THE MINING DISTRICTS OF THE WESTERN UNITED STATES

BY

JAMES M. HILL

WITH A

GEOLOGIC INTRODUCTION

BY

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THE MINING DISTRICTS OF THE WESTERN
UNITED STATES.

PART I. GEOLOGIC INTRODUCTION.

By WALDEMAR LINDGREN.

ORIGIN AND SCOPE OF THIS WORK.

The mining districts of the Western or Cordilleran States are numerous and scattered over wide areas. The first attempt to locate all of them on a single map was carried out by the writer in 1907, with the aid of Mr. J. M. Hill and the statisticians in charge of the offices of the Survey at Denver, Salt Lake City, and San Francisco (Messrs. Chester Naramore, V. C. Heikes, and C. G. Yale). This map of the Western States was included in the annual volume of Mineral Resources of the United States. The large area covered and the necessity of adding explanatory tables made this map cumbersome to handle. When a revision was decided upon in 1910 and assigned to Mr. J. M. Hill, it was found advisable to map the several States separately and publish the maps, with more extensive explanatory text, in the convenient form of a bulletin.

At the outset not a little difficulty was experienced in the definition of the mining districts and in deciding their proper names and extent. Mineral deposits rarely appear singly; on the contrary, a number of them usually cluster in certain localities. In general in the Western States, when such a mineralized area is discovered and locations have been made, a miners' meeting is called, regulations are adopted beyond the simple statutory laws of the Federal and State governments, the limits of the district are defined, and a name is given to it. For many districts these limits are uncertain and vague and can not always be ascertained, though the data are supposed to be on file with the county authorities. The name does not always correspond with that of the locality; for instance, the mining district
surrounding Butte, Mont., is called Summit Valley. At many places little attention has been given to these legal districts and the original area has by common consent been subdivided into several more or less definite subdistricts. The real reason for the adoption of mining districts is to have an easily accessible record of claims, for, as is well known, the Federal authorities keep no list of claims located, and this duty is relegated to the recorder of each district.

In California, except in the desert region, few well-defined mining districts exist, and each center of mining operations has been given a geographic name appropriate to the locality.

It is impossible, therefore, to apply the term "mining district" consistently, but in the present work wherever practicable the local designations and rules have been followed. A large mineralized area is designated as a mining region; for instance, the "San Juan region," embracing the mountainous area of southwestern Colorado. The mining region consists of a number of mining districts. These vary greatly in size, but such a representative unit would perhaps include from 12 to 36 square miles. Many districts are informally subdivided into smaller units, referred to as "camps," but as a rule the camps can not be shown owing to the small scale of the map.

**DISTRIBUTION OF MINING DISTRICTS.**

**IRREGULARITY.**

In order to show comprehensively the distribution of the districts they have been represented on a smaller-scale map of the Western States (fig. 1). The first impression is that of irregular distribution, a clustering at some places, a scattering at others, with certain areas almost devoid of mineral deposits. Except along the Pacific coast in California there is little evidence of any arrangement in regular zones or "belts."

The most easterly indications of the metallic wealth of the Cordillera are found in western Texas and Oklahoma, where copper ores are thinly scattered through certain "Permo-Carboniferous" sandstones. Slightly farther west rise small groups of mountains, sentinels in front of the Rocky Mountains, such as the Black Hills of South Dakota, the Little Rockies of Montana, or some of the short ranges of western Texas; these contain some ore deposits.

The most westerly districts lie in the Coast Range of California, which contains quicksilver ores, and along the beaches of Oregon and Washington, where the sands yield gold and platinum.

There are several notable "blanks" on the map where mining districts are almost absent. One of these occupies areas in Oregon and Washington. Another barren area embraces parts of Utah, Arizona, New Mexico, and Colorado.
GEOLOGIC INTRODUCTION.

DISTRIBUTION IN RELATION TO GEOLOGIC STRUCTURE.

As the deposits of metallic ores are the results of geologic processes, there is necessarily a close connection between the geologic structure and the mineralization of an area. On a map of the scale of figure 1, it is scarcely possible to bring out these relations clearly, especially where the structure is complicated. The first broad principle which holds for the Cordilleran region is that where the rocks lie horizontal and no disturbance has taken place ore deposits are rare, poor, or
absent. The last is of course true for alluvial areas like that of the Sacramento Valley in California. Few mining districts are found in the vast plateau province of southern and eastern Utah, western Colorado, northern Arizona, and western New Mexico, already referred to; this barren area also extends into western and central Wyoming. In this great province the sediments, ranging in age from Cambrian to Eocene, lie in horizontal position almost unbroken by mountain-building disturbances. An analogous condition exists in the enormous areas in the Northwest, in Oregon and Washington, with extensions into southern Idaho, Nevada, and California. Here flows of igneous rocks, mainly basalts of Tertiary to early Quaternary age, together with tuffs and lake beds, cover the country, and few traces of mineralization are found in them.

As a rule the deposits occur in mountain ranges, but here again it is necessary to draw a distinction, for many of the most conspicuous and highest ranges are almost void of metallic ores. Among well-known instances of this barrenness are the high Sierras of California, the Cascade Mountains of southwestern Washington, the Front Range of Colorado, the Bitterroot Range of Montana and Idaho, and finally the Wind River and Teton ranges of Wyoming. It is clear, then, that mere uplift, faulting, and crushing, and attendant circulation of atmospheric water are not sufficient to produce metal deposits. The ranges just enumerated consist either of enormous areas of mountainous intrusive rocks of post-Jurassic age, or of Tertiary lava flows and volcanoes, or of pre-Cambrian granite and gneiss.

Nor is it common to find rich deposits within ranges composed exclusively of folded and faulted sedimentary rocks. The most characteristic occurrence of important metal deposits is where intrusive masses of moderate size have broken through the sedimentary series; as a rule the sediments are of Paleozoic age and the intrusive rocks are granites, diorites, and monzonite of Cretaceous or Tertiary age. In all such deposits the metallization appears to have taken place shortly after the intrusion. The deposits may develop either in the sedimentary rock or in the igneous rock, and they have been laid bare by deep erosion of the rocks overlying them.

In another less common kind of deposit the ores are contained in lavas of Tertiary age and may be of great richness. The igneous rocks in this case are usually flows of andesite or rhyolite. These deposits occur in regions like Nevada, where there have been eruptions from many local vents and where the rocks have been extensively decomposed by solution and gases of volcanic origin. Many of these deposits have suffered little erosion since their formation, which followed closely the end of the epoch of eruptions.

There are many other kinds of deposits, but those mentioned are the sources of the largest part of the metallic production of the West.
FORM AND CONTENT.

The form of the deposits is manifold and depends on the spaces provided for their reception or on the manner in which they made place for themselves. Practically all of them were formed by deposition from water solutions, usually ascending hot water, and as the path of such waters commonly follows fissures the resulting deposits are in large part fissure veins. The walls of the fissures were soaked by the solutions and ores were deposited in them. Some rocks like limestone are peculiarly susceptible to chemical alteration, and where traversing such rocks the mineralizing solutions spread far and wide, causing the deposition of metallic ores. Such occurrences are called replacement deposits.

The ore minerals were in the first place sulphides of the baser metals, such as galena, pyrite, or zinc blende, or more rarely oxides such as magnetite. Gold alone has originally been deposited as native metal; more rarely it is combined with tellurium. Through the oxygen of surface waters the sulphides have usually been oxidized to various other compounds such as cerusite, hematite, and calamine; this so-called oxidized zone ordinarily reaches down to the permanent water level and in some places considerably below it. In regions of heavy precipitation the oxidized zone is thin. Where there is little rainfall the water level lies far below the surface. Within the Cordilleran region the water level is rarely more than a few hundred feet below the surface; in exceptional places such as Tintic, Utah, it may exceed 2,200 feet in depth.

The ores of the oxidized zone are, as a rule, richer than the underlying sulphides. Just below the oxidized belt secondary sulphides may be formed through concentration by descending surface waters and this part of the deposit is likely to be exceptionally rich. Such secondary sulphides are chalcocite or copper glance and various rich silver minerals. In many copper deposits, such as those at Ely, Nev., and Miami and Ray, Ariz., the only workable part of the deposits consists of a layer of this secondary copper glance. In silver veins no such sharp division between the two zones is found. Much of the richest ore mined near the surface in the Cordilleran region is the result of secondary enrichment by descending waters.

CLASSIFICATION OF DEPOSITS.

The first broad division that can be established among the mineral deposits of the West is between those of pre-Cambrian and post-Cambrian age. As a matter of fact the latter are almost wholly post-Jurassic and a large majority are post-Cretaceous.

PRE-CAMBRIAN DEPOSITS.

The ores of pre-Cambrian age were formed before the earliest Cambrian sediments were laid down in the Paleozoic seas which
covered a large part of the Cordilleran region. They had then been subjected to considerable erosion and therefore only the deep-seated deposits are now exposed. They are of many different kinds, but it is believed that they were mainly the result of after action of pre-Cambrian intrusions or were leached from old rocks by hot waters at considerable depth. The rocks in which they are contained are mainly granites, gneisses, and schists of various kinds; most commonly the ores are inclosed in amphibolite, diorite, or gabbro. The mere fact that ores occur in pre-Cambrian rocks is not enough to establish their age, for deposition could have been effected in these rocks during subsequent periods. They are in places directly overlain by Paleozoic sediments, and this of course constitutes a good proof of the age of the ore deposits. The pre-Cambrian rocks have usually participated in and been pressed by dynamometamorphic processes and are now schistose. This is another criterion, for except along the Pacific coast in California, Oregon, Washington, and western Nevada, there has been no regional metamorphism in the Cordilleran region since pre-Cambrian time. The association of the ore minerals with heavy silicates such as garnet and tourmaline is common in pre-Cambrian deposits, though such an association is also found in deposits formed during later epochs of metallization.

The pre-Cambrian deposits include segregations in igneous magmas, such as those of Iron Mountain, in Wyoming, but this type is rare. More common are irregular fissure veins and disseminations in schist. The metal contained is mainly copper in the form of chalcopyrite, with small amounts of gold and silver; lead deposits are of rare occurrence.

As the pre-Cambrian rocks are largely covered by younger sediments and igneous rocks, these ancient deposits are very irregularly distributed and do not form distinct belts or zones. They occur in South Dakota, Wyoming, Colorado, New Mexico, and Arizona; probably also in southwestern California. Compared to the later deposits they are on the whole poor.

**POST-CAMBRIAN DEPOSITS.**

The deposits formed later than the earliest Paleozoic sediments may be divided into two groups—(1) those contained in sedimentary rocks with no traceable connection with igneous rocks; (2) those occurring in igneous rocks, or in the sedimentary rocks surrounding them.

**DEPOSITS IN SEDIMENTARY ROCKS.**

The first group is much the smaller one. Aside from some poor and irregular deposits of copper and lead in limestone—for instance, in northeastern Utah and adjacent parts of Idaho—the origin of which is in doubt, this group consists of the widespread copper ores
in sandstone found in Oklahoma, Texas, New Mexico, Colorado, Arizona, Utah, and Idaho. The ores are disseminated in Jurassic, Triassic, or Carboniferous sandstones, and the most prominent ore mineral below the zone of oxidation consists of chalcocite. In western Colorado and eastern Utah these sandstones also contain vanadium and uranium minerals. Successful exploitation has been carried on at some places, but on the whole the deposits are poor. The metals sparsely disseminated as salts in the sedimentary rocks are believed to have been leached by surface waters. The concentration has probably proceeded since an active water circulation was established in these strata—that is, since the beginning of the Tertiary.

DEPOSITS CONNECTED WITH IGNEOUS ROCKS.

The large group of deposits connected with igneous rocks yields almost the whole of the Cordilleran production. Practically all the deposits are post-Jurassic, for in the Rocky Mountain region the Paleozoic and the larger part of the Mesozoic were eras of quiet sedimentation. Only along the Pacific coast, in the Sierra Nevada, do we find evidence of Paleozoic eruptions, which were mostly surface flows, and it is not impossible that a few ore deposits in that region may be found to be of Paleozoic age. During Triassic and Jurassic time eruptions of basic lava took place in California, Oregon, and western Nevada, and it is possible that they were closely followed by some metallization. The only definite evidence of this kind is from southeastern Oregon, where the Triassic or Jurassic basic flows east of Baker City, on Powder River, contain chalcocite and native copper in connection with zeolites, calcite, and epidote.

At the end of the Jurassic period or in the earliest part of the Cretaceous an era of igneous activity began in the Cordilleran region, which culminated in the middle of the Tertiary and continued in sporadic outbursts up to a comparatively recent time. Small eruptions are believed to have taken place near Lassen Peak, in northern California, within the last 200 years. Most of the ore deposits now worked in the Western States were formed within this era of volcanism.

Geologic evidence has shown that each epoch of eruptions was followed by a more or less intense mineralization, consisting in the development of ore minerals by the filling of fissures or by the replacement of the rocks themselves in or about the igneous rocks.

Volcanism manifests itself by the eruption of lavas at the surface and by the intrusion of magmas into deeper portions of the crust. The lavas, cooling quickly, usually consolidate as fine-grained porphyritic rocks, commonly containing more or less of a glassy base; the intrusive magmas, cooling slowly and under pressure, result in coarser-grained granular or porphyritic rocks without a glassy base. As the intrusions take place at a considerable depth, it is clear that
such masses and the ore deposits which may accompany them will not be exposed at the surface unless it happens that the region has been subjected to deep erosion. The eruption of lava flows at the surface is no doubt usually accompanied by intrusions underneath them, and there is likewise little doubt that the great masses of post-Jurassic intrusions were accompanied by now eroded lava flows. In the San Juan region of southwestern Colorado, at Tintic, Utah, and at some other places erosion has exposed the intrusive bodies below the earlier Tertiary lava flows.

The mineral deposits formed at considerable depth in and around intrusive masses differ both structurally and mineralogically from those formed near the surface, though it is possible, and in fact likely, that the latter may be the upper parts of a deeper body of mineralized rock and that they would be found to change their character if they could be followed to great depths. Therefore, though a distinction must be made between the two classes, there are intermediate forms and probably no radical genetic difference.

The oldest intrusions are the great early Cretaceous granitic batholiths of the Sierra Nevada, extending northward into British Columbia and Alaska. Less extensive intrusive masses of the same age are found in Oregon, Nevada, and Arizona, but on the whole toward the east such masses are less conspicuous and smaller and date from a later time. Most of the relatively small granitic and monzonitic stocks of Colorado and New Mexico are probably of latest Cretaceous or earliest Tertiary age. After they had been exposed by erosion, the middle Tertiary lavas in many places covered their outcrops.

The volcanic flows which cover large areas in the Western States are generally of Tertiary age, ranging from Eocene to latest Pliocene, though the latter are mainly nonproductive basalts. The productive areas are mostly in Eocene or Miocene flows of andesite or rhyolite. Late Cretaceous lavas occur in Montana and Colorado, but so far as known they contain few mineral deposits. Although mineralization, more or less intense, is the rule in the vicinity of intrusive bodies, especially those of moderate or small size, it is rather exceptional in the lava flows and enormous areas of them show no trace of metallic ores.

From the relations explained above it follows that the deposits in or near intrusive bodies are apt to be of greater age than those in the more recent lava flows; on the whole their age ranges from the earliest Cretaceous to the earliest Tertiary. Among the occurrences are the gold-quartz veins of the Sierra Nevada and Oregon and many similar deposits in Nevada; the gold, silver, and base-metal deposits extending from Leadville to Boulder, in Colorado, and the similar deposits in the great batholiths of central Idaho and western Montana and at
many places in Arizona, for instance near Kingman and Prescott; and the copper deposits of Clifton, Globe, and Bisbee, in Arizona; of Ely, in Nevada; and of Bingham, in Utah. The deposits may take the form of contact-metamorphic bodies, which usually carry copper and zinc, more rarely lead; or replacement deposits of lead ores some distance away from the intrusive contacts; or normal veins and shear zones with simple sulphides of the base metals, carrying more or less gold and silver; or of native gold or irregular disseminations of sulphides in altered igneous rocks. Very commonly all these modifications occur in the same district and form what has been termed a metallic aureole around the intrusive rock. Structurally the veins are likely to be clear cut and well defined, with regular strike and dip. The filling is massive and drusy structure is less common than in the veins formed near the surface, the principal gangue mineral being a milky quartz.

The deposits formed near the surface and usually appearing in volcanic flow rocks are almost exclusively veins or disseminations; most of the productive occurrences are typical veins. As the rocks are more extensively shattered near the surface than at greater depths, many wide areas of volcanic rock are deeply altered by ore-bearing solutions and transformed into quartzose, sericitic, or kaolinitic masses or less completely altered to greenish "propylite" by the development of chlorite and pyrite. The gangue of many deposits contains calcite, barite, and fluorite in addition to the common usually fine-grained and locally chalcedonic quartz. The structure of the veins is likely to be irregular, brecciated, and drusy. These veins, many of which are exceedingly rich, carry mainly native gold in fine distribution, rarely coarse, often alloyed with much silver; also argentite and various silver antimonites and arsenites.

Base metals are ordinarily not abundant in the deposits formed near the surface. These deposits occur in Nevada, Washington, Idaho, Colorado, New Mexico, Utah, and Arizona, but Nevada contains more of them than any other State. As examples may be cited, in Nevada the Comstock, Tonopah, Bullfrog, Tuscarora, Rawhide, Fairview, and National veins, as well as the more irregular deposits of Goldfield; in Washington, the Monte Cristo and Republic veins; in Idaho, the Custer and Silver City veins; in Colorado, the Cripple Creek and Silver Cliff veins; in New Mexico, the Mogollon veins; in Arizona, the veins of the Black Range, near Colorado River; and in Utah, the veins of the Mount Baldy district, near Richfield and Marysvale. The veins of the San Juan region in Colorado are found in a deeply dissected volcanic dome or plateau and some of the types here occurring are unusually rich in lead, copper, and zinc.
MINING DISTRICTS OF WESTERN UNITED STATES.

LOCAL GEOLOGY OF WESTERN ORE DEPOSITS.

ARIZONA.

The valuable ore deposits of Arizona are confined mainly to the southwestern part of the State. The portion which lies northeast of a line drawn from a point a little north of Clifton to Peach Springs and thence in the same direction to the Nevada line is covered by the horizontal beds of the plateau province or by lavas and contains only a few and unimportant copper deposits in sedimentary rocks. Wherever, as in parts of the canyon of Colorado River, the pre-Cambrian crystalline rocks are exposed, mineral deposits may be found, though the prospects thus far uncovered do not indicate strong metallization.

The southwestern and larger part of the State is characterized by ore deposits of great variety and abundance, scattered irregularly through detached ranges rising above desert plains. No mineral belts of great persistence and length can be traced.

The ranges of Arizona are of manifold structure and composition. In the eastern half of the mineral-bearing area there is as a rule a succession of several thousand feet of Paleozoic rocks ranging from Cambrian to Carboniferous, which rest on a pre-Cambrian basement that is in many places exposed. In the extreme southeast Cretaceous rocks are also present, though rarely mineralized. Toward the west the exposures of pre-Cambrian schist increase in area and a large number of ranges west of the one hundred and twelfth meridian are wholly built up of such rocks, locally intruded by monzonites or covered by Tertiary lavas.

The geologic section of the Paleozoic and Mesozoic rocks varies considerably in different parts of the State. At Bisbee, in the southeast corner, the Cambrian consists of 430 feet of quartzite overlain by 770 feet of limestone. The Carboniferous includes both Mississippian limestone 700 feet thick and heavy beds of Pennsylvanian limestone, of which 3,000 feet are exposed. The Cretaceous (Comanche) formations aggregate 4,500 feet in thickness. Farther north, near Clifton, the total thickness of the Paleozoic and later rocks is very much less.

Pre-Cambrian deposits of several types containing copper, gold, and silver are found in the districts adjoining Colorado River, near Parker, which is south of Williams Fork, and probably at other places farther south, in the little-explored country in Yuma County. They also appear in the crystalline schists of Yavapai County, and it has been suggested that the great copper deposit of the United Verde mine at Jerome, which is contained in amphibolitic schists, also belongs to this class. Deposits connected with granular intru-

sive rocks of Mesozoic or early Tertiary age are abundant in all parts of the region and consist of veins, contact-metamorphic deposits, and replacement deposits in limestone away from the immediate vicinity of igneous rocks.

Contact-metamorphic deposits in zones of garnet and other silicates adjoining intrusive rocks are particularly abundant, and as excellent examples may be mentioned those of the Clifton, Bisbee, Saddle Mountain, Twin Buttes, Silver Bell, and Washington districts. The gold-bearing veins of Yavapai County are probably of Mesozoic age and appear around smaller monzonite intrusions in pre-Cambrian schists. The veins near Kingman are likewise associated with intrusions of porphyry in pre-Cambrian schist. Copper, gold, silver, lead, and zinc are the principal metals found in the veins of these classes, but tungsten and molybdenum also occur. Chalcocite blanket deposits, due to concentration of lean primary disseminations by descending surface waters, connected with the same epochs of mineralization are mined at Clifton, Ray, and Globe, and prospected at a number of other places.

The deposits of the late Tertiary epoch are generally veins and are contained in rhyolitic and andesitic lavas; they are widely scattered, the most prominent examples being those of the Black Range, along Colorado River north of Needles, where the noted Gold Road mine is situated. Similar veins occur in the Kofa district, Yuma County; in the Mammoth district, Pinal County; and at some places in the Santa Rita Range, Santa Cruz County. The well-known Commonwealth mine, in the Pearce district, Cochise County, also belongs to the same class. These veins generally carry gold and silver, but in places also copper, lead, and molybdenum. Placers are known principally in regions of metallic aureoles around intrusions of granular rocks, but they can rarely be worked, on account of the scarcity of water; dry washing is often resorted to on a small scale. Among the best-known placer regions are those of Yuma and La Paz, along Colorado River; Red Hill, in Yavapai County; Quijotoa and Greaterville, in Pima County; and Dos Cabezas, in Cochise County.

After this general review the individual ranges and their mineralization may be briefly mentioned.

The southeastern mountains, including the Peloncillo, Chiricahua, and Pinaleno ranges, are not rich in valuable deposits, though mineralized at several points, notably at Dos Cabezas and Paradise. The well-known copper deposits of the Clifton-Morenci district are situated near the New Mexico line, near the southern boundary of the plateau province, but in no distinct structural range.

Next to the west, in Cochise and Graham counties, follow from south to north the Mule Pass and Dragoon ranges, both strongly mineralized and containing many types of deposits, most prominent
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among which are the contact-metamorphic copper deposits of Bisbee (Warren district) and the gold-silver-lead replacement deposits of Tombstone. The Dragoon Range and its foothills have gold-silver deposits in lavas at Pearce and contact-metamorphic and replacement deposits at Dragoon, Turquoise, and Courtland. To the north-northwest these ranges are continued by the Galiuro Mountains, which contain copper deposits at Copper Creek and undeveloped gold deposits in rhyolite. Still farther to the north-northwest, in Gila County and adjoining parts of Pinal County, are the veins and blanket deposits of copper ores at Globe, in a region of general uplift in which the range structure is less well defined. At short distances west and south of Globe are a number of contact-metamorphic copper deposits, among which the Saddle Mountain is the most prominent; also the chalcocite blankets of Ray and the now worked-out silver mine of Silver King.

The next tier of mountains begins at the Mexican line with the Huachuca and Canelo ranges, neither of which contains important mines. Just west of the Canelo lie the Patagonia and Santa Rita ranges, both of which are strongly mineralized and show deposits of many kinds. Contact-metamorphic copper deposits are found at Washington and Helvetia, here and there accompanied by chalcocite deposits. Silver deposits in andesite occur in the Harshaw district and mixed ores in rhyolite in the same vicinity; lead ores occur as replacements of limestone at the Mowry mines.

North of the Santa Rita extends the rugged Santa Catalina Range, with few valuable deposits; at its northern foot, in the San Pedro Valley, lies the Mammoth district, with gold-molybdenum ores in rhyolite.

West of Tucson and Santa Cruz River, in Pima, Pinal, Maricopa, and Yuma counties; the desert plains become more prominent. Numerous short ranges rise above the plains and are flanked by sloping alluvial fans. The region is extremely arid. Some of these ranges, especially those toward the west, contain only pre-Cambrian rocks. Others are built up of Paleozoic folded and faulted sediments with intrusive Mesozoic granitic rocks. Still others are composed mainly of Tertiary flow rocks. Among the more prominent deposits in Pima County may be mentioned the contact-metamorphic copper deposits of Twin Buttes and Silver Bell and the gold-bearing veins of Quijotoa, said to occur in Tertiary lavas. In the extreme western part of the county are the little-known districts of Ajo, Growler, and Gunsight, in which copper ores are said to occur in contact-metamorphic deposits.

In Yuma County there are also a considerable number of low desert ranges containing some mining districts. The gold-bearing vein of the Fortuna district, said to be in gneissoid rock, is southeast of
Yuma; the lead ores of Castle Dome are in a detached range northeast of Yuma. Farther away in the same direction are the gold-silver mines of Kofa, which are worked on vein deposits in Tertiary lava flows.

In the northern part of Yuma County the ranges are mainly of pre-Cambrian crystalline rocks. In the Harcuvar and Harquahala ranges intrusions of probably Mesozoic granite have caused considerable mineralization and the development of gold-bearing quartz veins, the best known district being that of Harquahala. A little farther east, in Maricopa County, also in a small desert range, lies the well-known gold deposit of the Vulture mine.

In the central portion of the State, in Yavapai County, rise a group of mountains, the most prominent of which are known as the Bradshaw Range. In this region cluster a great number of deposits of gold, silver, and copper. Among the gold mines the Congress is the best known, and the copper deposit of the United Verde is situated in the same region.

The mining districts in Mohave County comprise those of the Cerbat, Black, and Hualpai ranges, all of which trend north and south. The Black Range is continued north of Colorado River for some distance into Nevada. The Cerbat ores are mainly base metals associated with lead, zinc, and copper and differ greatly from the more recent gold veins of the Black Range, which outcrop in Tertiary lavas.

CALIFORNIA.

The dependence of mineral belts on geologic structure is particularly well marked in California.

Along the Pacific coast, from the vicinity of Santa Barbara to Humboldt County, rise the Coast Ranges, most recent of the great structural features of the State. They are largely built up of folded and crushed Cretaceous, Jurassic, and Tertiary sediments, in places broken through by andesite and basalt, and an older series of diabasic and serpentinoid rocks. The Coast Ranges are singularly poor in deposits of the ordinary metals, but a persistent belt of quicksilver ores follows them throughout and reaches its greatest development just north and south of San Francisco Bay. The quicksilver deposits are of late Tertiary or Quaternary age and seem to have been formed shortly after the eruption of basalt and andesite. The ores were formed near the surface and in all probability by hot ascending springs, of which the Coast Range contains a great number. The gangue usually contains much opal. Among the best-known districts are those of the Clear Lake region and those of New Almaden and New Idria, in Santa Clara and San Benito counties.

To the east of the central valleys and separating them from the Great Basin lies the long and imposing mountain block of the Sierra
Nevada. Geologically it consists of clayey and sandy sediments, ranging from earlier Paleozoic to later Jurassic in age, closely folded and forming a belt along the western part that greatly increases in width toward the north. In early Cretaceous time these sediments were intruded by enormous masses of granitic rocks, mainly granodiorite, which since the late Cretaceous and Tertiary movements along the eastern border of the range form a zone that is of moderate extent in the northern part, but widens toward the south until in Tulare and Kern counties the intrusive rocks form nearly the whole range.

The gold belt of California, a succession of deposits of unusual persistence, begins as a narrow fringe, along the foot of the Sierra Nevada in Tulare and Kern counties, but widens greatly toward the north, and in Butte and Plumas counties is over 60 miles broad. Along this belt are located a great number of well-known mining districts. In the southern counties from Eldorado to Mariposa it contains the numerous and strong veins of the Mother Lode region, on which a number of well-known mines are being worked. The Kennedy, with a depth of 3,600 feet, is the deepest mine in California. Farther north, in Nevada County, the celebrated Nevada City and Grass Valley districts are situated within this belt. Placer deposits abound throughout the gold belt, having accumulated along the present rivers and in the far older Tertiary gravels now exposed as erosion remnants high up above the canyons; in part the Tertiary gravels are covered by andesite and rhyolite, likewise of Tertiary age but without evidence of mineralization. The Tertiary gravels are still mined at many places by hydraulic or drifting methods. The Quaternary gravels at the foot of the range are now mined extensively by dredging at Oroville, Marysville, Folsom, and several points in Calaveras County.

The primary gold deposits, as distinguished from the secondary placers derived from their destruction by erosion, are for the most part quartz veins containing free gold. They were formed shortly after the intrusion of smaller masses of granite, granodiorite, gabbro, and peridotite into the sedimentary series, probably in early Cretaceous time.

The parts of the veins now exposed give evidence of having been deposited at considerable depth. Many thousand feet of overlying rock masses, together with the former outcrops of the veins, have been removed by erosion. Toward the north, in Tehama, northern Plumas, and Lassen counties, the gold belt is covered by a broad tongue of Tertiary volcanic rocks. Equally abruptly it emerges from this mantle above Redding and continues northward to the Oregon line, its width being from 50 to 60 miles. In this area, comprising parts of Shasta, Trinity, and Siskiyou counties and generally
known as the Klamath Mountains, gold-bearing veins and placers are widely distributed. The placers have been the more productive. The richest veins occur in the Coffee Creek region. Hydraulic mining is still actively pursued along Klamath River and in the older Tertiary gravels. The deposits and their geologic conditions are similar to those of the Sierra Nevada.

Toward the south end of the State gold-quartz veins, probably of about the same age as those of central California, appear in San Diego, Riverside, and Los Angeles counties, in the mountains which form the continuation of the Sierra of Lower California. Except in San Diego, where the formerly productive Banner and Julian districts are located, the output from these deposits has been small. The veins occur in or near masses of metamorphic schist, which lie embedded in granitic rock.

A less well-defined belt of copper-bearing deposits follows the foothills of the Sierra Nevada and continues toward the north-northwest into the Klamath Mountains. Deposits of economic value have been found in Calaveras County at Copperopolis and Campo Seco; in Placer County at Dairy Farm; in Nevada County at Spenceville; and at several other places. At present the most important copper mines are those at Keswick and Bully Hill, in Shasta County. Copper deposits are also found in the northern part of Siskiyou County, near the Oregon line. The copper deposits as a rule occur in connection with igneous rocks, including both basic rocks like the diabase porphyries and Mesozoic andesites of the Sierra Nevada and acidic rocks like the alaskite porphyry of Shasta County. In places they also occur in genetic connection with peridotite and gabbro. They appear to have been formed a little earlier than the gold-bearing quartz veins in late Jurassic or earliest Cretaceous time, at considerable depths below the surface. Some of the smaller copper deposits, however, probably resulted from concentration by deep water from the surrounding rocks. All these deposits carry chalcopyrite with pyrite; only exceptionally is chalcocite present.

That part of California which lies to the east of the Sierra Nevada and the Peninsular Range is very different from the rest of the State. It is an arid region with detached ranges, generally trending northward; geologically it belongs to the Great Basin region of Nevada and the desert province of Arizona. The map shows that the irregular and scattered distribution of the mining districts in this area is similar to that of the region mentioned. In many localities the geologic structure is as yet unknown. In general, the deposits may be grouped into those of pre-Cambrian age, those connected with granitic intrusions of late Mesozoic age, and lastly, those of late Tertiary age, which usually occur in surface lava flows. The few pre-Cambrian deposits are probably limited to the vicinity of the Arizona
boundary line and contain mainly copper ores and gold ores. The
gold mines at Hedges, near Yuma, Ariz., probably belong in this class,
as do those of Whipple Mountain, in San Bernardino County. The
Mesozoic deposits are widely distributed from Mono County south­
ward and appear as aureoles around smaller intrusions of grano­
diorite. They are in large part gold-bearing quartz veins, exempli­
fied by the deposits at Randsburg, in Kern County. A number of
small districts in the desert range of San Bernardino and Riverside
counties contain gold and quartz veins in granitic country rock.

A smaller number of deposits are replacements of limestone by
galena, as at Tecopa, Cerro Gordo, and Panamint, in Inyo County.
Still fewer are the contact-metamorphic deposits, of which examples
may be found in the copper-bearing garnet zones of Ubehebe, in
Inyo County, and the Standard mine at Cima, in San Bernardino
County. In the western part of California contact-metamorphic
deposits are very rare, though a few unimportant examples are
found in the Sierra Nevada and the Peninsular Range. In the
northern part of the State, in Shasta County, important contact­
metamorphic deposits carrying magnetite occur between limestone
and granitic rocks north of Pit River, and similar deposits carrying
copper have been discovered on the same contact south of the river.

More characteristic of the eastern region are the deposits—generally
quartz veins—in Tertiary rhyolite and andesite. Isolated examples
are found along the eastern boundary of the State, as at Hayden
Hill in Lassen County, in Alpine County, at Bodie and several other
places in Mono County, in Inyo County, and in San Bernardino
County. They usually carry both gold and silver, but in places (as
at Calico) also silver alone. Several deposits of this kind are found
near Mohave, in San Bernardino County.

The iron deposits of California are scattered from the southern to
the northern part of the State. Few of them are of present economic
importance. Most of them carry magnetite and were formed at the
contacts or elsewhere shortly after the intrusion of deep-seated
igneous rocks. The contact-metamorphic deposit of Herault, in
Shasta County, has already been mentioned. Other magnetite
deposits in granite occur at Dale, San Bernardino County, and in the
Eagle Mountains, Riverside County, both connected with granitic
intrusions. Another iron deposit is found at the Minarets, in the
western part of Madera County.

Manganese deposits of minor importance as well as prospects of
chromite are found at several places in the Coast Range. The chro­
mite is contained in serpentine country rock.

Deposits of rare metals are not abundant in California. Platinum
occurs in the gold-bearing gravels of northern California and in the
Sierra Nevada, and a small quantity is saved each year. Deposits
of scheelite are worked near Randsburg, Kern County.
COLORADO.

The ore deposits of Colorado are confined to the western or mountainous half of the State, but within this area they are not by any means uniformly distributed. Parts of the area near the western and northwestern borders belong to the plateau province of little-disturbed rocks. These contain only a special class of copper and rare-metal deposits. The southeastern part of the mountainous area is also poorly mineralized. The important deposits are confined largely to a diagonal belt trending northeast and southwest, beginning in Boulder County and ending in the San Juan Mountains.

The mines of Colorado yield principally gold, silver, lead, and zinc. There are few distinctly copper districts and none of great importance. With some exceptions, like those of Cripple Creek, which are almost exclusively gold bearing, the ores of Colorado are of complex nature and in many places they contain all five of the metals mentioned.

The rugged Front Range, composed mainly of pre-Cambrian rocks, extends from the Wyoming line to the Sangre de Cristo Range, at the New Mexico boundary. On the whole, it is very poor in ore deposits.

West of the Front Range lies a wide belt of uplifts of complicated structure, trending mainly northeastward, in which the basal pre-Cambrian is exposed at many places but elsewhere covered by a folded and faulted sedimentary series consisting of Paleozoic and Mesozoic beds of great thickness. As exemplified at Aspen, the sedimentary rocks consist of relatively thin formations of Cambrian, Ordovician, and Devonian age and several thousand feet of Carboniferous beds, in part sandy. The upper and thicker part of the Carboniferous is of dark-red color and may be considered as part of the "Red Beds." Above this lie 2,000 feet of Triassic "Red Beds" and the section is capped by Cretaceous sandstones and shales, which are said to reach a thickness of 3,500 feet at Breckenridge. At Leadville the basal formation is the Cambrian quartzite, 200 feet thick. This is overlain by the Silurian white limestone, 100 feet thick, covered by 50 feet of the "Parting" quartzite of Devonian age. Above this comes about 4,000 feet of Carboniferous rocks, divided into the Leadville or "Blue" limestone, 400 feet thick, the "Weber shales and grit," 2,500 feet thick, and 1,000 to 1,500 feet of the limestone and red beds of the "Upper Coal Measures."

With these sediments are interbedded sheets and dikes of monzonite porphyries of many kinds, and these intrusive rocks as a rule indicate the presence of mineral deposits.

The southwestern part of the State, known as the San Juan region, is marked by a large area of Tertiary (in part early Tertiary) volcanic flows of rhyolite and andesite. Intruded in this series are smaller masses of monzonite porphyries, and surrounding it in slightly upturned position is a thick mass of sediments, including a thin body of
Devonian rocks, about 4,000 feet of sandstone and limestone of Carboniferous age, including the lower part of the "Red Beds," about 1,000 feet of Jurassic and Triassic "Red Beds," and 1,500 feet or more of Cretaceous formations.

The northeast corner of the State is covered by flat-lying Eocene beds except where the east end of the Uinta uplift has brought older rocks to view.

As in other States, the deposits may be conveniently divided into those of pre-Cambrian and those of post-Cambrian age. The latter are by far the more important.

The pre-Cambrian ores occur, of course, only in the rocks of the same age, but such occurrence alone is not a sufficient criterion for determining the age of the deposits. Near the northern boundary line and extending into Wyoming are a number of low-grade copper deposits—for instance, those of Pearl, in Larimer County—which, on good grounds, are held to be of this early age. Little production has thus far been obtained from these deposits. They are in part veins, in part irregular masses of pyrite and chalcopyrite, usually connected with intrusions of diorite or gabbro. Considerably farther south, in Jefferson, Fremont, and Chaffee counties, are several copper deposits, also in close connection with basic igneous rocks to which a similar age has been attributed. The most prominent among these deposits is that of the Sedalia mine, which also yields zinc ore. A considerable number of small deposits of copper ore in the Front Range and the Sangre de Cristo Range probably belong in the same class.

As elsewhere in the Western States, there was a long interval between the pre-Cambrian and the later epochs of metallization, which may be assumed to begin with the close of the Cretaceous or the beginning of the Tertiary. The division between the earlier Tertiary mineralization which followed the intrusion of monzonite porphyries and the later development of deposits in surface lava is less strongly marked in Colorado than elsewhere.

The principal mineral belt, extending from Boulder to Leadville and Gunnison, appears to be of earliest Tertiary age and its ores occur in a great variety of rocks from pre-Cambrian to Cretaceous, constantly associated with intrusive dikes, sheets, and masses. Most of the deposits bear clearly the stamp of having been formed at considerable depths below the surface. None of the deposits occur in surface flows.

Beginning from the northeast, we have, first, the gold and silver bearing quartz veins in the pre-Cambrian rocks of Boulder, Gilpin, and Clear Creek counties. Associated with them and of about the same age are the tungsten veins of Boulder County, which yield the larger part of the tungsten ores produced in this country. There is little free gold, the precious metals occurring mainly in pyritic ores,
GEOLOGIC INTRODUCTION.

Galena, or zinc blende. The veins are accompanied by a system of porphyry dikes. Beyond the Divide are the veins of Breckenridge, in Cretaceous rocks, accompanied by sheets of monzonite porphyry. A number of smaller districts connect with the great deposits of Leadville, in which complex pyritic ores replace limestone and carry silver, gold, lead, zinc, and copper. The intrusives have here taken the form of thick sheets forced into the Paleozoic sediments. The Red Cliff and Tenmile districts are also characterized by replacement ores, as is Aspen, west of Leadville. At Aspen the silver-lead-zinc ores follow a network of fault fissures in limestone and are not so intimately connected with intrusive rocks; it is probable that the mineralization here is of more recent date than elsewhere.

To the southwest of Leadville, in Gunnison and Chaffee counties, lie a considerable number of less important districts exhibiting considerable variety in structure and mineralogy. A short barren stretch separates the Gunnison region from the San Juan region and is occupied mainly by surface lavas and tuffs originating in the volcanic center of the San Juan Mountains.

The San Juan region is rich in ore deposits, which carry mainly gold and silver, but also to some extent lead, copper, and zinc. The ore deposits are typically fissure veins which have a northeast or northwest trend. At Telluride and Ouray these quartz veins carry gold and some silver. At Silverton and in the Rico Mountains base metals are also present in abundance. The veins cut most of the volcanic flows of the region as well as the still later intrusive monzonites and in places the sedimentary and pre-Cambrian rocks. Toward the eastern border of the region is the Lake City district and, still farther east, the Creede district, the quartz veins of which cut rhyolite and carry gold, silver, lead, and zinc.

The veins of San Juan County bear the marks of having been formed relatively near to the surface, but, as is natural from the great depth to which erosion has exposed the lower rocks, some of them present features characteristic of deposition under conditions of higher temperature and pressure.

Practically no contact-metamorphic deposits of economic importance exist in Colorado. The ores of Leadville recall this type in some ways, but lack the characteristic contact minerals.

Outside of the main mineral belt are the districts of Cripple Creek and Silver Cliff, both situated in the Front Range south of Denver. The ores of these districts were deposited relatively near the surface of old volcanic centers. At Cripple Creek, well known as one of the principal gold-producing districts of the United States, gold tellurides occur in veins in a dissected volcano, which, in late Tertiary times, emitted phonolitic lavas. At Silver Cliff the silver ores occur in andesite and rhyolite, in part cementing breccia-filled pipes in the
volcanic rock. The age of this mineralization is thought to be Eocene.

In many of the gold districts mentioned detrital or placer deposits are found in the valleys below the outcrops of the ore bodies. The richest parts of these placers were washed out many years ago, but they still yield some gold by modern processes of dredging and hydraulic work.

There are few placer deposits in the San Juan region and at Cripple Creek. Most of them are in the main northeast-southwest-belt from Boulder to Leadville and the most important now worked are situated at Breckenridge. Some gold is also mined from the Recent and Tertiary gravels of Routt County.

Colorado is poor in iron deposits. A few small magnetite deposits occur in Gunnison County, generally at the contact of sedimentary rocks and granite. The oxidized ores of Leadville in part are rich in iron and manganese and are utilized as flux and in the manufacture of spiegeleisen, an alloy of iron and manganese.

It remains to mention an entirely different class of deposits, carrying copper, vanadium, and uranium. The ores occur disseminated in sedimentary beds, mainly in the "Red Beds" of southwestern and central Colorado, and were probably formed by concentration by means of meteoric waters from small quantities of the metals disseminated through the beds. Vanadium and uranium bearing sandstones of Jurassic age are mined in San Miguel and Montrose counties and also occur in Routt County. In places copper occurs together with the metals mentioned, and chalcocite ores have been found disseminated in the conglomerates, sandstones, and carbonaceous shales of Red Gulch, in Fremont County. They are also reported from Huerfano County, in the south-central part of the State. The tungsten-bearing veins of Nederland, in Boulder County, have already been mentioned.

IDAHO.

Ore deposits are irregularly distributed in Idaho. The extreme southern and eastern parts of the State are almost barren. The mining districts are most abundantly clustered in a region extending from the vicinity of Boise in a northeasterly direction to Lemhi County and the Salmon River valley. The most important output is that of lead and silver from the Cœur d'Alene district, in the northern part of the State. Gold and silver are derived from the belt mentioned and from veins in Owyhee County, in the southwest corner of the State.

The most prominent geologic feature is the great central mountain mass bordering Montana and continued on the north by the Clearwater and Cœur d'Alene Mountains. The eastern part of this
mountain mass consists of pre-Cambrian and Paleozoic strata, the extreme western part of Triassic sediments. Between these two areas lies a great intrusive mass of granitic rocks, principally quartz monzonite, continued on the north and east by smaller intrusive areas. The northern or panhandle part of the State is mainly built up of the steeply inclined sedimentary strata of a thick pre-Cambrian complex known as the Belt series. The southern and southwestern parts of the State are covered by thick volcanic flows of Tertiary age and this area connects on the east with the lavas of the Yellowstone Park region and Utah. Toward the Nevada line rise a number of short ranges of the type of the Basin Ranges of that State, and the extreme southeastern part of Idaho is occupied by north-south ranges built up of folded and faulted Paleozoic and Mesozoic rocks which may be considered as a northward extension of the Wasatch Mountain system.

Pre-Cambrian deposits are not present in Idaho, except possibly in some of the less important districts in the northern part of the State, where mineralization seems to have accompanied the intrusion of diabase sills in the Belt series. Here as elsewhere two important kinds of deposits may be recognized—those which were formed shortly after the intrusion of the great central batholith of Jurassic rocks, probably in late Cretaceous time, and those of late Tertiary age which developed after the outburst of the Tertiary lavas in the southern and central parts of the State. The latter are confined to the gold and silver veins of Owyhee County and to a belt of lavas in the central part of the State, including such deposits as the Custer, in Custer County; the Singiser veins, in Lemhi County; and the Thunder Mountain deposits, in Idaho County.

A few unimportant deposits of copper and lead ores of uncertain age occur in the Paleozoic limestones of the ranges in the extreme southeast corner of the State.

The upper parts of the late Cretaceous ore deposits have to a considerable extent been removed by erosion and the parts now exposed contain ores formed at considerable depths. They are mainly fissure veins, but in places, as in southern Lemhi County and at the Wood River (Hailey) district, these merge into replacement deposits of galena in limestone. Contact-metamorphic deposits containing copper ores are developed on a rather extensive scale at Seven Devils, near the Oregon boundary line, and at White Knob, in the southeastern part of Custer County, but neither place has proved a large or steady producer.

The veins are contained in a great number of districts situated in and around the borders of the central granitic mass. Most of them carry gold and silver in a quartz gangue with abundant sulphides. Among the best-known districts are those of the Idaho Basin and
the vicinity of Boise, adjoined on the east by the Sawtooth, Atlanta, and Rocky Bar districts. To the northeast are a number of minor districts in Lemhi County. To the north are those of Warren, Florence, Buffalo Hump, Dixie, Elk City, and Pierce. Still farther north, surrounding a smaller granitic intrusive mass, cluster the lead-silver veins of the Coeur d'Alene district. The late Cretaceous gold-bearing veins have usually yielded placer deposits of importance, many of which are still producing. The placer districts of greatest present importance are in the Idaho Basin, along the eastern boundary of Lemhi County, and at Pierce. The now largely exhausted placers of Warren, Florence, Elk City, and the Coeur d'Alene region should also be mentioned. The fine gold occurring in the sands of Snake River has been described frequently, but the actual production from these deposits is very small. Placers of diminishing importance are situated along Salmon and Boise rivers.

Among the Tertiary veins those near Silver City and De Lamar, in Owyhee County, have been and are still important producers. These veins cut through early Tertiary rhyolites and basalt and bear clear evidence of having been formed within short distances of the present surface.

Less well known are the veins at Custer and also those of a few districts like Singiser, in Lemhi County, which occur under similar conditions. Low-grade gold ores have been mined at Thunder Mountain, in Idaho County, and are said to form disseminations in rhyolitic tuffs. The Tertiary veins carry gold and silver with a very small amount of sulphides and no important amounts of the base metals.

Idaho contains few deposits of iron ore and none of them are mined at present. Iron Mountain, in Washington County, near Snake River, is the principal locality. No rare-metal deposits of importance occur in Idaho.

MONTANA.

The ore deposits of Montana occur in the western or mountainous half of the State. Though a few are contained in the detached front ranges, the major part are situated in a cluster in the southwestern part of the State, practically within the area included by Helena, Dillon, Missoula, and Virginia City. A few are situated north of the Yellowstone Park, and some others near the north end of the boundary line between Idaho and Montana, but the northern part of the Rocky Mountain area, though traversed by several high ranges, such as the Main Range and the Mission Range, is singularly barren of mineral deposits.

The great copper production of the Butte mines (Summit Valley district) overshadows all the rest of Montana's metallic output, but
the State also produces annually several million dollars in gold and much silver and lead.

The geologic structure is complicated. The eastern part of the Rocky Mountain region shows a succession of dome-shaped uplifts in which the Mesozoic and Paleozoic rocks are successively exposed; the central core consists of igneous rocks or the pre-Cambrian complex. Of such character are the Bighorn, Little and Big Belt, Moccasin, Judith, Little Rocky, and Bearpaw mountains. The main mass of mountains west of Helena and Livingston consists of similar systems of faulted and interlocking uplifts which expose a great thickness of sedimentary rocks. As measured near Philipsburg, the sedimentary rocks consist of a great thickness of the Algonkian (pre-Cambrian) Belt series, amounting to about 13,000 feet of slates, limestones, and quartzite, then 1,200 feet of Cambrian, 300 feet of Silurian, 1,000 feet of Devonian, 1,200 feet of Mississippian, 700 feet of Pennsylvanian, 400 feet of Jurassic, and about 2,000 feet of Cretaceous rocks. In this western province, which seems to have suffered more erosion than the area farther east, a number of batholiths, or great masses of granite rocks, have been intruded. They are mainly quartz monzonites of late Cretaceous or earliest Tertiary age, and the largest of them extends from Helena for about 70 miles in a south-southwest direction to Butte and Dillon. Several smaller intrusive masses surround this large body. Extensive eruptions of andesite lavas preceded the main epoch of intrusion.

The thick Belt series, which begins in the latitude of Butte, occupies a large part of the northern mountains of Montana, but it is as a rule poor in mineral deposits and contains few intrusive bodies.

The ore deposits of Montana mainly cluster in and around the great intrusive bodies in the southwestern part of the State. They were evidently formed shortly after the intrusive activity, at considerable depths below the surface, and their upper parts have been removed by erosion.

Few pre-Cambrian deposits have been observed in Montana, and the probable occurrences seem to be limited to copper ores associated with intrusive sills in the Belt series on the east side of Missouri River.

Important deposits of late Tertiary age in flows of lavas are also scarce, though some veins occur in rhyolite between Helena and Butte. Some veins in the early Tertiary andesites southeast of Helena are probably genetically connected with the monzonite intrusions mentioned above as occurring in this region. Near Helena, Boulder, and Radersburg there is some indication that hot-spring activity and ore deposition have continued until a late geologic period, but definite information on the subject has not yet been published.
The deposits connected with intrusive bodies assume a great variety of form and content. Contact-metamorphic deposits are rare, but are known in the Elkhorn, Bannack, Argenta, Bear Gulch, Highland, and Philipsburg districts; the Cable gold mine, which has been a large producer, is located in the district last named. Contact deposits are also reported to exist near Garnet, in Granite County.

A number of deposits of the same general class are quartz veins, carrying gold, silver, or both. Of this kind are the formerly highly productive veins of Gloster and Marysville, near Helena; the Granite-Bimetallic mine, near Philipsburg; and many others. More commonly the quartz veins are rich in sulphides, which carry silver and gold in intimate combination with pyrite, galena, chalcopyrite, and zinc blende. Examples of this class are plentiful in almost all the mining counties, especially between Helena and Boulder, where the old camps of Alta, Comet, and Lump Gulch are located, and near Dillon, in Beaverhead County.

The vein systems of the Summit Valley district at Butte carry mainly copper, with small amounts of gold and silver, but there are also veins rich in silver and zinc.

Replacement deposits of silver-bearing galena occur in the Elkhorn district, southeast of Helena; at Barker, in the Little Belt Mountains; at Castle, in Meagher County, and at some other places, but the production obtained from these sources is not large at the present time.

The outlying uplifts in front of the main range contain some gold-bearing deposits of importance associated with intrusions of granitic or monzonitic porphyries. Most prominent are those of the Moccasin and Warm Springs districts in Fergus County, which are replacement deposits of gold-bearing quartz and fluorite in limestone, and in the Little Rocky Mountains, where the altered porphyry itself contains disseminated free gold in irregular bodies.

In Park County, north of the Yellowstone Park, are a number of little-known mining districts that contain gold-bearing quartz veins in places associated with sulphides and at one locality (in the Sheep-eater district) with tungsten ores.

Near the north end of the Idaho boundary line, in the slates of the Belt series, are a number of vein deposits which show a close relationship to the Cœur d'Alene types, and contain galena and in places chalcopyrite. Genetically they are probably connected with intrusions of quartz monzonites. Among these districts the Libby, Iron Mountain, and St. Regis are the best known.

Wherever the deposits carry visible gold, placers have been formed in the gravels at lower elevations. Though the placer production is not large now and is derived mainly from dredging operations in the Alder Gulch (Virginia City) district, Montana was formerly noted for its rich gold-bearing gravels, which were worked not only at the place
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mentioned but also near Helena, Diamond City, Bannock, and at many other places.

No important deposits of iron are known in Montana. Manganese has been mined at one or two places in Jefferson County. There are few notable deposits of rare metals, though tungsten ores are found at Butte and in the Sheepeater district.

NEVADA.

Nevada is one of the most important metal-mining States of the West and has produced large quantities of gold, silver, and lead. At present her production of precious metals is again rising rapidly, and although the output of lead is much smaller than formerly the State is now an important producer of copper. The mining districts number about 200, and a glance at the map (Pl. IX, p. 200) will show that they are irregularly scattered over the State. The Great Basin, of which Nevada forms the larger part, is characterized by a great number of north-south ranges of complicated structure, separated by gravel-filled valleys. There is scarcely one of these ranges that is not mineralized to some extent. The great variety and the scattered distribution of the districts renders it difficult to give an adequate description of the metallic resources of the State within the space here allotted.

The northern boundary line of Nevada lies within the province of the Columbia River lava, and these flows of basalt and rhyolite extend for some distance into the State. At the bend of the California State line the Sierra Nevada forms the boundary of Nevada and a small part of that great range is included within its limits. A small area at the extreme south end of the State is occupied by the horizontal strata of the plateau province. Elsewhere the Basin Ranges are the dominating features, except where they are partly obliterated by Tertiary lava flows.

The ranges are built up of a great variety of rocks. The pre-Cambrian basement is visible at few places except in the extreme southern part of the State, close to Colorado River, where granitic rocks of that age appear. East of a line drawn a little east of Winnemucca through Austin to a point somewhat west of Tonopah, Paleozoic strata are the predominating rocks and there is little or no Mesozoic material present. The typical section at Eureka shows 7,600 feet of Cambrian shale, quartzite, and limestone, 5,000 feet of Ordovician limestone with some quartzite, 6,000 feet of Devonian limestone, and 11,300 feet of Carboniferous shale, quartzite, limestone, and conglomerate. This enormous thickness indicates the vicinity of a shore line, and we find, in fact, that west of the line mentioned above the Paleozoic disappears and is supplanted by a thick series of Triassic and Jurassic sediments. During the Paleozoic era western Nevada was a land area discharging sediments to the east. The Mesozoic
sediments that accumulated in western Nevada were derived from a land area of uplifted Paleozoic strata in the eastern part of the State. The Triassic is typically exposed in the Humboldt Range and its limestone, slate, sandstones, and associated flow rocks attain a thickness of 10,000 feet. The Jurassic is present in the range about Winnemucca, and also in the Humboldt Range. Its total thickness is considerable but not exactly known on account of extensive folding and metamorphism; it consists mainly of slates with some limestones.

Intrusive igneous rocks of the type of granodiorite, quartz monzonite, or corresponding porphyries are abundant but form smaller areas. These irregular masses or batholiths are most common in the western part of the State adjacent to California, but they also occur in the Paleozoic ranges of eastern Nevada. Their age appears to range from latest Jurassic to earliest Tertiary; those near the Sierra Nevada are probably the older. Tertiary flow rocks—andesite, rhyolite, and basalt—are widely distributed and cover large areas, some ranges being entirely built up of them. The lavas near the northern boundary have already been referred to. Another large field lies adjacent to the southwest corner of Utah, and from that vicinity toward the California boundary the lava flows are especially prominent. Some of the western flows are probably of Eocene age, but it is clear that the eruptions continued throughout the Tertiary period. The old lavas contain in some places small intrusions of monzonite.

The sedimentary rocks of the ranges have been folded and faulted. At some places the faulting is comparatively old, but at other places it is later than some of the lavas and is still visible in the topographic forms; in this case the ranges are apt to be monoclinal in structure.

The ore deposits fall into three classes according to their age and occurrence—pre-Cambrian, Cretaceous or early Tertiary, and middle or late Tertiary.

The pre-Cambrian deposits are very poorly represented. There is, in fact, only one occurrence which may with some confidence be placed in this class. It is in the Copper King district, near Bunkerville, Clark County, where basic dikes carry copper, nickel, and platinum.

The Cretaceous or early Tertiary deposits are invariably connected with intrusions of granodiorite or quartz monzonite, and as they have suffered much erosion since their formation the now accessible parts were formerly deeply buried. Gold, silver, copper, lead, and zinc are the principal metals.

There are several types in this class. Contact-metamorphic deposits between or near the boundary of limestone and intrusive rocks are not abundant nor have they yielded a great production; copper is the most prominent metal. They have been noted at Yerington (Mason district), in Lyon County; at Coppereid, in Churchill County; at Adelaide and the Jackson Mountains, in Humboldt County; at
Cortez, in Lander County; at Bullion, Lone Mountain, Lime Mountain, and Contact, in Elko County; and at Ely and Ward, in White Pine County.

Replacement deposits of argentiferous galena in limestone or quartzite, usually situated at some distance from the contacts but apparently connected genetically with intrusive masses, have yielded a large but now diminishing output. At many places transitions into normal fissure veins are observed. To this class belong the celebrated deposits at or near Pioche, in southern Nevada and those at Eureka, in Eureka County, although in the latter place there is some doubt about the genetic connection, for both rhyolite and acidic intrusive rocks occur in the district. Other districts are the Lida, Montezuma, and Southern Klondike districts, in Esmeralda County; the Rye Patch mine in the Humboldt Range, Humboldt County; Cortez and Mill Canyon in Lander County; Mineral Hill, in Eureka County; and many others.

There are all transitions between these replacement deposits and silver and lead bearing veins in quartz gangue, often accompanied by rich silver minerals; these may cut through the sedimentary or the intrusive rocks and they occur in so many places that it would be difficult to enumerate all. At Austin, in the Reese River district, silver-bearing veins cut granite; at Belmont, Nye County, they are contained in Paleozoic sediments in which granite is intruded; at the Horn Silver district, 26 miles south-southwest of Goldfield, the veins are contained in early Paleozoic beds. In the oxidized parts of these veins horn silver and rich sulphantimonites and arsenites usually occur in abundance, changing to poorer sulphides below water level.

In still another group of veins gold predominates, locally as native gold accompanied by quartz gangue but more commonly in association with more or less sulphides and some silver. These veins are usually found in or near intrusive bodies. Examples of their occurrence are in the Silver Peak district, Esmeralda County; at Ely, White Pine County; and in the Humboldt and Santa Rosa ranges, in Humboldt County. Many of the gold-bearing quartz veins occur in quartzite. At De Lamar, Lincoln County, for instance, a bed of quartzite penetrated by basic dikes has been impregnated with gold-bearing solutions and during its oxidation the gold was concentrated into a valuable mass of ore which for many years yielded a large production.

Pyritic disseminations, usually in porphyry, accompany this type of mineralization in many places, and where, as at Ely, White Pine County, these disseminations have been worked over by descending waters, important low-grade blanket deposits of chalcocite may be developed.

The various types mentioned may all occur in the same district, together forming a metallic aureole in and around intrusive masses.
The Tertiary mineralization of lavas in Nevada occurred on a scale and with a diversity not equaled elsewhere in the Western States. It took place at several epochs, and in places each eruption was followed by the ascension of metal-bearing solutions, which penetrated and altered great areas of the porous volcanic rocks, causing what is termed propylitization. The main epoch of mineralization appears to have been in the Miocene. The deposits are in veins or shear zones; some of them in extensive and irregular masses of silicified lavas. They occur in andesite, latite, dacite, or rhyolite, but few of them in basalt. The metals are gold and silver, which in many places occur together, in a quartz and adularia gangue, more rarely, as at Bullfrog, accompanied by calcite. Native gold is not common below the water level, though it is present, for instance, in the Round Mountain and National districts; above the water level the oxidized material usually carries gold. Copper, lead, and zinc are subordinate.

Districts of this type are abundant in western Nevada but are in fact scattered all over the State. Veins in andesite constitute the great Comstock deposits, in Washoe County; those of Tonopah, Kawich, and Gold Crater, in Nye County; Tuscarora, Cornucopia, and Stafford, in Elko County; and Seven Troughs, in Humboldt County. Veins in rhyolite are abundant and usually carry gold and silver. As examples of such districts may be mentioned Fairview and Wonder, in Churchill County; Bullfrog, Silverbow, Eden, Cactus Springs, Wilson's Camp, Stonewall Mountain, and Wellington, in Nye County; Rawhide, Esmeralda County; Gold Circle, Elko County; and National, Humboldt County. The Goldfield mines, which in late years have yielded a large production of gold, are working irregular bodies of altered and silicified rocks in latite.

By far the greater part of the gold and silver production of Nevada is derived from these Tertiary veins.

Placers have yielded large amounts of gold in Nevada, but in the absence of an abundant supply of water they are difficult to work. Both Cretaceous and Tertiary deposits have contributed to the formation, though they are practically absent from many of the richest Tertiary deposits, such as the Comstock lode and the deposit of Tonopah and Goldfield.

The gold-bearing gravels have been worked at Tuscarora, in the Humboldt Range, at Round Mountain, at Battle Mountain, and at numerous other places.

Iron ores are not of frequent occurrence. Brown iron ores are reported from Montello, Cobre, and Moor, Elko County, and from Winnemucca, Humboldt County. Magnetite deposits are said to occur some distance east of Lovelocks, Humboldt County; in the Cortez Mountains, Eureka County; and near Bullion and Dolly Varden, Elko County. Little is known about their geologic relations.
Nickel and cobalt ores occur in diorite and andesite of probably Mesozoic age, in the Cottonwood Canyon district, in the Humboldt Range.

Tungsten ores as wolframite or hüblnerite are worked near Osceola, White Pine County, and near Browns station, in southwestern Humboldt County. In minor quantities the ore occurs in many Tertiary veins, for instance, at Tonopah and Round Mountain.

Quicksilver ore (cinnabar) is of widespread occurrence in western Nevada, in Humboldt, Nye, and Esmeralda counties, but its exploitation has been attempted only at Ione, in Nye County. The ore usually occurs in Tertiary deposits in rhyolite or andesite associated with stibnite, locally also with gold and silver. At Steamboat Springs, in Washoe County, the decomposed granite contains some cinnabar evidently deposited by hot springs. The deposits in the Humboldt Range are of uncertain age and occur in Triassic or Jurassic sedimentary rocks.

NEW MEXICO.

The ore deposits of New Mexico form a gradually widening belt extending through the central portion of the State from Colfax County, at the north, to the southwest corner; in this southern part the districts are scattered over a wide area between El Paso and Silver City. In spite of the fact that there are numerous districts, the production of New Mexico is not large. Gold, silver, copper, lead, and zinc are the principal metals of the output, and Grant and Socorro are the principal productive counties.

New Mexico contains several well-defined geologic provinces. Over the smaller eastern portion extend high plains or plateaus of horizontal or gently dipping Tertiary, Cretaceous, and Carboniferous sediments. About the middle of the State these almost connect with the similar strata of the plateau province which cover the northwestern part, their monotony being broken only by several minor uplifts like the Zuni Mountains.

Through the center of the State and trending north and south are high succession of ranges. Toward the Colorado boundary they are high and assume the type of the Rocky Mountain uplifts, with a central core of pre-Cambrian rocks surrounded by the upturned edges of Paleozoic and Mesozoic strata. Toward the south they are lower and are of the monoclinal type of the Basin Ranges, being limited on the east or west side by prominent faults. The pre-Cambrian is less prominently exposed and the sediments comprise a thick series. In the central part of the State a thin bed of Cambrian quartzite is covered by a few hundred feet of Ordovician, 200 feet of Devonian shale, 100 feet of Mississippian, and 3,000 feet of Pennsylvanian limestone and sandstone, the upper part including some of the “Red Beds.” Above this lies a small thickness of prob-
ably Jurassic strata, and these are in turn covered by at least 3,000 feet of Cretaceous coal-bearing sandstones and shales. The southwest corner of New Mexico is occupied by a number of low ranges of the Arizona type, trending north-northwest, separated by wide desert plains and built up of folded and faulted Paleozoic and Mesozoic sediments; these ranges rarely have pronounced monoclinal structure. Lavas of late Tertiary age, chiefly andesitic and rhyolitic, cover a large space in the southwest, separating the province of the desert ranges from the plateau province. These lavas also extend toward the northeast and occupy large areas north of Santa Fe, but are here mainly basalts of latest Tertiary or even Quaternary age. Minor intrusions of quartz monzonites of late Cretaceous or early Tertiary age are known in nearly all the ranges and follow closely in their distribution the trend of the main mineral-bearing districts.

Deposits of pre-Cambrian age are known to occur in the northern ranges in Colfax, Taos, and Rio Arriba counties. Copper and gold are the principal metals. The deposits form either lenticular quartz veins or disseminations of sulphides in basic igneous rocks. At the Hamilton mine, in the Pecos district, Carboniferous strata cover the decomposed outcrops of a copper deposit of the latter kind. Many of the deposits contain minerals like garnet, tourmaline, and amphibole. The principal locality is that of the Hopewell and Bromide districts, in Rio Arriba County, where veins of this kind and placers derived from them have been mined.

In New Mexico, as elsewhere in the Western States, the most abundant deposits are those which are formed at the end of the Cretaceous or in the earliest Tertiary and which stand in close connection with granite or monzonite intrusions, surrounding them like metallic aureoles. There are several subdivisions of this genetic class which yield ores of gold, silver, copper, lead, and zinc.

Contact-metamorphic deposits in the silicate zone between limestone and intrusive rocks are more abundant than in any of the other States except possibly Arizona. They carry copper ores in the Elizabethtown, San Pedro, Organ, Jarilla, Hanover, and Hachita districts; lead and zinc ores are developed in the Magdalena and Tres Hermanas districts; iron ores at Hanover, Jones Camp, and other places. In all, 13 districts with such ores are known. Magdalena, San Pedro, and Hanover have yielded a considerable production of base metals.

Quartz veins almost invariably accompany the intrusions and are chiefly of the gold-bearing pyritic type, though in places they also carry silver, lead, and copper. The principal producing districts of this kind are Elizabethtown, Ortiz, White Oaks, and Pinos Altos. The silver veins form a smaller group, most of them occurring in Grant County. Replacement deposits of argentiferous galena or sil-
Ver ores are found at some little distance from the intrusive contact and have been mined in the Organ, Hermosa, Kingston, Hillsboro, Lake Valley, Georgetown, Victorio, Chloride Flat, and Granite Gap districts.

In connection with this general type of mineralization near intrusive bodies, there are at a few places, such as the Burro Mountains and Santa Rita, in Grant County, disseminations of cupriferous pyrite which are too poor to mine in themselves, but which have been enriched by a Recent or late Tertiary deposition of chalcocite formed by descending waters. These deposits now form large bodies of low-grade copper ore which are the main source of the copper production of the State.

Placer deposits which formerly were highly productive are worked at Elizabethtown, in Colfax County, in the Ortiz and San Pedro Mountains, at Hillsboro, and at Pinos Altos. Most of them are derived from the veins of early Tertiary age.

A distinctly later mineralization than that described above developed in some places in the lavas of middle or late Tertiary age, shortly after their eruption. It produced quartz veins carrying chiefly gold and silver and with certain characteristics indicating deposits near the surface. The principal districts are at Cochiti, in Sandoval County; at Hillsboro and in the Black Range, in Sierra County; and in the Mogollon district, in Socorro County. At present the principal production of gold and silver of the State is derived from the Mogollon district.

Concentrations of chalcocite in the sandstones of the "Red Beds" of Triassic or late Carboniferous age are found at Tecolote and other places in San Miguel County; in the Nacimiento and Zuni mountains, in the northwestern part of the State; at Estey, in Lincoln County; at Tularosa, in Otero County; and at several other places. The origin of these copper ores is still under discussion, but they have probably been concentrated by meteoric waters from small amounts of metal contained in the sandstones and this concentration has most likely been in progress ever since a water circulation was established in the strata involved. The deposits are in general independent of igneous rocks.

The iron ores consist chiefly of magnetite, occurring in contact-metamorphic deposits. They have been mined at Fierro, in Grant County. A bed of limonite in Cretaceous strata has also been mined near Glorieta, in Santa Fe County.

Bismuth ores occur in the San Andreas Range. Vanadium ores occur near Hillsboro and in the Caballo Range, in both places in connection with galena deposits in limestone. Some wolframite has been recovered from a quartz vein in limestone in the Victorio district, Luna County.
OREGON.

The map (Pl. XI, p. 246) shows plainly that the metal deposits of Oregon are confined to two small and widely separated regions. The northeastern part of the State, including Baker and Grant counties, contains a number of districts yielding mainly gold and silver but also some copper. The southwest corner, including parts of Douglas, Josephine, Jackson, and Coos counties, holds the extreme north end of the California gold belt, and the mines here yield gold, though there are also a few copper-bearing districts.

With the exception of these relatively small areas, the whole State is covered or underlain by flows of late Tertiary lavas, mainly andesites and basalts, or, as along the western coast, by Tertiary or Cretaceous sediments. Here and there the older rocks are exposed under the lavas, as in the Puebla Mountains, near the Nevada boundary line, and here some older mineralization may appear. In a few places, as in the Bohemia district, in the southern Cascade Mountains, and at a few points to the north in the same range, mineralization appears in the andesite rocks, resulting in deposits of gold and silver or quicksilver, but this, too, is unusual.

In geologic structure both regions belong to the Pacific type in which considerable regional metamorphism has been superimposed upon Paleozoic and Mesozoic rocks.

In southwestern Oregon the rocks are essentially the same as in the Sierra Nevada and in northern California. The structural trend here swings around from a northwesterly to a northeasterly direction. The sedimentary rocks comprise Devonian, Carboniferous, and Jurassic strata, the thickness of which is difficult to measure on account of the intense compression to which they have been subjected. These beds are intruded by granodiorite and its porphyries, as well as by serpentine and greenstone; the intrusions are earlier than the Cretaceous rocks, which also have a considerable development in the region. The gold-bearing quartz veins and the placers derived from their eroded outcrops stand in close connection with the intrusive porphyries and greenstones. Most of them are situated near Ashland and Jacksonville and especially north of Grants Pass. There are a great number of loosely defined districts, among which may be mentioned the Greenback, Gold Hill, Applegate, Jalico, Grave Creek, and Waldo. In all these districts placers accompany the veins. A few scattered gold deposits are situated in Coos and Curry counties. Gold-bearing black sands are mined at Gold Beach, Port Orford, and other places, the fine gold having probably been transported to the sea by the river which drains the auriferous region.

Of the rarer metallic products, nickel ores have been mined at Riddles, in Douglas County. Platinum occurs rather commonly but
only in small quantities in the gold-bearing gravels and beach sands and is probably derived from the serpentine rocks. Small quantities of this metal are recovered. Quicksilver occurs as low-grade cinnabar ore at Black Butte, in Douglas County.

In the Blue Mountains of northeastern Oregon, which stand out above the surrounding lava flows, there is a highly compressed and not easily measured section of Paleozoic rocks and an overlying less highly altered series of Triassic sediments, the latter extending northeastward across Snake River and into Idaho, by the Seven Devils copper district. These sedimentary rocks are intruded by a number of smaller masses of granodiorite, in and around which the gold-bearing quartz veins cluster. The veins as a rule carry more or less sulphides and contain more silver than the gold veins of the southwestern part of the State. The richest veins are those of the Cracker Creek district, near Sumpter; others in the same vicinity in Baker County are the Bonanza, Cable Cove, Elkhorn, Connor Creek, Virtue, and Cornucopia. The adjoining Grant County contains similar veins at Susanville, Quartzburg, Granite, and Canyon City. Placers accompany the veins, especially at Sumpter, Baker City, and Canyon City. The last-named place marks the west end of this gold-bearing region, whose southeastern limit is at Humboldt Basin, in Malheur County.

SOUTH DAKOTA.

Cretaceous and Tertiary horizontal sediments cover almost the whole of the State of South Dakota, but in the southwest corner rises a prominent outlier of the Rocky Mountains, known as the Black Hills, which contains gold deposits of great economic importance. This group is similar to the uplifts of Wyoming and Montana, its center being an elliptical mass of pre-Cambrian schists and granites surrounded by outward-dipping Cambrian, Carboniferous, Jurassic, and Cretaceous beds. In the northern part of this uplift are masses, sheets, laccoliths, and dikes of porphyries of phonolitic, rhyolitic, and andesitic types, the age of which is considered to be Eocene.

Both pre-Cambrian and Tertiary (probably Eocene) ore deposits are found in the Black Hills. The pre-Cambrian deposits include lenticular veins in the schists, with quartz, native gold, and sulphides. Of these the most prominent example is the great Home-stake mine at Lead, which is a low-grade but very large deposit of lenses in mica schist. These lenses of altered rock contain quartz stringers and much amphibole and carry native gold and auriferous sulphides. Somewhat similar but as yet not productive deposits occur in other parts of the pre-Cambrian area, in Lawrence, Pennington, and Custer counties. There are also low-grade copper depos-
its consisting of pyritic disseminations in schists, but at present none of these are productive.

The placer deposits, which now yield but little, were derived from veins in the schists. The oldest placers were accumulated in the conglomerate at the base of the Cambrian, when the Paleozoic sea first transgressed over the disintegrated pre-Cambrian rocks. Quaternary gold-bearing gravels lie in the present stream beds.

In the southern part of the Black Hills the granitic pre-Cambrian rocks hold pegmatite dikes which contain cassiterite, wolframite, and various tantalum-columbium minerals, also amblygonite and other lithia-bearing minerals.

A type of gold ore entirely different from that of the pre-Cambrian is connected with the intrusive porphyries, and the mineralization which produced it is probably of early Tertiary age. These gold ores, which do not carry visible metal, are siliceous replacements of Cambrian dolomite limestone, locally also of quartzite and shale; they occur in flat shoots following the stratification and are connected with usually barren vertical fissures that are believed to have formed the ducts for the passage of the solutions which caused the deposits. Cyanidation is the usual process of treatment and the ores, though now of medium to low tenor in gold, contribute largely to the production of the region. The ores are confined mainly to the northern part of the Black Hills, in Lawrence County. Wolframite occurs in one or two places in connection with these refractory siliceous ores.

TEXAS (WESTERN PART).

The western or trans-Pecos part of Texas contains a number of small mining districts in El Paso, Presidio, and Brewster counties. The principal metal production is limited to silver and quicksilver.

From eastern New Mexico a chain of short ranges indicated by the White Mountains, the Sacramento Range, and the Guadalupe Mountains extends southward into western Mexico; they are built up of Carboniferous and Cretaceous strata with small bodies of igneous rocks. A little farther south, in Presidio and Brewster counties, is a large area of volcanic flows which extends southward into Mexico.

The scattered mining districts in El Paso County have not yet proved of importance. In Presidio County is the Shafter district, which for several years has produced a notable amount of silver from an irregular oxidized deposit in Carboniferous limestone. East of the volcanic area mentioned the Cretaceous strata contain many small areas of volcanic flow rocks, in or near which, at Mariscal and Terlingua, important quicksilver deposits are located. Tin ore is mined near El Paso in the Franklin Mountains, where it occurs in a granitic rock.
GEOLOGIC INTRODUCTION.

UTAH.

The ore deposits of Utah are in the main confined to the western part of the State. They begin near the southwest corner of the State; thence the line between the productive and the barren region trends north-northwest, and in the latitude of Utah Lake and Salt Lake follows the crest of the Wasatch Range. The extreme northern part of the State, adjoining Idaho, contains few deposits. In the eastern region lie a few deposits of copper and rare metals in sandstone, on Grand River, a few iron deposits, and the gold-bearing district of the La Sal Mountains, near the Colorado boundary line.

Utah produces gold, silver, copper, and lead in large quantities and in the last few years the output of zinc ore has also been increasing.

The distribution of the districts corresponds to the two geologic provinces into which the State is divided. The unproductive area lies in the plateau province, in which Paleozoic, Mesozoic, and Tertiary strata are almost horizontal and igneous intrusions are generally absent. The ore-bearing area corresponds to the eastern part of the Great Basin, which is characterized by northward-trending ranges separated by desert plains. These ranges are built up of a thick series of Paleozoic sediments similar to that of eastern Nevada. Along the Wasatch Range Triassic, Jurassic, and Cretaceous rocks are also present. A typical section of the sedimentary strata comprises 10,000 or 12,000 feet of Cambrian quartzite, 1,500 feet of Silurian limestone, 1,250 feet of Devonian quartzite, 10,000 to 15,000 feet of Carboniferous limestone and quartzite, and finally about 5,000 feet of uppermost Carboniferous (Permian) or Triassic shales, sandstone, and limestone, the upper portion of which grades into the Mesozoic and consists in part of "Red Beds." In these folded and faulted sediments are numerous intrusions of granodiorite and quartz monzonite, and in places they are covered by Tertiary flow rocks like andesite, latite, and rhyolite. The largest area of intrusive rock is in Cottonwood Canyon, in the Wasatch Range, but even this is of comparatively small dimensions. The largest area of lavas is that of Beaver and adjacent counties in the southern part of the State, and this covers several thousand square miles. Toward the west it is continued across the Nevada line in the direction of Pioche.

The intrusive rocks are of post-Jurassic age; probably most of them date back to the late Cretaceous, but there is also reason to believe that granular rocks were intruded during early Tertiary time into some of the lofty volcanoes which at that time were situated in front of the Wasatch Range. The effusive rocks—the lavas—began to pour out early in the Tertiary period, and the maximum stage of their eruption falls in the later part of that period, though the basaltic eruptions which followed the andesite and rhyolite continued well into Quaternary time.
No pre-Cambrian ore deposits are known in Utah. As elsewhere the ores are, in a broad way, divided into those of Cretaceous age connected with intrusive rocks and those contained in lavas of late Tertiary age. Owing to the presence at some places of early Tertiary intrusions into volcanic cones, the line between these two classes is here and there difficult to define strictly.

Contact-metamorphic deposits carrying copper and some gold have been noted in the Frisco district, Beaver County; at Clifton, Tooele County; and in Cottonwood Canyon, Salt Lake County. Copper deposits allied to them are also found at Bingham. Replacement deposits of silver-bearing galena occur in many districts and are as a rule intimately connected with fissure veins. Examples are furnished by the districts of Park City, Tintic, West Tintic, Cottonwood, American Fork, Frisco, Star, Fish Springs, and Willow Springs. Replacement deposits of copper ores in limestone are worked at Bingham and Tintic. Copper ores disseminated in monzonite and accompanied by tourmaline are mined at the Cactus mine, in the Frisco district. Gold-bearing replacement deposits of limestone are mined on an extensive scale at Mercur, in the Oquirrh Range, and appear to be genetically connected with intrusive sheets of porphyry.

Gold and silver bearing fissure veins in or near intrusive rocks occur at many places, among which may be mentioned Bingham and Tintic, but they do not contribute a large share to the gold production of the State. At Bingham there are widespread impregnations of cupferous pyrite, and its enrichment by chalcocite deposited by descending solutions has given rise to the great low-grade copper deposits now worked by open-cut methods.

Placers derived from veins and other deposits connected with intrusive rocks have yielded a small production in Utah. Such gravels have been worked at Bingham, in the La Sal Mountains, and along San Juan River.

Veins formed during the volcanic activity in middle Tertiary time occur mainly in andesites and rhyolites and carry chiefly gold and silver; the principal localities are in the Kimberly, Mount Baldy, and Ohio districts, in the volcanic center situated in Piute County; similar veins are found in the Stateline district, bordering on Nevada, in Iron County.

Differing from all the preceding types are the metal-bearing sandstone ("Red Beds") of the plateau province. They show no evidence of genetic connection with igneous rocks. Silver and copper ores of this kind have been mined at Harrisburg (Silver Reef), in Washington County, and similar copper ores in sandstone are reported from Uinta County, in northeastern Utah. Vanadium and uranium ores occur on Grand River near the Colorado line.

Some quicksilver is found in the gold ores of the Mercur or Camp Floyd district, from which some production of this metal has been
reported, and a selenide and a sulphoselenide of mercury occur in veins of the Ohio district, near Marysville.

Iron ores are found at several points. In the Iron Springs district, Iron County, and at Bull Valley, Washington County, are considerable bodies of magnetite in deposits of contact-metamorphic origin, between porphyry and limestone. A hematite deposit in Carboniferous limestone occurs at Rhodes Plateau, in Summit County, in the Uinta Mountains. Brown iron ores in small masses are not uncommon. One of these deposits, contained in probably Mesozoic sandstone, occurs in the northeast corner of the State near Vernal

WASHINGTON.

The metal production of the State of Washington includes gold, silver, copper, and lead, but the output of each metal is comparatively small. The southern half of the State and the Olympic Peninsula are almost wholly covered by Tertiary basaltic flows or by Cretaceous and Tertiary sediments barren of metal deposits. In contrast to this, the northern part of the Cascade Range, as well as the mountainous region extending eastward to Idaho along the international boundary, is built up of metamorphosed Paleozoic sediments, mainly slates with smaller masses of limestone, into which a number of granitic masses were intruded during late Cretaceous and early Tertiary time. Lavas of Tertiary age cover these rocks in a number of places.

Ore deposits of pre-Cambrian age have not been reported from Washington but may possibly occur in the Kettle River region, near the Canadian boundary. In the late Tertiary lavas, in spite of the large space they occupy, mineralization is of rare occurrence. There are, however, three prominent districts in the deposits of this kind, all in andesitic rocks. The first is at Monte Cristo, in Snohomish County, in the Cascade Range, where gold-bearing veins occur with abundant sulphides and arsenopyrite. The second is the Republic district, in Ferry County, in the northeastern part of the State, where gold-bearing veins with chalcedonic quartz still yield a notable production. The third is the Pierre Lake district, at Orient, in Stevens County, the output of which has been rather large for several years.

Practically all the other metal deposits of Washington are of greater geologic age and were probably formed shortly after the intrusion of granodiorite and similar rocks in the Paleozoic sediments at the close of the Cretaceous period. Extensive erosion of the upper parts of the veins has left exposed the deeper-seated portions. There are scattered districts of this kind in the Cascade Range, but none of them have as yet an important production. The Blewett or Peshastin district, on the eastern slope of the Cascades in Chelan County, is the best known. Rich gold ores have also been found in
the Mount Baker district, in the northern part of the Cascade Moun-
tains, where gold-bearing quartz veins associated with dikes of
granodiorite have cut through peridotite and Paleozoic sediments.
Most of the producing districts are situated in Okanogan, Ferry,
and Stevens counties, and many of them lie close to the Canadian
boundary. Contact-metamorphic deposits carrying copper are repre-
sented by those at Buckhorn Mountain, in Okanogan County, and at
the Belcher Camp, in Ferry County, near Republic. Silver-lead
veins occur at Conconully (Ruby Hill), in Okanogan County; aurifer-
ous quartz veins on the Methow, in the same county, and in many
other smaller districts. Lead ores, without much silver, occurring
as replacements in limestone, are present near Bossburg and Colville
and in the Metaline district, all in Stevens County, in the northeast
corner of the State. There exists here between the town of Che-
welah and Clark Fork of the Columbia a large body of granite intrusive
in Paleozoic slates and limestones, and it is held that the numer-
ous deposits in this part of the State were formed shortly after this
intrusion.

The State contains few placer-mining districts of importance.
Among those which yielded much gold in the early days may be
mentioned the Swauk and Peshastin districts.

Iron ores are present at a number of places, but are not as yet
utilized. Magnetite is found at Snoqualmie Pass, in King County,
in connection with metamorphosed limestone, and on Skagit River,
in the northern Cascades, as lenses in slate. Chromiferous magnetite
appears at Clealum, in Kittitas County, on the contact between
sandstone and serpentine. Brown iron ore and bog iron is found at
several places in Stevens County—for instance, near Colville and
Chelewelah.

Of the rarer metals, nickel occurs in quartzose ores near Keller,
Ferry County. Cassiterite or oxide of tin has been found in granite
near Spokane. Wolframite, an important tungsten ore, occurs at
the same place, and also in larger quantities, together with some
bismuth minerals, in the quartz veins of the Deer Park and Spring
Dale (Cedar Canyon) districts, in Stevens County. Arsenic has been
recovered from the pyritic veins of the Monte Cristo district. A
quartz vein carrying molybdenite has been discovered in the granite
near Lake Chelan.

WYOMING.

The State of Wyoming contains few and scattered metal-bearing
districts, and its production is limited to a little gold and copper.
Wide stretches of high plains or high plateaus underlain by horizon-
tal Tertiary and Cretaceous sediments extend over the eastern and
southwestern parts. The several uplifts of the Rocky Mountains
traverse the State in a northwesterly direction and comprise a num-
ber of high ranges, usually exposing a large core of pre-Cambrian
rocks surrounded by upturned Paleozoic and Mesozoic sediments. There is little or no evidence of the late Mesozoic intrusions which in other parts of the West were so effective in promoting mineralization.

In the southern part of the State are the Laramie Hills, the Medicine Bow Range, and the Sierra Madre. In the northwestern part rise the Wind River, Teton, and Bighorn ranges, as well as the high plateaus of the Yellowstone Park region, the latter covered by a large area of effusive Tertiary lavas. If uplift and active water circulation produce mineral deposits, they surely ought to be abundant in this State, and if the metals could be concentrated by such circulation the pre-Cambrian igneous rocks, which undoubtedly contain traces of metals, would offer a source for such concentration. The general absence of ores of date later than the uplifts goes far to prove that metallization is dependent on other conditions.

Near the eastern boundary of the Yellowstone Park are some districts which have produced little and whose geologic features are not well known. Of the districts investigated practically all contain deposits of pre-Cambrian age, inclosed in the highly altered pre-Cambrian sediments or in the large masses of granitic and basic rocks intruded with them before the beginning of the Paleozoic era. The Laramie Hills contain many low-grade copper deposits in lenticular veins and disseminations in schists and granite. In the Medicine Bow Range are several districts yielding gold and copper; in the adjacent Sierra Madre, near the Colorado line, is the well-known Encampment district, which has yielded much copper and gold from veins and irregular deposits of pyritic ores enriched by chalcocitization in or near pre-Cambrian gabbros. Copper deposits are also found in similar rocks south of Casper. At several places the pre-Cambrian contains lenticular quartz veins with native gold; the best known deposits of this kind are at Atlantic and South Pass, in Fremont County. Placers below rich veins have been worked at the places mentioned and in several districts in the Medicine Bow Range. The basal conglomerate of the Cambrian in the region adjacent to the Black Hills is said to contain some placer gold.

Iron ores are found in the pre-Cambrian rocks. Iron Mountain, north of Cheyenne, in Laramie County, is a huge dike of ilmenite, in anorthositic rock, as yet not utilized. At Hartville, in the same county, lenses of hematite are worked, lying between the pre-Cambrian and the overlying Carboniferous. They are considered to be of pre-Cambrian age. Similar deposits are said to occur near Rawlins and in the Seminole Mountains, in Carbon County.

There are few deposits of rare metals in Wyoming. Platinum, palladium, and other platinum metals are found associated with copper minerals in the Rambler mine, near Holmes, in Albany County. They are reported to be present in the concentrates in paying quantities.
PART II. CATALOGUE OF MINING DISTRICTS.

By James M. Hill.

ACKNOWLEDGMENTS.

The writer is indebted to members of the United States Geological Survey who have supplied much first-hand information on many mining districts about which little has been known or published. The maps have been inspected by the men most familiar with the regions covered by them and have thus gained much in accuracy of location. To Mr. H. D. McCaskey the writer is indebted for advice as to method and arrangement and for constant cooperation throughout the work of compilation. Mr. Waldemar Lindgren has been a never-failing source of information. His careful scrutiny of the maps, lists, and text has added greatly to their value. Sincere thanks are due to him for his help and for the geologic introduction to this bulletin.

PLAN OF THE WORK.

In 1907 the United States Geological Survey issued, as a part of its publication "Mineral resources of the United States," a map showing by means of dots the relative location of the gold, silver, copper, lead, zinc, and quicksilver mining districts of the Western States. This map was published in one large sheet covering all the States west of the one hundred and third meridian, and the symbols used on it made no distinction for the predominant metal produced in each camp, with the exception of quicksilver.

Since the publication of that map many new districts have been added to the lists of producers. The Survey has also had the opportunity to study many regions about which there was little authentic information. The present bulletin is a revision and correction of the original map, based on the latest available information, with some added features which it is hoped will be useful to engineers, geologists, and others interested in the metal-mining industry of the Western States.

It is the hope of the writer that those interested will cooperate in the correction of mistakes and omissions in both maps and lists by notifying the Geological Survey of any errors they may discover.
The map of each State is published separately in order that it may be more easily handled. The scale of each map is about 40 miles to the inch. The State of California, on account of its large size, has been mapped in two parts, the dividing line being an entirely arbitrary one along the county lines south of the Mother Lode region. In California there are no mining districts as the term is used in other States—that is, there are no recorded boundaries to a particular district. The Survey has arbitrarily made the subdivision into districts for convenience of reference, the mines in a certain locality or near a particular town or camp being included in one district.

The location of the mining district is indicated on the maps by a symbol and a number. The different symbols indicate as far as possible the most important metal produced in each camp. This classification, however, was not always possible, as in some districts several metals are of equal importance, and other districts are in the prospect stage and their predominant metals are not certain or are unknown.

The number with each symbol refers to the list of the districts printed on the margin of each map and to the bibliography of that State. These lists are arranged alphabetically by counties and each map has one consecutive series of numbers.

The map of each State is accompanied by a few pages in which more information is given than can be shown on the map. This consists of the following items:

1. A number, which corresponds to the number given on the map.
2. The name and subnames of the district.
3. A list of the abbreviations for the metals produced in the camp, in the order of their importance. In this list the following abbreviations are used for the different metals:

   Au......Gold.
   Ag......Silver.
   Cu......Copper.
   Pb......Lead.
   Zn......Zinc.
   Hg......Quicksilver.
   Fe......Iron.
   Cr......Chromium.
   Ti......Titanium.
   Mn......Manganese.
   Ni......Nickel.
   Co......Cobalt.
   W......Tungsten.
   As......Arsenic.
   Bi......Bismuth.
   U......Uranium.
   V......Vanadium.
   Sn......Tin.
   Mo......Molybdenum.
   Pt......Platinum.
   Pd......Palladium.

The last 12 metals are classed as rare, and where they are the most important metals the district is shown on the map as a rare-metal district. Metals found in the district but of relatively slight importance are indicated by the appropriate abbreviations in parentheses.

For some districts the list of metals produced is followed by “Pl,” signifying that the production is largely from placer mines, or by “Pl and D” or “D and Pl,” signifying that the production is from both deep and placer mines, the more important source being placed first.
all districts not marked in this way the production is derived from deep mines.

4. The shipping point of the camp, with the distance and direction of the camp from it and the railroad on which it is located—for example, "14 miles NNE. Winnemucca, S. P. R. R." The distance is estimated from a town in or from the center of the mining district, and where possible is the number of miles along the route followed by the United States mail. It is entirely possible and in many cases probable that there may be some shorter means of approach to the camp than that given, but some uniform method had to be adopted for the measurement of distances. Many of the distances given do not represent the distances as measured on the map, because roads are winding and a mail route may touch several other towns in its course to a given locality.

The following abbreviations are used for the railroads of the Western States:

A. & M. R. R. .................. Arcata & Mad River Railroad.
A. & N. M. R. .................. Arizona & New Mexico Railway.
Am. C. R. R. .................. Amador Central Railroad.
Ar. C. R. R. .................. Argentine Central Railway.
B. C. R. R. .................... Butte County Railroad.
C. G. W. R. R. ................. Chicago Great Western Railroad.
C. M. R. R. .................... Colorado Midland Railway.
C. R. I. & P. R. R. ............ Chicago, Rock Island & Pacific Railway.
E. R. R. of N. M. .............. Eastern Railway of New Mexico.
<table>
<thead>
<tr>
<th>Railroad Name</th>
<th>Description</th>
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<tbody>
<tr>
<td>G. N. R. R.</td>
<td>Great Northern Railway.</td>
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<tr>
<td>G. V. G. &amp; N. R. R.</td>
<td>Gila Valley, Globe &amp; Northern Railway.</td>
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<tr>
<td>I. N. R. R.</td>
<td>Idaho Northern Railway.</td>
</tr>
<tr>
<td>L. H. P. &amp; P. R. R.</td>
<td>Laramie, Hahns Peak &amp; Pacific Railway.</td>
</tr>
<tr>
<td>L. V. &amp; T. R. R.</td>
<td>Las Vegas &amp; Tonopah Railroad.</td>
</tr>
<tr>
<td>N. C. B. R. R.</td>
<td>Nevada Copper Belt Railroad.</td>
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<tr>
<td>N. C. G. R. R.</td>
<td>Nevada County Narrow Gage Railroad.</td>
</tr>
<tr>
<td>N. C. R. R.</td>
<td>Nevada Central Railroad.</td>
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<tr>
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<td>N. P. R. R.</td>
<td>Northern Pacific Railway.</td>
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<td>N. W. P. R. R.</td>
<td>Northwestern Pacific Railroad.</td>
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<td>P. &amp; I. N. R. R.</td>
<td>Pacific &amp; Idaho Northern Railway.</td>
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<td>P. C. R. R.</td>
<td>Pacific Coast Railway.</td>
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<tr>
<td>St. L. R. M. &amp; P. R. R.</td>
<td>St. Louis, Rocky Mountain &amp; Pacific Railway.</td>
</tr>
<tr>
<td>S. F. C. R. R.</td>
<td>Santa Fe Central Railway (New Mexico Central Railroad).</td>
</tr>
<tr>
<td>S. F. P. &amp; P. R. R.</td>
<td>Santa Fe, Prescott &amp; Phoenix Railway.</td>
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<tr>
<td>S. N. R. R.</td>
<td>Silverton Northern Railroad.</td>
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<tr>
<td>Sill. P. R. R.</td>
<td>Silver Peak Railroad.</td>
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<td>S. P. R. R.</td>
<td>Southern Pacific Railroad.</td>
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<td>S. R. R.</td>
<td>Silverton Railway.</td>
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<tr>
<td>S. R. R., of Cal.</td>
<td>Sierra Railway of California.</td>
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<td>Sier. V. R. R.</td>
<td>Sierra Valley Railroad (Sierra &amp; Mohawk Railway).</td>
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<td>Sump. V. R. R.</td>
<td>Sumpter Valley Railway (Oregon).</td>
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<tr>
<td>S. V. &amp; E. R. R.</td>
<td>Sacramento Valley &amp; Eastern Railroad.</td>
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<tr>
<td>T. &amp; P. R. R.</td>
<td>Texas &amp; Pacific Railway.</td>
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<tr>
<td>U. P. R. R.</td>
<td>Union Pacific Railroad.</td>
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<tr>
<td>U. R. R.</td>
<td>Uintah Railway.</td>
</tr>
</tbody>
</table>
4. MINING DISTRICTS OF WESTERN UNITED STATES.

W. P. R. R............................. Western Pacific Railway.
Y. R. R............................... Yreka Railroad.
Y. V. R. R............................. Yosemite Valley Railroad.

5. A statement of the geologic formation of the region, intended to give simply a general idea of the rocks in which the deposits occur. The attempt has been made to name the oldest rocks first, using the terms pre-Cambrian schists, granite, or complex. The term complex is used in districts where schist, gneiss, and granite are found in intimate association. The Paleozoic or Mesozoic limestones, slates, quartzites, etc., are all combined under the terms Paleozoic or Mesozoic sediments. Intrusive rocks are said to "cut" the older formations, and volcanic flows "cap" the other formations. Where the relation is not known only the names of the rocks are given, as Paleozoic sediments, granite, andesite. In placer districts the gravels have been classed as follows:

- Stream gravels, those of the present stream channel.
- Terrace gravels, those of the present stream but found above the present level of the stream.
- Beach gravels, confined to the shores of the Pacific Ocean.
- Glacial gravels, moraines and outwash from the glaciers.
- Tertiary river gravels, like the buried channels of the Sierra Nevada in California.

6. The kind of deposits found in the region. No attempt has been made to discuss the deposits; simply their general character is mentioned in the belief that it may be of use. The following terms have been used with the meanings indicated, which are sanctioned by the United States Geological Survey:

- Vein.—A single body of minerals occupying or following a fissure, both walls of which generally, though not invariably, are well defined. Where several veins are so closely spaced that the ground between them becomes in places ore bearing and in its whole width constitutes an ore body the assemblage is called a lode. In this bulletin the term vein is used for both veins and lodes.
- Contact-metamorphic deposits.—Ore deposits which occur at or near the contacts of intrusive rocks with sedimentary beds and which carry minerals characteristic of contact metamorphism, such as garnet, pyroxene, and epidote.
- Replacement deposits.—Masses of ore and gangue formed by the alteration of limestone, dolomite, and other rocks. Usually irregular in form and in many places grading into country rock.
- Disseminated deposits.—Deposits containing ore minerals scattered throughout the rock, such as chalcocite occurring in grains through granite porphyry. The term "impregnations" is sometimes applied to deposits of this type.
- Stockwork.—A deposit consisting of a complex system of small fissure veins.
- Lenses.—Roughly tabular bodies which diminish in size vertically and horizontally.

7. A bibliography of Survey publications relative to the district. It is fully realized that many articles bearing on the metal industry which appear in mining, engineering, and scientific journals are of great
LEGEND

Surveyed in 1909-10
Surveyed in previous years
Surveyed in 1909-10
Surveyed in previous years
Surveyed in previous years

MAP OF THE WESTERN STATES, SHOWING AREAS COVERED BY TOPOGRAPHIC SURVEYS AND THE SCALE EMPLOYED FOR EACH AREA

100 0 100 200 300 Miles

Note: Areas covered by index maps indicated by heavy line and number which refers to list.

1912
value and should be included in any complete bibliography of the mining industry of the United States. The great mass of literature bearing on the subject of mining and the relatively short time available for this revision and compilation made it necessary to limit the publications listed, except as stated below, to those issued by the United States Geological Survey. These consist of several series, which are indicated by the following abbreviations:

- M..........Monograph.
- P. P........Professional Paper.
- Bull........Bulletin. 1
- W. S. P....Water-Supply Paper.
- Min. Res...Mineral Resources. 1
- Folio.......Folio of Geologic Atlas.
- Top. sheet..Sheet of Topographic Atlas.

Colorado, South Dakota, Washington, and Wyoming are the only States of the Cordilleran region which maintain geological surveys. Their publications are referred to in the list.

The following example will show the method of presenting the information indicated in the preceding paragraphs. The district is in New Mexico.

9. Organ. Pb, Ag, Cu.

15 miles NE. Las Cruces, A. T. & S. F. R. R., stage line.

Paleozoic sediments cut by quartz monzonite.
Veins, contact metamorphic, replacements.


This interpreted means: The deep mines of the Organ district, which is numbered 9 on the map of New Mexico, produce lead, silver, and copper, lead predominating. The central part of the district is 15 miles northeast of the shipping point, Las Cruces, on the Atchison, Topeka & Santa Fe Railway, with which it is connected by stage. The region is underlain by Paleozoic sediments intruded by quartz monzonite. The ores occur in veins, in contact-metamorphic deposits at the contacts of the sediments and intrusive rock, and as replacement bodies in the sediments. Notes on the district are given on pages 74 to 86 of Bulletin 285 of the Geological Survey, published in 1906. (Other Survey publications on this district are cited in the list on p. 230.)

The Thirty-second Annual Report of the Director of the Survey contains two maps showing the areas covered by geologic and topographic surveys. Plates I and II are adapted from these maps and show what has been accomplished by the Survey in the mapping and study of the geology of the Western States. Plate I shows the areas covered by topographic surveys. In this work the unit of survey is a quadrangle 15 minutes, 30 minutes, or 1 degree in extent each way, covering an area of one-sixteenth, one-fourth, or one

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1 In the series of bulletins entitled "Contributions to economic geology" and in the volumes of Mineral Resources are given bibliographies on the several metals.

21528°—Bull. 507—12——4
EXPLANATION OF PLATE II.

The numbers indicate Survey publications, as shown in the following list:

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<thead>
<tr>
<th>ARIZONA</th>
<th>NEVADA</th>
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<tr>
<td>2. Bradshaw Mountains, Folio 126.</td>
<td>2. Comstock lode, M. III, $11; IV, $1.50.</td>
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<td>4. Globe, P. P. 12, Folio 111.</td>
<td>4. Eureka, M. VII, $1.20; VIII, $1.10; XX, $5.25.</td>
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<td>5. Goldfield, P. P. 66.</td>
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<td>7. Tonopah, P. P. 42.</td>
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<td></td>
<td>8. Southwestern Nevada and eastern California, Bull. 308.</td>
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<td></td>
<td>1. Coos Bay, Folio 73.</td>
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<td>2. Crater Lake, P. P. 3.</td>
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<td></td>
<td>3. Port Orford, Folio 89.</td>
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<td>4. Riddles, will be folio.</td>
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<td></td>
<td>5. Roseburg, Folio 49.</td>
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<td>SOUTH DAKOTA.</td>
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<td>2. Deadwood, P. P. 26, will be folio.</td>
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<td>4. Oelrichs, Folio 85.</td>
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<td>5. Rapid, P. P. 26, will be folio.</td>
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<td>UTAH.</td>
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<td>1. Bingham, P. P. 38.</td>
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<td>3. Tintic, Folio 65.</td>
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<td>WASHINGTON.</td>
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<td></td>
<td>2. Mount Stuart, Folio 106.</td>
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<td></td>
<td>4. Tacoma, Folio 54.</td>
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<td>WYOMING.</td>
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<td></td>
<td>2. Bald Mountain, Folio 141.</td>
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<td></td>
<td>3. Canyon, M. XXXII, $2.45.</td>
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<td>5. Crandall, M. XXXII, $2.45.</td>
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<td>7. Devils Tower, Folio 150.</td>
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<td>10. Gallatin, M. XXXII, $2.45.</td>
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<td>11. Hartville, Folio 91.</td>
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<td>12. Ishawoaa, M. XXXII, $2.45.</td>
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<td>13. Lake, M. XXXII, $2.45.</td>
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<td>17. Shoshone, M. XXXII, $2.45.</td>
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<td>18. Sundance, Folio 127.</td>
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<td>MONTANA.</td>
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<td>2. Fort Benton, Folio 55.</td>
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<td>4. Little Belt Mountains, Folio 56.</td>
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<td>5. Livingston, Folio 1.</td>
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<td>7. Philipsburg, will be folio and P. P. 78.</td>
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<td>8. Three Forks, Folio 24.</td>
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COLORADO.

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IDAHO.

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</tr>
</tbody>
</table>
MAP OF THE WESTERN STATES, SHOWING AREAS COVERED BY GEOLOGIC SURVEYS AND KIND OF WORK DONE

100 0 100 200 300 Miles

1912

Note: Numbers refer to list of geologic folios, monographs, and professional papers
square degree. A quadrangle is designated by the name of some well-known place or feature in it. The unit of publication is an atlas sheet 16½ by 20 inches, and each sheet is a topographic map of one quadrangle. As the atlas sheets are uniform in size, the greater the area covered the smaller the scale of the map. The scale of the 1-degree sheet is 1:250,000, that of the 30-minute sheet is 1:125,000, and that of the 15-minute sheet is 1:62,500. The names of adjoining quadrangles for which sheets have been published are printed on the margins. The cultural features, such as roads, railroads, cities, and towns, as well as all lettering, are shown in black; the water features in blue; the features of relief—hills, mountains, etc.—by brown contour lines. The contour interval varies with the scale of the map and the relief of the country. Some maps of areas that are economically important are not in conformity with the general scheme outlined above.

"Index maps" on a scale of about 40 miles to the inch, showing the location and names of quadrangles represented by published topographic sheets, also names and numbers of geologic folios, have been prepared and may be obtained free on application to the Director of the Survey at Washington. As it is impossible to show distinctly the names of the quadrangles on Plate I, the areas covered by index maps are indicated by heavy lines and by numbers which correspond to those in the subjoined list:

<table>
<thead>
<tr>
<th>Form No.</th>
<th>List of Areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>North and South Dakota</td>
</tr>
<tr>
<td>2.</td>
<td>Montana, Idaho, and Wyoming</td>
</tr>
<tr>
<td>3.</td>
<td>Oregon and Washington</td>
</tr>
<tr>
<td>4.</td>
<td>Texas and Oklahoma</td>
</tr>
<tr>
<td>5.</td>
<td>Colorado and New Mexico</td>
</tr>
<tr>
<td>6.</td>
<td>Utah and Arizona</td>
</tr>
<tr>
<td>7.</td>
<td>California and Nevada</td>
</tr>
</tbody>
</table>

The topographic maps are sold at 5 cents a sheet of standard size, or $3 a hundred if at least 100 are ordered at one time. Prepayment is required, and may be made by money order payable to the order of the Director of the United States Geological Survey, or in stamps or cash—the exact amount.

Plate II shows the areas covered by geologic surveys. The numbers refer to the list of folios, professional papers, and monographs on the page facing the plate.

Geologic maps of the quadrangles covered by the topographic maps are generally published in the form of folios. On these maps the areal geology, underground structure, and mineral deposits are represented by colors and patterns. Each folio contains other maps, descriptive text, etc. The price of folios is 25 cents each, as a rule; a few that are unusually large are sold for 50 cents. A general circular on geologic folios may be had on application.
MINING DISTRICTS OF WESTERN UNITED STATES.

Professional papers are distributed free of charge on application to the Director of the Geological Survey. It sometimes happens, however, that they are out of stock; in that case they can usually be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., at a nominal cost. Monographs are sold at the prices indicated in the list.

It is impossible to indicate the areas described in the other publications of the Survey. Those which deal particularly with mining are "Mineral Resources" and some of the bulletins. A complete list of Survey publications, revised quarterly, may be had on application to the Director.

CLASSIFICATION OF MINING DISTRICTS.

Fourteen States west of the one hundred and third meridian are represented in this report as producers of gold, silver, copper, lead, zinc, quicksilver, iron, chromium, manganese, and the rare metals.

In these States there are more than 1,479 mining districts recognized by the United States Geological Survey, that number being shown on the maps. Some districts are not shown owing to lack of knowledge or lack of space. The scale of the map limits the number of mining districts which can be shown as distinct units. In Gilpin County, Colo., there are about 12 districts, which have been grouped into three on the map. The Mother Lode region of California is another example of the necessity for combining districts on account of lack of space.

The classification of the districts by predominant metals was made on the basis of the production of the districts for the period from 1902 to 1908, as reported to the United States Geological Survey. The following table shows the number of districts in each State which produce the several metals, as thus classified:

Distribution of the mining districts in the Western States according to the predominant metal.

<table>
<thead>
<tr>
<th>State</th>
<th>Gold</th>
<th>Silver</th>
<th>Copper</th>
<th>Lead</th>
<th>Zinc</th>
<th>Quicksilver</th>
<th>Iron</th>
<th>Rare metals</th>
<th>Unknown</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arizona</td>
<td>67</td>
<td>11</td>
<td>46</td>
<td>7</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>156</td>
</tr>
<tr>
<td>California, northern counties</td>
<td>178</td>
<td>1</td>
<td>13</td>
<td>16</td>
<td>14</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>222</td>
</tr>
<tr>
<td>California, southern counties</td>
<td>129</td>
<td>12</td>
<td>19</td>
<td>11</td>
<td>9</td>
<td>8</td>
<td>5</td>
<td>1</td>
<td>1</td>
<td>191</td>
</tr>
<tr>
<td>Colorado</td>
<td>66</td>
<td>21</td>
<td>116</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>132</td>
</tr>
<tr>
<td>Idaho</td>
<td>84</td>
<td>14</td>
<td>13</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>133</td>
</tr>
<tr>
<td>Montana</td>
<td>59</td>
<td>7</td>
<td>11</td>
<td>15</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>107</td>
</tr>
<tr>
<td>Nevada</td>
<td>105</td>
<td>38</td>
<td>17</td>
<td>14</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>182</td>
</tr>
<tr>
<td>New Mexico</td>
<td>26</td>
<td>16</td>
<td>11</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>85</td>
</tr>
<tr>
<td>Oregon</td>
<td>63</td>
<td>1</td>
<td>7</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>73</td>
</tr>
<tr>
<td>South Dakota</td>
<td>14</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>26</td>
</tr>
<tr>
<td>Texas</td>
<td>4</td>
<td>2</td>
<td>15</td>
<td>14</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>11</td>
</tr>
<tr>
<td>Utah</td>
<td>22</td>
<td>20</td>
<td>15</td>
<td>14</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>86</td>
</tr>
<tr>
<td>Washington</td>
<td>31</td>
<td>5</td>
<td>11</td>
<td>6</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>59</td>
</tr>
<tr>
<td>Wyoming</td>
<td>13</td>
<td>15</td>
<td>15</td>
<td>14</td>
<td>1</td>
<td>11</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>36</td>
</tr>
</tbody>
</table>

861 181 222 115 6 34 44 25 21 1,479
This table takes no account of the other metals found in a camp. In most regions several metals are produced, and in many districts it is difficult to say which is the most important product. Where there are few mines the production of one of them may greatly influence the classification. For instance, in a copper camp one producer may obtain a large amount of gold from his ore. In case this gold value exceeds the value of all the copper produced in the camp it would be classed as a gold district, even though it is generally spoken of as belonging to the copper class. The silver camps are particularly open to question, for there are few mines producing principally silver, yet in 151 districts in the Western States silver has a greater value than the other metals produced. The table is inserted for the reason that it gives the number of districts in each State in which one metal has a greater value than the others produced.

The above statement is applicable to the tabulated statements by counties for each State.

For a truer record of the relative importance of the metals produced by the mining districts of the Western States the reader is referred to the volumes of “Mineral Resources” published by the United States Geological Survey.
ARIZONA.

In 12 counties of Arizona there are 136 mining districts. Of these the predominant metal is unknown in 3, and in 1 tungsten minerals are produced exclusively; 67 districts produce more gold than any other metal, 46 more copper, 11 more silver, and 7 more lead. Quicksilver is recovered in 1 district.

Distribution of the predominant metals produced in the mining districts of Arizona.

<table>
<thead>
<tr>
<th>County</th>
<th>Gold</th>
<th>Silver</th>
<th>Copper</th>
<th>Lead</th>
<th>Quicksilver</th>
<th>Rare metals</th>
<th>Unknown</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cochise</td>
<td>5</td>
<td>5</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>Gila</td>
<td>4</td>
<td>6</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Graham and Greenlee</td>
<td>1</td>
<td>5</td>
<td>1</td>
<td>1</td>
<td>8</td>
<td>1</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Maricopa</td>
<td>4</td>
<td>6</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>Mohave</td>
<td>19</td>
<td>2</td>
<td>8</td>
<td>1</td>
<td>2</td>
<td>11</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>Pima</td>
<td>5</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>16</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Pinal</td>
<td>4</td>
<td>6</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>10</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Yavapai</td>
<td>16</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>20</td>
<td>17</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>Yuma</td>
<td>6</td>
<td>5</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td></td>
<td>67</td>
<td>11</td>
<td>46</td>
<td>7</td>
<td>1</td>
<td>18</td>
<td>136</td>
<td></td>
</tr>
</tbody>
</table>

MINING DISTRICTS IN ARIZONA.

[See Pl. III. Additional references may be found in Mineral Resources for 1910 and 1911.]

COCHISE COUNTY.

1. California (Paradise). Pb, Ag, Cu, Au.

   15 miles NW. Rodeo, N. Mex., E. P. & S. W. R. R.
   Paleozoic (?) limestones cut by granite porphyry.
   Contact metamorphic, veins.
   Min. Res. 1905, pp. 144-145.
   1906, p. 154.
   1907, pt. 1, p. 160.
   1908, pt. 1, p. 297.

2. Courtland (Turquoise). Cu, Au, Ag.

   Station E. P. & S. W. R. R.
   Paleozoic sediments cut by granite porphyry.
   Replacements, veins in porphyry.
   Min. Res. 1905, p. 146.
   1906, p. 156.
   1907, pt. 1, p. 162.
   1908, pt. 1, pp. 205, 298.

3. Dos Cabezas. Au, Ag, Pb, Fe, Cu. (D, Pl.)

   15 miles E. Wilcox, S. P. R. R.
   1908, pt. 1, p. 297.

54
<table>
<thead>
<tr>
<th>LIST OF MINING DISTRICTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>COCHISE COUNTY</td>
</tr>
<tr>
<td>1. Cochise (Paradise)</td>
</tr>
<tr>
<td>2. Courtland (Turquoise)</td>
</tr>
<tr>
<td>3. Dos Cabezas</td>
</tr>
<tr>
<td>4. Dragon</td>
</tr>
<tr>
<td>5. Huachuca (Hartford)</td>
</tr>
<tr>
<td>6. Johnson (Cochise)</td>
</tr>
<tr>
<td>7. Pearce</td>
</tr>
<tr>
<td>8. Teviston</td>
</tr>
<tr>
<td>9. Tombstone</td>
</tr>
<tr>
<td>10. Warren (Blabee)</td>
</tr>
<tr>
<td>11. Whetstone (Benson)</td>
</tr>
<tr>
<td>12. Winchester</td>
</tr>
<tr>
<td>13. Yellowstone (location uncertain)</td>
</tr>
<tr>
<td>14. Courtland (Turquoise)</td>
</tr>
<tr>
<td>15. Dos Cabezas</td>
</tr>
<tr>
<td>16. Huachuca (Hartford)</td>
</tr>
<tr>
<td>17. Johnson (Cochise)</td>
</tr>
<tr>
<td>18. Pearce</td>
</tr>
<tr>
<td>19. Teviston</td>
</tr>
<tr>
<td>20. Tombstone</td>
</tr>
<tr>
<td>21. Warren (Blabee)</td>
</tr>
<tr>
<td>22. Whetstone (Benson)</td>
</tr>
<tr>
<td>23. Winchester</td>
</tr>
<tr>
<td>24. Yellowstone (location uncertain)</td>
</tr>
</tbody>
</table>

| COCONINO COUNTY           |
| 1. Francis               |
| 2. Grand Canyon          |
| 3. Jacob Lake (Kalib Plateau) |
| 4. Dripping Springs      |
| 5. Elliot                |
| 6. Globe                 |
| 7. Green Valley (Payson) |
| 8. Lost Gulch            |
| 9. Miami                 |
| 10. Pinto Creek          |

| GILA COUNTY               |
| 1. Banner (Troy)          |
| 2. Black Warrior          |
| 3. Christmas (Saddle Mountain, San Carlos) |
| 4. Dripping Springs       |
| 5. Elliot                |
| 6. Globe                 |
| 7. Green Valley (Payson) |
| 8. Lost Gulch            |
| 9. Miami                 |
| 10. Pinto Creek          |

| GRAN AND GREENLEE COUNTIES |
| 1. Aravaipa              |
| 2. Ash Peak              |
| 3. Bunker Hill (Copper Creek) |
| 4. Clark                 |
| 5. Copper Mountain       |
| 6. Greenlee (Matcalf)    |
| 7. Lane Star             |
| 8. Stanley              |

| MARICOPA COUNTY          |
| 1. Agua Fria             |
| 2. Cave Creek            |
| 3. San Domingo (location uncertain) |
| 4. Vulture              |
| 5. Wickenburg           |

| MOHAVE COUNTY            |
| 1. Omitted               |
| 2. Bantley              |
| 3. Boundary Cone        |
| 4. Cedar Valley (Owens) |
| 5. Cerbat (Hualapai)    |
| 6. Chemehuevas          |
| 7. Chloride (Hualapai)  |
| 8. Clark                 |
| 9. Collins (Greenwood)  |
| 10. Stockton Hill (Hualapai) |
| 11. Union Pass (San Francisco) |
| 12. Virginia (Weaver)   |
| 13. White Hills (Indian Secret) |

| PINAL COUNTY             |
| 1. Bunker Hill (Copper Creek) |
| 2. Gold Mountains (Galiuro) |
| 3. Mammooth               |
| 4. Mineral Creek (Ray, Kelvin) |
| 5. Mineral Hill (location uncertain) |
| 6. Old Hat (Oracle)      |
| 7. Pioneer               |
| 8. Riverside             |
| 9. Silver King           |
| 10. Yekol (Casa Grande) |

| SANTA CRUZ COUNTY        |
| 1. Harshaw               |
| 2. Mowry                |
| 3. Nogales              |
| 4. One Bacon            |
| 5. Palmetto             |
| 6. Parnassus            |
| 7. Red Rock             |
| 8. San Cayetano        |
| 9. Tyrrell (Ariz)       |
| 10. Washington (Duquesne) |
| 11. Wrightson           |

| YAVAPAi COUNTY           |
| 1. Agua Fria             |
| 2. Big Bug              |
| 3. Black Canyon         |
| 4. Black Hills          |
| 5. Black Rock           |
| 6. Cherry Creek         |
| 7. Congress             |
| 8. Copper Basin         |
| 9. Del Rio              |
| 10. Eureka              |
| 11. Haneyampa          |
| 12. Peck                |
| 13. Peavine Creek       |
| 14. Thumb Butte         |
| 15. Tiger (Harrington)  |
| 16. Tip Top (Birdshaw Mts.) |
| 17. Verde               |
| 18. Walker              |
| 19. Weaver (Rich Hill)  |
| 20. White-Picacho       |

| Yuma COUNTY              |
| 1. Castle Dome           |
| 2. Cienega              |
| 3. Harcourt            |
| 4. Harquahala          |
| 5. Kula (Humbug, Polaris) |
| 6. La Fortuna          |
| 7. Laguna              |
| 8. Planet              |
| 9. Plomosa             |
| 10. Santa Maria (Bighorn) |
| 11. Silver             |
| 12. Swansea              |
| 13. Vicksburg           |
| 14. Weaver (La Paz)    |
| 15. White Hills (Indian Secret) |

MAP OF ARIZONA, SHOWING LOCATION OF MINING DISTRICTS

Legend:
- Gold predominant
- Copper predominant
- Silver predominant
- Lead predominant
- Gold, silver, copper, lead (predominant metal uncertain)
- Rare metals
- Quicksilver
4. **Dragoon.** Cu, Au, Ag, W.
   Station S. P. R. R.
   Paleozoic limestone cut by granite.
   Contact metamorphic, veins.
   Min. Res. 1899, p. 300.
   1900, p. 257.
   1904, pp. 329-330.
   1905, pp. 145, 412.
   1906, p. 525.
   1908, pt. 1, p. 725.
   1909, pt. 1, p. 577.

5. **Huachuca (Hartford).** Cu, Ag, Au.
   
   12 miles W. Hereford, E. P. & S. W. R. R.
   1908, pt. 1, p. 297.

6. **Johnson (Cochise).** Cu, Au, Ag, Pb.
   
   9 miles W. Cochise, S. P. R. R., stage.
   Paleozoic sediments cut by granite porphyry.
   Replacements, contact metamorphic.
   1906, pp. 154-155.
   1907, pt. 1, p. 160.
   1908, pt. 1, p. 297.

7. **Pearce.** Au, Ag.
   Station A. E. R. R.
   Rhyolite.
   Veins.

8. **Teviston (?).** Au, Ag, Pb.
   
   16 miles SE. Bowie, 10 miles WSW. San Simon, S. P. R. R.
   1908, pt. 1, p. 298.

9. **Tombstone.** Au, Ag, Pb, Zn, Cu.
   
   Station E. P. & S. W. R. R.
   Paleozoic and Mesozoic sediments cut by porphyry.
   Veins, replacements.
   1885, p. 258.
   1905, pp. 145-146.
   1906, pp. 155-156.
   1908, pt. 1, p. 298.
   Top. sheet Tombstone special.

10. **Warren (Bisbee).** Cu, Au, Ag.
    
    Station E. P. & S. W. R. R.
    Paleozoic limestone cut by granite porphyry.
    Replacements, probably of contact-metamorphic origin.
COCHISE COUNTY—Continued.

10. **Warren (Bisbee)—Continued.**
   ——— The geology and ore deposits of the Bisbee quadrangle, Arizona; P. P. 21, 1904.
   Min. Res. 1882, pp. 221-224.
   1883-84, pp. 334-336.
   1885, p. 215.
   1886, p. 116.
   1887, p. 74.
   1888, p. 58.
   1905, pp. 143-144, 352.
   1906, pp. 156-158.
   1908, pt. 1, pp. 201-202, 298-299.
   1909, pt. 1, pp. 166, 243-244.
   Folio 112, 1904.

11. **Whetstone (Benson).** W.
   12 miles SSW. Benson, S. P. R. R.
   Granite.
   Veins.
   Min. Res. 1906, p. 525.
   1908, pt. 1, p. 725.

12. **Winchester.**
   20 miles N. Benson, S. P. R. R.

13. **Yellowstone (?)**. Au, Ag, Cu, Pb.
   Location not known.

COCONINO COUNTY.

14. **Francis.** Cu, Ag, Au.
   Williams, A. T. & S. F. R. R.
   Min. Res. 1906, p. 158.
   1907, pt. 1, p. 164.
   1909, pt. 1, p. 245.
   Top. sheet San Francisco Mountains.

15. **Grand Canyon.** Cu, Au.
   12 miles E. Grand Canyon, A. T. & S. F. R. R.
   Carboniferous sediments.
   Replacement shear zones.
   Min. Res. 1906, p. 158.
   1907, pt. 1, p. 164.
   1908, pt. 1, p. 299.
   Top. sheet San Francisco Mountains.
180 miles S. Marysville, Utah, R. G. W. R. R.
Paleozoic sediments.
Veins, disseminations.
Emmons, S. F., The copper in the red beds of the Colorado Plateau region
Weed, W. H., The copper deposits of the United States in 1905: Bull. 285,
1906, p. 103.
Top. sheet Kaibab.

17. Banner (Troy). Au, Ag, Cu.
8 miles NE. Kelvin, A. E. R. R.
Paleozoic sediments cut by diabase, quartz monzonite, and porphyry.
Replacements.
Top. sheet Ray.

Station A. E. R. R.
Pre-Cambrian schist, dacite, and dacite tuff.
Disseminated.
Min. Res. 1905, p. 147.
Top. sheet Globe.
Folio 111.

9 miles N. Winkelman, A. E. R. R.
Altered Paleozoic sediments cut by porphyry.
Contact metamorphic.
1907, pt. 1, pp. 167, 177, 598.
1908, pt. 1, p. 300.
1909, pt. 1, p. 246.

15 miles E. Kelvin, A. E. R. R.
Paleozoic sediments cut by diabase and monzonite porphyry.
Veins.
Top. sheet Ray.

112 miles SE. Jerome, U. V. & P. R. R.
Top. sheet Holbrook.

Station A. E. R. R.
Pre-Cambrian schist; Paleozoic sediments cut by granite, quartz monzonite, and diabase.
Replacements, veins, and disseminations.
397–410.
Weed, W. H., The copper mines of the United States in 1905: Bull. 285, 1906,
1885, p. 215.
Min. Res. 1887, p. 74.
1888, p. 58.
1904, pp. 236–237.
1905, pp. 146–147, 353.
1908, pt. 1, pp. 204, 300.
Top. sheet Globe.
Folio 111, 1905.

23. Green Valley (Payson). Au, Ag.
104 miles SE. Jerome, U. V. & P. R. R.
Top. sheet Verde.

24. Lost Gulch. Cu, Pb, Au, Ag.
8 miles NW. Black Warrior, A. E. R. R.
Paleozoic limestone cut by quartz monzonite and diabase.
Replacements.
1908, pt. 1, p. 300.
1909, pt. 1, p. 246.

25. Miami. Cu, Ag.
Station A. E. R. R.
Pre-Cambrian schist; Paleozoic sediments cut by granite and granite porphyry.
Disseminated.
1885, p. 215.
1887, p. 74.
1888, p. 58.
1904, pp. 236–237.
1905, pp. 146–147, 353.
1908, pt. 1, pp. 204, 300.
Top. sheet Globe.
Folio 111, 1904.

26. Pinto Creek. Cu, Ag, Au.
10 miles NW. Black Warrior, A. E. R. R.
Pre-Cambrian schists cut by granite and granite porphyry.
Disseminations.
27. **Aravaipa.** Pb, Cu, Ag, Au.
   75 miles NW. Willcox, S. P. R. R.; 30 miles SSE. San Carlos, A. E. R. R.

28. **Ash Peak.** Ag, Au.
   12 miles W. Seldon, A. & N. M. R. R.
   1907, pt. 1, p. 168.
   1908, pt. 1, p. 301.

29. **Bunker Hill (Copper Creek).** Cu, Au, Ag, Pb, Fe.
   36 miles SE. Winkelman, A. E. R. R.
   Limestone, diorite, rhyolite.
   Disseminated, contact metamorphic.
   1907, pt. 1, p. 168.

30. **Clark.** Cu, Au, Ag, Pb.
   35 miles W. Safford, A. E. R. R.

31. **Copper Mountain (Morenci).** Cu, Au, Ag.
   Station A. & N. M. R. R.
   Paleozoic sediments cut by acidic porphyry.
   Contact metamorphic, veins, disseminated.
   Lindgren, W., Copper deposits at Clifton, Ariz.: Bull. 213, 1903, pp. 133–140.
   1885, p. 215.
   1886, p. 118.
   1887, p. 75.
   1888, p. 58.
   1904, pp. 235–236.
   1908, pt. 1, pp. 203–204, 301.
   Top. sheet Clifton.
   Folio 129, 1905.

32. **Greenlee (Metcalf).** Cu, Au, Ag.
   Station A. & N. M. R. R.
   Paleozoic sediments cut by acidic porphyries.
   Contact metamorphic, veins, and disseminated.
   Lindgren, W., Copper deposits at Clifton, Ariz.: Bull. 213, 1903, pp. 133–140.
32. **Greenlee (Metcalf)**—Continued.

1885, p. 215.
1886, p. 116.
1887, p. 75.
1888, p. 58.
1904, pp. 235-236.
1905, pp. 148-149, 353.
1908, pt. 1, pp. 203-204, 301.
Top. sheet Clifton.
Folio 129, 1905.

33. **Lone Star.** Cu, Au, Ag.
7 miles N. Solomonsville, A. E. R. R.
Min. Res. 1906, p. 162.
1907, pt. 1, p. 170.
1908, pt. 1, p. 301.

34. **Stanley.** Au, Ag, Pb.
18 miles SSE. San Carlos, A. E. R. R.
Min. Res. 1905, p. 149.
1906, p. 162.

35. **Agua Fria.** Au.
25 miles W. Phoenix, S. F. P. & P. R. R., A. E. R. R.
Veins (?).
Min. Res. 1905, p. 149.
1906, p. 162.
1907, pt. 1, p. 171.
1908, pt. 1, p. 302.

36. **Cave Creek.** Au, Cu, Ag.
30 miles NNE. Phoenix, S. F. P. & P. R. R., A. E. R. R.
Pre-Cambrian granite and schists cut by basic dikes.
Veins.
Min. Res. 1904, p. 149.
1908, pt. 1, p. 302.

37. **San Domingo.** Cu, Au, Ag.
Hot Springs Junction, S. F. P. & P. R. R.
38. **Vulture.** Au (Cu, Ag).
   20 miles SW. Wickenburg, S. F. P. & P. R. R.
   Pre-Cambrian schist cut by diabase.
   Veins.
   Min. Res. 1905, p. 150.
   1908, pt. 1, p. 302.

39. **Wickenburg.** Au, Ag.
    Station S. F. P. & P. R. R.

**MOHAVE COUNTY.**

40. Omitted.

41. **Bentley.** Cu, Ag (Au).
    Sediments.
    Replacements.
    Min. Res. 1905, p. 150.
    1906, p. 163.
    1907, pt. 1, p. 172.
    1908, pt. 1, p. 303.
    1909, pt. 1, p. 249.
    Top. sheet Mount Trumbull.

42. **Boundary Cone.** Au, Ag.
    12 miles NE. Needles, Cal., A. T. & S. F. R. R.
    Tertiary volcanics.
    Veins.
    Schrader, F. C., Mineral deposits of the Cerbat Range, Black Mountains, and
    Grand Wash Cliffs, Mohave County, Ariz.: Bull. 340, 1908, p. 82; Bull. 397,
    1909, pp. 198-203.
    Min. Res. 1905, pp. 151-152.
    Top. sheet Needles special.

43. **Cedar Valley (McCracken).** Pb, Ag, Cu, Au, W.
    35 miles SE. Yucca, A. T. & S. F. R. R.
    Pre-Cambrian gneiss and schist.
    Veins.
    Bancroft, H., Reconnaissance of the ore deposits in northern Yuma County,
    Schrader, F. C., Mineral deposits of the Cerbat Range, Black Mountains, and
    Min. Res. 1905, pp. 150, 412.
    1906, p. 163.
    1907, pt. 1, p. 172.
    1908, pt. 1, p. 725.

44. **Cerbat (Hualpai).** Au, Ag, Pb.
    14 miles NW. Kingman, A. T. & S. F. R. R.
    Pre-Cambrian gneiss and schist cut by granite porphyry.
    Veins.
    Schrader, F. C., Mineral deposits of the Cerbat Range, Black Mountains, and
    397, 1909, pp. 91-107.
    1906, pp. 164-165.
    1907, pt. 1, p. 173.
    1908, pt. 1, pp. 303-304.
MOHAVE COUNTY—Continued.

45. Chemehuevis. Au, Ag, Pb. (D, Pl.)
   40 miles SSW. Franconia, A. T. & S. F. R. R.
   Top. sheet Parker.

46. Chloride (Hualpai). Ag, Pb, Au, Cu.
   Station A. T. & S. F. R. R.
   Pre-Cambrian granite, gneiss, and schist cut by granite porphyry.
   Veins.
   Schrader, F. C., Mineral deposits of the Cerbat Range, Black Mountains, and
   Grand Wash Cliffs, Mohave County, Ariz.: Bull. 340, 1908, pp. 62-65; Bull. 397,
   1909, pp. 51-80.
   Min. Res. 1905, p. 752.
   1906, pp. 164-165.
   1907, pt. 1, p. 173.
   1908, pt. 1, pp. 303-304.
   Top. sheet Camp Mohave.

47. Eldorado Pass. Au, Ag, Cu.
   50 miles NE. Searchlight, B. & S. R. R.
   Pre-Cambrian granite, gneiss, and schist cut by Tertiary volcanics.
   Veins.
   Schrader, F. C., Mineral deposits of the Cerbat Range, Black Mountains, and
   Grand Wash Cliffs, Mohave County, Ariz.: Bull. 340, 1908, pp. 72; Bull. 397,
   1909, p. 218.
   Top. sheet Camp Mohave.

48. Gold Basin. Au, Pb, Cu, Mo, W.
   40 miles N. Hackberry, A. T. & S. F. R. R.
   Pre-Cambrian gneiss, schist, and granite.
   Veins.
   Schrader, F. C., Mineral deposits of the Cerbat Range, Black Mountains, and
   Grand Wash Cliffs, Mohave County, Ariz.: Bull. 340, 1908, pp. 69-70; Bull. 397,
   1909, pp. 118-127.
   1906, p. 163.
   1908, pt. 1, p. 303.
   1909, pt. 1, p. 249.
   Top. sheet Camp Mohave.

   40 miles NW. Chloride, A. T. & S. F. R. R.
   Tertiary volcanics.
   Veins.
   Schrader, F. C., Mineral deposits of the Cerbat Range, Black Mountains, and
   Grand Wash Cliffs, Mohave County, Ariz.: Bull. 340, 1908, pp. 72-73; Bull. 397,
   1909, p. 217.
   Top. sheet Camp Mohave.

50. Gold Road (San Francisco). Au.
   16 miles NE. Needles, Cal., 24 miles W. Kingman, A. T. & S. F. R. R.
   Tertiary Volcanics.
   Veins.
   Schrader, F. C., Mineral deposits of the Cerbat Range, Black Mountains, and
   Grand Wash Cliffs, Mohave County, Ariz.: Bull. 340, 1908, pp. 75-78; Bull. 397,
   Min. Res. 1905, pp. 151-152.
   1906, pp. 163-164.
   1907, pt. 1, pp. 172-173.
   1908, pt. 1, p. 303.
   Top. sheet Camp Mohave.
51. **Hackberry.** Ag.
    Station A. T. & S. F. R. R.
    Top. sheet Diamond Creek.

52. **Hualpai.** Cu.
    20 miles E. Yucca, A. T. & S. F. R. R.
    Pre-Cambrian granite.
    Veins.

53. **Lost Basin.** Au, Ag, Cu.
    60 miles N. Chloride, A. T. & S. F. R. R.
    Pre-Cambrian granite.
    Veins.
    Top. sheet St. Thomas.

54. **Maynard.** Au, Cu (Mo, Hg, W).
    15 miles SE. Kingman, A. T. & S. F. R. R.
    Pre-Cambrian granite cut by porphyry.
    Veins.
    Top. sheet Diamond Creek.

55. **McConnico.** Au.
    Station A. T. & S. F. R. R.
    Pre-Cambrian granite and pegmatite.
    Shear zones.
    1906, pp. 164–165.
    1907, pt. 1, p. 173.
    1908, pt. 1, pp. 303–304.

56. **Mineral Park (Hualpai).** Au, Ag, Pb, Cu.
    5 miles SSE. Chloride, A. T. & S. F. R. R.
    Pre-Cambrian complex cut by granite porphyry.
    Veins.
    1906, pp. 164–165.
    1907, pt. 1, p. 173.
    1908, pt. 1, pp. 303–304.

57. **Mocking Bird (Weaver).** Au.
    24 miles NW. Chloride, A. T. & S. F. R. R.
    Pre-Cambrian granite, gneiss, schist, cut by Tertiary volcanics.
    Veins.
    1908, pt. 1, p. 304.
    Top. sheet Camp Mohave.
25 miles N. Hackberry, A. T. & S. F. R. R.
Pre-Cambrian complex cut by acidic and basic dikes.
Veins.
Schrader, F. C., Mineral deposits of the Cerbat Range, Black Mountains,
and Grand Wash Cliffs, Mohave County, Ariz.: Bull. 340, 1908, p. 71;
1908, pt. 1, p. 303.
1909, pt. 1, p. 249.
Top. sheet Diamond Creek.

12 miles W. Chloride, A. T. & S. F. R. R.
Rhyolite and granite porphyry.
Veins.
Schrader, F. C., Mineral deposits of the Cerbat Range, Black Mountains,
and Grand Wash Cliffs, Mohave County, Ariz.: Bull. 340, 1908, p. 74;
1906. pp. 164-165.
1908. pt. 1, pp. 303-304.
Top. sheet Camp Mohave.

60. Signal (Greenwood). Au, W.
107 miles SSE. Kingman, A. T. & S. F. R. R.
Schrader, F. C., Mineral deposits of the Cerbat Range, Black Mountains,
and Grand Wash Cliffs, Mohave County, Ariz.: Bull. 340, 1908, p. 74;
1906, pp. 164–165.
1907, pt. 1, p. 173.
1908, pt. 1, pp. 303–304.
Top. sheet Camp Mohave.

61. Stockton Hill (Hualpai). Pb, Ag, Au, Cu.
10 miles NNW. Kingman, A. T. & S. F. R. R.
Pre-Cambrian complex cut by acidic and basic dikes.
Veins.
Schrader, F. C., Mineral deposits of the Cerbat Range, Black Mountains,
and Grand Wash Cliffs, Mohave County, Ariz.: Bull. 397, 1909, p. 47.

30 miles WNW. Kingman, A. T. & S. F. R. R.
Pre-Cambrian complex cut by Tertiary volcanics.
Veins.
Schrader, F. C., Mineral deposits of the Cerbat Range, Black Mountains,
and Grand Wash Cliffs, Mohave County, Ariz.: Bull. 340, 1908, pp. 74-75;
1906, pp. 163–164.
1908, pt. 1, p. 303.
1909, pt. 1, p. 249.
Top. sheet Camp Mohave.

63. Virginia (Weaver). Au.
25 miles NW. Chloride, A. T. & S. F. R. R.
Tertiary volcanics.
Veins.
Schrader, F. C., Mineral deposits of the Cerbat Range, Black Mountains,
and Grand Wash Cliffs, Mohave County, Ariz.: Bull. 340, 1908, p. 74;
ARIZONA.

MOHAVE COUNTY—Continued.

63. Virginia (Weaver)—Continued.
1909, pt. 1, p. 250.
Top. sheet Camp Mohave.

64. Vivian (San Francisco). Au.
14 miles NE. Needles, Cal., A. T. & S. F. R. R.
Tertiary volcanics.
Veins.
Schrader, F. C., Mineral deposits of the Cerbat Range, Black Mountains,
and Grand Wash Cliffs, Mohave County, Ariz.: Bull. 340, 1908, pp. 78–81;
1906, pp. 163–164.
1908, pt. 1, p. 303.
1909, pt. 1, p. 249.

65. White Hills (Indian Secret). Au, Ag.
30 miles NNW. Chloride, A. T. & S. F. R. R.
Pre-Cambrian complex.
Veins.
Schrader, F. C., Mineral deposits of the Cerbat Range, Black Mountains,
Min. Res. 1906, p. 163.
Top. sheet Camp Mohave.

PIMA COUNTY.

45 miles SSW. Gila Bend, S. P. R. R.
Eruptives (?)
Replacements (?)
1906, p. 166.
1908, pt. 1, p. 304.
1909, pt. 1, p. 250.

10 miles WNW. Tucson, S. P. R. R.
Tertiary volcanics.
Veins.
1906, p. 166.
1908, pt. 1, p. 304.
1909, pt. 1, p. 250.

68. Arivaca. Au, Cu, Ag, Pb, W.
25 miles SW. Twin Buttes, 70 miles SSW. Tucson, S. P. R. R.
Granite.
Veins.
1906, pp. 166, 525.
1908, pt. 1, pp. 305, 725.

21528°—Bull. 507—12—5
69. Baboquivari. Au, Ag.
   60 miles SW. Tucson, S. P. R. R.
   Min. Res. 1906, p. 166.
   1908, pt. 1, p. 305.

70. Cababi (Comobabi). Ag, Cu.
   75 miles WSW. Tucson, S. P. R. R.
   Min. Res. 1905, p. 166.

71. Empire. Pb, Ag, Cu.
   9 miles S. Pantano, S. P. R. R.
   Paleozoic sediments cut by acidic intrusives.
   Replacements.
   Min. Res. 1906, p. 166.
   1907, pt. 1, p. 175.
   1908, pt. 1, p. 305.

72. Greaterville. Au, Ag. (D, Pl.)
   15 miles NW. Sonoita, S. P. R. R.
   Granite (pre-Cambrian?), Paleozoic sediments cut by acidic intrusives.
   Veins and replacements.
   1906, pp. 166-167.
   1908, pt. 1, p. 305.

73. Gunsight.
   60 miles S. Gila Bend, S. P. R. R.
   Contact metamorphic (?)?

74. Helvetia. Cu, Au, Ag, Pb, Mo.
   17 miles S. Vail, S. P. R. R.
   Granite (pre-Cambrian?), Paleozoic sediments cut by acidic intrusives.
   Veins, replacements, contact metamorphic.
   Schrader, F. C., and Hill, J. M., Some occurrences of molybdnite in the
   Santa Rita and Patagonia mountains, Ariz.: Bull. 430, 1910, pp. 154-158.
   1907, pt. 1, p. 175.
   1908, pt. 1, p. 305.

75. Montezuma (Sonoita Mountains).
   100 miles S. Gila Bend, S. P. R. R.

76. Old Baldy. Cu, Au, Ag, (Fe, Mo).
   45 miles SSE. Tucson, S. P. R. R.
   Pre-Cambrian granite and schist cut by acidic volcanics, capped by Tertiary
   volcanics.
   Veins.
   Schrader, F. C., and Hill, J. M., Some occurrences of molybdnite in the
   Top. sheet Patagonia.
ARIZONA.

PIMA COUNTY—Continued.

77. Pima (Olive, San Xavier, Twin Buttes). Cu, Ag, Pb, Au.
    Station Twin Buttes, S. P. R. R.
    Paleozoic sediments cut by granite.
    Contact metamorphic.
    1906, pp. 168, 391.
    1907, pt. 1, p. p, 175.
    1908, pt. 1, p. 305.

78. Quijota. Au, Cu, Ag, Pb. (D, Pl.)
    70 miles SSW. Casa Grande, S. P. R. R.
    1906, p. 167.
    1907, pt. 1, p. 175.
    1908, pt. 1, p. 305.

    18 miles E. Tucson, S. P. R. R.
    Min. Res. 1907, pt. 1, p. 175.
    Top. sheet Tucson.

80. Santa Rosa. Cu, Au, Ag.
    15 miles WSW. Silver Bell, A. S. R. R.

81. Silver Bell. Cu, Pb, Ag, Au.
    Station A. S. R. R.
    Paleozoic sediments cut by granite porphyry.
    Contact metamorphic, disseminated, veins.
    Weed, W. H., The copper mines of the United States in 1905: Bull. 285, 1906,
    pp. 102–103.
    1906, pp. 167, 391.
    1907, pt. 1, pp. 175–176, 598.
    1908, pt. 1, pp. 204, 305.

82. Silver Hill. Au, Ag, Cu, Pb.
    18 miles SW. Tucson, S. P. R. R.

FINAL COUNTY.

83. Bunker Hill (Copper Creek). Cu, Au, Ag, Pb, Fe.
    33 miles SSE. Winkelman, A. E. R. R.
    Limestone, diorite, rhyolite.
    Disseminated, contact metamorphic.
    1909, pt. 1, p. 252.

84. Gold Mountains (Galiuro). Au.
    10 miles SE. Winkelman, A. E. R. R.
    Tertiary volcanics.
    Veins (?).

85. Mammoth. Au, Mo.
    21 miles SSE. Winkelman, A. E. R. R.
    Tertiary volcanics.
    Veins.
MINING DISTRICTS OF WESTERN UNITED STATES.

FINAL COUNTY—Continued.

86. **Mineral Creek (Ray, Kelvin)**. Cu.
   7 miles N. Kelvin, A. E. R. R.
   Pre-Cambrian schist, Paleozoic sediments.
   Disseminated.
   1905, p. 154.
   1906, p. 169.
   1907, pt. 1, pp. 176–177, 599.
   Top. sheet Ray.

87. **Mineral Hill**. Cu, Ag, Au, Pb.
   Location uncertain.

88. **Old Hat (Oracle)**. Au, Ag, Pb, W. (D, Pl.)
   38 miles N. Tucson, S. P. R. R.
   Pre-Cambrian granite.
   Veins.
   1906, p. 169.
   1907, pt. 1, p. 177.

89. **Pioneer**. Cu, Pb, Ag, Au, Zn.
   10 miles NE. Kelvin, A. E. R. R.
   Paleozoic sediments cut by diabase.
   Veins.
   1906, p. 169.
   1907, pt. 1, p. 177.
   1908, pt. 1, p. 306.
   Top. sheet Ray.

90. **Riverside**. Au, Ag, Cu, Pb.
   5 miles E. Kelvin, A. E. R. R.
   Paleozoic sediments cut by diabase and monzonite porphyry.
   Veins (?).
   1906, p. 169.
   1907, pt. 1, p. 177.
   Top. sheet Ray.

91. **Silver King**. Ag, Cu.
   39 miles NE. Florence, A. E. R. R.
   Pre-Cambrian schist and Paleozoic sediments cut by syenite.
   Veins.
   Top. sheet Florence.

92. **Vekol (Casa Grande)**. Cu, Au, Ag, Pb.
   28 miles S. Casa Grande, S. P. R. R.
   Contact metamorphic (?).
92. Vekol (Casa Grande)—Continued.

1908, pt. 1, p. 306.
1909, pt. 1, p. 252.

SANTA CRUZ COUNTY.

93. Harshaw. Ag, Au, Cu, Pb.
12 miles S. Patagonia, S. P. R. R.
Paleozoic sediments and Tertiary volcanics.
Veins, replacements.
Top. sheet Nogales.

94. Mowry. Ag, Pb, Au, Cu.
15 miles S. Patagonia, S. P. R. R.
Granite (pre-Cambrian?), Paleozoic sediments.
Veins.
Min. Res. 1905, pp. 155, 156.
1906, p. 170.
1907, pt. 1, p. 178.
Top. sheet Nogales.

95. Nogales. Au, Cu, W.
8 miles N. Nogales, S. P. R. R.
Granite (pre-Cambrian?), cut by acidic and basic dikes.
Veins.
Hill, J. M., Notes on the occurrence of tungsten minerals near Calabasas,
Top. sheet Nogales.

96. Oro Blanco. Au, Ag, Cu.
30 miles W. Nogales, 77 miles SSW. Tucson, S. P. R. R.
1907, pt. 1, p. 178.

97. Palmetto. Ag, Pb, Cu.
15 miles SW. Patagonia, S. P. R. R.
Granite (pre-Cambrian?), cut by acidic and basic dikes.
Veins and disseminations.
Top. sheet Nogales.

98. Patagonia. Cu, Au, Ag, Pb, Mo.
15 miles E. Nogales, S. P. R. R.
Granite (pre-Cambrian?), cut by acidic and basic dikes.
Veins.
Schrader, F. C., and Hill, J. M., Some occurrences of molybdenite in the
98. **Patagonia**—Continued.
   Min. Res. 1906, p. 171.
   Top. sheet Nogales.

99. **Red Rock.** Ag, Pb, Cu, Au, Fe.
   18 miles E. Patagonia, S. P. R. R.
   Tertiary volcanics.
   Veins.
   Top. sheets Patagonia, Nogales.

100. **San Cayetano.** Ag, Pb, Cu.
    8 miles N. Calabasas, S. P. R. R.
    Granite (pre-Cambrian?), Tertiary volcanics.
    Veins.
    Top. sheet Patagonia.

101. **Tyndall (Aztec).** Au, Ag, Cu, Pb.
     20 miles NNW. Patagonia, S. P. R. R.
     Granite (pre-Cambrian?) cut by diorite, capped by Tertiary volcanics.
     Veins.
     1907, pt. 1, p. 178.
     Top. sheet Patagonia.

102. **Washington (Duquesne).** Cu, Au, Ag, Pb, Zn.
     20 miles E. Nogales, 21 miles S. Patagonia, S. P. R. R.
     Granite (pre-Cambrian?) Paleozoic sediments cut by acidic dikes.
     Veins, contact metamorphic.
     Schrader, F. C., and Hill, J. M., Some occurrences of molybdenite in the
     1905, p. 156.
     1907, pt. 1, p. 178.
     Top. sheet Nogales.

103. **Wrightson.** Ag, Au, Pb, Cu.
     14 miles N. Patagonia, S. P. R. R.
     Tertiary volcanics.
     Veins.
     Min. Res. 1906, p. 171.
     1907, pt. 1, p. 178.
     Top. sheet Patagonia.

**YAVAPAi COUNTY.**

104. **Agua Fria.** Cu.
     3 miles E. Mayer, S. F. P. & P. R. R.
     Schists.
     Impregnations.
104. **Agua Fria**—Continued.

Min. Res. 1905, p. 158.
1906, p. 172.
1908, pt. 1, p. 309.
1909, pt. 1, p. 255.
Top. sheet Bradshaw Mountains.
Folio 126, 1905.

105. **Big Bug.** Au, Ag, Cu, Pb, Zn. (D, Pl.)

4 miles SE. Mayer, S. F. P. & P. R. R.
Schists.
Veins, disseminations.
1908, pt. 1, p. 309.
1909, pt. 1, p. 255.
Top. sheet Bradshaw Mountains.
Folio 126, 1905.

106. **Black Canyon.** Au, Ag.

10 miles SE. Turkey, S. F. P. & P. R. R.
Schists cut by granite.
Veins.
Min. Res. 1905, p. 159.
1906, p. 174.
1907, pt. 1, p. 181.
1908, pt. 1, p. 310.
1909, pt. 1, p. 255.
Top. sheet Bradshaw Mountains.
Folio 126, 1905.

107. **Black Hills.** Cu, Au, Ag.

15 miles S. Jerome, U. V. & P. R. R.
Min. Res. 1905, p. 159.
1906, p. 174.
1907, pt. 1, p. 181.
1908, pt. 1, p. 310.
Top. sheet Jerome.

108. **Black Rock.** Au, Ag, Cu.

14 miles NE. Wickenburg, S. F. P. & P. R. R.
Schists.
Veins.
Min. Res. 1905, p. 159.
1906, p. 174.
1908, pt. 1, p. 310.
1909, pt. 1, p. 256.

109. **Cherry Creek.** Au, Ag.

18 miles E. Dewey, S. F. P. & P. R. R.
Schist and granite, pre-Cambrian.
Veins.
109. **Cherry Creek**—Continued.
   Min. Res. 1907, pt. 1, p. 182.
   1908, pt. 1, p. 310.
   1909, pt. 1, p. 256.

110. **Congress.** Au, Ag.
    Station S. F. P. & P. R. R.
    Granite.
    Veins.
    Min. Res. 1905, p. 159.
    1906, p. 175.
    1908, pt. 1, p. 311.
    1909, pt. 1, p. 256.
    Top. sheet Congress.

111. **Copper Basin.** Cu, Au, Ag.
     8 miles SW. Harrington, S. F. P. & P. R. R.
     Schist cut by granite and quartz diorite.
     Veins.
     1906, p. 174.
     1907, pt. 1, p. 183.
     1908, pt. 1, p. 310.
     1909, pt. 1, p. 256.

112. **Del Rio.** Au. (Pl.)
     10 miles SSE. Junction, S. F. P. & P. R. R.
     Wash gravels.
     Top. sheet Jerome.

113. **Eureka.** Au, Ag, Cu.
     28 miles NW. Hillside, S. F. P. & P. R. R.
     1907, pt. 1, p. 183.
     1908, pt. 1, p. 310.
     1909, pt. 1, p. 256.

114. **Hassayampa.** Au, Ag, Cu, Pb.
     Poland station, S. F. P. & P. R. R.
     Schist and amphibolite cut by quartz diorite.
     Veins.
     Min. Res. 1905, p. 159.
     1906, p. 175.
     1907, pt. 1, p. 183.
     1909, pt. 1, p. 256.
     Top. sheet Bradshaw Mountains.
     Folio 126, 1905.

115. **Peck.** Au, Ag, Cu, Pb.
     8 miles SE. Turkey, S. F. P. & P. R. R.
     Slate and quartzite.
     Vein.
     1906, p. 175.
     1907, pt. 1, pp. 184, 185.
     1908, pt. 1, p. 311.
     1909, pt. 1, p. 256.
115. **Peck**—Continued.
   Top. sheet Bradshaw Mountains.
   Folio 126, 1905.

116. **Squaw Creek.** Au, Ag:
   15 miles E. Turkey, S. F. P. & P. R. R.
   Schist and granite.
   Veins.
   Min. Res. 1906, p. 175.

117. **Thumb Butte.** Au, Ag:
   18 miles NNW. Hillside, S. F. P. & P. R. R.
   1907, pt. 1, p. 184.
   Top. sheet Prescott.

118. **Tiger** (Crown King, Harrington). Au, Ag, Pb, Zn, Cu.
   Station S. F. P. & P. R. R.
   Schist cut by granite and quartz diorite.
   Veins.
   Min. Res. 1905, p. 163.
   1906, p. 176.
   1908, pt. 1, p. 311.
   1909, pt. 1, p. 256.
   Top. sheet Bradshaw Mountains.
   Folio 126, 1905.

119. **Tip Top** (Bradshaw Mountains). Au (W).
   8 miles S. Crown King, S. F. P. & P. R. R.
   Granite.
   Veins.
   Weed, W. H., The copper mines of the United States in 1905: Bull. 285, 1906,
   p. 103.
   Top. sheet Bradshaw Mountains.
   Folio 126, 1905.

120. **Verde.** Au, Cu, Ag.
   Jerome station, U. V. & P. R. R.
   Amphibolite schist.
   Replacements.
   Weed, W. H., The copper mines of the United States in 1905: Bull. 285, 1906,
   p. 103.
   Min. Res. 1887, p. 75.
   1888, pp. 58-59.
   1904, p. 237.
   1906, pp. 176-177, 389-390.
   1907, pt. 1, pp. 185, 597-598.
   Top. sheet Jerome.

121. **Walker.** Au, Ag, Pb, Cu. (D, Pl.)
   8 miles NW. Poland, S. F. P. & P. R. R.
   Schist and granite cut by quartz diorite.
   Veins.
   1906, p. 176.
YAVAPAI COUNTY—Continued.

121. Walker—Continued.
Min. Res. 1907, pt. 1, p. 185.
1908, pt. 1, p. 312.
Top. sheet Bradshaw Mountains.
Folio 126, 1905.

122. Weaver (Rich Hill). Au, Ag, Pb. (D, Pl.)
10 miles E. Congress, S. F. P. & P. R. R.
1906, p. 176.
1907, pt. 1, p. 185.
1908, pt. 1, p. 312.
1909, pt. 1, p. 257.
Top. sheet Congress.

123. White Picacho. Cu, Au, Ag.
24 miles NE. Morristown, S. F. P. & P. R. R.

YUMA COUNTY.

124. Castle Dome. Pb, Ag (Au, Cu).
25 miles NNE. Yuma, S. P. R. R.
Pre-Cambrian granite and schist cut by granite and monzonite porphyry.
Tertiary volcanics.
Veins (?).
Bancroft, H., Ore deposits in northern Yuma County, Ariz.: Bull. 451, 1911, pp. 32, 45.
1906, p. 177.
1907, pt. 1, p. 186.
1908, pt. 1, p. 313.
1909, pt. 1, p. 258.

125. Cienega. Au, Cu, Ag (Pb).
15 miles NE. Parker, A. T. & S. F. R. R.
Pre-Cambrian schist capped by Tertiary volcanics.
Veins.
Bancroft, H., Ore deposits in northern Yuma County, Ariz.: Bull. 451, 1911, pp. 68–73.
Min. Res. 1905, p. 162.
1908, pt. 1, p. 313.
1909, pt. 1, p. 258.
Top. sheet Parker.

12 miles N. Wenden, A. T. & S. F. R. R.
Pre-Cambrian schist cut by granite.
Veins, contact metamorphic.
Bancroft, H., Ore deposits in northern Yuma County, Ariz.: Bull. 451, 1911, pp. 95–103.
1909, pt. 1, p. 258.

9 miles S. Salome, A. T. & S. F. R. R.
Pre-Cambrian complex cut by basic dikes.
127. Harquahala—Continued.
Veins.
Bancroft, H., Ore deposits in northern Yuma County, Ariz.: Bull. 451, 1911,
1906, p. 177.
1908, pt. 1, p. 313.

128. Kofa (Humbug, Polaris). Au, Ag.
45 miles NNW. Mohawk, S. P. R. R.
Pre-Cambrian complex and Tertiary volcanics.
Veins.
Bancroft, H., Ore deposits in northern Yuma County, Ariz.: Bull. 451, 1911,
p. 45.
1906, p. 177.
1907, pt. 1, p. 187.
1908, pt. 1, p. 313.
1909, pt. 1, p. 256.

129. La Fortuna. Au.
36 miles SE. Yuma, S. P. R. R.
Pre-Cambrian schists.
Veins.

130. Laguna. Au. (Pt.)
14 miles NE. Yuma, S. P. R. R.
Wash gravels.

28 miles NNW. Bouse, A. & S. R. R.
Pre-Cambrian schists and sediments.
Replacements.
397–410.
Bancroft, H., Ore deposits in northern Yuma County, Ariz.: Bull. 451, 1911,

132. Plomosa. Cu, Ag, Au. (D, Pt.)
18 miles WSW. Vicksburg, A. T. & S. F. R. R.
Pre-Cambrian schists capped by Tertiary volcanics.
Veins.
Bancroft, H., Ore deposits in northern Yuma County, Ariz.: Bull. 451, 1911,
pp. 21–22, 33, 87–95.
1906, pp. 177, 495.
1907, pt. 1, p. 187.
1908, pt. 1, pp. 313, 692.
1909, pt. 1, p. 258.

133. Santa Maria (Bighorn). Au, Ag, Cu.
30 miles NNE. Wenden, A. T. & S. F. R. R.
Bancroft, H., Ore deposits in northern Yuma County, Ariz.: Bull. 451, 1911,
pp. 122–123.

134. Silver. Pb, Ag.
30 miles NNE. Yuma, S. P. R. R.
135. Swansea. Cu, Au, Ag.
Station, A. & S. R. R.
Pre-Cambrian schists and sediments.
Replacements.

Station, A. T. & S. F. R. R.
Pre-Cambrian schists cut by granite.
Contact metamorphic, veins.
Bancroft, H., Ore deposits in northern Yuma County, Ariz.: Bull. 451, 1911, pp. 95–104.

137. Weaver (La Paz). Hg, Cu, Au.
55 miles WSW. Vicksburg, A. T. & S. F. R. R.
Pre-Cambrian schists capped by Tertiary volcanics.
Veins.
Bancroft, H., Ore deposits in northern Yuma County, Ariz.: Bull. 451, 1911.
CALIFORNIA, NORTHERN COUNTIES.

The State of California maintains a Bureau of Mines, from which a large number of reports dealing with the mining industry of the State have come. These reports contain much information relative to the mining districts which has not been listed in this bibliography.

In the 31 northern counties of California there are 222 areas called mining districts by the United States Geological Survey. In 178 of these districts gold is the principal metal produced; in 16 districts quicksilver, in 14 iron or chromium, in 13 copper, and in 1 silver.

Distribution of the predominant metals produced in the mining districts of the northern counties of California.

<table>
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<th>County</th>
<th>Gold</th>
<th>Silver</th>
<th>Copper</th>
<th>Quicksilver</th>
<th>Iron</th>
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178 1 13 16 14 222

MINING DISTRICTS IN NORTHERN COUNTIES OF CALIFORNIA.

[See Pl. IV. Additional references may be found in Mineral Resources for 1910 and 1911.]

ALAMEDA COUNTY.

Serpentine.
Lenses.
Top. sheet Concord.

2. Livermore (Tesla). Mn, Cr.
15 miles SE. Livermore, S. P. R. R.
Serpentine and chert.
Lenses.
ALAMEDA COUNTY—Continued.

2. Livermore (Tesla)—Continued.
Min. Res. 1885, pp. 349-350, 357.
1908, pt. 1, p. 767.
Top. sheet Tesla.

ALPINE COUNTY.

3. Silver Mountain (Leviathan). Ag, Au.
25 miles SSW. Minden, Nev., V. & T. R. R.
Tertiary volcanics.
Veins.
Lindgren, W., Tertiary gravels of the Sierra Nevada: P. P. 73, 1911, p. 191.
Top. sheet Markleeville.

AMADOR COUNTY.

Station Am. C. R. R.
Slates and greenstones.
Veins.
1906, p. 186.
1907, pt. 1, p. 201.
1908, pt. 1, p. 327.
Top. sheet Jackson.
Folio 11, 1894.

5. Lancha Plana. Au. (Pl.)
8 miles NE. Wallace, S. P. R. R.
Bench gravels.
1906, p. 186.
1907, pt. 1, p. 201.
1908, pt. 1, p. 328.
Top. sheet Jackson.
Folio 11, 1894.

6. Middle Bar. Au. (Pl.)
10 miles SW. Jackson, Am. C. R. R.
Terrace gravels.
Top. sheet Jackson.
Folio 11, 1894.

7. Oleta. Au. (Pl.)
21 miles NE. May, S. P. R. R.
Quaternary and Tertiary gravels.
Lindgren, W., Tertiary gravels of the Sierra Nevada: P. P. 73, 1911, p. 199.
1906, p. 186.
1907, pt. 1, p. 201.
1908, pt. 1, p. 328.
Top. sheet Placerville.
Folio 3, 1894.
CALIFORNIA, NORTHERN COUNTIES.

AMADOR COUNTY—Continued.

10 miles NE. Jackson, Am. C. R. R.
Terrace gravels.
1906, p. 186.
1907, pt. 1, p. 201.
Top. sheet Jackson.
Folio 11, 1894.

9. Plymouth (Drytown). Au. (D, Pl.)
12 miles ENE. of May, S. P. R. R.
Slates and greenstone.
Veins.
1906, p. 186.
1907, pt. 1, p. 201.
1908, pt. 1, pp. 327, 328.
Top. sheet Jackson.
Folios 11, 1894; 63, 1900.

10. Sutter Creek (Amador). Au.
5 miles N. Martell, Am. C. R. R.
Slates and greenstone.
Veins.
1906, p. 186.
1907, pt. 1, p. 201.
Top. sheet Jackson.
Folios 11, 1894; 63, 1900.

11. Volcano. Au. (Pl.)
13 miles NE. Jackson, Am. C. R. R.
Quaternary and Tertiary gravels.
Lindgren, W., Tertiary gravels of the Sierra Nevada: P. P. 73, 1911, p. 199.
1906, p. 186.
1907, pt. 1, p. 201.
1909, pt. 1, p. 271.
Top. sheet Jackson.
Folio 11, 1894.

15 miles SE. Oroville, S. P. R. R.
Tertiary river gravels.
Top. sheet Smartsville.
Folio 18, 1895.

12 miles N. Oroville, S. P. R. R.
Tertiary river gravels.
1906, p. 187.

BUTTE COUNTY.

Top. sheet Chico.


22 miles E. Oroville, S. P. R. R.
Diorite cut by granite.
Veins.

Turner, H. W., Further contributions to the geology of the Sierra Nevada:
1906, p. 187.
1908, pt. 1, pp. 328, 769.
Top. sheet Bidwell Bar.
Folio 43, 1898.

15. Inskip. Au.

7 miles N. Sterling City, B. C. R. R.
Diorite cut by granite.
Veins.

1908, pt. 1, p. 329.
Top. sheet Chico.


Station B. C. R. R.
Tertiary river gravels.

Turner, H. W., Further contributions to the geology of the Sierra Nevada:
Lindgren, W., Tertiary gravels of the Sierra Nevada: P. P. 73, 1911, pp. 90–93.
1908, pt. 1, p. 329.
Top. sheet Chico.

17. Nimshew. Au. (Pl.)

21 miles N.E. Chico, S. P. R. R.
Tertiary river gravels.

Lindgren, W., Tertiary gravels of the Sierra Nevada: P. P. 73, 1911, pp. 95–98.
1907, pt. 1, p. 203.
Top. sheet Chico.

18. Oroville. Au, Pt. (Pl.)

Station S. P. R. R.
Quaternary gravels.

Lindgren, W., Tertiary gravels of the Sierra Nevada: P. P. 73, 1911, pp. 86–90.
1905, p. 176.
1906, p. 187.
1907, pt. 1, p. 203.
1908, pt. 1, p. 329.
Top. sheet Chico.

19. Yankee Hill. Au. (D, Pl.)

21 miles N. Oroville, S. P. R. R.
Schists and greenstones.
Veins and Tertiary river gravels.
CALIFORNIA, NORTHERN COUNTIES.

BUTTE COUNTY—Continued.

Turner, H. W., Further contributions to the geology of the Sierra Nevada:
Lindgren, W., Tertiary gravels of the Sierra Nevada: P. P. 73, 1911, pp.
150-154.
Top. sheets Chico, Bidwell Bar.
Folio 43, 1898.

CALAVERAS COUNTY.

Station S. R. R. of Gal.
Slates and greenstones.
Veins.
Turner, H. W., Further contributions to the geology of the Sierra Nevada:
Min. Res. 1905, pp. 174-175.
1906, p. 188.
1907, pt. 1, pp. 204-205.
Top. sheet Jackson.
Folios 11, 1894; 63, 1900.

21. Campo Seco (Valley Springs). Cu, Au, Ag, Fe, Cr.
4 miles N. Valley Springs, S. P. R. R.
Schists and greenstones.
Veins and lenses.
Weed, W. H., The copper mines of the United States in 1905: Bull. 285,
1906, p. 106.
223-225.
1883-84, pp. 341, 570-571.
1905, pp. 174-175.
1906, pp. 187-188, 394.
1907, pt. 1, pp. 205, 601.
1908, pt. 1, pp. 331, 768.
Top. sheet Jackson.
Folios 11, 1894; 63, 1900.

22. Copperopolis. Cu, Au, Ag.
18 miles ESE. Milton, S. P. R. R.
Schists cut by greenstones and granite.
Veins and lenses.
Turner, H. W., Further contributions to the geology of the Sierra Nevada:
Weed, W. H., The copper mines of the United States in 1905: Bull. 285,
1906, p. 106.
Min. Res. 1887, p. 76.
1888, p. 59.
1906, pp. 187-188, 394.
1907, pt. 1, pp. 204, 601.
21528°—Bull. 507—12——6

23. Esmeralda (Murphy, Sperry). Fe, Au.
   20 miles ESE. Valley Springs, S. P. R. R.
   Slates and greenstones, Tertiary gravels.
   Lenses, Tertiary river gravels.
   Harder, E. C., Iron ores of western and central California: Bull. 430, 1910,
   pp. 223–224.
   Lindgren, W., Tertiary gravels of the Sierra Nevada: P. P. 73, 1911, p. 201.
   Top. sheets Jackson and Big Trees.
   Folios 11, 1894; 51, 1898.

   8 miles NE. Valley Springs, S. P. R. R.
   Slates and greenstones.
   Veins.
   Min. Res. 1905, p. 175.
   1906, p. 188.
   1907, pt. 1, p. 205.
   1908, pt. 1, p. 331.
   Top. sheet Jackson.
   Folios 11, 1894; 63, 1900.

   6 miles N. Milton, S. P. R. R.
   Tertiary gravels.
   1906, p. 188.
   1907, pt. 1, p. 205.
   1908, pt. 1, p. 783.
   Top. sheet Jackson.
   Folios 11, 1894; 63, 1900.

   Station S. R. R. of Cal.
   Slates and greenstones.
   Veins.
   1907, pt. 1, p. 205.
   1908, pt. 1, p. 331.
   Top. sheet Big Trees.
   Folios 51, 1898; 63, 1900.

27. Mokelumne Hill. Au. (Pl.)
   16 miles NE. Valley Springs, S. P. R. R.
   Tertiary river gravels.
   Lindgren, W., Tertiary gravels of the Sierra Nevada: P. P. 73, 1911, pp.
   205–209.
   1907, pt. 1, p. 205.
   1908, pt. 1, pp. 331–332.
   Top. sheet Jackson.
   Folios 11, 1894; 63, 1900.
28. Railroad Flat. Au. (Pl.)
24 miles NE. Valley Springs, S. P. R. R.
Tertiary river gravels.
Lindgren, W., Tertiary gravels of the Sierra Nevada: P. P. 73, 1911, pp. 210-212.
1908, pt. 1, p. 332.
Top. sheet Jackson.
Folio 11, 1894.

29. Sheep Ranch (Eldorado). Au. (D, Pl.)
27 miles E. Valley Springs, S. P. R. R.
Slates and greenstone.
Veins and Tertiary river gravels.
Lindgren, W., Tertiary gravels of the Sierra Nevada: P. P. 73, 1911, p. 211.
Min. Res. 1905, pp. 174-175.
1906, p. 188.
Top. sheet Big Trees.
Folio 51, 1898.

30. Vallecito (Douglas Flat). Au. (Pl.)
7 miles NE. Angles Camp, S. R. R. of Cal.
Tertiary river gravels.
Top. sheet Big Trees.
Folios 51, 1898; 63, 1900.

31. West Point. Au. (D, Pl.)
30 miles NE. Valley Springs, S. P. R. R.
Granite.
Veins and Tertiary river gravels.
Lindgren, W., Tertiary gravels of the Sierra Nevada: P. P. 73, 1911, pp. 210-211.
1908, pt. 1, p. 332.
Top. sheet Jackson.
Folio 11, 1894.

32. Sulphur Creek. Hg.
25 miles SW. Williams, S. P. R. R.
Schists and slates.
Stockworks.
1909, pt. 1, pp. 289, 552.
33. Mount Diablo (Ryne). Hg (Ag, Au).
   12 miles SE. Martinez, S. P. R. R.
   Schists and slates.
   Stockworks.
   Becker, G. F., Geology of the quicksilver deposits of the Pacific slope:
   Top. sheet Mount Diablo.

DEL NORTE COUNTY.

34. Crescent City. Au, Ag, Pt. (Pl.)
   97 miles SW. Grants Pass, Oreg., S. P. R. R.
   Stream gravels.
   1906, p. 188.
   1907, pt. 1, p. 233.
   1909, pt. 1, p. 274.

35. Diamond Creek. Au, Ag, Cu, Hg. (D, Pl.)
   65 miles SW. Grants Pass, Oreg., S. P. R. R.
   Serpentine.
   Disseminated.

36. Low Divide. Cr.
   117 miles SW. Grants Pass, Oreg., S. P. R. R.
   Serpentine.
   Lenses.
   Min. Res. 1908, pt. 1, p. 768.

37. Rattlesnake Divide. Cr.
   120 miles SW. Grants Pass, Oreg., S. P. R. R.
   Serpentine.
   Lenses.
   Min. Res. 1908, pt. 1, p. 768.

ELDORADO COUNTY.

38. Coloma. Au. (D, Pl.)
   7 miles NNW. Placerville, S. P. R. R.
   Schists cut by granodiorite.
   Veins, stream gravels.
   Top. sheet Placerville.
   Folio 3, 1894.

39. Eldorado (Shingle Springs). Au. (D, Pl.)
   Station S. P. R. R.
   Schists cut by diorite.
   Veins, stream gravels.
   Min. Res. 1906, p. 188.
   1908, pt. 1, p. 333.
   Top. sheet Placerville.
   Folio 3, 1894.

40. Fairplay. Au. (D, Pl.)
   20 miles SE. Placerville, S. P. R. R.
   Granodiorite and andesite.
   Veins and Tertiary river gravels.
   Lindgren, W., Tertiary gravels of the Sierra Nevada: P. P. 73, 1911, pp.
   180-181.
40. **Fairplay**—Continued.
   Min. Res. 1905, p. 175.
   Top. sheet Placerville.
   Folio 3, 1894.

41. **Flagstaff Hill**. Cr.
   9 miles S. Auburn, S. P. R. R.
   Amphibolite and serpentine.
   Lenses.
   Min. Res. 1908, pt. 1, p. 768.
   Top. sheet Sacramento.
   Folio 5, 1894.

42. **Garden Valley (Greenwood)**. Au. (D, Pl.)
   12 miles N. Placerville, S. P. R. R.
   Slates and greenstone.
   Veins and stream gravels.
   Top. sheet Placerville.
   Folio 3, 1894.

43. **Georgetown**. Au. (D, Pl.)
   16 miles N. Placerville, S. P. R. R.; 19 miles E. Auburn, S. P. R. R.
   Slates and greenstone.
   Veins and stream and Tertiary river gravels.
   Min. Res. 1906, p. 188.
   1908, pt. 1, pp. 332, 333.
   Top. sheet Placerville.
   Folio 3, 1894.

44. **Grizzly Flat**. Au. (D, Pl.)
   21 miles ESE. Placerville, S. P. R. R.
   Schists cut by granodiorite.
   Veins, Tertiary river gravels.
   1908, pt. 1, pp. 332, 333.
   Top. sheet Placerville.
   Folio 3, 1894.

45. **Indian Diggings (Brownsville)**. Au. (Pl.)
   33 miles SSE. Placerville, S. P. R. R.
   Tertiary river gravels.
   Top. sheet Placerville.
   Folio 3, 1894.

46. **Kelsey**. Au.
   5 miles N. Placerville, S. P. R. R.
   Slates and greenstone.
   Veins.
46. Kelsey—Continued.
Top. sheet Placerville.
Folio 3, 1894.

47. Kentucky Flat (Volcanoville). Au. (D, Pl.)
31 miles E. Auburn, S. P. R. R.
Slates and andesite.
Veins and Tertiary river gravels.
Top. sheet Placerville.
Folio 3, 1894.

48. Latrobe. Cr.
Station S. P. R. R.
Serpentine.
Lenses.
Min. Res. 1908, pt. 1, p. 768.
Top. sheet Placerville.
Folio 3, 1894.

49. Logtown. Au. (D, Pl.)
5 miles S. El Dorado, S. P. R. R.
Slates cut by diabase and quartz porphyry.
Veins and stream gravels.
Top. sheet Placerville.
Folio 3, 1894.

50. Nashville. Au, Hg.
12 miles S. El Dorado, S. P. R. R.
Slates and diabase.
Veins.
Min. Res. 1905, p. 175.
1907, pt. 1, p. 206.
1908, pt. 1, p. 332.
Top. sheet Placerville.
Folio 3, 1894.

51. Newtown (South Fork Webber Creek). Au. (Pl.)
8 miles E. Placerville, S. P. R. R.
Tertiary river gravels.
Lindgren, W., Tertiary gravels of the Sierra Nevada: P. P. 73, 1911, p. 178.
Top. sheet Placerville.
Folio 3, 1894.

52. Pacific. Au. (Pl.)
19 miles E. Placerville, S. P. R. R.
Tertiary river gravels.
Lindgren, W., Tertiary gravels of the Sierra Nevada: P. P. 73, 1911, pp. 169–171.
Top. sheet Placerville.
Folio 3, 1894.

53. Pilot Hill. Au, Fe. (D, Pl.)
10 miles SE. Auburn, S. P. R. R.
Schists and slates.
Tertiary river gravels.
Lenses.
Lindgren, W., Tertiary gravels of the Sierra Nevada: P. P. 73, 1911, p. 164.
1907, pt. 1, p. 206.
53. **Pilot Hill**—Continued.
   Top. sheet Sacramento.
   Folio 5, 1894.

54. **Placerville.**  Au.  (D, Pl.)
   Station, S. P. R. R.
   Slates and greenstone; andesite.
   Veins and Tertiary river gravels.
   Lindgren, W., Tertiary gravels of the Sierra Nevada: P. P. 73, 1911, pp. 171-180.
   Min. Res. 1905, p. 175.
   1906, p. 188.
   1907, pt. 1, p. 206.
   1908, pt. 1, pp. 332-333.
   Top. sheet Placerville.
   Folio 3, 1894.

55. **Spanish Diggings.**  Au.
   14 miles E. Auburn, S. P. R. R.
   Schists and slates.
   Veins.
   Top. sheet Placerville.
   Folio 3, 1894.

56. **Blocksburg.**  Au, Ag.  (Pl.)
   76 miles N. Sherwood, 42 miles SSE. Carlotta, N. W. P. R. R.
   Stream gravels.
   Min. Res. 1906, p. 188.

57. **China Flat.**  Au, Ag, Pt.  (Pl.)
   45 miles ENE. Korbel, A. & M. R. R. R.
   Stream gravels.
   Min. Res. 1906, p. 188.
   1907, pt. 1, p. 207.
   1908, pt. 1, p. 333.

58. **Hoopa.**  Au, Ag.  (Pl.)
   33 miles NE. Korbel, A. & M. R. R. R.
   Stream gravels.
   Min. Res. 1906, p. 188.

59. **Klamath.**  Au, Ag.  (Pl.)
   51 miles NNE. Trinidad, O. & E. R. R.
   Stream gravels.
   Min. Res. 1906, p. 188.

60. **Orick.**  Au, Ag.  (Pl.)
   25 miles N. Trinidad, O. & E. R. R.
   Beach gravels.
   Min. Res. 1906, p. 188.

61. **Orleans.**  Au, Ag, Pt.  (Pl.)
   62 miles NE. Korbel, A. & M. R. R. R.
   Stream gravels.
   Min. Res. 1906, p. 188.
   1907, pt. 1, p. 207.
62. Weitchpec. Au, Ag, Pt. (Pl.)
45 miles NE. Korbel, A. & M. R. R. R.
Stream gravels.
Min. Res. 1906, p. 188.
1907, pt. 1, p. 207.

LAKE COUNTY.

63. Baker (Clear Lake). Hg.
44 miles NNE. Calistoga, S. P. R. R.
Metamorphosed sediments cut by andesite.
Stockworks.
Becker, G. F., Geology of the quicksilver deposits of the Pacific slope:

64. Mayacmas (Great Western). Hg.
16 miles NNW. Calistoga, S. P. R. R.
Mesozoic sediments, greenstone and serpentine, cut by basalt.
Veins, stockworks, and disseminations.
Becker, G. F., Geology of the quicksilver deposits of the Pacific slope:
1887, pp. 119–121.
1908, pt. 1, p. 686.
1909, pt. 1, p. 552.

65. Sulphur Bank. Hg.
33 miles N. Calistoga, S. P. R. R.
Metamorphosed sediments cut by andesite and basalt.
Disseminations and stockworks.
Becker, G. F., Geology of the quicksilver deposits of the Pacific slope:
1887, pp. 119–121.

66. Hayden Hill. Au, Ag.
40 miles W. Madeline, N. C. & O. R. R.
Tertiary volcanics (?)..
Veins (?)..
Top. sheet Alturas.

Station, Y. V. R. R.
Schists and slates.
Veins.
Min. Res. 1906, p. 190.
1907, pt. 1, p. 211.
Top. sheet Sonora.
Folio 41, 1897.

68. Coulterville. Au.
12 miles NE. Varain, Y. V. R. R.
Schists, slates, and serpentines.
MARIPOSA COUNTY—Continued.

68. **Coulterville**—Continued.
Veins.
Min. Res. 1905, p. 175.
1906, p. 190.
1907, pt. 1, p. 211.
1908, pt. 1, p. 337.
Top. sheet Sonora.
Folio 41, 1897.

69. **Green Mountain (Ben Hur)**. Cu.
35 miles SSW. Bagby, Y. V. R. R.
Diorite, greenstones.
Veins.
1908, pt. 1, p. 337.
Top. sheet Mariposa (to be issued).

70. **Hite Cove**. Au.
15 miles E. Briceburg, Y. V. R. R.
Slates.
Veins.
Min. Res. 1905, p. 175.
1907, pt. 1, p. 211.
Top. sheet Yosemite.

71. **Hornitos (Indian Gulch)**. Au, Cu.
8 miles E. Merced Falls, Y. V. R. R.
Slates and greenstones.
Veins.
Min. Res. 1905, p. 175.
1906, p. 190.
1907, pt. 1, p. 211.
1908, pt. 1, p. 337.
Top. sheet Sonora.
Folio 41, 1897.

72. **Kinsley**. Au.
12 miles NNE. Mountain King, Y. V. R. R.
Slates (?).
Veins (?).
Min. Res. 1905, p. 175.
1906, p. 190.
1907, pt. 1, p. 211.
1908, pt. 1, p. 337.
Top. sheet Yosemite.

73. **Mount Bullion (Whitlock, Mariposa)**. Au. (D, Pl.)
25 miles SE. Bagby, Y. V. R. R.
Slates and augite porphyry.
Veins and stream gravels.
90 MINING DISTRICTS OF WESTERN UNITED STATES.

MARIPOSA COUNTY—Continued.

73. Mount Bullion (Whitlock, Mariposa)—Continued.
   Min. Res. 1905, p. 175.
   1906, p. 190.
   1907, pt. 1, p. 211.
   1908, pt. 1, p. 337.
   Top. sheet Sonora.
   Folio 41, 1897.

74. Quartz Mountain. Au.
   Mountain King station, Y. V. R. R.
   Slates cut by augite porphyry.
   Veins.
   Top. sheet Sonora.
   Folio 41, 1897.

MODOC COUNTY.

75. Hoag. Au, Ag.
   57 miles NNE. Alturas, N. C. & O. R. R.
   Tertiary volcanics
   Veins.
   Top. sheet Alturas.

NAPA COUNTY.

76. Bella Union. Hg.
   12 miles N. Napa, S. P. R. R.
   Serpentine, greenstone, and Mesozoic sediments cut by andesite and basalt.
   Disseminations and stockworks.
   Becker, G. F., Geology of the quicksilver deposits of the Pacific slope:
   Min. Res. 1909, pt. 1, p. 553
   Top. sheet Napa.

77. Knoxville. Hg.
   15 miles NW. Knoxville, S. P. R. R.
   Serpentine, greenstone, and Mesozoic sediments cut by basalt.
   Impregnations and stockworks.
   Becker, G. F., Geology of the quicksilver deposits of the Pacific slope:
   Melville, W. H., and Lindgren, W., Contributions to the mineralogy of the
   Pacific coast: Bull. 61, 1890, pp. 22, 23-25.
   Min. Res. 1887, pp. 119-121.
   1908, pt. 1, p. 686.
   1909, pt. 1, p. 553.

78. La Joya (Oat Hill). Hg.
   St. Helena station, S. P. R. R.
   Serpentine, greenstone, and Mesozoic sediments cut by andesite and basalt.
   Stockworks and impregnations.
   Becker, G. F., Geology of the quicksilver deposits of the Pacific slope:

79. Mayacamas (Napa Consolidated). Hg.
   17 miles N. St. Helena, S. P. R. R.
   Serpentine, greenstone, and Mesozoic sediments cut by andesite and basalt.
   Stockworks and impregnations.
   Becker, G. F., Geology of the quicksilver deposits of the Pacific slope:
CALIFORNIA, NORTHERN COUNTIES.

NAPA COUNTY—Continued.

79. Mayacmas (Napa Consolidated)—Continued.

1887, pp. 119–121.
1888, pp. 97–99.
1908, pt. 1, p. 686.
1909, pt. 1, p. 553.

NEVADA COUNTY.

80. French Corral. Au. (D, Pl.)
10 miles NW. Nevada City, N. C. N. G. R. R.
Granodiorite and diabase.
Veins and Tertiary river gravels.
Lindgren, W., Tertiary gravels of the Sierra Nevada: P. P. 73, 1911, pp.
123–125.
Min. Res. 1905, p. 179.
1906, p. 191.
1908, pt. 1, p. 341.
Top. sheet Smartsville.
Folio 18, 1895.

31 miles ENE. Nevada City, N. C. N. G. R. R.
Slates cut by granite, andesite.
Veins and Tertiary river gravels.
Lindgren, W., Tertiary gravels of the Sierra Nevada: P. P. 73, 1911, pp.
Min. Res. 1905, p. 179.
1906, p. 191.
1908, pt. 1, p. 341.
1909, pt. 1, p. 280.
Top. sheet Colfax.
Folio 66, 1900.

82. Lowell Hill. Au. (Pl.)
6 miles N. Dutch Flat, S. P. R. R.
Tertiary river gravels.
Lindgren, W., Tertiary gravels of the Sierra Nevada: P. P. 73, 1911, pp.
146–147.
Min. Res. 1905, p. 179.
1906, p. 191.
1908, pt. 1, p. 341.
Top. sheet Colfax.
Folio 66, 1900.

83. Meadow Lake. Au.
30 miles NE. Emigrant Gap, S. P. R. R.
Schist cut by granodiorite and capped by andesite.
Veins.
Lindgren W., Tertiary gravels of the Sierra Nevada: P. P. 73, 1911, pp.
98–99.
Top. sheet Truckee.
Folio 39, 1897.
NEVADA COUNTY—Continued.

84. Nevada City (Grass Valley). Au. (D, Pl.)
Station, N. C. N. G. R. R.
Slates, schists, and granodiorite capped by andesite.
Veins and Tertiary river gravels.
Lindgren, W., Gold-quartz veins of Nevada City and Grass Valley districts,
1906, p. 191.
Top. sheets Smartsville, Nevada City special.
Folios 18, 1895; 29, 1896.

85. North Bloomfield (Belief). Au. (Pl.)
14 miles NE. Nevada City, N. C. N. G. R. R.
Tertiary river gravels.
Lindgren, W., Tertiary gravels of the Sierra Nevada: P. P. 73, 1911, pp.
139–141.
Min. Res. 1905, p. 179.
1906, p. 191.
Top. sheet Colfax.
Folio 66, 1900.

86. North Columbia (Grizzly Hill). Au. (D, Pl.)
21 miles N. Nevada City, N. C. N. G. R. R.
Slates, schists, and diorite.
Veins and Tertiary river gravels.
Lindgren, W., Tertiary gravels of the Sierra Nevada: P. P. 73, 1911, p. 139.
Top. sheet Colfax.
Folio 66, 1900.

87. North San Juan (Badger Hill). Au. (D, Pl.)
13 miles N. Nevada City, N. C. N. G. R. R.
Slate, granodiorite, and diabase.
Veins and Tertiary river gravels.
Lindgren, W., Tertiary gravels of the Sierra Nevada: P. P. 73, 1911, pp.
121–125.
Min. Res. 1905, p. 179.
1906, p. 192.
Top. sheet Smartsville.
Folio 18, 1895.

88. Rough and Ready. Au. (D, Pl.)
4 miles SW. Grass Valley, N. C. N. G. R. R.
Granodiorite and amphibolite.
Veins and Tertiary river gravels.
Lindgren, W., Tertiary gravels of the Sierra Nevada: P. P. 73, 1911, pp.
127–132.
Top. sheet Smartsville.
Folio 18, 1895.

89. Spenceville. Cu, Ag, Au.
17 miles NE. Wheatland, S. P. R. R.
Diabase and granodiorite.
89. Spenceville—Continued.
Veins.
1883-84, pp. 340-341.
1887, p. 76.
Top. sheet Smartsville.
Folio 18, 1895.

90. Washington (Omega). Au. (D, Pl.)
19 miles ENE. Nevada City, N. C. N. G. R. R.
Slates and serpentine.
Veins and stream gravels.
Lindgren, W., Tertiary gravels of the Sierra Nevada: P. P. 73, 1911, pp.
139-141.
Min. Res. 1905, p. 179.
1906, p. 215.
1908, pt. 1, p. 341.
Top. sheet Colfax.
Folio 66, 1900.

91. You Bet (Little York). Au. (Pl.)
4 miles NW. Gold Run, S. P. R. R.
Tertiary river gravels.
Lindgren, W., Tertiary gravels of the Sierra Nevada: P. P. 77, 1911, p. 144.
1909, pt. 1, p. 278.
Top. sheet Colfax.
Folio 66, 1900.

PLACER COUNTY.

92. Blue Canyon. Au. (D, Pl.)
Station, S. P. R. R.
Slates and andesite.
Veins and Tertiary gravels.
Lindgren, W., Tertiary gravels of the Sierra Nevada: P. P. 73, 1911, p. 146.
Min. Res. 1905, p. 179.
1906, p. 192.
1907, pt. 1, p. 218.
1908, pt. 1, pp. 342-343.
Top. sheet Colfax.
Folio 66, 1900.

93. Canada Hill. Au. (D, Pl.)
40 miles E. Colfax, S. P. R. R.
Slates and andesite.
Veins and Tertiary river gravels.
Lindgren, W., Tertiary gravels of the Sierra Nevada: P. P. 73, 1911, pp.
157-158.
Top. sheets Colfax, Truckee.
Folios 66, 1900; 39, 1897.

94. Dairy Farm (Trent). Au, Cu.
10 miles NE. Sheridan, S. P. R. R.
Greenstone.
Veins.
Min. Res. 1905, p. 179.
1907, pt. 1, p. 216.
Top. sheet Smartsville.
Folio 18, 1895.
95. Damascus. Au. (Pl.)
12 miles E. Colfax, S. P. R. R.
Tertiary river gravels.
Min. Res. 1905, p. 179.
1906, p. 192.
1907, pt. 1, p. 217.
Top. sheet Colfax.
Folio 66, 1900.

96. Dutch Flat (Gold Run, Towle). Au, Cr. (D, Pl.)
Station, S. P. R. R.
Schists and gabbro capped by andesite.
Veins and Tertiary river gravels.
Lindgren, W., Tertiary gravels of the Sierra Nevada: P. P. 73, 1911, pp. 144-145.
Min. Res. 1905, p. 179.
1906, p. 192.
1908, pt. 1, pp. 342-343, 768.
1909, pt. 1, p. 280.
Top. sheet Colfax.
Folio 66, 1900.

97. Forest Hill. Au. (D, Pl.)
15 miles SE. Colfax, S. P. R. R.
Slates, schists, and serpentine capped by andesite.
Veins and Tertiary river gravels.
Lindgren, W., Tertiary gravels of the Sierra Nevada; P. P. 73, 1911, pp. 149-151, 155-156, 164.
Min. Res. 1905, p. 179.
1906, p. 192.
1908, pt. 1, pp. 343, 768.
1909, pt. 1, p. 280.
Top. sheet Colfax.
Folio 66, 1900.

98. Hotaling. Fe.
34 miles NW. Clipper Gap, S. P. R. R.
Slates, granodiorite, and diabase.
Contact metamorphic.
1883-84, pp. 286, 570-571.
1885, pp. 197-199.
Top. sheet Sacramento.
Folio 5, 1894.

99. Iowa Hill. Au. (D, Pl.)
9 miles E. Colfax, S. P. R. R.
Slates and amphibolite capped by andesite.
Veins and Tertiary river gravels.
Lindgren, W., Tertiary gravels of the Sierra Nevada: P. P. 73, 1911, pp. 148-149.
Min. Res. 1905, p. 179.
   Min. Res. 1906, p. 192.
   1907, pt. 1, p. 218.
   1908, pt. 1, p. 343.
   1909, pt. 1, p. 280.
   Top. sheet Colfax.
   Folio 66, 1900.

100. Last Chance. Au. (D, Pl.)
   42 miles ENE. Auburn, S. P. R. R.
   Slates capped by andesite.
   Veins and Tertiary river gravels.
   Lindgren, W., Tertiary gravels of the Sierra Nevada: P. P. 73, 1911, p. 158.
   Top. sheet Colfax.
   Folio 66, 1900.

101. Michigan Bluff. Au, Cr. (D, PI.)
   22 miles SE. Colfax, S. P. R. R.
   Slates and serpentine capped by andesite.
   Veins and Tertiary river gravels.
   Min. Res. 1905, p. 179.
   1906, p. 192.
   1908, pt. 1, pp. 343, 768.
   1909, pt. 1, p. 280.
   Top. sheet Colfax.
   Folio 66, 1900.

102. Ophir (Auburn). Au, Ag. (D, Pl.)
   Station, S. P. R. R.
   Amphibolite and granodiorite capped by andesite.
   Veins, Tertiary and stream gravels.
   Lindgren, W., The gold-silver mines at Ophir, Cal.: Fourteenth Ann. Rept.,
   Min. Res. 1905, p. 179.
   1906, p. 192.
   1907, pt. 1, p. 216.
   1908, pt. 1, p. 342.
   Top. sheet Colfax.
   Folio 5, 1894.

103. Ralston Divide. Au. (Pl.)
   40 miles E. Auburn, S. P. R. R.
   Tertiary river gravels.
   Top. sheets Placerville and Colfax.
   Folios 5 and 66, 1894.

104. Westville. Au. (D, Pl.)
   40 miles NE. Auburn, S. P. R. R.
   Slates capped by andesite.
   Veins and Tertiary river gravels.
   1908, pt. 1, p. 342.
   Top. sheet Colfax.
   Folio 66, 1894.
PLUMAS COUNTY.

105. **Butte Valley (Sunnyside).** Au. (D, Pl.)
Slates and greenstone capped by basalt.
Veins and stream gravels.
Top. sheet Lassen Peak.
Folio 15, 1895.

106. **Crescent Mills (Greenville).** Au, Ag, Cu. (D, Pl.)
47 miles NW. Beckwith, S. V. R. R.
Paleozoic sediments cut by granodiorite.
Veins.
1907, pt. 1, p. 219.
1908, pt. 1, p. 344.
Top. sheets Indian Valley, Taylorsville, Honey Lake.

107. **Elizabethtown.** Au. (Pl.)
39 miles NW. Clio, S. V. R. R.
Stream gravels.
Diller, J. S., Geology of the Taylorsville region, California: Bull. 353, 1908.
Top. sheets Taylorsville, Indian Valley, Honey Lake.

108. **Edmanton (Meadow Valley).** Au, Mn. (D, Pl.)
38 miles NW. Clio, S. V. R. R.
Slates, amphibolites, granite.
Veins and Tertiary river gravels.
Top. sheet Bidwell Bar.
Folio 43, 1898.

109. **Genesee Valley.** Cu, Au.
34 miles NW. Beckwith, S. V. R. R., B. & L. R. R.
Paleozoic and Mesozoic sediments cut by granodiorite and capped by andesite.
Veins.
1907, pt. 1, p. 219.
Top. sheets Indian Valley, Genesee, Honey Lake.

110. **Granite Basin.** Au. (D, Pl.)
57 miles NE. Oroville, S. P. R. R.
Amphibolite and granite.
Veins and Tertiary river gravels.
Top. sheet Bidwell Bar.
Folio 43, 1898.
111. **Johnsville (Jamison).** Au.
9 miles W. Clio, S. V. R. R., W. P. R. R.
Slates, gabbro, augite porphyry.
Veins and Quaternary gravels.
Lindgren, W., Tertiary gravels of the Sierra Nevada: P. P. 73, 1911, p. 111.
1906, p. 192.
1907, pt. 1, p. 218.
1908, pt. 1, p. 344.
Top. sheet Downieville.
Folio 37, 1897.

112. **La Porte.** Au. (Pl.)
47 miles NE. Oroville, S. P. R. R.
Tertiary river gravels.
Lindgren, W., Tertiary gravels of the Sierra Nevada: P. P. 73, 1911, p. 105.
1908, pt. 1, p. 344.
Top. sheet Downieville.
Folio 37, 1897.

113. **Lights Canyon.** Au. (Pl.)
50 miles NE. Beckwith, S. V. R. R., W. P. R. R.
Stream gravels.
Diller, J. S., Geology of the Taylorsville region: Bull. 353, 1908.
Top. sheets Indian Valley, Genesee, Honey Lake.

114. **Sawpit Flat.** Au. (Pl.)
60 miles NE. Oroville, S. P. R. R.; 49 miles W. Clio, S. V. R. R.
Tertiary river gravels.
Top. sheet Downieville.
Folio 37, 1897.

115. **Spanish Ranch.** Au, Cr. (Pl.)
36 miles NW. Clio, S. V. R. R.
Serpentine.
Lenses, Tertiary river gravels.
Turner, H. W., Further contributions to the geology of the Sierra Nevada:
1908, pt. 1, p. 768.
Top. sheet Bidwell Bar.
Folio 43, 1898.

116. **Taylorsville.** Cu, Au. (D, Pl.)
40 miles NW. Beckwith, S. V. R. R., B. & L. R. R.
Slates, andesite, granodiorite.
Veins, stream gravels.
1907, pt. 1, p. 219.
Top. sheets Taylorsville, Indian Valley, Honey Lake.

21528°—Bull. 507—12—7
117. Folsom (Blue Ravine, Michigan Bar). Au. (Pl.)
Stations S. P. R. R.
Quaternary gravels.
Lindgren, W., Tertiary gravels of the Sierra Nevada: P. P. 73, 1911, pp. 164-165, 222.
1906, p. 193.
1907, pt. 1, pp. 219–220.
1908, pt. 1, p. 345.
Top. sheet Sacramento.
Folio 5, 1894.

118. Los Gatos. Cr, Hg.
Station S. P. R. R.
Serpentine.
Lenses.
Min. Res. 1906, pt. 1, p. 768.

13 miles S. San Jose, S. P. R. R.
Mesozoic sediments.
Stockworks.
1883–84, p. 492.
1885, p. 284.
1886, pp. 160–165.
1887, pp. 119–121.
1888, pp. 97–99.
1908, pt. 1, p. 690.
1909, pt. 1, p. 553.

120. Afterthought (Little Cow Creek, Ingot). Cu, Zn (Pb).
26 miles NE. Redding, S. P. R. R.
Paleozoic sediments cut by alaskite porphyry.
Replacements.
Diller, J. S., Copper deposits of the Redding district, California: Bull. 213, 1903, p. 126.
——— Mining and mineral resources in the Redding quadrangle, California, in 1903: Bull. 223, 1904, pp. 169–179.
Top. sheet Redding.
Folio 138, 1906.
SHASTA COUNTY—Continued.

121. Baird (Heroult). Fe.
   4 miles N. Heroult, S. V. & E. R. R.
   Paleozoic limestone cut by augite diorite.
   Contact metamorphic.
   Diller, J. S., Iron ores of the Redding quadrangle, California: Bull. 213,
   1903, pp. 219–220.
   Top. sheet Redding.
   Folio 138, 1906.

122. Bayles (Lamoine). Au. (Pl.)
   Station, S. P. R. R.
   Stream gravels.
   1908, pt. 1, p. 349.
   Top. sheets Redding, Red Bluff.
   Folio 138, 1906.

123. Black Diamond. Cu, Au, Ag.
   14 miles NE. Redding, S. P. R. R.
   Paleozoic sediments cut by augite diorite.
   Contact metamorphic.
   Diller, J. S., Copper deposits of the Redding district, California: Bull. 213,
   1903, p. 130.
   Top. sheet Redding.
   Folio 138, 1906.

   Station, S. V. & E. R. R.
   Paleozoic slates, alaskite porphyry.
   Replacements.
   Diller, J. S., Copper deposits of the Redding district, California: Bull. 213,
   1903, pp. 126–130.
   ——— Mining and mineral resources in the Redding quadrangle, California,
   Graton, L. C., The occurrence of copper in Shasta County, Cal.: Bull. 430,
   1910, pp. 71–111.
   Weed, W. H., The copper mines of the United States in 1905: Bull. 285,
   1906, p. 104.
   Min. Res. 1904, p. 239.
   1905, p. 182.
   Top. sheets Redding, Red Bluff.
   Folio 138, 1906.

   21 miles NW. Redding, S. P. R. R.
   Alaskite porphyry.
   Veins.
   1907, pt. 1, p. 224.
   1908, pt. 1, p. 348.
   Top. sheet Red Bluff.
126. **Harrison Gulch (Knob)**. Au, Ag.
53 miles SW. Redding, S. P. R. R.
1908, pt. 1, p. 348.
Top. sheet Red Bluff.

127. **Igo (South Clear Creek)**. Au. (D, Pl.)
13 miles SW. Redding, S. P. R. R.
Greenstones and slates cut by granodiorite.
Veins, stream gravels.
1908, pt. 1, p. 348.
Top. sheet Red Bluff.

128. **Jerusalem Creek (Ono)**. Au. (Pi.)
21 miles SW. Redding, S. P. R. R.
Stream gravels.
Top. sheet Red Bluff.

129. **Kennett (Squaw Creek, Little Backbone)**. Cu, Au, Ag.
Station S. P. R. R.
Paleozoic sediments and alaskite porphyry.
Veins and replacements.
Min. Res. 1904, p. 239.
1905, pp. 182, 355.
1906, pp. 195, 392-394.
1907, pt. 1, pp. 223, 599-600.
Top. sheets Redding, Red Bluff.
Folio 138, 1906.

130. **Keswick (Iron Mountain)**. Cu, Au, Ag.
Station S. P. R. R.
Paleozoic sediments and alaskite porphyry.
Veins and replacements.
1906, pp. 195, 392-394.
1907, pt. 1, pp. 222-223, 599-600.
Top. sheet Redding.
Folio 138, 1906.
131. **Larkin.** Au, Ag, Cu. (D, Pl.)

- 8 miles SW. Redding, S. P. R. R.
- Paleozoic sediments, meta-andesite, and diorite.
- Veins and stream gravels.
- Top. sheet Redding.
- Folio 138, 1906.

132. Omitted.

133. **Redding.** Au. (Pl.)

- Station S. P. R. R.
- Quaternary gravels.
- Min. Res. 1904, p. 239.
- Top. sheets Redding, Red Bluff.
- Folio 138, 1906.

134. **Shasta.** Au. (D, Pl.)

- 6 miles W. Redding, S. P. R. R.
- Quartz diorite.
- Veins and replacements.
- Top. sheet Redding.
- Folio 138, 1906.

135. **Shotgun Creek.** Cr.

- 15 miles NNW. Lamoine, S. P. R. R.
- Serpentine.
- Lenses.
- Top. sheet Shasta.

136. **Stella.** Au, Cu.

- 20 miles NW. Redding, S. P. R. R.
- Alaskite porphyry.
- Veins.
- 1908, pt. 1, p. 349.
- Top. sheet Red Bluff.

137. **Whitehouse (Buckeye).** Au. (D, Pl.)

- 5 miles N. Keswick, S. P. R. R.
- Meta-andesite.
- Veins.
- Top. sheet Redding.
- Folio 138, 1906.

138. **American Hill.** Au. (Pl.)

- 31 miles NE. Nevada City, N. C. N. G. R. R.
- Tertiary river gravels.

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**SIERRA COUNTY.**
Lindgren, W., Tertiary gravels of the Sierra Nevada: P. P. 73, 1911, pp. 142-143.
Top. sheet Colfax.
Folio 66, 1900.

139. Brandy City. Au. (Pl.)
31 miles N. Nevada City, N. C. N. G. R. R.
Tertiary river gravels.
Top. sheet Bidwell Bar.
Folio 43, 1898.

140. Church Meadows. Au. (Pl.)
20 miles W. Loyalton, B. & L. R. R.
Glacial gravels.
Top. sheet Downieville.
Folio 37, 1897.

141. Downieville (Goodyears Bar). Au. (D, Pl.)
63 miles NW. Marysville, S. P. R. R.; 40 miles N. Nevada City, N. C. N. G. R. R.
Slates and serpentine.
Veins, stream gravels.
Min. Res. 1905, p. 182.
1906, p. 196.
Top. sheet Downieville.
Folio 37, 1897.

142. Eureka. Au. (Pl.)
70 miles NW. Marysville, S. P. R. R.; 50 miles N. Nevada City, N. C. N. G. R. R.
Tertiary river gravels.
Lindgren, W., Tertiary gravels of the Sierra Nevada: P. P. 73, 1911, p. 110.
Top. sheet Downieville.
Folio 37, 1897.

143. Forest (Alleghany, Chips Flats, Minnesota). Au. (D, Pl.)
65 miles ENE. Marysville, S. P. R. R.
Amphibolite and serpentine capped by andesite.
Veins, Tertiary river gravels.
Lindgren, W., Tertiary gravels of the Sierra Nevada: P. P. 73, 1911, pp. 112, 113, 142.
Min. Res. 1905, p. 182.
1906, pp. 195-196.
1908, pt. 1, p. 350.
Top. sheet Colfax.
Folio 66, 1900.

144. Furnier. Au.
69 miles NW. Marysville, S. P. R. R.
Slates capped by andesite and basalt.
Veins.
Top. sheet Downieville.
Folio 37, 1897.
145. **Gibsonville (Whisky Diggings).** Au. (D, Pl.)
68 miles NNE. Marysville, S. P. R. R.
Tertiary river gravels.
1908, pt. 1, p. 351.
Top. sheet Downieville.
Folio 37, 1897.

146. **Indian Hill.** Au. (Pl.)
50 miles NE. Marysville, S. P. R. R.
Tertiary river gravels.
Lindgren, W., Tertiary gravels of the Sierra Nevada: P. P. 73, 1911, p. 111.
Top. sheet Downieville.
Folio 37, 1897.

147. **Pike.** Au, Cr. (D, Pl.)
52 miles ENE. Marysville, S. P. R. R.
Slates and diabase capped by andesite.
Veins, Tertiary river gravels.
1908, pt. 1, p. 769.
Top. sheet Colfax.
Folio 66, 1900.

148. **Poker Flat (Table Rock).** Au. (Pl.)
75 miles NE. Marysville, S. P. R. R.
Tertiary river gravels.
Lindgren, W., Tertiary gravels of the Sierra Nevada: P. P. 73, 1911, p. 105.
Top. sheet Downieville.
Folio 37, 1897.

149. **Port Wine (Queen City, St. Louis).** Au. (D, Pl.)
69 miles NE. Marysville, S. P. R. R.
Slates, andesite, and amphibolite.
Veins, Tertiary river gravels.
Lindgren, W., Tertiary gravels of the Sierra Nevada: P. P. 73, 1911, pp. 108–110.
Top. sheet Downieville.
Folio 37, 1897.

150. **Poverty Hill (Scales, Mount Pleasant).** Au. (Pl.)
59 miles NE. Marysville, S. P. R. R.
Tertiary river gravels.
Top. sheet Downieville.
Folio 37, 1897.
151. **Sierra City (Sierra Butte).** Au. (D, Pl.)
46 miles NW. Truckee, 80 miles ENE. Marysville, S. P. R. R.
Slate, serpentine, quartz porphyry.
Veins, terrace gravels.
Lindgren, W., Tertiary gravels of the Sierra Nevada: P. P. 73, 1911, pp. 117-118.
Turner, H. W., Further contributions to the geology of the Sierra Nevada:
Min. Res. 1905, p. 182.
1908, pt. 1, p. 350.
Top. sheet Sierraville.

**SISKIYOU COUNTY.**

152. **Beaver Creek.** Hg.
28 miles W. Hornbrook, S. P. R. R.
Granodiorite (?).
Impregnations (?).
1909, pt. 1, p. 554.
Top. sheet Shasta.

153. **Blue Ledge.** Au, Cu.
40 miles NW. Hornbrook, S. P. R. R.
Granodiorite (?).
Veins (?).
Top. sheet Shasta.

154. **Callahans.** Au. (D, Pl.)
27 miles SW. Gazelle, S. P. R. R.
Paleozoic sediments cut by acidic and basic intrusives.
Stream gravels and veins.
1908, pt. 1, p. 351.
Top. sheet Shasta.

155. **Cecilville.** Au. (D, Pl.)
57 miles SW. Gazelle, S. P. R. R.
Greenstones.
Veins and stream gravels.
1907, pt. 1, p. 227.
1908, pt. 1, p. 352.
1909, pt. 1, p. 286.

156. **Clear Creek.** Au, Cu. (D, Pl.)
82 miles W. Yreka, Y. R. R.
Paleozoic sediments cut by acidic and basic intrusives.
Veins and stream gravels.

157. **Cottage Grove.** Au. (Pl.)
100 miles W. Yreka, Y. R. R.
Stream and terrace gravels.

158. **Cottonwood Creek (Henley, Hornbrook).** Au, Cu. (D, Pl.)
Station S. P. R. R.
Metamorphosed Paleozoic sediments cut by granite and diorite.
Veins, stream and terrace gravels.
SISKIYOU COUNTY—Continued.

158. Cottonwood Creek (Henley, Hornbrook)—Continued.
Top. sheet Shasta.

159. Deadwood. Au. (Pl.)
20 miles SW. Yreka, Y. R. R.
Stream gravels.
Top. sheet Shasta.

160. Etna. Au. (Pl.)
31 miles SW. Yreka, Y. R. R.
Stream gravels.
Top. sheet Shasta.

161. Forks of Salmon. Au. (Pl.)
74 miles SW. Yreka, Y. R. R.
Stream and terrace gravels.
1907, pt. 1, p. 227.
1909, pt. 1, p. 286.

162. Gazelle. Cr.
10 miles SW. Gazelle, S. P. R. R.
Serpentine.
Lenses.
Top. sheet Shasta.

163. Gilta. Au. (Pl.)
83 miles SW. Yreka, Y. R. R.
Stream gravels.
1908, pt. 1, p. 352.

164. Gottville. Au. (Pl.)
18 miles WSW. Hornbrook, S. P. R. R.
Terrace gravels.
1909, pt. 1, p. 286.
Top. sheet Shasta.

165. Hamburg. Au. (Pl.)
50 miles W. Hornbrook, S. P. R. R.
Stream and terrace gravels.
1907, pt. 1, p. 227.

166. Happy Camp (Nolton). Au. (Pl.)
80 miles W. Hornbrook, S. P. R. R.
Stream and terrace gravels.

167. Hawkinsville (Yreka). Au. (D, Pl.)
Station Y. R. R.
Paleozoic sediments cut by acidic and basic intrusives.
Veins and stream gravels.
1907, pt. 1, p. 227.
1908, pt. 1, p. 352.
1909, pt. 1, p. 286.
Top. sheet Shasta.
106 MINING DISTRICTS OF WESTERN UNITED STATES.

SISKIYOU COUNTY—Continued.

60 miles WNW. Bayles, S. P. R. R.
Stream gravels.

169. Oak Bar. Au, Ag. (D, Pl.)
33 miles W. Hornbrook, S. P. R. R.
Schists, Paleozoic sediments cut by acidic and basic intrusives.
Stream and terrace gravels, veins.
1908, pt. 1, p. 690.
Top. sheet Shasta.

170. O'Mears. Au. (Pl.)
72 miles W. Hornbrook, S. P. R. R.
Stream and terrace gravels.

171. Oro Fino (Walker). Au, Cu. (D, Pl.)
23 miles SW. Yreka, Y. R. R.
Schists, Paleozoic sediments cut by acidic and basic intrusives.
Stream and terrace gravels, veins.
Top. sheet Shasta.

172. Preston Peak. Au, Cu. (D, Pl.)
80 miles W. Hornbrook, S. P. R. R.
Paleozoic sediments cut by acidic and basic intrusives.
Veins, stream and terrace gravels.

173. Sawyers Bar (Rollins, Black Bear). Au. (Pl.)
57 miles SW. Yreka, Y. R. R.
Stream and terrace gravels.
1908, pt. 1, p. 352.
1909, pt. 1, p. 286.

45 miles SW. Hornbrook, S. P. R. R.
Paleozoic sediments cut by acidic and basic intrusives.
Stream and terrace gravels, veins.

175. Somes Bar. Au. (Pl.)
93 miles SW. Yreka, Y. R. R.
Stream and terrace gravels.

176. Summerville. Au. (Pl.)
50 miles WNW. Bayles, S. P. R. R.
Stream gravels.

SOLANO COUNTY.

4 miles SE. Vallejo, S. P. R. R.
Metamorphosed sediments.
Stockworks.
Becker, G. F., Geology of the quicksilver deposits of the Pacific slope:
1909, pt. 1, p. 554.
Top. sheet Carquinez.

SONOMA COUNTY.

178. Cloverdale. Cr.
Station N. W. P. R. R.
Serpentine.
178. Cloverdale—Continued.
   Lenses.

179. Geyserville. Cr.
   Station N. W. P. R. R.
   Serpentine.
   Lenses.

180. Guerneville (Great Eastern). Hg.
   Station N. W. P. R. R.
   Mesozoic sediments and serpentine cut by andesite and basalt.
   Stockworks, veins, and disseminations.
   Becker, G. F., Geology of the quicksilver deposits of the Pacific slope:

181. Mayacmas (Pine Flat). Hg.
   20 miles E. Geyserville, N. W. P. R. R.
   Mesozoic sediments cut by andesite and basalt.
   Stockworks, veins, and disseminations.
   Becker, G. F., Geology of the quicksilver deposits of the Pacific slope:
   Min. Res. 1908, pt. 1, p. 691.
   1909, pt. 1, p. 554.

STANISLAUS COUNTY.

182. Knights Ferry. Au. (Pl.)
   12 miles NE. Oakdale, A. T. & S. F. R. R., S. P. R. R.
   Quaternary gravels.
   Lindgren, W., Tertiary gravels of the Sierra Nevada: P. P. 73, 1911, p. 201.

TEHAMA COUNTY.

183. Newville. Cr.
   70 miles SW. Redding, S. P. R. R.
   Serpentine.
   Lenses.

184. Tom Head. Cu.
   25 miles NW. Red Bluff, S. P. R. R.
   Greenstone.
   Veins.
   Top. sheet Red Bluff.

TRINITY COUNTY.

185. Altoona (Allens Camp). Hg, Au. (D, Pl.)
   50 miles NW. Bayles, S. P. R. R.
   Greenstone, slate, serpentine, and sandstone.
   Impregnations and veins.
   Becker, G. F., Geology of the quicksilver deposits of the Pacific slope:
   Min. Res. 1908, pt. 1, p. 691.
   Top. sheet Shasta.

186. Big Bar. Au. (Pl.)
   78 miles WNW. Redding, S. P. R. R.
   Stream gravels.
186. **Big Bar**—Continued.

1909, pt. 1, p. 287.

187. **Bully Choop.** Au.
70 miles W. Redding, S. P. R. R.
Basic intrusives.
Veins.
Top. sheet Red Bluff.

188. **Canyon City.** Au. (Pl, D.)
56 miles NW. Redding, S. P. R. R.
Greenstone.
Stream gravels, veins.

189. **Carrville.** Au, Ag, Cu. (D, Pl.)
33 miles NW. Bayles, S. P. R. R.
Greenstones and slates cut by acidic and basic intrusives.
Stream and terrace gravels, veins, and replacements.
MacDonald, D. F., Notes on the gold lodes of the Carrville district, Trinity County, Cal.: Bull. 530, 1912.
1908, pt. 1, p. 353.
1909, pt. 1, p. 287.
Top. sheet Shasta.

190. **Coffee.** Au. (Pl, D.)
40 miles NW. Bayles, S. P. R. R.
Serpentine and granodiorite cut by basic dikes.
Veins and stream gravels.
1907, pt. 1, p. 229.
1909, pt. 1, p. 287.
Top. sheet Shasta.

191. **Colridge.** Au, Hg. (D, Pl.)
77 miles NW. Redding, S. P. R. R.
Paleozoic sediments cut by acidic and basic intrusives.
Stream gravels, veins.

192. **Deadwood.** Au.
31 miles NW. Redding, S. P. R. R.
Paleozoic sediments cut by acidic and basic intrusives.
Veins (?).
1908, pt. 1, p. 353.
1909, pt. 1, p. 287.
Top. sheet Red Bluff.

193. **Dedrick.** Au. (D, Pl.)
48 miles WNW. Bayles, S. P. R. R.
Hornblende schist.
Veins, terrace gravels.
1908, pt. 1, p. 353.
1909, pt. 1, p. 287.
194. **Denny.** Au, Ag, Pt, Cu. (D, Pl.)
150 miles NW. Redding, S. P. R. R.
Paleozoic sediments cut by basic intrusives.
Veins, stream gravels.
1908, pt. 1, p. 353.
1909, pt. 1, p. 287.

195. **Dodge.** Au. (Pl.)
47 miles SSW. Gazelle, S. P. R. R.
Terrace and stream gravels.
Top. sheet Shasta.

196. **Dorieska.** Au. (D, Pl.)
55 miles WNW. Bayles, S. P. R. R.
Serpentine, limestone, and shale cut by basic intrusives.
Veins.
MacDonald, D. F., Notes on the gold lodes of the Carrville district, Trinity County, Cal.: Bull. 530, 1912.
1907, pt. 1, p. 229.
1908, pt. 1, p. 353.
1909, pt. 1, p. 287.
Top. sheet Shasta.

197. **Douglas City.** Au. (D, Pl.)
57 miles W. Redding, S. P. R. R.
Mica and hornblende shist.
Stream and terrace gravels, veins.
1909, pt. 1, p. 287.
Top. sheet Red Bluff.

198. **Eastman Gulch (Lewiston).** Au. (D, Pl.)
36 miles NW. Redding, S. P. R. R.
Paleozoic sediments cut by greenstone.
Stream gravels, veins.
Top. sheet Red Bluff.

199. **Hawkins Creek (Burnt Ranch).** Au. (Pl.)
105 miles WNW. Redding, S. P. R. R.
Terrace and stream gravels.
1908, pt. 1, p. 353.

200. **Hay Fork.** Au, Pt. (Pl.)
78 miles W. Redding, S. P. R. R.
Stream and terrace gravels.
1907, pt. 1, p. 229.
1909, pt. 1, p. 287.

201. **Helena.** Au. (Pl.)
67 miles NW. Redding, S. P. R. R.
201. Helena—Continued.
Stream and terrace gravels.
1909, pt. 1, p. 287.

202. Indian Creek. Au. (Pl.)
85 miles W. Redding, S. P. R. R.
Stream and terrace gravels.
Top. sheet Red Bluff.

203. Junction City. Au, Pt. (Pl.)
59 miles WNW. Redding, S. P. R. R.
Stream and terrace gravels.
1909, pt. 1, p. 287.

204. Minersville. Au. (Pl.)
44 miles NW. Redding, S. P. R. R.
Stream and terrace gravels.
1907, pt. 1, p. 229.
1909, pt. 1, p. 287.
Top. sheet Red Bluff.

205. Slate Creek. Au. (Pl.)
54 miles NW. Redding, S. P. R. R.
Stream gravels.
Top. sheet Red Bluff.

206. Swedes Point. Au. (Pl.)
88 miles WNW. Redding, S. P. R. R.
Terrace gravels.

207. Trinity Center. Au. (Pl.)
29 miles W. Bayles, S. P. R. R.
Stream and terrace gravels.
——— Notes on the gold lodes of the Carrville district, Trinity County, Cal.: Bull. 530, 1912.
1907, pt. 1, pp. 228, 229.
1908, pt. 1, p. 354.
1909, pt. 1, p. 287.
Top. sheet Shasta.

208. Weaverville. Au. (Pl.)
50 miles NW. Redding, S. P. R. R.
Terrace and stream gravels.
TRINITY COUNTY—Continued.

208. Weaverville—Continued.
1907, pt. 1, pp. 228, 229.
1909, pt. 1, p. 287.
Top. sheet Red Bluff.

TUOLUMNE COUNTY.

209. Big Oak Flat. Au. (D, Pl.)
Slates cut by granodiorite.
Veins.
Lindgren, W., Tertiary gravels of the Sierra Nevada: P. P. 73, 1911, p. 217.
Min. Res. 1905, p. 175.
1908, pt. 1, p. 355.
Top. sheet Sonora.
Folio 41, 1897.

Station S. R. R. of Cal.
Slates and serpentine.
Tertiary river gravels, lenses.
Lindgren, W., Tertiary gravels of the Sierra Nevada: P. P. 73, 1911, p. 217.
Min. Res. 1905, p. 175.
1908, pt. 1, p. 769.
Top. sheet Sonora.
Folios 41, 1897; 63, 1900.

211. Columbia. Au. (Pl.)
4 miles N. Sonora, S. R. R. of Cal.
Tertiary river gravels.
Lindgren, W., Tertiary gravels of the Sierra Nevada: P. P. 73, 1911, pp. 212–213.
Min. Res. 1905, p. 175.
1906, p. 355.
Top. sheet Big Trees.
Folios 51, 1898; 63, 1900.

Station S. R. R. of Cal.
Slates, serpentine, and amphibolites.
Veins and Tertiary river gravels.
1907, pt. 1, p. 231.
Top. sheet Sonora.
Folios 41, 1897; 63, 1900.

213. Soulsbyville (Carters). Au
Station S. R. R. of Cal.
Granodiorite.
213. Soulsbyville (Carters)—Continued
Veins.
Lindgren, W., Tertiary gravels of the Sierra Nevada: P. P. 73, 1911, p. 217.
Turner, H. W., Further contributions to the geology of the Sierra Nevada:
Min. Res. 1905, p. 175.
1908, pt. 1, p. 356.
Top. sheet Sonora.
Folio 41, 1897.

Station S. R. R. of Cal.
Slates and amphibolites.
Veins.
Lindgren, W., Tertiary gravels of the Sierra Nevada: P. P. 73, 1911, p. 217.
Turner, H. W., Further contributions to the geology of the Sierra Nevada:
Top. sheet Sonora.
Folios 41, 1897; 63, 1900.

5 miles W. Tancred, S. P. R. R.
Mesozoic sediments and serpentine cut by andesite and basalt.
Stockworks and disseminations.
Becker, G. F., Geology of the quicksilver deposits of the Pacific slope:

13 miles NW. Marysville, S. P. R. R.
Diabase.
Veins.
Top. sheet Smartsville.
Folio 18, 1895.

34 miles NE. Marysville, 36 miles E. Oroville, S. P. R. R.
Greenstone and diorite.
Tertiary river gravels and veins.
1908, pt. 1, p. 357.
Top. sheet Smartsville.
Folio 18, 1895.

218. Camptonville. Au. (Pl.)
47 miles NE. Marysville, S. P. R. R.; 23 miles N. Nevada City, N. C.
N. G. R. R.
Tertiary river gravels.
218. Camptonville—Continued.

Lindgren, W., Tertiary gravels of the Sierra Nevada: P. P. 73, 1911, pp. 105-108, 123.
Top. sheet Smartsville.
Folio 18, 1895.

30 miles NE. Marysville, S. P. R. R.
Granodiorite.
Veins.
Top. sheet Smartsville.
Folio 18, 1895.

220. Marysville (Yuba Basin). Au. (Pl.)
Station S. P. R. R.
Quaternary river gravels.
Lindgren, W., Tertiary gravels of the Sierra Nevada: P. P. 73, 1911, pp. 120, 221-222.
Top. sheet Smartsville.
Folio 18, 1895.

221. Smartsville. Au. (Pl.)
27 miles E. Marysville, S. P. R. R.; 14 miles W. Grass Valley, N. C. N. G.
R. R.
Tertiary river gravels.
Lindgren, W., Tertiary gravels of the Sierra Nevada: P. P. 73, 1911, pp. 123-125.
1908, pt. 1, p. 357.
Top. sheet Smartsville.
Folio 18, 1895.

222. Wheatland. Au. (Pl.)
Station S. P. R. R.
Quaternary gravels.
Top. sheets Smartsville, Wheatland.
Folio 18, 1895.

21528°—Bull. 507—12—8
CALIFORNIA, SOUTHERN COUNTIES.

In the 17 southern counties of California there are 191 regions which the Survey has called mining districts for convenience of reference. Of this number 9 produce mainly iron or chromium, 11 quicksilver, 3 rare metals, 129 gold, 19 copper, 12 silver, and 7 lead. In one district the principal metal is unknown.

Distribution of the predominant metal produced in the mining districts of the southern counties of California.

<table>
<thead>
<tr>
<th>County</th>
<th>Gold</th>
<th>Silver</th>
<th>Copper</th>
<th>Lead</th>
<th>Iron</th>
<th>Quicksilver</th>
<th>Rare Metals</th>
<th>Unknown</th>
<th>Total</th>
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</tbody>
</table>

MINING DISTRICTS IN SOUTHERN COUNTIES OF CALIFORNIA.

[See Pl. V. Additional references may be found in Mineral Resources for 1910 and 1911.]

FRESNO COUNTY.

11 miles ENE. Clovis, S. P. R. R.
Mica schists and granite cut by basic dikes.
Lenses.

25 miles W. Mendota, S. P. R. R.
Upper Cretaceous (Chico) sandstone.
Dissemination.

3. Mill Creek. Au, Ag. (D, Pl.)
22 miles W. Sanger, S. P. R. R.
Schists and granite.
Veins.

Friant station, S. P. R. R.
Schists and granite.
Veins.

30 miles NE. Clovis, S. P. R. R.
Granite, slate, and schist.
Veins.
Top. sheet Kaiser.
114
6. Temperance Flat. Au.
   12 miles E. Friant, S. P. R. R.

IMPERIAL COUNTY.

   5 miles NE. Ogilby, S. P. R. R.
   Schists cut by pegmatite.
   Veins.
   1907, pt. 1, p. 234.
   Top. sheet Yuma.

8. Picacho. Au. (D, Pl.)
   25 miles NNW. Yuma, S. P. R. R.
   Schist and granite capped by Tertiary volcanics.
   Impregnations, and wash gravels.

9. White Gold Basin. Au, Ag. (D, Pl.)
   22 miles NNW. Yuma, S. P. R. R.
   Top. sheet Yuma.

     12 miles NNE. Yuma, S. P. R. R.
     Gneiss.
     Veins.
     Top. sheet Yuma.

INYO COUNTY.

    10 miles NE. Whitney, S. P. R. R.
    Paleozoic sediments cut by granite.
    Veins.
    Spurr, J. E., Geology of Nevada south of the fortieth parallel: Bull. 208,
    1903, pp. 206–212.
    Top. sheet Mount Whitney.

12. Big Pine. Au, Ag, Pb.
     Alvord station, S. P. R. R.
     Paleozoic sediments cut by granite.
     Veins.
     Spurr, J. E., Geology of Nevada south of the fortieth parallel: Bull. 208,
     1903, pp. 206–212.
     1908, pt. 1, p. 334.

13. Bishop Creek. Au, Ag, Cu.
     5 miles SW. Laws, S. P. R. R.
     Paleozoic sediments cut by granite.
     Veins.
     Spurr, J. E., Geology of Nevada south of the fortieth parallel: Bull. 208,
     1903, pp. 206–212.
     1908, pt. 1, p. 335.

14. Cerro Gordo. Ag, Pb, Au, Cu, Fe.
     28 miles NE. Keeler, S. P. R. R.
     Paleozoic sediments cut by granite.
     Contact metamorphic, replacements.
14. **Cerro Gordo**—Continued.

Spurr, J. E., Geology of Nevada south of the fortieth parallel: Bull. 208, 1903, pp. 206-212.
1908, pt. 1, p. 334.

15. **Chloride Cliff**. Au, Pb, Cu.

— A geologic reconnaissance in southwestern Nevada and eastern California: Bull. 308, 1907, pp. 161, 162, 173-175.
Top. sheet Furnace Creek.

16. **Darwin**. Au, Ag, Cu, Pb.

Tertiary volcanics.
Veins.
Spurr, J. E., Geology of Nevada south of the fortieth parallel: Bull. 208, 1903, pp. 206-212.
1908, pt. 1, p. 334.

17. **Daylight**. Ag, Pb (Au, Cu).

Tertiary volcanics.
Veins.
Top. sheet Furnace Creek.

18. **Deep Springs (Pine Mountain)**. Ag, Pb (Au, Cu).

Spurr, J. E., Geology of Nevada south of the fortieth parallel: Bull. 208, 1903, pp. 206-212.

19. **Echo Canyon (Schwaub)**. Au.

Spurr, J. E., Geology of Nevada south of the fortieth parallel: Bull. 208, 1903, pp. 206-212.

20. **Emigrant**. Au.

Spurr, J. E., Geology of Nevada south of the fortieth parallel: Bull. 208, 1903, pp. 206-212.

Spurr, J. E., Geology of Nevada south of the fortieth parallel: Bull. 208, 1903, pp. 200-205.
Top. sheet Ballarat.

21. Furnace Creek (Greenwater). Cu, Au, Ag.

Spurr, J. E., Geology of Nevada south of the fortieth parallel: Bull. 208, 1903, pp. 200-205.
Top. sheet Ballarat.

Top. sheet Greenwater.


Spurr, J. E., Notes on ore deposits of southwestern Nevada and eastern California: Bull. 285, 1906, p. 73.
Spurr, J. E., Geology of Nevada south of the fortieth parallel: Bull. 208, 1903, pp. 200-205.
Top. sheet Ballarat.

23. Grapevine Canyon. Au, Ag.

Top. sheet Ballarat.

24. Harrisburg. Cu, Au, Ag, Pb.

Spurr, J. E., Geology of Nevada south of the fortieth parallel: Bull. 208, 1903, pp. 200-205.
Top. sheet Ballarat.


Spurr, J. E., Geology of Nevada south of the fortieth parallel: Bull. 208, 1903, pp. 206-212.
Top. sheet Mount Whitney.


Spurr, J. E., Geology of Nevada south of the fortieth parallel: Bull. 208, 1903, pp. 200-205.
26. **Kearsarge**—Continued.
  Veins.
  Top. sheet Mount Whitney.

27. **Kelley.**  Au, Ag.
   20 miles NE. Brown, S. P. R. R.

28. **Lee.**  Au, Ag.
   30 miles SSE. Keeler, S. P. R. R.
   Paleozoic sediments cut by granite.
   Veins and replacements.
   Top. sheet Ballarat.

29. **Lees Camp.**  Au, Ag.
   6 miles W. Leeland, T. & T. R. R.
   Paleozoic sediments.
   Veins.
   Ball, S. H., A geologic reconnaissance in southwestern Nevada and eastern California: Bull. 308, 1907, p. 175.
   Top. sheet Lees Camp.

30. **Lone Pine.**
   4 miles W. Whitney, S. P. R. R.
   Top. sheet Mount Whitney.

31. **Lookout (Modoc).**  Pb, Ag.
   45 miles NE. Brown, S. P. R. R.
   Paleozoic sediments, Tertiary volcanics.
   Replacements.
   Top. sheet Ballarat.

32. **New Coso.**  Pb, Ag (Cu, Au).
   30 miles NE. Brown, S. P. R. R.
   Paleozoic sediments, Tertiary volcanics.
   Replacements.

33. **Panamint (Ballarat).**  Ag, Pb (Cu, Sb).
   50 miles NE. Brown, S. P. R. R.
   Paleozoic sediments.
   Veins, replacements.
   1907, pt. 1, p. 207.
   1908, pt. 1, p. 334.
   Top. sheet Ballarat.

34. **Poison Spring.**  Au.
   16 miles W. Leeland, T. & T. R. R.
   Paleozoic sediments.
   Veins.
   Ball, S. H., A geologic reconnaissance in southwestern Nevada and eastern California: Bull. 308, 1907, p. 175.
   Top. sheet Furnace Creek.
35. **Russ.** Pb, Ag.  
15 miles NE. Whitney, S. P. R. R.  
Paleozoic sediments cut by granite.  
Replacements and veins.  
Spurr, J. E., Geology of Nevada south of the fortieth parallel: Bull. 208, 1903, pp. 206-212.

36. **Saratoga (Tecopa Mountain).** Pb, Cu, Ag, Au, Zn.  
12 miles NE. Tecopa, T. & T. R. R.  
Paleozoic sediments, granite and Tertiary volcanics.  
Veins.  

37. **Sherwin.** Au.  
20 miles W. Bishop, S. P. R. R.  
Granite.  
Veins.

38. **Skidoo.** Au, Pb, Ag.  
75 miles NE. Brown, S. P. R. R.; 45 miles SW. Rhyolite, Nev., B. G. R. R.  
Granite cut by syenite, diorite, and monzonite.  
Veins.  
Spurr, J. E., Geology of Nevada south of the fortieth parallel: Bull. 208, 1903, pp. 200-205.  
1908, pt. 1, p. 334.  
Top. sheet Ballarat.

39. **Swansea (Keeler, Kruger).** Pb, Ag.  
Keeler station S. P. R. R.  
Paleozoic sediments cut by granite.  
Veins and replacements.  
Spurr, J. E., Geology of Nevada south of the fortieth parallel: Bull. 208, 1903, pp. 206-212.  

40. **Tibbets.** Au, Ag.  
16 miles N. Citrus, S. P. R. R.  
Paleozoic sediments cut by granite.  
Veins.  
Spurr, J. E., Geology of Nevada south of the fortieth parallel: Bull. 208, 1903, pp. 206-212.  
Top. sheet Mount Whitney.

41. **Tinemaha (Fish Springs).** Au.  
10 miles S. Alvord, S. P. R. R.  
Paleozoic sediments cut by granite.  
Veins.  

42. **Tucki Mountain.** Au.  
Paleozoic sediments cut by granite.  
Veins.  
Ball, S. H., A geologic reconnaissance in southwestern Nevada and eastern California: Bull. 308, 1907, p. 211.  
Spurr, J. E., Geology of Nevada south of the fortieth parallel: Bull. 208, 1903, pp. 200-205.  
Top. sheet Ballarat.
43. **Ubehebe.** Cu (Au, Ag).
   60 miles E. Laws, S. P. R. R.
   Paleozoic limestone cut by acidic intrusives.
   Contact metamorphic.

44. **Union.** Pb, Ag.
   12 miles SSE. Laws, S. P. R. R.
   Paleozoic sediments cut by granite.
   Replacements and veins.
   Spurr, J. E., Geology of Nevada south of the fortieth parallel: Bull. 208, 1903, pp. 206-212.

45. **Wildrose.** Ag, Pb.
   70 miles NE. Brown, S. P. R. R.
   Paleozoic sediments cut by granite.
   Veins and replacements.
   Spurr, J. E., Geology of Nevada south of the fortieth parallel: Bull. 208, 1903, pp. 200-205.
   Top. sheet Ballarat.

46. **Willow.** Au, Ag.
   15 miles NW. Zabriskie, T. & T. R. R.
   Paleozoic sediments, Tertiary volcanics.
   Veins.

**KERN COUNTY.**

47. **Agua Caliente.** Au.
   20 miles E. Caliente, A. T. & S. F. R. R.
   Veins.

48. **Amalie (Paris).** Ag, Au, W, Pb.
   15 miles E. Caliente, A. T. & S. F. R. R.
   Limestone and schist.
   Veins.
   Min. Res. 1905, p. 177.
   1906, pp. 188, 525.
   1908, pt. 1, pp. 335, 336, 724.

49. **Big Dixie.** Au.
   15 miles NE. Cantil, S. P. R. R.

50. **Black Mountain.** Au, Mo.
   15 miles NW. Johannesburg, A. T. & S. F. R. R.

51. **Garlock.** Au.
   11 miles SW. Johannesburg, A. T. & S. F. R. R.
   Granite, schist.
   Veins.

52. **Goler.** Au. (Pl.)
   6 miles W. Searles, S. P. R. R.
   Wash gravels.

53. **Greenhorn Mountains.** Au.
   40 miles N. Caliente, A. T. & S. F. R. R.
54. Green Mountain. Au, Ag.
48 miles NNE. Caliente, A. T. & S. F. R. R.
Top. sheet Kernville.

55. Havilah. Au.
25 miles N. Caliente, A. T. & S. F. R. R.
Metamorphosed slates and limestones cut by granite.
Veins.

56. Isabella. Au, Ag.
37 miles N. Caliente, A. T. & S. F. R. R.
Top. sheet Kernville.

57. Kernville. Au, Ag, Cu.
42 miles N. Caliente, A. T. & S. F. R. R.
Top. sheet Kernville.

58. Keysville. Au, Ag.
31 miles N. Caliente, A. T. & S. F. R. R.

59. Long Tom. Au (Pb, Cu).
15 miles ENE. Bakersfield, A. T. & S. F. R. R., S. P. R. R.

60. Mohave. Au, Ag.
Mojave station, A. T. & S. F. R. R., S. P. R. R.
Tertiary volcanics.
Veins.
Min. Res. 1905, p. 177.
1906, p. 188.
1907, pt. 1, p. 209.
1908, pt. 1, p. 336.

35 miles NNE. Caliente, A. T. & S. F. R. R.
Top. sheet Kernville.

5 miles N. Searles, S. P. R. R.
Granite and schist.
Veins.

63. Randsburg. Au, Ag, W.
14 miles W. Johannesburg, A. T. & S. F. R. R.
Schist and granite.
Veins.
Min. Res. 1905, pp. 177, 412.
1906, pp. 189, 525.
1908, pt. 1, pp. 336, 723.
Top. sheet Randsburg.
KERN COUNTY—Continued.

64. Red Rock. Au. (Pl.)
12 miles NNW. Cantil, S. P. R. R.
Wash gravels.

9 miles W. Rosamond, S. P. R. R.
Min. Res. 1905, p. 177.

30 miles NE. Caliente, A. T. & S. F. R. R.
1883-84, p. 641.
1885, p. 387.

Station S. P. R. R.

68. Slate Range. Au.
28 miles SSE. Portersville, S. P. R. R.
Veins.

69. Summit. Au. (Pl.)
6 miles N. Johannesburg, A. T. & S. F. R. R.
Wash gravels.
1910, pp. 23-47.
Top. sheet Randsburg.

70. Vaughn. Au.
33 miles N. Caliente, A. T. & S. F. R. R.

34 miles NE. Martensdale, S. P. R. R.
Granodiorite, aplite.
Vein.

LOS ANGELES COUNTY.

72. Arrastre Canyon (Newhall). Au. (Pl.)
Station S. P. R. R.
Wash gravels.
Top. sheet Santa Susana.

73. Azusa (Kern). Au, Ag (Ni, Co).
10 miles N. San Dimas, A. T. & S. F. R. R., S. P. R. R.
Schist and greenstones.
Veins.
Top. sheet Pomona.

22 miles SE. Palmdale, S. P. R. R.
Top. sheet Rock Creek.

75. Cedar. Au, Ag.
8 miles N. Acton; S. P. R. R.
Schist and greenstones.
Veins.

76. Gleason Mountain. Au, Ag (Cu).
15 miles S. Acton, S. P. R. R.
Granite and schist.
Veins.
Top. sheet Tujunga.

77. Soledad (Acton). Au. (D, Pl.)
Station S. P. R. R.
Granite and schist.
CALIFORNIA, SOUTHERN COUNTIES.

LOS ANGELES COUNTY—Continued.

77. Soledad (Acton)—Continued.
Veins, stream gravels.
Top. sheet Tujunga.

78. Tujunga. Au, Ag.
15 miles SSE. Acton, S. P. R. R.
Granite and schist.
Veins.
Top. sheet Tujunga.

MADERA COUNTY.

79. Coarse Gold. Au. (D, Pl.)
44 miles NE. Madera, S. P. R. R.
Turner, H. W., Further contributions to the geology of the Sierra Nevada:
Min. Res. 1906, p. 190.
1907, pt. 1, p. 234.
1908, pt. 1, p. 359.

Station S. P. R. R.
Granite and schist.
Veins.

81. Fine Gold. Au. (D, Pl.)
42 miles E. Madera, S. P. R. R.
Veins and stream gravels.
Turner, H. W., Further contributions to the geology of the Sierra Nevada:

82. Grub Gulch. Au, W. (D, Pl.)
14 miles NE. Raymond, S. P. R. R.
Schist.
Veins.
340, 1908, p. 271.
Turner, H. W., Further contributions to the geology of the Sierra Nevada:

83. Hildreth. Au, Ag.
35 miles E. Madera, S. P. R. R.
Granite and slate.
Veins.

84. Minarets (Mount Raymond). Fe, Ag.
90 miles NE. Friant, S. P. R. R.
Turner, H. W., Further contributions to the geology of the Sierra Nevada:
Top. sheet Mount Lyell.

45 miles ENE. Madera, S. P. R. R.
Top. sheet Mount Lyell.

10 miles NE. Madera, S. P. R. R.
Granite and slate.
Veins.
MINING DISTRICTS OF WESTERN UNITED STATES.

MONO COUNTY.

87. **Blind Spring.** Au, Ag, Cu, Pb.
   Benton station, S. P. R. R.
   Granite, limestone, and Tertiary volcanics.
   Veins.

88. **Bodie.** Au, Ag.
   46 miles WSW. Thorn, Nev., S. P. R. R.
   Tertiary volcanics.
   Veins.
   1906, p. 190.
   1907, pt. 1, pp. 211–212.
   1908, pt. 1, p. 338.
   1909, pt. 1, p. 278.

89. **Castle Peak.** Ag.
   90 miles S. Minden, Nev., V. & T. R. R.

90. **Cloverpatch.** Ag, Au.
   20 miles SW. Benton, S. P. R. R.

91. **Dogtown Diggings.** Au. (Pl.)
   85 miles S. Minden, Nev., V. & T. R. R.

92. **Homer (Lundy).** Au, Ag.
   63 miles SW. Thorn, Nev., S. P. R. R.
   Granite.
   Veins.
   Min. Res. 1906, p. 190.
   1907, pt. 1, p. 212.
   1908, pt. 1, p. 338.
   1909, pt. 1, p. 278.

93. **Indian.** Au, Ag.
   20 miles W. Benton, S. P. R. R.

94. **Jordan.** Au, Cu.
   50 miles SW. Thorn, Nev., S. P. R. R.

95. Omitted.

96. **Keith.** Au.

97. **Lakes (Mammoth).** Au, Ag.
   50 miles SW. Benton, S. P. R. R.
   Granite and schist.
   Veins.
   Top. sheet Mount Lyell.

98. **Masonic.** Au, Ag.
   65 miles S. Minden, Nev., V. & T. R. R.
   Min. Res. 1906, p. 190.
   1907, pt. 1, p. 212.
   1908, pt. 1, p. 338.
   1909, pt. 1, p. 278.

99. **Patterson.** Au, Ag.
   65 miles S. Minden, Nev., V. & T. R. R.

100. **Tioga.** Au, Ag.
    75 miles SW. Thorn, Nev., S. P. R. R.
    Granite.
    Veins.
    Turner, H. W., Further contributions to the geology of the Sierra Nevada:
CALIFORNIA, SOUTHERN COUNTIES. 125

MONO COUNTY—Continued.

101. West Walker. Au (Ag).
    36 miles S. Minden, Nev., V. & T. R. R.

    Benton station, S. P. R. R.

MONTEREY COUNTY.

103. Dutro. Hg.
    40 miles WSW. King City, S. P. R. R.

    21 miles S. King City, S. P. R. R.

105. Los Burros. Au. (Pl, D.)
    43 miles W. King City, S. P. R. R.
    Slates, serpentine, and limestone.
    Veins.

106. Table Mountain. Hg.
    30 miles ENE. San Miguel, S. P. R. R.

ORANGE COUNTY.

107. Trabuco Canyon. Pb, Zn, Au, Ag.
    25 miles N. San Juan Capistrano, A. T. & S. F. R. R.
    Clay, slate, and porphyry.
    Veins.

    50 miles ENE. Mecca, S. P. R. R.

    4 miles N. Corona, A. T. & S. F. R. R.
    Granite.
    Veins.
    340, 1908, pp. 238-239.

    20 miles E. Mecca, S. P. R. R.

111. Ironwood. Au, Ag, Cu, Pb.
    40 miles S. Randolph, A. T. & S. F. R. R.
    Porphyry.
    Veins.

112. Lost Horse. Au.
    30 miles N. Indio, S. P. R. R.

113. Menifee (Auld). Au, Ag.
    10 miles S. Winchester, A. T. & S. F. R. R.
    Top. sheet Elsinore.

114. Monte Negro (Eagle Mountain). Au, Ag, Cu, Fe.
    Granite and metamorphosed sediments cut by granite porphyry.
    Veins.
    Harder, E. C., The Iron Age iron-ore deposit near Dale, San Bernardino
    County, Cal.: Bull. 430, 1910, p. 229.

    55 miles N. Mecca, S. P. R. R.
    Granite.
    Veins.
    Station A. T. & S. F. R. R.
    Slate and granite.
    Veins.
    Top. sheet Elsinore.

    15 miles N. Indio, S. P. R. R.

117a. Temescal Mountains (San Jacinto). Sn.
    10 miles SE. Corona, A. T. & S. F. R. R.
    Metamorphosed sediments cut by granite.
    Veins.
    260, 1905, pp. 165-166.
    1883-84, pp. 614-615.
    1891, p. 161.

SAN BENITO COUNTY.

118. Central Benito. Hg.
    26 miles SSE. Tres Pinos, S. P. R. R.
    Mesozoic sediments.
    Stockworks.
    Becker, G. F., Geology of the quicksilver deposits of the Pacific slope:

119. New Idria. Hg.
    64 miles SE. Tres Pinos, S. P. R. R.
    Cretaceous shales and sandstones.
    Stockworks, veins, and disseminations.
    Becker, G. F., Geology of the quicksilver deposits of the Pacific slope:
    Melville, W. H., and Lindgren, W., Contributions to the mineralogy of the
    Pacific coast: Bull. 61, 1890, p. 21.
    1883-84, p. 492.
    1887, pp. 119-120.
    1909, pt. 1, p. 553.

120. Stayton (McLeod, Panoche). Hg, Sb.
    15 miles NE. Hollister, S. P. R. R.
    Metamorphosed slates.
    Stockworks.
    Becker, G. F., Geology of the quicksilver deposits of the Pacific slope:
    M. XIII, 1888, pp. 379-381.
    Min. Res. 1883-84, p. 642.
    1885, p. 387.
    1909, pt. 1, p. 553.

SAN BERNARDINO COUNTY.

121. Alword. Au.
    Limestone cut by porphyry.
    Veins.
SAN BERNARDINO COUNTY—Continued.

122. Arondo (Slate Range). Au, Ag.
   50 miles NE. Johannesburg, A. T. & S. F. R. R.
   Tertiary volcanics.
   Veins.
   Spurr, J. E., Geology of Nevada south of the fortieth parallel: Bull. 208, 1903, p. 213.

123. Arrowhead. Au.
   Granite.
   Veins.

   Station A. T. & S. F. R. R.
   Granite and schist.
   Veins.
   Min. Res. 1906, p. 525.
   1907, pt. 1, p. 712.
   1908, pt. 1, p. 723.
   1909, pt. 1, pp. 577-578.
   Top. sheet Randsburg.

125. Blackhawk (Silver Reef). Au, Ag.
   40 miles ESE. Victorville, S. P. L. A. & S. L. R. R.
   Sediments and granite.
   Veins and replacements.
   Top. sheet San Gorgonio.

126. Brightwood (Providence Mountains). Ag, Pb, Cu.
   15 miles NE. Kelso, S. P. L. A. & S. L. R. R.
   Granite and schist cut by diorite and porphyry.
   Veins.

127. Bullion (Standard). Cu, Ag, Pb, Au.
   14 miles N. Cima, S. P. L. A. & S. L. R. R.
   Paleozoic sediments cut by granite.
   Contact metamorphic.

128. Calico (Daggett). Ag.
   Rhyolite.
   Replacements and veins.
   Min. Res. 1907, pt. 1, p. 221.
   1908, pt. 1, p. 346.

129. Cave Canyon. Fe.
   1 mile N. Scott, S. P. L. A. & S. L. R. R.
   Paleozoic sediments cut by granite.
   Contact metamorphic.
130. Cima. Ag, Au.
Cima station, S. P. L. A. & S. L. R. R.
Granite.
Veins.
Min. Res. 1906, p. 194.
1907, pt. 1, p. 221.
1908, pt. 1, p. 346.
131. Cottonwood. Au, Ag.
5 miles N. Judson, S. P. L. A. & S. L. R. R.
10 miles W. Silver Lake, T. & T. R. R.
133. Dry Lake. Cu.
134. Garlic Spring. Fe.
Harder, E. C., and Rich, J. L., The Iron Age iron-ore deposit near Dale,
135. Grapevine. Au, Ag, Pb.
Veins.
3 miles S. Hitt, B. & S. R. R.
Rhyolite.
Veins.
Min. Res. 1907, pt. 1, p. 221.
137. Helen. Au, Ag
Judson station, S. P. L. A. & S. L. R. R.
20 miles NE. Patton, A. T. & S. F. R. R.
Top. sheet San Gorgonio.
139. Ibex. Au.
15 miles NW. Needles, A. T. & S. F. R. R.
140. Iron Mountain. Fe.
Harder, E. C., and Rich, J. L., The Iron Age iron-ore deposit near Dale,
San Bernardino County, Cal.: Bull. 430, 1910, p. 229, map.
141. Ivanpah (Copper World). Cu, Au, Ag, Pb.
Station A. T. & S. F. R. R.
Paleozoic sediments cut by granite.
Veins and contact metamorphic.
1907, pt. 1, pp. 221, 712.
142. Kane Springs. Cu, Au, Ag.
Granite.
Veins.
143. Kelso. Fe.
144. Kewanee. Au.
Veins.
Min. Res. 1907, pt. 1, p. 221.
SAN BERNARDINO COUNTY—Continued.

145. **Kingston Range.** Fe.
25 miles SE. Tecopa, T. & T. R. R.

146. **Knob Peak.** Au, Cu.
35 miles SE. Tecopa, T. & T. R. R.

147. **Lava Beds (Newberry).** Au, Ag, Cu.
Granodiorite.
Veins.

148. **Monument Peak (Whipple Mountain).** Cu, Au.
14 miles N. Vidal, A. T. & S. F. R. R.
Pre-Cambrian gneiss, schist; diorite capped by Tertiary volcanics.
Veins.
Bancroft, H., Reconnaissance of the ore deposits in northern Yuma County, Ariz.: Bull. 451, 1911, pp. 68–73.
Top. sheet Parker.

149. **Morongo (Lone Valley?).** Au, Ag.
15 miles N. Palm Springs, S. P. R. R.
Limestone and slate.
Vein.
Top. sheet San Gorgonio.

150. **Needles.** Au, Cu.
15 miles W. Mellen, A. T. & S. F. R. R.
Veins.

151. **New York (Manvel, Barnwell).** Au, Ag, Cu (Pb, Zn, W).
Barnwell station, A. T. & S. F. R. R.
Granite and schist.
Veins.
Min. Res. 1906, p. 525.
1907, pt. 1, p. 221.

152. **Ord.** Au, Ag, Cu.
Granite.
Veins.

153. **Oro Grande.** Au, Ag, Pb.
10 miles W. Hesperia, S. P. L. A. & S. L. R. R.
Paleozoic sediments cut by diorite and quartz porphyry.
Replacements and veins.
Top. sheet Hesperia.

154. **Owl Holes.** Fe.
70 miles NW. Silver Lake, T. & T. R. R.

155. **San Antonio.** Au.
15 miles W. Cajon, A. T. & S. F. R. R.
Top. sheet San Antonio.

156. **Shadow Mountains.** Cu, Au, Ag, Pb, W.
20 miles NW. Cima, S. P. L. A. & S. L. R. R.

21528°—Bull. 507—12$^\circ$—9
157. **Signal (Vontrigger)**. Cu, Au, W.  
8 miles E. Vontrigger, A. T. & S. F. R. R.  

158. **Silver Mountain**. Au, Ag, Cu.  
Granite, limestone.  
Veins.  

159. **Spangler**. Au, Ag, Cu.  
24 miles NE. Johannesburg, A. T. & S. F. R. R.  

160. **Stedman**. Cu, Au, Ag.  
1906, p. 194.  
1907, pt. 1, p. 220.  

161. **Stringer**. Au, W (Pb, Zn, Cu).  
Atolia station, A. T. & S. F. R. R.  
Schist and granite.  
Veins.  
Min. Res. 1906, p. 525.  
1907, pt. 1, p. 712.  
Top. sheet Stringer.  

162. Omitted.  

163. **Trojan (Providence)**. Au, Cu.  
20 miles W. Blake, A. T. & S. F. R. R.  
Veins.  

164. **Twentynine Palms**. Au, Ag.  
40 miles SSW. Amboy, A. T. & S. F. R. R.  
Veins.  

165. **Vanderbilt**. Au, Cu.  
Barnwell station, A. T. & S. F. R. R.  
Granite and limestone.  
Veins.  

166. Omitted.  

167. **Virginia Dale (Monte Negro)**. Au, Ag, Cu, Fe.  
Sediments cut by granite, diorite, and syenite.  
Veins.  
Min. Res. 1907, pt. 1, p. 221.  
1908, pt. 1, p. 346.  

168. Omitted.  

**SAN DIEGO COUNTY.**  

169. **Banner**. Au.  
30 miles NE. Lakeside, S. D. & C. R. R.  
Schist and granite.  
Veins.  
Top. sheet Ramona.
25 miles ENE. Lakeside, S. D. & C. R. R.
Schist and granite (?).
Veins.
Top. sheet Cuyamaca.

24 miles SE. Spring Valley, S. D. & C. R. R.
Metamorphosed sediments cut by acidic and basic dikes.
Veins.
Top. sheet Cuyamaca.

172. Escondido. Au, Ag.
Station A. T. & S. F. R. R.
Granite.
Veins.
Top. sheet Escondido.

173. Foster (San Vicente). Au.
Foster station, S. D. & C. R. R.
Top. sheets Ramona, Cuyamaca.

25 miles NE. Foster, S. D. & C. R. R.
Slates, schist, and granite.
Veins.
1907, pt. 1, p. 234.
Top. sheet Ramona.

25 miles NNE. Foster, S. D. & C. R. R.
Top. sheet Ramona.

176. Pine Valley. Au, Ag.
30 miles E. Lakeside, S. D. & C. R. R.
Granite and schist.
Veins.

40 miles ENE. Foster, S. D. & C. R. R.

25 miles E. San Juan Capistrano, A. T. & S. F. R. R.
Schists, gneiss, granite.
Veins.
Top. sheets San Luis Rey, Capistrano.

179. Adelaida (Klau). Hg.
16 miles W. Paso Robles, S. P. R. R.
Mesozoic slates and sandstones.
Stockworks.
Becker, G. F., Geology of the quicksilver deposits of the Pacific slope:
M. XIII, 1888, pp. 381-382.
1909, pt. 1, p. 553.

SAN LUIS OBISPO COUNTY.
180. La Panza. Au. (Pl.)
50 miles SE. Santa Margarita, S. P. R. R.
Min. Res. 1907, pt.-1, p. 234.

181. Oceanic (Santa Rosa). Hg.
25 miles NW. San Luis Obispo, S. P. R. R.
Mesozoic sandstone.
Impregnations.
Becker, G. F., Geology of the quicksilver deposits of the Pacific slope:
M. XIII, 1888, pp. 381-382.
Min. Res. 1887, pp. 119-121.
1908, pt. 1, p. 689.
1909, pt. 1, p. 553.

182. Ocean View (Pine Peak). Hg.
44 miles NW. San Luis Obispo, S. P. R. R.
Metamorphosed slates.
Stockworks.
Becker, G. F., Geology of the quicksilver deposits of the Pacific slope:
M. XIII, 1888, pp. 381-382.

183. Perfumo Canyon. Fe, Cr.
5 miles WSW. San Luis Obispo, S. P. R. R.
Jurassic sediments.
Lenses.
Harder, E. C., Iron ores of western and central California: Bull. 430, 1910,
pp. 220-223.
1883-84, pp. 570-571.
1885, pp. 357-358.
1886, p. 176.

184. Rinconada (Santa Margarita). Hg.
Station S. P. R. R.
Metamorphosed slates and serpentine.
Disseminations.
Becker, G. F., Geology of the quicksilver deposits of the Pacific slope:
M. XIII, 1888, pp. 381-382.
Top. sheet San Luis Obispo.

185. San Luis Obispo (Santa Lucia). Fe, Cr.
20 miles NW. San Luis Obispo, S. P. R. R.
Metamorphosed slates and serpentine.
Lenses.
Harder, E. C., Some chromite deposits in western and central California:
Min. Res. 1883-84, pp. 570-571.
1908, pt. 1, p. 767.
Top. sheet San Luis Obispo.
Folio 101, 1904.

SANTA BARBARA COUNTY.

186. Los Prietos. Hg.
5 miles N. Santa Barbara, S. P. R. R.
Serpentine.
Stockworks.
Becker, G. F., Geology of the quicksilver deposits of the Pacific slope:
M. XIII, 1888, p. 382.
Top. sheet Santa Barbara special.
TULARE COUNTY.

   37 miles SE. Plano, S. P. R. R.
   Serpentine and limestone.
   Vein (?)..

188. Finger Rock. Au.
   30 miles NE. Exeter, S. P. R. R.
   Top. sheet Tehipite.

   14 miles E. Portersville, S. P. R. R.
   Top. sheet Kaweah.

   48 miles ENE. Exeter, S. P. R. R.
   Metamorphosed sediments and granite.
   Contact metamorphic.
   Min. Res. 1883-84, p. 642.
   Top. sheet Kaweah.

   Station S. P. R. R.

   23 miles SE. Plano, S. P. R. R.

VENTURA COUNTY.

   46 miles SSE. Maricopa, S. P. R. R.
   Gneiss, slate, and granite.
   Vein.
   Top. sheet Tejon.

194. Snowy Creek (Piru Creek). Au.
   35 miles N. Piru, S. P. R. R.
   Granite.
   Vein.
   Top. sheet Tejon.
COLORADO.

In 35 counties of Colorado there are 132 mining districts, as shown by Plate VI. This is not accurate in that in Gilpin and Clear Creek counties and some other localities the mining districts are small and several have been combined under one symbol and number. In 5 of the 132 districts the predominant metal is unknown, in 1 zinc is the most important product, in 1 iron, in 8 rare metals, in 60 gold, in 21 silver, in 20 copper, and in 16 lead.

Distribution of the predominant metals produced in the mining districts of Colorado.

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<th>Silver</th>
<th>Copper</th>
<th>Lead</th>
<th>Zinc</th>
<th>Iron</th>
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MINING DISTRICTS IN COLORADO.

[See Pl. VI. Additional references may be found in Mineral Resources for 1910 and 1911.]

BOULDER COUNTY.

1. Central. Au, Ag.

7 miles NW. Boulder, C. & S. R. R., U. P. R. R.
Pre-Cambrian complex and basic dikes.
Veins.

Min. Res. 1905, p. 194.
1906, p. 208.
1907, pt. 1, p. 245.
1908, pt. 1, p. 371.
1909, pt. 1, p. 303.
BOULDER COUNTY—Continued.

2. **Gold Hill.** Au, Ag, Pb, Cu.
   6 miles NNW. Crisman, D. B. & W. R. R.
   Pre-Cambrian complex cut by acidic and basic dikes.
   Veins.
   Min. Res. 1905, p. 194.
   1906, p. 208.
   1907, pt. 1, p. 245.
   1908, pt. 1, p. 371.
   1909, pt. 1, p. 303.

3. **Grand Island (Caribou).** Au, Ag, Pb (Mn, Cu).
   2 miles W. Cardinal, D. B. & W. R. R.
   Pre-Cambrian complex cut by acidic and basic dikes.
   Veins.
   1906, p. 208.
   1907, pt. 1, p. 245.
   1908, pt. 1, p. 371.
   1909, pt. 1, p. 304.
   Top. sheet Central City.

4. **Magnolia.** Au, Ag, W.
   Pre-Cambrian complex cut by acidic and basic dikes.
   Veins.
   George, R. D., and Crawford, R. D., The main tungsten area of Boulder
   1907, pt. 1, pp. 245, 712.
   1909, pt. 1, p. 304.
   Top. sheet Central City.

5. **Nederland.** W.
   2½ miles E. Cardinal, D. B. & W. R. R.
   Pre-Cambrian complex cut by acidic and basic dikes.
   Veins.
   George, R. D., and Crawford, R. D., The main tungsten area of Boulder
   1905, p. 411.
   1907, pt. 1, p. 712.
   1908, pt. 1, p. 722.
   Top. sheet Central City.

6. **Sugarloaf.** Au, Ag, W, Pb, Cu.
   Station D. B. & W. R. R.
   Pre-Cambrian complex cut by acidic and basic dikes.
   Veins.
   1905, pp. 195, 411.
   1906, p. 208.
   1907, pt. 1, pp. 245, 246, 712.
   1908, pt. 1, p. 372.
   1909, pt. 1, pp. 304, 579.
BOULDER COUNTY—Continued.

7. Ward. Au, Ag, Cu, Pb.
Station D. B. & W. R. R.
Pre-Cambrian complex cut by acidic and basic dikes.
Veins.
1906, p. 209.
1907, pt. 1, p. 246.
1908, pt. 1, p. 372.
1909, pt. 1, p. 304.

CHAFFEE COUNTY.

8. Alpine. Pb, Ag, Au, Cu.
Station C. & S. R. R.
Pre-Cambrian complex.
Veins.
Spurr, J. E., and Garrey, G. H., Economic geology of the Georgetown quad­
range, Colorado: P. P. 63, 1908, p. 106.

9. Chalk Creek. Pb, Ag, Au, Zn.
St. Elmo station, C. & S. R. R.
1907, pt. 1, p. 247.
1908, pt. 1, p. 373.
1909, pt. 1, p. 305.

4 miles S. Salida, D. & R. G. R. R.
Pre-Cambrian complex.
Veins.
Lindgren, W., Notes on copper deposits in Chaffee, Fremont, and Jefferson
1908, pt. 1, p. 373.
1909, pt. 1, p. 305.

11. Cottonwood. Pb, Ag.
10 miles W. Buena Vista, D. & R. G. R. R., C. M. R. R.
Pre-Cambrian complex (?)?
Veins (?)?

12. Granite. Au, Ag, Pb. (D, Pl.)
Station D. & R. G. R. R., C. M. R. R.
Pre-Cambrian complex cut by dikes.
Veins.
Min. Res. 1908, pt. 1, p. 373.
1909, pt. 1, p. 305.
Top. sheet Leadville.

13. La Plata (Winfield). Ag, Au, Cu, Pb.
15 miles WSW. Granite, D. & R. G. R. R., C. M. R. R.
1906, p. 209.
1907, pt. 1, p. 247.
1908, pt. 1, p. 373.
1909, pt. 1, p. 305.
14. **Monarch-Garfled.** Ag, Au, Cu, Pb, Zn.
19 miles W. Salida, D. & R. G. R. R.
Pre-Cambrian granite and Paleozoic sediments cut by quartz monzoniite.
Veins and replacements.
Crawford, R. D., A preliminary report on the geology of the Monarch mining
Min. Res. 1885, p. 256.
1887, p. 105.
1888, p. 87.
1905, p. 195.
1907, pt. 1, p. 247.
1908, pt. 1, p. 373.
1909, pt. 1, p. 305.

15. **Riverside.** Au, Ag, Pb, Cu.
15 miles NNW. Buena Vista, D. & R. G. R. R., C. M. R. R.
1907, pt. 1, p. 247.
1908, pt. 1, p. 373.
1909, pt. 1, p. 305.

16. **Sedalia.** Cu, Zn.
6 miles ENE. Salida, D. & R. G. R. R.
Pre-Cambrian schists and gneiss.
Lenses.
Lindgren, W., Notes on copper deposits in Chaffee, Fremont, and Jefferson
Min. Res. 1883-84, p. 341.
1908, pt. 1, p. 373.

17. **South Arkansas.** Fe.
19 miles NNE. Salida, D. & R. G. R. R.
1887, p. 53.

18. **Turret.** Au, Ag, Cu.
14 miles NNE. Salida, D. & R. G. R. R.
Pre-Cambrian complex.
Veins and lenses.
Lindgren, W., Notes on copper deposits in Chaffee, Fremont, and Jefferson
Min. Res. 1906, p. 196.
1908, pt. 1, p. 373.
1909, pt. 1, p. 305.

**CLEAR CREEK COUNTY.**

19. **Argentine.** Au, Pb, Ag, Cu, Zn.
Waldorf station, Ar. C. R. R.
Pre-Cambrian complex cut by acidic dikes.
Veins.
Patton, H. B., The Montezuma mining district of Summit County, Colo.: First
Spurr, J. E., and Garrey, G. H., Economic geology of the Georgetown quad­
19. **Argentine**—Continued.
   
   Min. Res. 1885, p. 256.
   1905, pp. 197-198.
   1906, p. 212.
   1907, pt. 1, p. 249.
   1908, pt. 1, p. 375.

   Top. sheet Georgetown.

20. **Georgetown** (Griffith, Silver Plume, Queens). Ag, Zn, Pb, Au, Cu.
   Silver Plume station, C. & S. R. R.
   Pre-Cambrian complex cut by acidic dikes.
   Veins.
   
   1885, p. 256.
   1905, p. 197.
   1906, pp. 211-212.
   1907, pt. 1, p. 249.

21. **Idaho Springs** (Virginia). Au, Ag, Pb, Cu, Zn.
   Idaho Springs station, C. & S. R. R.
   Pre-Cambrian complex cut by acidic dikes.
   Veins.
   
   Min. Res. 1883-84, p. 341.
   1885, p. 256.
   1905, pp. 196-197.
   1906, p. 211.
   1907, pt. 1, p. 250.

   Top. sheets Georgetown, Idaho Springs special.

22. **Jackson** (Corral, Cascade, Democrat). Ag, Au, Pb, Cu.
   Idaho Springs station, C. & S. R. R.
   Pre-Cambrian complex cut by acidic dikes.
   Veins.
   
   Min. Res. 1885, p. 256.
   1905, pp. 197-198.
   1906, p. 212.
   1907, pt. 1, p. 250.
   1909, pt. 1, p. 309.

   Top. sheet Georgetown.
23. Lincoln (Alice, Yankee). Au, Ag, Cu, Pb. (D, Pl.)
12 miles NW. Idaho Springs, C. & S. R. R.
Pre-Cambrian complex cut by acidic and basic dikes.
Veins, stream and terrace gravels.
Min. Res. 1905, p. 197.
1908, pt. 1, p. 377.
Top. sheet Central City.

24. Montana (Lawson, Dumont). Ag, Au, Cu, Pb, Zn.
Lawson and Dumont stations, C. & S. R. R.
Pre-Cambrian complex cut by acidic dikes.
Veins.
Spurr, J. E., and Garrey, G. H., Preliminary report on the ore deposits of the
Min. Res. 1885, p. 256.
1905, p. 197.
1906, p. 213.
1908, pt. 1, p. 377.
1909, pt. 1, p. 309.
Top. sheet Central City.

25. Trail. Pb, Au, Ag, Cu, Zn.
6 miles WSW. Idaho Springs, C. & S. R. R.
Pre-Cambrian complex cut by acidic dikes.
Veins.
Spurr, J. E., and Garrey, G. H., Preliminary report on the ore deposits of the
Min. Res. 1883, p. 341.
1885, p. 256.
1905, p. 196.
1906, p. 212.
1907, pt. 1, p. 251.
1908, pt. 1, p. 377.
1909, pt. 1, p. 309.
Top. sheet Georgetown.

26. Upper Union (Empire). Au, Ag, Cu, Pb.
3 miles NW. Empire, C. & S. R. R.
Pre-Cambrian complex cut by acidic dikes.
Veins.
Spurr, J. E., and Garrey, G. H., Economic geology of the Georgetown quad­
1907, pt. 1, p. 251.
1908, pt. 1, p. 377.
Top. sheet Central City.

27. Ute (Platoro). Au, Ag.
45 miles SW. Monte Vista, D. & R. G. R. R.
Tertiary volcanics.
Veins.
27. **Ute (Platoro)—Continued.**

1906, p. 213.
1907, pt. 1, p. 251.

**COSTILLA COUNTY.**

28. **Grayback (Russell).** Au. (D, Pl.)

3 miles N. Russell station, D. & R. G. R. R.
Pre-Cambrian complex and Paleozoic sediments cut by monzonite.
Veins and replacements, stream gravels.
Min. Res. 1906, p. 213.
1907, pt. 1, p. 251.
Top. sheet Huerfano Park.

28a. **Plomo.** Au. (Pl.)

17 miles S. Fort Garland, D. & R. G. R. R.
Pre-Cambrian gneiss cut by quartz porphyry.
Replacements.

**CUSTER COUNTY.**

29. **Hardscrabble (Rosita, Silver Cliff).** Ag, Au, Pb, Cu, Zn.
Westcliff station, D. & R. G. R. R.
Pre-Cambrian complex, Tertiary volcanics.
Veins and pipes.
Min. Res. 1883-84, p. 549.
1885, p. 256.
1905, p. 198.
1906, p. 213.
1907, pt. 1, pp. 251-252.
1908, pt. 1, p. 378.
1909, pt. 1, p. 309.
Top. sheet Canon City.

30. **Spaulding.** Pb, Au, Ag.
14 miles SW. Florence, D. & R. G. R. R.
1906, p. 213.
1907, pt. 1, pp. 251-252.
1908, pt. 1, p. 378.
Top. sheet Canon City.

**DOLORES COUNTY.**

31. **Lone Cone (Dunton).** Ag, Au, Pb, Zn, Cu.
16\frac{1}{2} miles NW. Rico, R. G. S. R. R.
Min. Res. 1905, p. 199.
1906, p. 214.
1907, pt. 1, p. 252.
1908, pt. 1, p. 378.
1909, pt. 1, p. 310.

32. **Pioneer (Rico).** Ag, Cu, Pb, Zn, Au.
Station R. G. S. R. R.
Pre-Cambrian and Paleozoic sediments domed by monzonite porphyry.
DOLores COUNTY—Continued.

32. Pioneer (Rico)—Continued.
Veins, replacements, and stockworks.
Cross, W., and Spencer, A. C., Geology of the Rico Mountains, Colorado:
Ransome, F. L., The ore deposits of the Rico Mountains, Colorado: Twenty-
Min. Res. 1886, p. 145.
1905, p. 199.
1906, pp. 214, 476.8
1907, pt. 1, p. 252.
1909, pt. 1, p. 310.
Top. sheets Rico, Rico special.
Folio 130, 1905.

EAGLE COUNTY.

33. Battle Mountain (Red Cliff, Gilman). Ag, Zn, Au, Cu, Pb.
Red Cliff station, D. & R. G. R. R.
Pre-Cambrian granite, Paleozoic sediments cut by acidic porphyry.
Veins and replacements.
1883–84, p. 422.
1885, p. 255.
1886, p. 144.
1905, p. 199.
1906, p. 215.
1908, pt. 1, p. 378.
1909, pt. 1, p. 311.

34. Fulford. Au, Cu.
18 miles SE. Eagle, D. & R. G. R. R.
Min. Res. 1905, p. 199.
1906, p. 215.
1908, pt. 1, p. 379.

35. Holy Cross (Eagle River). Au, Ag. (D, Pl.)
18 miles SW. Red Cliff, D. & R. G. R. R.
1908, pt. 1, p. 379.
1909, pt. 1, p. 311.
Top. sheet Leadville.

FREMONT COUNTY.

36. Canon City. Cu, W.
Station D. & R. G. R. R.
Pre-Cambrian complex.
Veins.
Min. Res. 1906, p. 216.
Top. sheet Canon City.

Station D. & R. G. R. R.
Pre-Cambrian complex.
37. **Cotopaxi—Continued.**

Lenses.


38. **Currant Creek (Micanite).** Zn (Au, Ag).

26 miles S. Howbert, C. M. R. R.


39. **Greenhorn (Grape Creek).** Ni, Co, Fe.

15 miles SW. Canon City, 3 miles S. Radiant, D. & R. G. R. R.


1887, p. 53.

1906, p. 216.

Top. sheet Canon City.

40. **Red Gulch.** Cu, Ag.

9 miles N. Cotopaxi, D. & R. G. R. R.

Paleozoic sediments, “red beds.”

Disseminated.


1908, pt. 1, p. 380.

41. **Whitehorn (Manoa, Calumet).** Au, Ag (Cu).

26 miles NE. Salida, D. & R. G. R. R.

42. **Central City (Central, Nevada, Gregory, Russell, Quartz Mountain).** Au, Ag, Cu, Pb.

Station C. & S. R. R.

Pre-Cambrian complex cut by acidic dikes.

Veins.


1883–84, p. 341.

1885, p. 256.

1904, p. 344.

1905, p. 200.

1906, pp. 216–217.


Top. sheet Central City.

43. **Independence (Perigo).** Au, Ag, Cu, Pb.

6 miles N. Central City, C. & S. R. R.; 5 miles SSW. Rollinsville, D. N. W. & P. R. R.

Pre-Cambrian complex cut by acidic dikes.

Veins.


1905, p. 200.

1906, p. 217.

1907, pt. 1, p. 255.


Top. sheet Central City.
GILPIN COUNTY—Continued.

44. Pine (Kingston, Apex). Au, Pb, Cu, Ag.
   7 miles NW. Central City, C. & S. R. R.; 5 miles S. Tolland, D. N. W. & P. R. R.,
   Pre-Cambrian complex cut by acidic dikes.
   Veins.
   Min. Res. 1883-84, p. 341.
   1905, p. 200.
   1906, p. 217.
   1907, pt. 1, p. 256.
   Top. sheet Central City.

GRAND COUNTY.

45. Blue Ridge.
   11 miles S. Parshall, D. N. W. & P. R. R.

46. Corral Creek.
   Parshall station, D. N. W. & P. R. R.

47. Grand Lake (Wolverine). Au, Cu, Ag, Pb,
   16 miles NNE. Granby, D. N. W. & P. R. R.
   Pre-Cambrian complex.
   Veins.
   Min. Res. 1905, p. 201.

   12 miles E. Granby, D. N. W. & P. R. R.
   Pre-Cambrian.
   Veins.
   Min. Res. 1905, p. 201.
   1906, p. 218.

49. La Plata. Au, Ag, Cu.
   24 miles SSE. Granby, D. N. W. & P. R. R.
   Pre-Cambrian complex.
   Veins.

GUNNISON COUNTY.

50. Box Canyon. Au, Ag (Cu).
   7 miles S. Pitkin, C. & S. R. R.
   Pre-Cambrian schists cut by diorite.
   Lenses.
   Hill, J. M., Notes on the economic geology of southeastern Gunnison County,
   1908, pt. 1, p. 384.
   1909, pt. 1, p. 315.

51. Cebolla (Vulcan, Domingo). Au, Ag, Fe.
   18 miles S. Iola, D. & R. G. R. R.
   Pre-Cambrian schists, Cretaceous sediments.
   Veins.
   Harder, E. C., Manganese deposits of the United States: Bull. 380, 1909,
   p. 273; Bull. 427, 1910, p. 150.
   Leith, C. K., Iron ores of the western United States and British Columbia:
   Min. Res. 1882, pp. 144-147.
   1883-84, p. 283.
   1907, pt. 1, pp. 105, 257.
   1908, pt. 1, p. 111.
52. **Cochetopa.**  Au, Ag.
5 miles S. Parlin, D. & R. G. R. R.
Pre-Cambrian granite cut by acidic and basic dikes.
Veins.
1907, pt. 1, p. 257.
1908, pt. 1, p. 384.

53. **Elk Mountain (Ruby).**  Pb, Au, Ag.
Crested Butte station, D. & R. G. R. R.
Cretaceous sediments cut by acidic and basic dikes.
Veins.
1907, pt. 1, p. 257.
1908, pt. 1, p. 385.
1909, pt. 1, p. 315.
Top. sheet Crested Butte. Folio 9, 1894.

54. **Gold Brick.**  Au, Ag, Pb.
3 miles N. Ohio, C. & S. R. R.
Pre-Cambrian granite schists.
Veins.
1907, pt. 1, p. 257.
1908, pt. 1, p. 385.
1909, pt. 1, p. 315.

55. **Quartz Creek.**  Ag, Au, Pb.
3 miles N. Pitkin, C. & S. R. R.
Pre-Cambrian complex, Paleozoic sediments cut by acidic dikes.
Veins and replacements.
1906, p. 219.
1907, pt. 1, p. 257.
1908, pt. 1, p. 385.
1909, pt. 1, p. 315.

56. **Rock Creek.**  Ag, Pb, Cu, Zn, Au.
Marble station, C. R. & S. J. R. R.
Min. Res. 1905, p. 201.
1906, pp. 218-219.
1907, pt. 1, p. 257.
1908, pt. 1, p. 385.
Top. sheet Anthracite.
Folio 9, 1894.

57. **Ruby.**  Ag.
Floresta station, D. & R. G. R. R.
Cretaceous sediments cut by acidic and basic dikes.
Veins.
57. **Ruby—Continued.**

Min. Res. 1905, p. 201.
1908, pt. 1, p. 385.
Top. sheet Anthracite.
Folio 9, 1894.

58. **Tincup (Pieplant).** Au, Ag, Pb (Cu).
Pre-Cambrian complex, Paleozoic sediments cut by acidic porphyry.
Veins and replacements.
1906, p. 219.
1907, pt. 1, pp. 257, 258.
1908, pt. 1, p. 385.
1909, pt. 1, p. 315.

59. **Tomichi (Whitepine).** Pb, Ag, Zn, Cu, Au, Fe.
12 miles NNE. Sargents, D. & R. G. R. R.
Pre-Cambrian granite, Paleozoic sediments cut by acidic dikes.
Veins and replacements.
Min. Res. 1885, p. 256.
1887, p. 28.
1906, p. 219.
1907, pt. 1, p. 258.
1908, pt. 1, p. 385.
1909, pt. 1, p. 315.

60. **White Earth.** Au.
18 miles S. Iola, D. & R. G. R. R.

61. **Galena.** Pb, Ag, Cu, Au.
5 miles W. Lake City, D. & R. G. R. R.
Tertiary volcanics.
Veins.
Irving, J. D., Ore deposits in the vicinity of Lake City, Colo.: Bull. 260, 1905, pp. 78-84.
Irving, J. D., and Bancroft, H., Geology and ore deposits near Lake City, Colo.: Bull. 478, 1911, pp. 81-99.
1906, p. 220.
1907, pt. 1, pp. 258-259.
1908, pt. 1, p. 386.
1909, pt. 1, p. 316.
Top. sheet Lake.

62. **Lake (San Cristobal).** Ag, Au, Pb, Cu, Zn.
6 miles S. Lake City, D. & R. G. R. R.
Tertiary volcanics.
21528°—Bull. 507—12——10
MINING DISTRICTS OF WESTERN UNITED STATES.

HINSDALE COUNTY—Continued.

62. Lake (San Cristobal)—Continued.

Veins.
Irving, J. D., Ore deposits in the vicinity of Lake City, Colo.: Bull. 260, 1905, pp. 78-84.
Irving, J. D., and Bancroft, H., Geology and ore deposits near Lake City, Colo.: Bull. 478, 1911, pp. 99-116
1906, p. 220.
1907, pt. 1, p. 259.
1908, pt. 1, p. 386.
1909, pt. 1, p. 316.
Top. sheet Lake.

63. Park (Sherman).  Au, Ag.
22 miles SW. Lake City, D. & R. G. R. R.
Tertiary volcanics.
Veins.
Irving, J. D., Ore deposits in the vicinity of Lake City, Colo.: Bull. 260, 1905, pp. 78-84.
Top. sheet San Cristobal.

HUERFANO COUNTY.

64. Huerfano (Malachite).  Cu, Ag.
Paleozoic sediments, "Red Beds."
Disseminated.
Top. sheet Huerfano Park.

65. La Veta.  Au, Ag.
Station D. & R. G. R. R.
Tertiary volcanics, acidic and basic dikes.
Veins.
Top. sheets Walsenburg, Spanish Peaks.
Folios 68, 1900; 71, 1901.

JACKSON COUNTY.  (See Larimer.)

JEFFERSON COUNTY.

66. Evergreen (Malachite).  Cu, Ag, Au, Ni.
11 miles W. Mount Morrison, C. & S. R. R.
Pre-Cambrian complex cut by basic dikes.
Veins.
1906, p. 220.
1907, pt. 1, p. 259.
1909, pt. 1, p. 316.
Top. sheet Denver.

Station C. & S. R. R.
Stream gravels.
JEFFERSON COUNTY—Continued.

Top. sheet Denver.

LAKE COUNTY.

68. California (Leadville).  Pb, Ag, Au, Zn, Cu, Fe, Mn.
Leadville station, D. & R. G. R. R.
Pre-Cambrian complex, Paleozoic sediments cut by acidic intrusives.
Replacements and veins.
Emmons, S. F., Geology and mining industry of Leadville, Colo.: M. XII, 1895.
Emmons, S. F., and Irving, J. D., The Downtown district of Leadville, Colo.: Bull. 320, 1907.
1883–84, pp. 419–422.
1885, pp. 250–255, 348.
1886, p. 144.
1887, p. 105.
1888, pp. 53, 87.
1904, p. 276.
1905, pp. 203–204.
1906, pp. 221–223, 475, 517.
Top. sheets Leadville, Leadville special.

69. Harrington (Tennessee Pass).
Tennessee Pass station, D. & R. G. R. R.
Top. sheet Leadville.

70. Twin Lakes.  Au, Ag, Pb.  (D, PL)
9 miles NW. Granite, D. & R. G. R. R., C. M. R. R.
Pre-Cambrian complex.
Veins, glacial gravels.
Top. sheet Leadville.

LA PLATA COUNTY.

71. California (Oro Fino).  Au, Ag, Pb, Cu.
14 miles NW. Durango, D. & R. G. R. R.
"Red Beds" cut by diorite or monzonite porphyry.
Veins.
1906, p. 224.
1907, pt. 1, p. 262.
1908, pt. 1, p. 389.
Top. sheets Durango and La Plata.
Folio 60, 1899.

72. Needle Mountains (Florida).  Au, Ag, Cu (Pb).
25 miles ENE. Tacoma, D. & R. G. R. R.
Pre-Cambrian complex cut by granite.
Veins.
LA PLATA COUNTY—Continued.

72. Needle Mountains (Florida)—Continued
1906, p. 224.
1908, pt. 1, p. 389.
Top. sheet Needle Mountains.
Folio 131, 1905.

LARIMER AND JACKSON COUNTIES.

73. Empire (Howes Gulch). Cu, Au.
8 miles W. Fort Collins, C. & S. R. R.
Pre-Cambrian complex.
Veins.

74. Manhattan.
45 miles NW. Fort Collins, C. & S. R. R.

75. Pearl. Cu (Au, Ag).
33 miles SE. Riverside, Wyo., S. & E. R. R.
Pre-Cambrian complex.
Veins.
Spencer, A. C., Reconnaissance examination of the copper deposits at Pearl, Colo.: Bull. 213, 1903, pp. 163-169.

76. Steamboat Rock (Gray Rock). Cu, Au.
NW. Fort Collins, C. & S. R. R.
Pre-Cambrian complex.
Veins.

MESA COUNTY.

77. Unaweep. Cu, Au, Ag.
Pre-Cambrian schists and Paleozoic and Cretaceous sediments.
Disseminated.

MINERAL COUNTY.

78. Sunnyside (Creede). Ag, Pb, Au, Zn.
Station D. & R. G. R. R.
Tertiary volcanics.
Veins.
1906, pp. 224-225.
1907, pt. 1, pp. 262-263.
1908, pt. 1, p. 390.
1909, pt. 1, p. 320.

MOFFAT COUNTY. (See Routt.)

MONTEZUMA COUNTY.

79. East Mancos. Au, Ag.
12 miles NE. Mancos, R. G. S. R. R.
“Red Beds” cut by diorite and monzonite.
Veins.
Min. Res. 1907, pt. 1, p. 263.
Top. sheet La Plata.
Folio 60, 1899.
MONTROSE COUNTY.

80. Hydraulic. V, U. 
74 miles WNW. Placerville, R. G. S. R. R.
Jurassic sediments.
Disseminated.
Min. Res. 1908, pt. 1, p. 748.

81. La Sal. Cu, Ag, V, U.
76 miles W. Placerville, D. & R. G. R. R.
Jurassic sediments.
Veins and disseminations.
1907, pt. 1, p. 264.
1908, pt. 1, pp. 741, 748.

82. Naturita (Vixen). V, U.
43 miles WNW. Placerville, R. G. S. R. R.
Jurassic sediments.
Disseminations.
Min. Res. 1908, pt. 1, p. 748.

83. Roc Creek. V, U.
80 miles WNW. Placerville, R. G. S. R. R.
Jurassic sediments.
Disseminations.
1908, pt. 1, pp. 741, 748.

OURAY COUNTY.

84. Imogene Basin (Camp Bird). Au, Ag.
8 miles SW. Ouray, D. & R. G. R. R.
Tertiary volcanics.
Veins.
1906, p. 226.
1907, pt. 1, p. 264.
1908, pt. 1, p. 391.
1909, pt. 1, p. 322.
Top. sheet Silverton.
Folio 120, 1905.

85. Red Mountain. Cu, Ag, Au, Pb.
Station S. R. R.
Tertiary volcanics.
Veins.
OURAY COUNTY—Continued.

85. Red Mountain—Continued.
1906, p. 227.
1907, pt. 1, p. 265.
1909, pt. 1, p. 322.
Top. sheet Silverton.
Folio 120, 1905.

86. Sneffels. Au, Ag, Pb, Cu.
8 miles W. Ouray, D. & R. G. R. R
Tertiary volcanics.
Veins.
1906, p. 226.
1907, pt. 1, p. 265.
1908, pt. 1, p. 391.
1909, pt. 1, p. 322.
Top. sheet Ouray.
Folio 153, 1907.

87. Uncompahgre. Au, Ag, Pb, Cu, Zn.
Ouray station, D. & R. G. R. R.
Paleozoic sediments and Tertiary volcanics.
Veins and replacements.
1906, p. 227.
1907, pt. 1, pp. 265–266.
1908, pt. 1, p. 392.
1909, pt. 1, p. 322.
Top. sheet Ouray.
Folio 153, 1907.

88. Buckskin. Au, Ag, Cu, Pb, Zn.
6 miles NW. Alma, C. & S. R. R.
Pre-Cambrian complex and Paleozoic sediments.
Veins.
Min. Res. 1905, p. 207.
1906, p. 228.
1907, pt. 1, p. 266.
1908, pt. 1, pp. 392–393
1909, pt. 1, p. 323.
Top. sheet Leadville.

89. Consolidated-Montgomery. Au, Ag, Pb, Cu.
6 miles N. Alma, C. & S. R. R.
Pre-Cambrian complex.
Veins.
Min. Res. 1906, p. 228.
1908, pt. 1, p. 393.
PARK COUNTY—Continued.

89. Consolidated-Montgomery—Continued.
   Top. sheet Leadville.

90. Halls Gulch. Ag (Au).
   5 miles N. Grant, C. & S. R. R.
   Pre-Cambrian complex cut by acidic dikes.
   Veins.
   Min. Res. 1900, p. 228.
   1907, pt. 1, p. 267.
   1908, pt. 1, p. 333.

91. Hartsel. Au.
   Station C. M. R. R.

92. Horseshoe. Pb, Ag, Au, Cu, Zn.
   7 miles W. Garo, C. & S. R. R.
   Pre-Cambrian complex, Paleozoic sediments.
   Veins and replacements.
   Min. Res. 1906, p. 228.
   1907, pt. 1, p. 267.
   1908, pt. 1, p. 393.
   Top. sheet Leadville.

93. Mosquito. Au, Ag, Pb. (D, Pl.)
   6 miles W. Alma, C. & S. R. R.
   Paleozoic sediments.
   Veins and glacial gravels.
   Min. Res. 1905, p. 207.
   1906, p. 228.
   1907, pt. 1, p. 267.
   1908, pt. 1, p. 393.
   1909, pt. 1, p. 323.
   Top. sheet Leadville.

94. Sacramento. Ag, Au, Pb (Cu).
   8 miles NW. Garo, C. & S. R. R.
   Pre-Cambrian complex.
   Veins.
   Min. Res. 1909, pt. 1, p. 323
   Top. sheet Leadville.

95. Tarryall. Au, Ag. (D, Pl.)
   Como station, C. & S. R. R.
   Paleozoic and Cretaceous sediments cut by monzonite.
   Veins and glacial gravels.
   Min. Res. 1906, p. 228.
   1907, pt. 1, p. 267.
   1908, pt. 1, p. 393.
   1909, pt. 1, p. 323.

PITKIN COUNTY.

96. Columbia (Ashcroft). Pb, Ag, Cu, Fe.
   12 miles S. Aspen, D. & R. G. R. R., C. M. R. R.
   Cretaceous sediments cut by acidic and basic dikes.
   Veins.
   Leith, C. K., Iron ores in western United States and British Columbia:
   Min. Res. 1887, p. 28.
   1888, p. 33.
   1906, p. 230.
MINING DISTRICTS OF WESTERN UNITED STATES.

PITKIN COUNTY—Continued.

96. Columbia (Ashcroft)—Continued.
   1908, pt. 1, p. 394.
   1909, pt. 1, p. 324.
   Top. sheet Aspen.

97. Frying Pan. Pb, Au, Ag, Cu.
   Nest station, C. M. R. R.
   Pre-Cambrian granite; Paleozoic sediments cut by acidic and basic dikes.
   Veins and replacements.

98. Lincoln. Ag, Pb, Au.
   15 miles SSE. Aspen, C. M. R. R., D. & R. G. R. R.
   1906, p. 230.
   1908, pt. 1, p. 294.
   1909, pt. 1, p. 324.

   Aspen station, D. & R. G. R. R., C. M. R. R.
   Paleozoic sediments cut by dikes.
   Veins and replacements.
   Spurr, J. E., Geology of the Aspen mining district, Colorado: M. XXXI, 1898.
   Min. Res. 1883–84, p. 422.
   1885, p. 256.
   1886, p. 145.
   1888, pp. 87–88.
   1905, p. 208.
   1907, pt. 1, p. 268.
   1908, pt. 1, p. 294.
   1909, pt. 1, p. 324.
   Top. sheets Aspen, Aspen special.

RIO BLANCO COUNTY.

100. Coal Creek. V, U.
   50 miles N. Rifle, D. & R. G. R. R.
   Jurassic sediments.
   Disseminated.
   Gale, H. S., Carnotite in Rio Blanco County, Colo.: Bull. 315, 1907, pp. 110–117.
   Min. Res. 1908, pt. 1, pp. 741, 748.

RIO GRANDE COUNTY.

101. Decatur. Au, Ag.
   33 miles SW. Monte Vista, D. & R. G. R. R.

102. Embargo. Au, Ag, Pb, Cu.
   Del Norte station, D. & R. G. R. R.

103. Summitville. Au, Ag.
   28 miles SW. Del Norte, D. & R. G. R. R.
   Tertiary volcanics.
   Veins.
   1906, p. 213.
104. **Copper Ridge.** Cu, Au.
   9 miles NW. Steamboat Springs, D. N. W. & P. R. R.

105. **Douglas Mountain.**
   40 miles NE. Dragoon, Utah, U. R. R.

106. **Elkhorn (Three Forks, Slater).** Cu, Pb, Ag, Au.
   70 miles SE. Wamsutter, Wyo., U. P. R. R.
   Pre-Cambrian complex.
   Veins.

107. **Hahns Peak (Columbine).** Au, Ag, Pb. (D, Pl.)
   26 miles N. Steamboat Springs, D. N. W. & P. R. R.
   Pre-Cambrian complex and Cretaceous sediments cut by rhyolite porphyry.
   Veins.
   1906, p. 230.
   1907, pt. 1, p. 269.
   1908, pt. 1, p. 395.
   1909, pt. 1, p. 324.

108. **Lay (Jackrabbit).** Au. (Pl.)
   8 miles W. Steamboat Springs, D. N. W. & P. R. R.
   River gravels.
   1907, pt. 1, p. 269.
   1908, pt. 1, p. 395.
   1909, pt. 1, p. 324.

109. **Oak Creek (Red Gorge).** Cu.
   Station D. N. W. & P. R. R.

110. **Rock Creek (Gore Range).** Cu.
   16 miles E. Yampa, D. N. W. & P. R. R.

111. **Skull Creek (Blue Mountain).** V, U, Cu.
   80 miles NE. Dragoon, Utah, U. R. R.
   Jurassic sediments.
   Disseminations along shear zones.
   Min. Res. 1908, pt. 1, pp. 741, 748.

112. **Slavonia.** Pb (Ag, Cu, Au).
   40 miles N. Steamboat Springs, D. N. W. & P. R. R.
   Granite, gneiss, and schist cut by granite porphyry and diorite.
   Veins.

113. **Spring Creek (Steamboat Springs).** Cu, Au.
   Steamboat Springs station, D. N. W. & P. R. R.
SAGUACHE COUNTY.

114. Baca Grant (Crestone). Au, Ag.
   13 miles E. Moffat, D. & R. G. R. R.
     1906, p. 231.
     1907, pt. 1, p. 270.
     1908, pt. 1, p. 394.
     1909, pt. 1, p. 324.

115. Blake (Kerber Creek). Pb, Ag, Au (Cu).
   16 miles W. Villagrove, D. & R. G. R. R.
     1906, p. 231.
     1907, pt. 1, p. 270.
     1909, pt. 1, p. 324.

116. Crystal Hill. Ag, Au.
   25 miles NW. Del Norte, D. & R. G. R. R.

SAN JUAN COUNTY.

117. Animas. Au, Ag, Cu, Pb, Zn.
   Silverton station, D. & R. G. R. R.
   Tertiary volcanics.
   Veins stockworks.
   Emmons, W. H., Ore deposits of Bear Creek, near Silverton, Colo.: Bull.
   Ransome, F. L., A report on the economic geology of the Silverton quad-
   rangle, Colorado: Bull. 182, 1901, pp. 1-265.
     1906, p. 232.
     1908, pt. 1, pp. 396-397.
     1909, pt. 1, p. 326.
   Top. sheet Silverton.
   Folio 120, 1905.

118. Eureka. Au, Ag, Pb, Cu, Zn.
   Station S. N. R. R.
   Tertiary volcanics.
   Veins, stockworks.
   Ransome, F. L., A report on the economic geology of the Silverton quad-
   rangle, Colorado: Bull. 182, 1901, pp. 1-265.
     1907, pt. 1, p. 272.
     1908, pt. 1, p. 297.
     1909, pt. 1, p. 326.
   Top. sheet Silverton.
   Folio 120, 1905.

SAN MIGUEL COUNTY.

119. Iron Spring (Ophir). Au, Ag, Pb, Cu.
   Ophir station, R. G. S. R. R.
   Tertiary volcanics.
   Veins, stockworks.
   Purington, C. W., Preliminary report on the mining industries of the Tel-
119. **Iron Spring** (Ophir)—Continued.

Min. Res. 1886, p. 145.
1905, pp. 210-211.
1906, p. 234.
1907, pt. 1, pp. 273-274.
1908, pt. 1, p. 399.
Top. sheet Telluride.
Folio 57, 1899.

120. **Lower San Miguel** (Placerville, Sawpit, Newmire). Au, Ag, Pb, Cu, V.

Sawpit and Newmire stations, R. G. S. R. R.
Cretaceous sediments cut by dikes.
Veins and replacements.
Min. Res. 1900, pp. 262-265.
1905, p. 211.
1906, p. 234.
1907, pt. 1, p. 274.
1908, pt. 1, p. 299.
Top. sheet Telluride.
Folio 57, 1899.

121. **Mount Wilson**. Ag, Au, Pb, Cu.
12 miles S. Newmire, R. G. S. R. R.
Cretaceous sediments and Tertiary volcanics.
Veins.
Min. Res. 1905, p. 211.
1907, pt. 1, p. 274.
1908, pt. 1, p. 399.
Top. sheet Telluride.
Folio 57, 1899.

122. **Snyderville** (Cedar). V, U.
35 miles WSW. Placerville, R. G. S. R. R.
Jurassic sediments.
Disseminations.
Min. Res. 1906, pp. 531-532.
1908, pt. 1, pp. 741, 748.

123. **Upper San Miguel** (Telluride). Au, Ag, Pb, Cu, Zn.
Telluride station, R. G. S. R. R.
Tertiary volcanics.
Veins, stockworks.
156  MINING DISTRICTS OF WESTERN UNITED STATES.

SAN MIGUEL COUNTY—Continued.

123. Upper San Miguel (Telluride)—Continued.
   1906, pp. 233–234.
   1907, pt. 1, p. 273.
   Top. sheet Telluride.
   Folio 57, 1899.

SUMMIT COUNTY.

124. Breckenridge (Bevan, Union, Minnesota). Au, Zn, Pb, Ag. (D, Pl.)
   Station C. & S. R. R.
   Paleozoic and Cretaceous sediments cut by porphyry dikes.
   Veins, replacements, and disseminations.
   Ransome, F. L., Geology and ore deposits of the Breckenridge district, Colorado: P. P. 75, 1911.
   Min. Res. 1905, p. 211.
   1906, pp. 235–236, 475.
   1907, pt. 1, p. 274.
   1908, pt. 1, pp. 400–401.
   Top. sheets Leadville, Breckenridge special.

125. Frisco. Au, Ag (Pb, Zn).
   Station C. & S. R. R.
   Min. Res. 1905, p. 211.
   1908, pt. 1, p. 401.

126. Montezuma (Snake River). Pb, Ag, Cu, Zn, Au.
   12 miles E. Dillon, C. & S. R. R.
   Pre-Cambrian complex cut by acidic dikes.
   Veins.
   Min. Res. 1905, p. 211.
   1906, pp. 236, 475.
   1907, pt. 1, p. 275.
   1908, pt. 1, p. 401.

127. Peru. Ag, Pb, Au.
   8 miles E. Dillon, C. & S. R. R.
   Min. Res. 1905, p. 211.

128. Swan River. Au. (D, Pl.)
   12 miles NE. Breckenridge, C. & S. R. R.
   Pre-Cambrian complex cut by acidic porphyries.
   Veins.
   Top. sheet Breckenridge special.

129. Tenmile (Kokomo). Ag, Au, Pb, Zn, Cu.
   Kokomo station, C. & S. R. R.
   Paleozoic sediments cut by acidic dikes.
   Veins and replacements.
   Min. Res. 1905, pp. 211–212.
   1906, p. 236.
   1907, pt. 1, p. 275.
   1908, pt. 1, p. 401.
SUMMIT COUNTY—Continued.

129. Tenmile (Kokomo)—Continued.
   Top. sheet Tenmile.
   Folio 48, 1898.

TELLER COUNTY.

130. Cripple Creek. Au, Ag.
   Station C. S. & C. C. R. R.
   Tertiary volcanics, mainly phonolite, in pre-Cambrian granite.
   Veins.
   Cross, W., and Penrose, R. A. F., jr., Geology and mining industries of the
   13-209.
   Hillebrand, W. F., Two tellurium minerals from Colorado: Bull. 262, 1905,
   pp. 55-57.
   Lindgren, W., The geological resurvey of the Cripple Creek district, Colo­
   Lindgren, W., and Ransome, F. L., Report of progress in the geological
   resurvey of the Cripple Creek district, Colorado: Bull. 254, 1904.
   ——— Geology and gold deposits of the Cripple Creek district, Colorado:
   P. P. 54, 1906.
   1906, pp. 236-240.
   1907, pt. 1, pp. 275-278.
   1908, pt. 1, pp. 401-405.
   Top. sheets Pikes Peak, Cripple Creek special.
   Folio 7, 1894.

131. East Beaver. Cu, Au, Ag.
   8 miles S. Rosemont, C. S. & C. C. R. R.
   Pre-Cambrian complex cut by basic dikes.
   Veins.
IDAHO.

In the State of Idaho there are 133 mining districts in 20 counties. Gold is the predominant metal produced in 84 districts, silver in 14, lead in 22, and copper in 13.

Distribution of the predominant metals produced in the mining districts of Idaho.

<table>
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<th>County</th>
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<th>Copper</th>
<th>Lead</th>
<th>Total</th>
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MINING DISTRICTS IN IDAHO.

[See Pl. VII. Additional references may be found in Mineral Resources for 1910 and 1911.]

ADA COUNTY.

1. Black Hornet (Highland Valley, Shaw Mountain). Au, Ag. (D, Pl.)
8 miles E. Boise, O. S. L. R. R.
Granite cut by granite porphyry.
Veins.
1906, pp. 249-250.
1908, pt. 1, p. 414.
Top. sheet Boise.
Folio 45, 1898.

2. Boise (McIntyre). Au, Ag.
3 to 5 miles E. Boise, O. S. L. R. R.
Granite cut by granite porphyry and lamprophyre dikes.
Veins.
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IDAHO.

ADA COUNTY—Continued.

2. Boise (McIntyre)—Continued.
   1908, pt. 1, p. 414.

   Stream gravels.
   1907, pt. 1, p. 289.
   Top. sheet Bisuka.

ADAMS COUNTY. (See Washington.)

BANNOCK COUNTY.

4. Fort Hall. Cu, Ag, Au, Pb.
   9 miles E. Pocatello, 1½ miles W. Portneuf, O. S. L. R. R.
   Paleozoic sediments and diabase.
   Veins.
   Weed, W. H., Copper mines in the United States in 1905: Bull. 285, 1906,
   Weeks, F. B., and Heikes, V. C., Notes on the Fort Hall mining district,
   1906, p. 250.
   1907, pt. 1, p. 289.
   1908, pt. 1, p. 414.

BEAR LAKE COUNTY.

   4 miles E. Montpelier, O. S. L. R. R.
   Triassic “Red Beds.”
   Disseminations.
   Gale, H. S., Geology of the copper deposits near Montpelier, Idaho: Bull.
   430, 1910, pp. 112–121.
   Weeks, F. B., and Ferrier, W. F., Phosphate deposits in the western United
   Weeks, F. B., Phosphate deposits in the western United States: Bull. 340,
   1908, pp. 441–444.
   1906, p. 250.

   5 miles S. Paris, O. S. L. R. R.
   Paleozoic sediments.
   Veins and replacements.
   Richards, R. W., Notes on lead and copper deposits in the Bear River Range,

BINGHAM AND BONNEVILLE COUNTIES.

7. Mount Pisgah (Caribou). Cu, Au, Ag. (Pl, D.)
   42 miles NNE. Soda Springs, O. S. L. R. R.
   1906, p. 250.
   1907, pt. 1, p. 290.
   1908, pt. 1, p. 415.
8. **Snake River placers.** Au. (Pl.)
   Stream gravels.
   1906, p. 250.
   1907, pt. 1, p. 290.
   1908, pt. 1, p. 415.

**BLAINE COUNTY.**

9. **Antelope.** Ag, Pb.
   17 miles SW. Darlington, O. S. L. R. R.

10. **Camas.** Au.
    20 miles SW. Hailey, O. S. L. R. R.
    Granite and diorite.
    Veins.

11. **Dome.** Pb, Ag, Cu, Au.
    28 miles NE. Arco, O. S. L. R. R.
    Paleozoic sediments and granite.
    Veins and replacements.
    1907, pt. 1, p. 291.
    1908, pt. 1, p. 416.

12. **Elkhorn (Ketchum).** Pb, Ag.
    Station O. S. L. R. R.
    Paleozoic sediments.
    Veins.
    Min. Res. 1882, pp. 311-312.
    1883-84, pp. 424-425.
    1885, p. 258.

13. **Galena.** Pb, Ag.
    26 miles NW. Ketchum, O. S. L. R. R.
    Min. Res. 1882, pp. 311-312.
    1883-84, pp. 424-425.
    1885, p. 258.
    1886, p. 146.
    Top. sheet Hailey.

14. **Hamilton (Clyde).** Cu, Pb, Ag, Au.
    28 miles NE. Mackay, O. S. L. R. R.
    Paleozoic sediments.
    Veins.
    1908, pt. 1, p. 416.

15. **Lava Creek (Martin).** Ag, Cu, Pb.
    24 miles SW. Arco, O. S. L. R. R.
    Paleozoic sediments, granite.
15. Lava Creek (Martin)—Continued.
Veins and replacements.
1907, pt. 1, p. 291.
1908, pt. 1, p. 416.

16. Little Smoky. Au, Pb, Ag.
28 miles W. Hailey, O. S. L. R. R.
Paleozoic sediments cut by granite.
Veins and replacements.
1909, pt. 1, p. 343.
Top. sheet Sawtooth.

17. Little Wood River (Muldoon). Pb, Ag.
20 miles E. Bellevue, O. S. L. R. R.
Paleozoic sediments.
Veins and replacements.
Min. Res. 1882, pp. 311–312.
1885, p. 258.
1908, pt. 1, p. 416.
1909, pt. 1, p. 343.

Station O. S. L. R. R.
Paleozoic sediments cut by granitic rocks.
Veins.
Min. Res. 1882, pp. 311–312.
1883–84, pp. 424, 425.
1887, p. 107.
1906, pp. 251–252.
1909, pt. 1, p. 343.
Top. sheet Hailey.

19. Rosetta. Au, Ag, Pb, Zn.
30 miles W. Ketchum, O. S. L. R. R.
Paleozoic sediments cut by granitic rocks.
Veins.
1906, p. 252.
1907, pt. 1, p. 292.
Top. sheet Sawtooth.

20. Sawtooth. Ag.
40 miles NW. Ketchum, O. S. L. R. R.
Granite.
21528°—Bull. 507—12——11
20. **Sawtooth—Continued.**

Veins.

Min. Res. 1885, p. 258.

Top. sheet Sawtooth.

**21. Snake River placer (Neeley).** Au. (PI.)

Neeley station, O. S. L. R. R.

Stream gravels.


1906, p. 252.

**22. Soldier.** Au. (Pl.)

33 miles N. Gooding, O. S. L. R. R.

Stream gravels.


1909, pt. 1, p. 343.

**23. Warm Springs.** Ag, Pb, Zn, Au.

72 miles W. Ketchum, O. S. L. R. R.

Min. Res. 1882, pp. 311-312.

1883-84, pp. 424-425.

1905, p. 227.

1906, p. 253.

1907, pt. 1, p. 292.

1908, pt. 1, p. 417.

1909, pt. 1, p. 343.

Top. sheet Sawtooth.

**BOISE COUNTY.**

**24. Banner.** Ag.

76 miles NE. Boise, O. S. L. R. R.

Granite.

Veins.

Top. sheet Bear Valley.

**25. Moore Creek.** Au, monazite. (Pl.)

Stream gravels.

Top. sheet Idaho Basin.

**26. Centerville (Idaho Basin).** Au. (D, Pl.)

44 miles NE. Boise, O. S. L. R. R.

Granite cut by aplite and lamprophyres.

Veins, stream gravels.


1906, pp. 253-254.

1907, pt. 1, p. 293.

1908, pt. 1, pp. 418-419.

1909, pt. 1, p. 344.

Top. sheet Idaho Basin.

**27. Deadwood.** Au. (Pl.)

80 miles NE. Boise, O. S. L. R. R.

Stream gravels.

Min. Res. 1907, pt. 1, p. 293.

1908, pt. 1, p. 419.

1909, pt. 1, p. 345.

Top. sheet Bear Valley.
28. **Gold Fork (Roseberry).** Au. (Pl.)
41 miles SE. Evergreen, P. & I. N. R. R.
Tertiary gravels.

29. **Highland Valley.** Au. (D, Pl.)
18 miles ESE. Boise, O. S. L. R. R.
Granite cut by granite porphyry.
Veins.
1909, pt. 1, p. 345.
Top. sheet Boise.
Folio 45, 1888.

30. **Idaho City (Idaho Basin).** Au, monazite. (D, Pl.)
36 miles NE. Boise, O. S. L. R. R.
Granite cut by aplite and lamprophyres.
Veins, stream gravels.
1906, pp. 253-254.
1907, pt. 1, p. 293.
1909, pt. 1, p. 344.
Top. sheet Idaho Basin.

**Moore Creek.** See No. 25.

31. **Payette River placers (Jacobs Gulch).** Au. (Pl.)
Stream gravels.
Min. Res. 1908, pt. 1, p. 419.
1909, pt. 1, p. 345.
Top. sheets Garden Valley, Squaw Creek.

32. **Quartzburg (Idaho Basin).** Au, monazite. (D, Pl.)
51 miles NNE. Boise, O. S. L. R. R.
Granite cut by diorite porphyry.
Veins, stream gravels.
1906, pp. 253-254.
1907, pt. 1, p. 293.
1908, pt. 1, pp. 418-419.
1909, pt. 1, p. 344.
Top. sheet Idaho Basin.

33. **Summit Flat (Pioneerville).** Au, Ag.
50 miles NNE. Boise, O. S. L. R. R.
Granite cut by aplite and lamprophyre.
Veins.
1908, pt. 1, p. 420.
1909, pt. 1, p. 345.
Top. sheets Idaho Basin, Garden Valley.
34. Twin Springs. Au. (Pl.)
   41 miles E. Boise, O. S. L. R. R.
   Stream gravels.
   Top. sheet Twin Springs.

35. Westview (Willow Creek, Pearl, Rock Creek). Au, Ag, Pb.
   Granite cut by granite and diorite porphyry dikes.
   Veins.
   Lindgren, W., The mining districts of Idaho Basin and Boise Ridge, Idaho:
   1906, p. 255.
   1907, pt. 1, p. 294.
   1908, pt. 1, p. 420.
   1909, pt. 1, p. 345.
   Top. sheet Boise.
   Folio 45, 1898.

   Clark Fork and Hope stations, N. P. R. R.
   Paleozoic sediments.
   Veins.
   Calkins, F. C., and MacDonald, D. F., A geological reconnaissance in northern
   MacDonald, D. F., Economic features of northern Idaho and northwestern
   1908, pt. 1, p. 420.
   1909, pt. 1, p. 345.

37. Kootenai. Ag, Pb.

38. Mooyie Yaak. Au, Pb, Ag.
   19 miles NE. Bonners Ferry, G. N. R. R.
   Calkins, F. C., and MacDonald, D. F., A geological reconnaissance in northern

39. Pend Oreille (Blacktail). Au, Ag, Cu, Pb.
   5 miles E. Westmond, N. P. R. R.
   Pre-Cambrian sediments cut by monzonites.
   Veins.
   Calkins, F. C., and MacDonald, D. F., A geological reconnaissance in northern
   MacDonald, D. F., Economic features of western Idaho and northwestern
   1908, pt. 1, pp. 420, 421.
   1909, pt. 1, p. 345.
   Top. sheet Sandpoint.

40. Pine Creek. Au, Ag, Pb, Zn.
   12 miles NNW. Priest River, G. N. R. R.
   Pre-Cambrian sediments.
IDAHO.

BONNER COUNTY—Continued.

40. Pine Creek—Continued.
Veins.
Top. sheet Sandpoint.

41. Priest Lake (Coolin). Pb, Ag, Cu, Au.
25 miles N. Priest River, G. N. R. R.
Pre-Cambrian sediments, granite.
Veins.
1909, pt. 1, p. 345.
Top. sheet Sandpoint.

BONNEVILLE COUNTY. (See Bingham.)

CASSIA COUNTY.

42. Connor Creek (Cumora, Stokes). Au, Ag, Pb, Cu.
38 miles SSE. Burley, O. S. L. R. R.
Veins.
1906, p. 255.
1907, pt. 1, p. 295.
1908, pt. 1, p. 421.

43. Snake River placers. Au. (Pl.)
Stream gravels.
1906, p. 255.
1907, pt. 1, p. 295.

CLEARWATER COUNTY (formerly part of Nez Perce County).

103. Burnt Creek. Au. (Pl.)
35 miles NE. Ahsahka, N. P. R. R.
Stream gravels.
1906, p. 261.
1907, pt. 1, p. 304.
1908, pt. 1, p. 429.
1909, pt. 1, p. 351.

104. Moose City. Au. (Pl.)
80 miles NE. Ahsahka, N. P. R. R.
Stream gravels.

105. Musselshell Creek (Weippe). Au, monazite. (D, Pl.)
25 miles E. Greer, N. P. R. R.
Granite, gneiss, and schist.
Veins, stream gravels.

106. Pierce. Au. (D, Pl.)
28 miles NE. Greer, N. P. R. R.
Granite, gneiss, and schist.
Veins, bench gravels.
106. Pierce—Continued.
Russell, I. C., Geology and water resources of Nez Perce County, Idaho, pt. 2: W. S. P. 54, 1901.
1906, pp. 261-262.
1907, pt. 1, p. 304.
1908, pt. 1, p. 429.
1909, pt. 1, p. 351.

CUSTER COUNTY.

44. Alder Creek (Lost River, White Knob). Cu, Au, Ag, Pb.
Mackay station, O. S. L. R. R.
Paleozoic sediments, granite, and porphyry.
Contact metamorphic.
1906, p. 255.
1907, pt. 1, p. 295.
1908, pt. 1, p. 422.

45. Bay Horse. Ag, Pb, Cu, Au.
76 miles NW. Mackay, O. S. L. R. R.
Paleozoic sediments cut by granite.
Veins and replacements.
1905, p. 230.
1906, p. 256.
1908, pt. 1, p. 422.

46. East Fork. Pb, Ag.
24 miles W. Mackay, O. S. L. R. R.
Min. Res. 1908, pt. 1, p. 422.

47. Loon Creek (Casto, Lost Packer). Au, Ag, Cu.
125 miles NW. Mackay, O. S. L. R. R.
Pre-Cambrian sediments cut by granite and capped by rhyolite.
Vein.
Umpleby, J. B., A preliminary account of the ore deposits of the Loon Creek district, Idaho: Bull. 530, 1912.
Min. Res. 1906, p. 256.
1907, pt. 1, p. 295.
1908, pt. 1, p. 422.

48. Seafoam. Au, Ag.
109 miles NW. Ketchum, O. S. L. R. R.
   1908, pt. 1, p. 422.
   Top. sheet Bear Valley.

49. Sheep Mountain. Ag, Pb.
   131 miles NW. Ketchum, O. S. L. R. R.
   Granite and schist cut by diorite and quartz porphyry.
   Replacements.
   Rept., pt. 2, 1895, p. 258.
   Top. sheet Bear Valley.

50. Stanley Basin. Au, Ag. (D, Pl.)
   89 miles NW. Ketchum, O. S. L. R. R.
   Granite and porphyry.
   Veins, stream gravels.
   1906, p. 256.
   1907, pt. 1, p. 296.
   1908, pt. 1, p. 422.
   Top. sheet Bear Valley.

   48 miles NW. Ketchum, O. S. L. R. R.

52. Yankee Fork (Custer). Au, Ag.
   114 miles NW. Mackay, O. S. L. R. R.
   Tertiary volcanics.
   Veins.
   Min. Res. 1905, p. 231.
   1906, p. 256.
   1907, pt. 1, p. 296.
   1908, pt. 1, pp. 421-422.
   Top. sheet Rocky Bar.

53. Atlanta. Au, Ag. (D, Pl.)
   89 miles NE. Mountain Home, O. S. L. R. R.
   Granite cut by quartz porphyry.
   Veins, stream gravels.
   Min. Res. 1905, p. 231.
   1906, p. 257.
   1907, pt. 1, p. 297.
   1909, pt. 1, p. 347.
   Top. sheet Rocky Bar.

54. Black Warrior. Au, Ag.
   99 miles NE. Mountain Home, O. S. L. R. R.
   Granite cut by quartz porphyry.
   Veins.
   Min. Res. 1906, p. 256.
   1907, pt. 1, p. 297.
   1908, pt. 1, p. 423.
   1909, pt. 1, p. 347.
   Top. sheet Rocky Bar.
55. Highland Valley. Au, Ag. (Pl.)
   25 miles ESE. Boise, O. S. L. R. R.
   Stream gravels.
   1908, pt. 1, p. 423.
   1909, pt. 1, p. 347.
   Top. sheet Idaho Basin.

56. Neal. Au, Ag.
   25 miles SE. Boise, O. S. L. R. R.
   Granite cut by granite and syenite porphyry and lamprophyre.
   Veins.
   Lindgren, W., The mining districts of Idaho Basin and Boise Ridge, Idaho:
   1906, p. 250.
   1907, pt. 1, p. 297.
   1908, pt. 1, p. 424.
   1909, pt. 1, p. 347.
   Top. sheet Idaho Basin.

57. Pine Grove. Au (Ag).
   45 miles NE. Mountain Home, O. S. L. R. R.
   Veins (?).
   Min. Res. 1905, p. 231.
   1906, p. 257.
   1908, pt. 1, p. 424.
   1909, pt. 1, p. 347.
   Top. sheet Camas Prairie.

58. Rocky Bar (Bear Creek). Au, Ag.
   65 miles NE. Mountain Home, O. S. L. R. R.
   Granite cut by diorite, diabase, and quartz porphyry.
   Veins.
   1908, pt. 1, p. 423.
   1909, pt. 1, p. 347.
   Top. sheet Rocky Bar.

59. Little Lost River (How). Pb, Ag.
   25 miles NE. Arco, O. S. L. R. R.
   1909, pt. 1, p. 347.

60. Skull Canyon (Kaufman). Cu, Pb, Ag, Au.
   50 miles W. Dubois, O. S. L. R. R.
   Paleozoic sediments.
   Replacements.
   Weed, W. H., The copper mines of the United States in 1905: Bull. 285, 1906,
   p. 108.
   Min. Res. 1905, p. 231.
   1906, p. 257.
   1907, pt. 1, p. 298.
   1908, pt. 1, p. 424.
IDAHO.

IDAHO COUNTY.

61. Big Creek. Au, Ag, Pb, Cu.
   60 miles W. Kooskia, N. P. R. R.
   Veins.
   1908, pt. 1, p. 425.

   12 miles SSW. Grangeville, N. P. R. R.
   Paleozoic sediments cut by diorite.
   Veins.
   Lindgren, W., A geological reconnaissance across the Bitterroot Range and
   1908, pt. 1, p. 425.

63. Cottonwood Buttes. Au, Ag, Cu.
   Cottonwood station, N. P. R. R.
   Pre-Tertiary sediments.
   Veins.
   Lindgren, W., A geological reconnaissance across the Bitterroot Range and

64. Crooks Corral. Au, Ag. (Pl.)
   51 miles N. Evergreen, P. & I. N. R. R.
   Bench gravels.
   1908, pt. 1, p. 425.

   7 miles W. Grangeville, N. P. R. R.
   Slates and schist cut by diorite.
   Veins.
   Lindgren, W., A geological reconnaissance across the Bitterroot Range and
   Clearwater Mountains in Montana and Idaho: P. P. 27, 1904, pp. 105-106.

66. Dixie. Au, Ag.
   78 miles SE. Grangeville, N. P. R. R.
   Granite.
   Veins.
   Lindgren, W., Mineral deposits of the Bitterroot Range and Clearwater Moun­
   ——— A geological reconnaissance across the Bitterroot Range and Clearwater
   Mountains in Montana and Idaho: P. P. 27, 1904, p. 98.
   1906, p. 258.
   1907, pt. 1, p. 299.
   1908, pt. 1, p. 425.

67. Elk City. Au, Ag. (D, Pl.)
   52 miles SE. Grangeville, N. P. R. R.
   Pre-Cambrian gneiss cut by granite.
   Veins, stream gravels.
   Lindgren, W., Mineral deposits of the Bitterroot Range and Clearwater Moun­
   ——— A geological reconnaissance across the Bitterroot Range and Clear­
   water Mountains in Montana and Idaho: P. P. 27, 1904, pp. 91-96.
67. Elk City—Continued.
   1906, p. 258.
   1907, pt. 1, p. 299.
   1908, pt. 1, p. 425.

68. Florence. Au. (D, Pl.)
   42 miles SSE. Grangeville, N. P. R. R.
   Granite.
   Veins, stream gravels.
   Lindgren, W., Mineral deposits of the Bitterroot Range and Clearwater
   Mountains, Montana: Bull. 213, 1903, pp. 66-70.
   ——— The gold and silver veins of Silver City, De Lamar, and other mining
   1906, p. 258.
   1907, pt. 1, p. 299.

69. Maggie. Au. (Pl.)
   8 miles E. Kooskia, N. P. R. R.
   Stream gravels.
   Min. Res. 1906, p. 258.

70. Marshall (Resort). Au, Ag. (D, Pl.)
   50 miles NE. Evergreen, P. & I. N. R. R.
   Granite.
   Veins, stream gravels.
   Lindgren, W., The gold and silver veins of Silver City, De Lamar, and other
   Min. Res. 1905, p. 252.
   1907, pt. 1, p. 300.
   1908, pt. 1, p. 425.

71. Newsome. Au. (D, Pl.)
   31 miles E. Grangeville, N. P. R. R.
   Pre-Cambrian gneiss cut by granite.
   Veins, terrace gravels.
   Lindgren, W., Mineral deposits of the Bitterroot Range and Clearwater
   Mountains, Montana: Bull. 213, 1903, pp. 66-70.
   ——— A geological reconnaissance across the Bitterroot Range and Clear-
   water Mountains in Montana and Idaho: P. P. 27, 1904, pp. 96-98.
   1906, p. 258.
   1907, pt. 1, p. 300.
   1908, pt. 1, p. 425.

72. Orogrande. Au, Ag. (D, Pl.)
   61 miles SE. Grangeville, N. P. R. R.
   Pre-Cambrian gneiss cut by granite.
   Veins, stream gravels.
   Lindgren, W., A geological reconnaissance across the Bitterroot Range and
   Clearwater Mountains in Montana and Idaho: P. P. 27, 1904, pp. 94-98.
   1909, pt. 1, p. 349.
73. Profile. Au.
151 miles NE. Emmett, P. & I. N. R. R.
Tertiary volcanics.
Veins and impregnations.

74. Robbins (Buffalo Hump). Au, Ag.
50 miles SE. Grangeville, N. P. R. R.
Granite, schist cut by granite dikes.
Veins.
Lindgren, W., Mineral deposits of the Bitterroot Range and Clearwater
Mountains, Montana: Bull. 213, 1903, pp. 66-70.
—— A geological reconnaissance across the Bitterroot Range and Clear-
1906, pp. 258-259.
1907, pt. 1, p. 300.
1908, pt. 1, p. 426.
1909, pt. 1, p. 349.

75. Salmon River placers (Simpson). Au, Ag. (Pl.)
Stream gravels.
1906, p. 259.
1907, pt. 1, p. 300.
1908, pt. 1, p. 426.
1909, pt. 1, p. 349.

76. Thunder Mountain. Au, Ag.
139 miles NE. Emmett, P. & I. N. R. R.
Tertiary volcanics.
Veins and impregnations.
1906, p. 259.
1907, pt. 1, p. 300.
1908, pt. 1, p. 426.
1909, pt. 1, p. 349.

77. Warren. Au, Ag (Cu). (D, Pl.)
67 miles NE. Evergreen, P. & I. N. R. R.
Granite cut by lamprophyric dikes.
Veins.
Lindgren, W., The gold and silver veins of Silver City, De Lamar, and other
1906, p. 259.
1907, pt. 1, pp. 300-301.
1908, pt. 1, p. 426.
1909, pt. 1, p. 349.

78. Camas Cove (Tyson). Au. (Pl.)
18 miles SSE. St. Maries, C. M. & P. S. R. R.
Stream gravels.
1907, pt. 1, p. 301.
1908, pt. 1, p. 426.
79. Lakeview. Ag, Pb.
15 miles E. Athol, N. P. R. R.
Pre-Cambrian sediments.
Veins.
1906, p. 259.
Top. sheet Rathdrum.

80. Medimont. Ag.
Cataldo or Dudley station, N. P. R. R.
Algonkian sediments.
Veins.

81. Gold Creek (Potlatch). Au. (Pl.)
Station W. I. & M. R. R.
Stream gravels.
1907, pt. 1, p. 301.
1908, pt. 1, p. 426.

82. Hoodoo (Blackbird). Au. (D, Pl.)
8 to 12 miles NNE. Harvard, W. I. & M. R. R.
1907, pt. 1, p. 301.
1908, pt. 1, p. 426.

83. Moscow. Au. (Pl, D.)
Station N. P. R. R.
Stream gravels.
1906, p. 259.
1907, pt. 1, p. 301.
Top. sheet Pullman.

84. Blackbird. Cu, Au, Ag (Ni, Co).
25 miles W. Noble, G. & P. R. R.
Pre-Cambrian schist, cut by basic dikes and granite.
Veins and replacements.

85. Bluewing (Patterson Creek). Ag.
80 miles N. Mackay, O. S. L. R. R.
Granite (?).
Veins (?).

86. Carmen Creek. Au, Cu.
Station G. & P. R. R.
Pre-Cambrian schists.
Veins.

87. Eldorado (Geertson). Au.
10 miles NE. Baker, G. & P. R. R.
Pre-Cambrian schists cut by basic dikes.
Veins.
87. Eldorado (Geertson)—Continued.
Min. Res. 1905, p. 236.
1908, pt. 1, p. 427.

88. Eureka. Au, Ag.
8 miles NW. Salmon, G. & P. R. R.
Pre-Cambrian schists cut by granite.
Veins.
1908, pt. 1, p. 427.

89. Forney (Gravel Range). Au, Ag. (D, Pl.)
46 miles SW. Salmon, G. & P. R. R.
Tertiary volcanics.
Veins.
Min. Res. 1905, p. 236.
1907, pt. 1, p. 302.
1908, pt. 1, p. 427.

90. McDevitt. Au. (D, Pl.)
Sunfield station, G. & P. R. R.
Pre-Cambrian schists.
Veins, stream gravels.
Min. Res. 1905, p. 236.
1909, pt. 1, p. 351.

91. Gibbonsville. Au, Ag. (D, Pl.)
Station G. & P. R. R.
Pre-Cambrian slates.
Veins.
—— A geological reconnaissance across the Bitterroot Range and Clearwater Mountains in Montana and Idaho: P. P. 27, 1904, p. 90.
Min. Res. 1905, p. 236.
1906, p. 260.
1907, pt. 1, p. 302.
1908, pt. 1, p. 427.

92. Indian Creek (Ulysses). Au, Ag, Cu.
17 miles WNW. Noble, G. & P. R. R.
Pre-Cambrian schist cut by acidic dikes.
Veins.
Min. Res. 1905, p. 236.
1906, pp. 260-261.
1907, pt. 1, p. 302.
1908, pt. 1, p. 427.

93. Junction. Pb, Ag.
Station G. & P. R. R.
Paleozoic sediments cut by acidic intrusions.
Veins.
1908, pt. 1, p. 428.
94. Kirtley Creek. Au. (Pl, D.)
10 miles E. Sunfield, G. & P. R. R.
Pre-Cambrian schist cut by basic dikes.
Veins, stream gravels.
1908, pt. 1, p. 428.

95. Leesburg (Arnett Creek). Au. (Pl, D.)
16 miles W. Salmon, G. & P. R. R.
Pre-Cambrian schist cut by granite.
Veins, stream gravels.
Min. Res. 1905, p. 236.
1907, pt. 1, p. 303.
1908, pt. 1, p. 428.

96. Mackinaw. Au, Ag. (Pl, D.)
20 miles NW. Salmon, G. & P. R. R.
Pre-Cambrian complex cut by granite.
Veins, stream gravels.
1908, pt. 1, p. 428.

97. Mineral Hill (Shoup). Au. (D, Pl.)
13 miles W. Noble, G. & P. R. R.
Gneiss cut by granite porphyry and diorite.
Veins, stream gravels.
Lindgren, W., A geological reconnaissance across the Bitterroot Range and
Clearwater Mountains in Montana and Idaho: P. P. 27, 1904, pp. 66,
89–90.
Min. Res. 1905, p. 236.
1906, p. 261.
1907, pt. 1, p. 303.
1908, pt. 1, p. 428.
1909, pt. 1, p. 351.

98. Parker Mountain. Ag, Au.
75 miles SW. Salmon, G. & P. R. R.
Tertiary volcanics.
Veins.
Min. Res. 1905, p. 236.
1906, p. 261.
1907, pt. 1, pp. 303–304.
1908, pt. 1, p. 428.

99. Pratt Creek. Au, Ag, Pb. (Pl, D.)
10 miles E. Baker, G. & P. R. R.
Pre-Cambrian schist.
Veins, stream gravels.

100. Spring Mountain. Pb, Ag, Cu, Au.
38 miles SSE. Junction, G. & P. R. R.; 60 miles NE. Mackay, O. S. L. R. R.
Paleozoic sediments cut by diorite
Veins and replacements.
1907, pt. 1, p. 303.
1908, pt. 1, p. 428.
1909, pt. 1, p. 351.
101. **Texas Creek (Gilmore)**. Pb, Ag, Au.
19 miles S. Junction, G. & P. R. R.; 80 miles NNW. Dubois, O. S. L. R. R.
Paleozoic sediments cut by basic dikes.
Veins and replacements.
Min. Res. 1905, pp. 235, 236.
1906, pp. 261, 446.
1907, pt. 1, p. 303.
1908, pt. 1, p. 428.
1909, pt. 1, p. 351.

102. **Yellowjacket.** Au. (D, Pl.)
58 miles WSW. Salmon, G. & P. R. R.
Schist (pre-Cambrian?) cut by rhyolite and andesite porphyry and minette.
Veins.
Rept., pt. 2, 1895, pp. 259-264
Min. Res. 1905, p. 236.
1906, p. 261.
1907, pt. 1, p. 304.
1908, pt. 1, p. 428.
1909, pt. 1, p. 351.

[Note.—For Nos. 103-106, see Clearwater County, pp. 165-166.]

**OWYHEE COUNTY.**

107. **Carson (War Eagle, Silver City, Florida Mountain)**. Ag, Au.
23 miles SSW. Murphy, I. N. R. R.
Granite and Tertiary volcanics.
Veins.
Lindgren, W., The gold and silver veins of Silver City, De Lamar, and other
1906, pp. 262-263.
1907, pt. 1, p. 305.
1908, pt. 1, pp. 429-430.
Top. sheet Silver City.
Folio 104, 1904.

108. **De Lamar.** Au, Ag.
31 miles SSW. Murphy, I. N. R. R.
Tertiary volcanics.
Veins.
Rept., pt. 2, 1895, pp. 271-274.
Lindgren, W., The gold and silver veins of Silver City, De Lamar, and other
1908, pt. 1, pp. 429-430.
Top. sheet Silver City
Folio 104, 1904.

109. **Flint.** Ag, Au.
40 miles SSW. Murphy, I. N. R. R.
Granite and diorite.
Veins.

110. Mammoth. Au, Ag.
33 miles SSW. Murphy, I. N. R. R.
Granite.
Veins.
Lindgren, W., The gold and silver veins of Silver City, De Lamar, and other mining districts in Idaho: Twentieth Ann. Rept., pt. 3, 1900, p. 188.

111. Snake River placers. Au. (Pl.)
Stream gravels.
1908, pt. 1, p. 430.
Top. sheets Bisuka, Silver City.
Folio 104, 1904.

112. South Mountain. Pb, Ag, Cu.
46 miles SSW. Murphy, I. N. R. R.
Schist, diorite, and limestone.
Contact metamorphic veins.
Lindgren, W., The gold and silver veins of Silver City, De Lamar, and other mining districts in Idaho: Twentieth Ann. Rept., pt. 3, 1900, p. 188.
Min. Res. 1906, p. 446.

SHOSHONE COUNTY.

5½ miles W. Saltse, Mont., N. P. R. R., C. M. & P. S. R. R.
Pre-Cambrian sediments cut by diabase.
Veins.

114. Beaver (Cœur d’Alene). Pb, Ag, Cu, Au. (D, Pl.)
4 miles NW. Burke, N. P. R. R.
Pre-Cambrian sediments.
Veins.
1906, pp. 264, 445, 446.
1907, pt. 1, p. 308.
1908, pt. 1, p. 431.
Top. sheet Cœur d’Alene special.

St. Joe station, C. M. & P. S. R. R.
Pre-Cambrian quartzite cut by granite.
Veins.
115. **Black Prince—Continued.**

116. **Eagle (Murray, Cœur d'Alene).** Au (Pb, Ag).
Paragon station, I. N. R. R.
Pre-Cambrian sediments cut by acidic intrusives.
Veins.
1906, pp. 264, 445, 446.
1907, pt. 1, p. 308.
1908, pt. 1, p. 431.
Top. sheet Cœur d'Alene special.

117. **Evolution (Cœur d'Alene).** Pb, Ag, Cu (Au).
Kellogg station, N. P. R. R.
Pre-Cambrian sediments.
Veins.
1906, pp. 264, 445, 446.
1908, pt. 1, p. 432.
Top. sheet Cœur d'Alene special.

118. **Hunter (Mullan, Cœur d'Alene).** Pb, Ag, Cu, Au.
Mullan station, N. P. R. R.
Pre-Cambrian sediments.
Veins.
1906, pp. 264, 445, 446.
1908, pt. 1, pp. 207-208, 432, 433.
Top. sheet Cœur d'Alene special.

119. **Leland (Burke, Cœur d'Alene).** Pb, Ag, Au, Cu, Zn.
Burke station, N. P. R. R.
Pre-Cambrian sediments cut by monzonite.
Veins.
21528°—Bull. 507—12—12
190. Pine Creek. Pb, Ag, Zn.
12 miles SSE. Kingston, N. P. R. R.
Pre-Cambrian sediments.
Veins.
Calkins, F. C., and MacDonald, D. F., A geological reconnaissance in northern
191. Placer Center (Wallace, Cœur d'Alene). Pb, Ag, Cu, Zn, W.
Wallace station, N. P. R. R.
Pre-Cambrian sediments cut by monzonite.
Veins.
Lindgren, W., A geological reconnaissance across the Bitterroot Range and
Ransome, F. L., Ore deposits of the Cœur d'Alene district, Idaho: Bull. 260,
1905, pp. 274-303.
Ransome, F. L., and Calkins, F. C., The geology and ore deposits of the Cœur
d'Alene district, Idaho: P. P. 62, 1908.
1906, pp. 265, 445-446.
1907, pt. 1, p. 310.
1908, pt. 1, pp. 434, 723.
Top. sheet Cœur d'Alene special.
192. Slate Creek. Pb, Ag.
15 miles S. Wallace, N. P. R. R.
Pre-Cambrian sediments cut by acidic intrusives.
Replacements and veins.
Collier, A. J., Ore deposits of the St. Joe River basin, Idaho: Bull. 285, 1906,
pp. 133-134.
193. Omitted.
25 miles W. Iron Mountain, Mont., N. P. R. R., C. M. & P. S. R. R.
Stream gravels.
Calkins, F. C., and Jones, E. L., jr., Geology of the St. Joe-Clearwater region,
Idaho: Bull. 530, 1912.
Collier, A. J., Ore deposits of the St. Joe River basin, Idaho: Bull. 285, 1906,
p. 137.
Pardee, J. T., Geology and mineralization of the upper St. Joe River basin,
Lookout station, N. P. R. R.
Pre-Cambrian sediments cut by acidic dikes.
Veins.
125. St. Regis (Cœur d'Alene)—Continued.


1906, pp. 266, 445-446.

1907, pt. 1, p. 310.

Top. sheet Cœur d'Alene special.

126. Summit (Cœur d'Alene). Au, Pb, Cu, Ag.

10 miles SE. Paragon, I. N. R. R.

Pre-Cambrian sediments.

Veins.


1906, pp. 266, 445-446.


1908, pt. 1, p. 434.

Top. sheet Cœur d'Alene special.

127. Yreka (Wardner, Cœur d'Alene). Pb, Ag, Au, Cu.

Kellogg station, N. P. R. R.

Pre-Cambrian sediments.

Veins.


Min. Res. 1885, p. 387.

1886, p. 146.


1888, pp. 88-89.

1905, p. 241.

1906, pp. 266, 445, 446.

1908, pt. 1, p. 434.

1909, pt. 1, p. 356-357.

Top. sheet Cœur d'Alene special.

WASHINGTON AND ADAMS COUNTIES.

128. Black Lake. Au. (D, Pl.)

40 miles NNW. Council, P. & I. N. R. R.


1906, p. 267.

129. Heath. Cu, Ag, Au.

24 miles NW. Cambridge, P. & I. N. R. R.

Triassic (?) sediments cut by diorite (?).

Contact metamorphic (?).

129. **Heath**—Continued.
   1906, p. 267.

130. **Meadows.** Au. (Pl.)
   16 miles NE. Evergreen, P. & I. N. R. R.
   1906, p. 267.

131. **Mineral.** Pb, Ag, Cu, Au.
   Greenstones, quartz diorite.
   Replacements, veins.
   Lindgren, W., The gold belt of the Blue Mountains of Oregon: Twenty-

132. **Monroe Creek (Weiser).** Au. (D, Pl.)
   Top. sheet Weiser.

133. **Placer Basin.** Au.
   37 miles NNE. Council, P. & I. N. R. R.
   Veins.
   Lindgren, W., The gold and silver veins of Silver City, De Lamar, and other

134. **Seven Devils.** Cu, Au, Ag.
   37 miles NW. Council, P. & I. N. R. R.
   Triassic (?) sediments cut by diorite.
   Contact metamorphic.
   Lindgren, W., The gold and silver veins of Silver City, De Lamar, and other
   Weed, W. H., The copper mines of the United States in 1905: Bull. 285,

   1905, p. 242.
   1906, p. 267.
   1907, pt. 1, p. 312.
   1908, pt. 1, p. 435.
   1909, pt. 1, p. 357.
MONTANA.

Eighteen of the mountain counties of Montana produce all of the metallic wealth of that State. In this region there are 107 mining districts. Gold is the predominant metal in 68 of these districts, lead in 15, copper in 11, silver in 7, zinc in 1, and iron in 1. In 4 camps the predominant metal is uncertain.

Distribution of the predominant metals produced in the mining districts of Montana.

<table>
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<th>County</th>
<th>Gold</th>
<th>Silver</th>
<th>Copper</th>
<th>Lead</th>
<th>Zinc</th>
<th>Iron</th>
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<td><strong>11</strong></td>
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<td><strong>3</strong></td>
<td><strong>107</strong></td>
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MINING DISTRICTS IN MONTANA.

[See Pl. VIII. Additional references will be found in Mineral Resources for 1910 and 1911.]

BEAVERHEAD COUNTY.

1a. Ajax. Pb, Ag.
1b. Argenta. Pb, Ag, Au, Cu.
   25 miles WNW. Dillon, O. S. L. R. R.
   Paleozoic sediments cut by granite.
   Contact metamorphic, veins.
   1907, pt. 1, p. 320.
   Top. sheet Dillon.

1a. Bald Mountain. Au, Ag.
   Granite.
   Veins.

2. Bannack. Au, Ag, Cu. (Pl. D.)
   40 miles WSW. Dillon, O. S. L. R. R.
   Paleozoic sediments cut by syenite.
   Contact metamorphic.
   Stream gravels, veins.
   Top. sheet Dillon.
3. Beaverhead (Dark Horse). Cu, Ag, Au.
   Grant station, G. & P. R. R.
   Pre-Cambrian sediments cut by diorite.
   Veins.

4. Bluewing (Dillon). Ag, Pb, Au, Cu.
   35 miles WNW. Dillon, O. S. L. R. R.
   Paleozoic sediments cut by Tertiary igneous rocks.
   Veins.
   Top. sheet Dillon.

5. Bryant (Hecla). Ag, Cu, Pb, Au, Mo.
   10 miles W. Willis, O. S. L. R. R.
   Paleozoic sediments cut by granite.
   Replacements and contact metamorphic.
   Min. Res. 1882, p. 311.
   1883-84, pp. 423-424.
   1885, p. 258.
   1887, p. 109.
   1888, p. 89.
   1904, p. 341.
   1905, p. 249.
   1906, p. 273.
   Top. sheet Dillon.

   45 miles SW. Dillon, O. S. L. R. R.
   Granite.
   Veins.
   Min. Res. 1908, pt. 1, p. 446.

6a. Mount Torrey.
   Top. sheet Dillon.

7. Polaris. Au, Ag, Cu.
   40 miles W. Apex, 60 miles NW. Dillon, O. S. L. R. R.
   Paleozoic sediments cut by granite.
   Contact metamorphic (?).
   Min. Res. 1908, pt. 1, p. 446.
   Top. sheet Dillon.

8. Utopia. Cu, Ag, Au.
   10 miles W. Melrose, O. S. L. R. R.
   Paleozoic sediments cut by granite.
   Contact metamorphic.
   1908, pt. 1, p. 446.
   Top. sheet Dillon.

9. Vipond. Ag, Pb, Au, Cu.
   11 miles SW. Divide, O. S. L. R. R.
   Pre-Cambrian complex, Paleozoic sediments cut by granite and aplite.
Veins.
Min. Res. 1908, pt. 1, p. 446.
Top. sheet Dillon.

10. Backer (Diamond City). Au, Ag, Cu, Pb. (D, Pl.)
14 miles N. Townsend, N. P. R. R.
Pre-Cambrian slates.
Veins, stream gravels.
Min. Res. 1905, p. 249.
1906, p. 273.
1908, pt. 1, pp. 446-447.
1909, pt. 1, p. 368.
Top. sheet Fort Logan.

11. Beaver Creek (Winston). Au, Pb, Ag, Cu. (D, Pl.)
Winston station, N. P. R. R.
Granite and andesite.
Veins, stream gravels.
Stone, R. W., Geologic relation of ore deposits in the Elkhorn Mountains, Montana: Bull. 470, 1911, pp. 84-86.
Min. Res. 1905, p. 249.
1906, pp. 273, 274.
1907, pt. 1, p. 320.
1908, pt. 1, p. 447.
1909, pt. 1, p. 368.
Top. sheet Fort Logan.

12. Cedar Plain (Radersburg). Pb, Ag, Cu, Au.
11 miles W. Toston, N. P. R. R.
Andesite porphyry and Tertiary lake beds.
Veins.
Min. Res. 1905, p. 249.
1906, p. 274.
1908, pt. 1, p. 447.
Top. sheet Fort Logan.

12 miles N. Winston, N. P. R. R.
Top. sheet Fort Logan.

14. Lone Mountain. Au, Ag, Cu.
Toston station, N. P. R. R.

15. Park (Indian Creek). Au, Ag, Cu, Pb.
10 miles W. Townsend, N. P. R. R.
Andesite and diorite.
Veins.
15. Park (Indian Creek)—Continued.
Top. sheet Fort Logan.

16. Barker. Pb, Ag.
Station G. N. R. R.
Granite and Paleozoic sediments cut by porphyry.
Contact metamorphic, replacements, veins.
Weed, W. H., Geology of the Little Belt Mountains, Montana: Twentieth
Min. Res. 1883-84, p. 424.
Top. sheet Fort Benton.
Folio 55, 1899.

17. Montana (Neihart). Ag, Au, Pb (Cu).
Station G. N. R. R.
Pre-Cambrian gneiss, schist and Algonkian sandstone cut by rhyolite, diorite,
and minette dikes.
Veins.
148-149.
Weed, W. H., Geology of the Little Belt Mountains, Montana: Twentieth
Min. Res. 1905, p. 249.
1906, p. 274.
1908, pt. 1, p. 448.
Top. sheet Little Belt Mountains.
Folio 56, 1899.

12 miles SE. Great Falls, N. P. R. R., G. N. R. R.
Min. Res. 1888, p. 34.
Top. sheet Great Falls.

45 miles S. Chinook, G. N. R. R.
Cretaceous sediments and Tertiary volcanics.
Veins.
Calhoun, F. H. H., The Montana lobe of the Keewatin ice sheet: P. P. 50,
1906.
Pepperberg, L. J., Notes on the mineral deposits of the Bearpaw Mountains,
Montana: Bull. 430, 1910, pp. 135-146.

20. Little Rockies (Landusky, Zortman, Whitcomb). Au, Ag.
45-50 miles SSW. Dodson, G. N. R. R.
Pre-Cambrian schists, Paleozoic sediments domed by acidic Tertiary
porphyries.
Replacements.
Emmons, W. H., Gold deposits of the Little Rocky Mountains, Montana:
CHOUTEAU COUNTY—Continued.

20. Little Rockies (Landusky, Zortman, Whitcomb)—Continued.
1906, p. 275.
1907, pt. 1, p. 322.
1908, pt. 1, p. 448.

21. West Butte. Pb, Ag, Au.
54 miles NW. Chester, G. N. R. R.

DEER LODGE COUNTY.

22. Georgetown (Cable). Au, Cu, Ag.
74 miles WNW. Brown's siding, B. A. & P. R. R.
Paleozoic sediments cut by granite.
Replacement, veins.
Emmons, W. H., The Granite-Bimetallic and Cable mines, Philipsburg
quadrangle, Montana: Bull. 315, 1907, pp. 45-54.
1905, p. 250.
1906, p. 275.
1907, pt. 1, p. 322.
1908, pt. 1, p. 449.
Top. sheet Philipsburg.

23. Heber. Au, Ag, Pb, Cu. (D, Pl.)
10 miles W. Gregson, B. A. & P. R. R.
1907, pt. 1, p. 323.
Top. sheet Helena.

FERGUS COUNTY.

20 miles N. Lewiston, C. M. & P. S. R. R.
Paleozoic and Mesozoic sediments cut by acidic intrusives.
Replacements.
Weed, W. H., and Pirsson, L. V., Geology and mineral resources of the
437-616.
1906, p. 276.
1907, pt. 1, p. 323.

25. Warm Springs (Giltedge). Au, Pb, Ag, Cu.
15 miles NE. Lewiston, C. M. & P. S. R. R.
Paleozoic and Mesozoic sediments cut by intrusives.
Replacements.
Weed, W. H., and Pirsson, L. V., Geology and mineral resources of the
437-616.
1905, pp. 250-251.
1906, p. 276.
1907, pt. 1, p. 323.
1908, pt. 1, p. 450.
26. **Yogo.** Au, Ag, Cu, Pb.
   30 miles WSW. Philbrook, G. N. R. R.
   Paleozoic sediments cut by minettes.
   Contact metamorphic.

**FERGUS COUNTY—Continued.**

27. **Black Prince (Combination).** Au, Cu.
   15 miles SW. Hall, N. P. R. R.
   Pre-Cambrian sediments.
   Veins.
   Top. sheet Sapphire.

28. **First Chance (Garnet).** Au, Ag, Cu, Pb. (D, Pl.)
   11 miles N. Bearmouth, N. P. R. R., C. M. & P. S. R. R.
   Paleozoic sediments cut by granite.
   Veins, stream gravels.
   1906, p. 276.
   1907, pt. 1, p. 324.

29. **Flint Creek (Philipsburg).** Au, Ag, Pb, Cu.
   Station N. P. R. R.
   Pre-Cambrian and Paleozoic sediments cut by granite.
   Veins, contact metamorphic.
   1906, p. 277.
   Top. sheet Philipsburg.

30. **Red Lion.** Au, Ag.
   25 miles NW. Anaconda, B. A. & P. R. R.
   Paleozoic sediments cut by granite.
   Veins and replacements.
   Min. Res. 1905, p. 252.
   1906, p. 277.
   Top. sheet Philipsburg.

31. **South Boulder (Princeton).** Pb, Ag, Au, Cu.
   12 miles ESE. Flint, N. P. R. R.
   Paleozoic sediments cut by granite.
   Veins.
   Min. Res. 1905, p. 252.
   1906, p. 277.
   1907, pt. 1, p. 325.
   Top. sheet Philipsburg.
32. **Amazon.** Pb, Ag, Au, Cu.
   Station G. N. R. R.
   Granite.
   Veins.
   1909, pt. 1, p. 373.
   Top. sheets Boulder, Helena.

33. **Boulder.** Pb, Ag, Au. (D, Pl.)
   Station G. N. R. R.
   Granite cut by rhyolite.
   Veins.
   Weed, W. H., Mineral-vein formation at Boulder Hot Springs, Mont.:
   Min. Res. 1906, p. 278.
   1907, pt. 1, p. 326.
   1908, pt. 1, p. 452.
   1909, pt. 1, p. 373.
   Top. sheets Boulder, Helena.

34. **Cataraet (Comet, Basin).** Au, Ag, Pb, Cu. (D, Pl.)
   Basin station, G. N. R. R.
   Andesite cut by granite, both cut by dacite.
   Veins.
   1905, p. 252.
   1906, p. 278.
   1907, pt. 1, p. 326.
   1908, pt. 1, p. 452.
   Top. sheets Boulder, Helena.

35. **Colorado (Prickly Pear Creek, Corbin).** Au, Ag, Cu, Pb.
   Corbin station, G. N. R. R.
   Andesite cut by granite, both cut by dacite.
   Veins.
   Stone, R. W., Geologic relation of ore deposits in the Elkhorn Mountains,
   Montana: Bull. 470, 1911, p. 89
   Min. Res. 1883-84, p. 423.
   1905, pp. 252-253.
   1906, pp. 278-279.
   1907, pt. 1, p. 326.
   1908, pt. 1, p. 453.
   Top. sheets Boulder, Helena.

36. **Elkhorn.** Au, Ag, Pb, Cu.
   Station G. N. R. R.
   Paleozoic sediments cut by diorite, gabbro, and quartz monzonite.
   Replacements, contact metamorphic.
   Stone, R. W., Geologic relation of ore deposits in the Elkhorn Mountains,
   Montana: Bull. 470, 1911, pp. 96-98.
   Weed, W. H., and Barrell, J., Geology and ore deposits of Elkhorn mining
   district, Jefferson County, Mont.: Twenty-second Ann. Rept., pt. 2, 1900,
   pp. 399-550.
   1906, p. 279.
   1907, pt. 1, p. 327.
36. **Elkhorn—Continued.**

Top. sheet Fort Logan.

37. **Lump Gulch (Clancy, Warm Springs).** Au, Ag, Pb, Cu.

Clancy station, G. N. R. R.

Granite.

Vein.


1906, p. 279.
1907, pt. 1, p. 327.
1908, pt. 1, p. 453.

Top. sheets Boulder, Fort Logan.

38. **McClellan Creek.** Au, Ag, Cu, Mo.

9 miles NE. Clancy, G. N. R. R.

Andesite cut by granite.

Veins.


39. **Whitehall (Cardwell).** Au, Ag. (D, Pl.)

Station N. P. R. R.

Pre-Cambrian and Paleozoic sediments cut by andesite porphyry.

Veins.

1907, pt. 1, p. 328.
1909, pt. 1, p. 375.

Top. sheet Dillon.

**LEWIS AND CLARK COUNTY.**

40. **Bald Butte (Marysville).** Au, Ag, Pb, Cu.

2 miles W. Marysville, N. P. R. R.

Pre-Cambrian sediments cut by granite.

Veins.

Barrell, J., Geology of the Marysville mining district, Montana: P. P. 57, 1907.


1907, pt. 1, p. 328.
1909, pt. 1, p. 375.

Top. sheet Helena.

41. **Dry Gulch (York).** Au, Pb, Ag. (D, Pl.)

20 miles NE. Helena, G. N. R. R., N. P. R. R.

1909, pt. 1, p. 376.

Top. sheet Fort Logan.

42. **Greenhorn (Austin).** Ag, Au, Pb, Cu.

Austin station, N. P. R. R.

Pre-Cambrian and Paleozoic sediments cut by granite.

Veins.

1909, pt. 1, p. 376.

Top. sheet Helena.
43. Helena (Spring Hill). Au, Pb, Ag, Cu. (D, Pl.)
Station N. P. R. R., G. N. R. R.
Pre-Cambrian and Paleozoic sediments cut by granite.
Veins.
1885, pp. 257–258.
1887, p. 109.
1888, p. 89.
1905, p. 253.
1906, p. 280.
1907, pt. 1, p. 329.
1909, pt. 1, p. 376.
Top. sheets Helena, Helena special.

44. Ottawa (Marysville). Au, Ag, Cu, Pb.
Marysville station, N. P. R. R.
Pre-Cambrian sediments cut by granite.
Veins.
Weed, W. H., Gold mines of the Marysville district, Montana: Bull. 213, 1903,
pp. 88–89.
1906, p. 280.
1907, pt. 1, p. 328.
1908, pt. 1, p. 454.
1909, pt. 1, p. 376.
Top. sheets Helena, Marysville special.

45. Poorman. Au, Ag (Cu).
Silver station, G. N. R. R.
1909, pt. 1, p. 376.
Top. sheets Helena, Marysville special.

46. Stemple (Fool Hen). Au, Ag, Pb, Cu.
25 miles NW. Silver, G. N. R. R.
Sediments cut by granite.
Veins.
1906, p. 280.
1907, pt. 1, p. 329.
1908, pt. 1, p. 454.
1909, pt. 1, p. 376.
Top. sheet Helena.

47. Unionville. Au, Ag (Cu, Pb).
5 miles SSW. Helena, G. N. R. R., N. P. R. R.
Paleozoic sediments cut by granite
Veins.
1905, p. 254.
1906, p. 280.
1907, pt. 1, p. 329.
1908, pt. 1, p. 454.
1909, pt. 1, p. 376.
Top. sheets Helena, Boulder, Helena special.

48. Vaughn (Rimini). Au, Ag, Pb.
Rimini station, N. P. R. R.
Granite capped by rhyolite.
48. Vaughn (Rimini)—Continued.
Veins.
1907, pt. 1, p. 329.
1908, pt. 1, p. 454.
1909, pt. 1, p. 376.
Top. sheet Boulder.

LINCOLN COUNTY.

49. Cabinet. Au.
Pre-Cambrian sediments.
Veins.
Calkins, F. C., and MacDonald, D. F., A geological reconnaissance in northern
MacDonald, D. F., Economic features of northern Idaho and northwestern

50. Callahan Creek (Grouse Mountain). Zn, Pb.
8 miles S. Troy, G. N. R. R.
Pre-Cambrian sediments cut by basic dikes.
Veins, contact metamorphic.
Calkins, F. C., and MacDonald, D. F., A geological reconnaissance in northern
MacDonald, D. F., Economic features of northern Idaho and northwestern

51. Libby (Snowshoe). Pb, Ag, Au. (D, Pl.)
18 miles S. Libby, G. N. R. R.
Pre-Cambrian sediments.
Veins, stream gravels.
Calkins, F. C., and MacDonald, D. F., A geological reconnaissance in northern
Schrader, F. C., Gold-bearing ground moraine in northwestern Montana:
Bull. 470, 1911, pp. 70-74.
1906, p. 276.
1907, pt. 1, p. 324.
1908, pt. 1, p. 450.

52. Sylvanite. Au.
18 miles NNW. Troy, G. N. R. R.
Pre-Cambrian sediments.
Veins.
Calkins, F. C., and MacDonald, D. F., A geological reconnaissance in northern
MacDonald, D. F., Economic features of northern Idaho and northwestern

MADISON COUNTY.

53. Alder Gulch (Virginia City, Fairweather). Au, Ag. (Pl.)
12 miles E. Alder, N. P. R. R.
Stream gravels.
MONTANA.

MADISON COUNTY—Continued.

53. **Alder Gulch (Virginia City, Fairweather)—Continued.**
   Top. sheets Three Forks, Dillon.
   Folio 24, 1896.

54. **Lower Hot Springs (Norris).** Au, Ag. (Pb, Cu.)
   Station N. P. R. R.
   Pre-Cambrian gneiss.
   Veins.
   1906, p. 281.
   1907, pt. 1, p. 331.
   1908, pt. 1, p. 456.
   Top. sheet Three Forks.
   Folio 24, 1896.

54a. **McCarty Mountain.** Pb, Ag.
   Quartzite and slates cut by granite.
   Veins.
   Top. sheet Dillon.

55. **Mineral Hill (Pony).** Au, Cu, Ag, Pb, Zn.
   Pony station, N. P. R. R.
   Pre-Cambrian gneiss cut by granite.
   Veins.
   1906, p. 282.
   1907, pt. 1, p. 331.
   1908, pt. 1, p. 456.
   Top. sheet Three Forks.
   Folio 24, 1896.

56. **Norwegian (Whitehall).** Au, Ag, Cu, Pb.
   5 miles SE. Pony, N. P. R. R.
   Pre-Cambrian gneiss.
   Veins.
   Min. Res. 1905, p. 255.
   1907, pt. 1, p. 332.
   1908, pt. 1, p. 456.
   Top. sheet Three Forks.
   Folio 24, 1896.

56a. **Point of Rocks (Mammoth).** Au, Ag, Cu, Pb.
   12 miles SE. Whitehall, N. P. R. R.
   Pre-Cambrian and Paleozoic sediments cut by quartz monzonite.
   Veins.
   Top. sheet Dillon.

57. **Rabbit.** Au, Ag, Pb, Cu.
   12 miles NW. Twin Bridges, N. P. R. R.
   Pre-Cambrian complex cut by aplite.
   Veins.
   Min. Res. 1905, p. 255.
   1906, p. 282.
   1907, pt. 1, p. 331.
   1908, pt. 1, p. 456.
   Top. sheet Dillon.
58. **Ramshorn (Union).** Au, Ag, Cu, Pb.

8 miles E. Laurin, N. P. R. R.

Pre-Cambrian schist and sediments cut by granite.

Veins.

*1909, pt. 1, p. 379.*

Top. sheet Dillon.

59. **Sheridan (Mill Creek, Wisconsin).** Au, Pb, Ag, Cu.

6 miles E. Sheridan station, N. P. R. R.

Pre-Cambrian schist and sediments cut by granite.

Veins.

*1908, pt. 1, p. 456.*
*1909, pt. 1, p. 379.*

Top. sheet Dillon.

60. **Silver Star.** Au, Pb, Cu, Ag.

4 miles NW. Silver Star siding, N. P. R. R.

Pre-Cambrian schist and Paleozoic sediments cut by quartz monzonite.

Veins and contact metamorphic.

*1906, p. 282.*
*1907, pt. 1, p. 331.*
*1908, pt. 1, pp. 456-457.*
*1909, pt. 1, p. 379.*

Top. sheet Dillon.

61. **Summit.** Au, Ag, Pb.

20 miles SE. Alder, N. P. R. R.

Pre-Cambrian complex.

Veins.

*1906, p. 282.*
*1907, pt. 1, p. 332.*
*1908, pt. 1, p. 457.*
*1909, pt. 1, p. 379.*

Top. sheet Three Forks.

Folio 24, 1896.

62. **Tidal Wave (Bear Gulch, Goodrich Gulch).** Au, Pb, Ag, Cu.

10 miles E. Twin Bridges, N. P. R. R.

Pre-Cambrian and Paleozoic sediments cut by granite.

Veins and contact metamorphic.

*Min. Res. 1906, p. 283.*
*1907, pt. 1, p. 332.*
*1908, pt. 1, p. 457.*
*1909, pt. 1, p. 379.*

Top. sheet Dillon.

63. **Upper Hot Springs.** Au, Pb, Ag.

8 miles W. Norris, N. P. R. R.

Granite porphyry cut by aplite.

Veins.

*1906, p. 283.*
*1907, pt. 1, p. 332.*
*1908, pt. 1, p. 457.*
*1909, pt. 1, p. 380.*
MONTANA.

MADISON COUNTY—Continued.

63. Upper Hot Springs—Continued.
   Top. sheet Three Forks.
   Folio 24, 1896.

64. Washington (Meadow Creek). Au, Pb, Ag.
   12 miles SW. Norris, N. P. R. R.
   Pre-Cambrian complex cut by granite and andesite.
   Veins.
   Min. Res. 1905, p. 255.
   1906, p. 283.
   1907, pt. 1, p. 332.
   1908, pt. 1, p. 457.
   Top. sheet Three Forks.
   Folio 24, 1896.

MEAGHER COUNTY.

65. Castle Mountain. Pb, Ag, Cu.
   7 miles W. Lennep, C. M. & P. S. R. R.
   Pre-Cambrian and Paleozoic sediments cut by granite and diorite.
   Replacements.
   Harder, E. C., Manganese deposits of the United States: Bull. 427, 1910,
   pp. 148-149.
   Weed, W. H., and Pirsson, L. V., Geology of the Castle Mountain mining
   district, Montana: Bull. 139, 1896.
   Min. Res. 1893, p. 131.
   1906, p. 333.
   1908, pt. 1, p. 457.
   Top. sheet Little Belt Mountains.
   Folio 56, 1899.

   14 miles NW. Martinsdale, C. M. & P. S. R. R.
   Pre-Cambrian and Paleozoic sediments cut by granite and diorite.
   Replacements.
   Weed, W. H., and Pirsson, L. V., Geology of the Castle Mountain mining
   district, Montana: Bull. 139, 1896.
   1908, pt. 1, p. 457.
   Top. sheet Little Belt Mountains.
   Folio 56, 1899.

MISSOULA COUNTY.

67. Cedar Creek (Trout Creek, Superior). Au. (Pl.)
   15 miles SW. Superior, C. M. & P. S. R. R.
   Stream gravels.
   Min. Res. 1905, p. 256.
   1908, pt. 1, p. 458.
   1909, pt. 1, pp. 380-381.

68. Denemora (Big Elk). Cu, Au, Ag, Pb.
   Saltese station, C. M. & P. S. R. R.
   Pre-Cambrian sediments cut by acidic dikes.
   Replacements and veins.

21528°—Bull. 507—12—13
MINING DISTRICTS OF WESTERN UNITED STATES.

MISSOULA COUNTY—Continued.

69. Iron Mountain. Pb, Ag.

22 miles NNW. Hudson, N. P. R. R., C. M. & P. S. R. R.

Pre-Cambrian sediments.

Veins.


1909, pt. 1, p. 381.

69a. Ninemile Creek (Kennedy Creek). Au. (Pl.)

12 miles NW. Huson, N. P. R. R., C. M. & P. S. R. R.

Glacial gravels (?)


70. Packer Creek.

5 miles N. Saltese, C. M. & P. S. R. R.

Pre-Cambrian sediments cut by acidic intrusives.

Replacements.

71. Rock Island.

8 miles N. Henderson, N. P. R. R.

Pre-Cambrian sediments cut by acidic intrusives.

Replacements and veins.

72. St. Regis (Deer Creek, Ward). Au. (D, Pl.)

St. Regis station, N. P. R. R., C. M. & P. S. R. R.


1909, pt. 1, p. 381.

73. Wallace (Clinton). Cu, Au, Ag, Pb.

Clinton station, N. P. R. R.

Min. Res. 1905, p. 256.

1906, p. 283.

1907, pt. 1, p. 333.

Top. sheet Bonner.

74. Woodman (Mormon Creek). Au, Cu.

11 miles W. Lolo, N. P. R. R.

Pre-Cambrian sediments cut by diorite.

Veins.


——— A geological reconnaissance across the Bitterroot Range and Clearwater Mountains, in Montana and Idaho: P. P. 27, 1904, p. 86.

PARK COUNTY.

75. Cowles. Ag.

50 miles ENE. Gardiner, N. P. R. R.

Pre-Cambrian gneiss, gabbro, diorite.

Veins.

Top. sheet Livingston.

Folio 1, 1894.

76. Crevasse. Au, Ag.

10 miles ESE. Gardiner, N. P. R. R.

Pre-Cambrian gneiss.

Veins.

Min. Res. 1905, p. 256.

1906, p. 284.

1907, pt. 1, p. 333.
76. Crevasse—Continued.
   Top. sheet Livingston.
   Folio 1, 1894.

77. Emigrant Creek (Chico). Au. (D, PI.)
   5 miles SSE. Fridley, N. P. R. R.
   Andesite, dacite.
   Veins.
   Top. sheet Livingston.
   Folio 1, 1894.

78. Horseshoe. Au.
   60 miles E. Gardiner, N. P. R. R.
   Pre-Cambrian gneiss cut by andesite and dacite.
   Veins.
   Top. sheet Livingston.
   Folio 1, 1894.

79. New World (Cooke). Pb, Ag, Cu, Au.
   65 miles E. Gardiner, N. P. R. R.
   Basic lavas (?)?
   Veins.
   1908, pt. 1, p. 458.

80. Sheepeater (Bear Gulch, Jardine). Au, Ag, W. (D, PI.)
   6 miles NE. Gardiner, N. P. R. R.
   Pre-Cambrian gneiss, andesite, dacite.
   Veins, stream gravels.
   Min. Res. 1905, p. 256.
   1906, p. 284.
   1907, pt. 1, p. 333.
   1908, pt. 1, p. 458.
   Top. sheet Livingston.
   Folio 1, 1894.

POWELL COUNTY.

81. Big Blackfoot (Helmville). Au. (Pl.)
   22 miles NNE. Drummond, N. P. R. R., C. M. & P. S. R. R.
   Stream gravels.
   Top. sheet Helena.

82. Coloma (Elk, Washoe, Garnet). Au, Ag, Cu.
   15 miles N. Bearmouth, 29 miles E. Bonner, N. P. R. R.
   Paleozoic sediments cut by granite.
   Veins.
   1908, pt. 1, p. 459.
   1909, pt. 1, p. 382.
   Top. sheet Bonner.

83. Gold Creek. Ag, Pb, Au, Cu. (Pl, D.)
   10 miles SSW. Gold Creek, N. P. R. R., C. M. & P. S. R. R.
   Granite.
   Veins, stream gravels.
   1907, pt. 1, p. 325.
POWELL COUNTY—Continued.

84. **Ontario (Elliston).** Au, Ag, Pb.
   Elliston station, N. P. R. R.
   Paleozoic and Mesozoic sediments, andesite cut by granite.
   Veins.
   1906, p. 284.
   1907, pt. 1, p. 334.
   1909, pt. 1, p. 382.
   Top. sheets Boulder, Helena.

85. **Ophir.** Au, Ag, Cu, Pb.
   9 miles N. Avon, N. P. R. R.
   Paleozoic sediments cut by granite.
   Contact metamorphic.
   1909, pt. 1, p. 382.
   Top. sheet Helena.

86. **Pioneer.** Au, Ag. (Pl.)
   Gold Creek station, N. P. R. R.
   Stream gravels.
   1909, pt. 1, p. 382.
   Top. sheet Helena.

87. **Racetrack Creek.** Au. (Pl.)
   Station N. P. R. R.
   Stream gravels.
   Top. sheet Helena.

88. **Washington Gulch (Finn).** Au, Ag, Pb, Cu. (D, Pl.)
   15 miles NNW. Avon, N. P. R. R.
   1908, pt. 1, p. 459.
   1909, pt. 1, p. 382.
   Top. sheet Helena.

89. **Zozell (Deer Lodge).** Au, Ag, Pb.
   9 miles W. Deer Lodge, N. P. R. R., C. M. & P. S. R. R.
   Cretaceous andesites.
   Veins.
   1906, p. 284.
   1907, pt. 1, p. 334.
   1908, pt. 1, p. 459.
   Top. sheet Helena.

RAVALLI COUNTY.

90. **Curlew.** Pb, Ag.
   5 miles W. Victor, N. P. R. R.
   Paleozoic sediments.
   Veins.
   1907, pt. 1, p. 334.
   Top. sheet Hamilton.
RAVALLI COUNTY—Continued.

91. Hughes Creek (Alta). Au, Sn. (D, Pl.)
   36 miles S. Darby, N. P. R. R.
   Quartzite.
   Stream gravels, veins.

92. Mineral Point. Cu, Ag, Pb.
   40 miles S. Darby, N. P. R. R.
   Schists, granite, and gneiss.
   Veins.
   ——— A geological reconnaissance across the Bitterroot Range and Clearwater Mountains in Montana and Idaho: P. P. 27, 1904, p. 89.

93. Pleasant View. Cu, Ag.
   5 miles W. Stevensville, N. P. R. R.
   Granite.
   Veins.
   ——— A geological reconnaissance across the Bitterroot Range and Clearwater Mountains in Montana and Idaho: P. P. 27, 1904, p. 87.
   Top. sheet Hamilton.

94. Slate Creek. Cu, Ag.
   30 miles S. Darby, N. P. R. R.
   Granite porphyry.
   Veins.

SANDERS COUNTY.

95. Prospect Creek. Au, Ag, Pb.
   9 miles W. Thompson, N. P. R. R.
   Pre-Cambrian sediments cut by basic dikes.
   Veins.

96. Silver Butte (Vermilion, Cabinet). Pb, Ag.
   10 miles N. Trout Creek, N. P. R. R., C. M. & P. S. R. R.
   Pre-Cambrian sediments.
   Veins.

97. Spring Gulch. Au, Cu, Pb, Ag.
   10 miles E. St. Regis, N. P. R. R., C. M. & P. S. R. R.
MINING DISTRICTS OF WESTERN UNITED STATES.

SILVER BOW COUNTY.

97a. **Fleecer Mountain.** Au, Ag, Cu.
Paleozoic sediments cut by granite and andesite.
Veins, contact metamorphic.

98. **German Gulch.** Au, Ag.
15 miles W. Silver Bow, N. P. R. R.
Pre-Cambrian sediments cut by diorite.
Disseminated.

99. **Highland (Siberia).** Au, Ag.
20 miles ENE. Divide, O. S. L. R. R.
Pre-Cambrian and Paleozoic sediments cut by quartz monzonite.
Replacements and contact metamorphic.

100. **Summit Valley (Butte).** Cu, Ag, Au, Zn.
Station C. M. & P. S. R. R., G. N. R. R., N. P. R. R., O. S. L. R. R.,
Quartz monzonite cut by aplite, rhyolite.
Veins.
1885, pp. 216, 349.
1886, p. 117.
1888, pp. 57-58.
1891, pp. 90-99.
1900, pp. 157-158.
1907, pt. 1, pp. 105, 334-337, 609-611, 713.
Top. sheets Helena, Butte special.
Folio 38, 1897.
NEVADA.

In Nevada there are 182 mining districts in the 15 counties credited with the metallic wealth of the State. In 105 of these districts gold is the most valuable metal produced, in 38 silver, in 17 copper, in 14 lead, in 2 tungsten, in 1 iron, in 1 manganese, and in 1 zinc. Quicksilver was formerly mined exclusively in one locality. Two districts in the State are classed as uncertain—that is, the predominant metal is not known.

Distribution of the predominant metals produced in the mining districts of Nevada.

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<th>County</th>
<th>Gold</th>
<th>Silver</th>
<th>Copper</th>
<th>Lead</th>
<th>Zinc</th>
<th>Iron</th>
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MINING DISTRICTS IN NEVADA.

[See Pl. IX. Additional references will be found in Mineral Resources for 1910 and 1911.]

CHURCHILL COUNTY.

1. Alpine. Au, Ag. 79 miles W. Fallon, S. P. R. R.


4. Eagleville (Hot Springs). Au, Ag.
   64 miles SE. Fallon, S. P. R. R.
   Top. sheet Carson Sink.

5. Eastgate. Au, Ag.
   90 miles SE. Fallon, S. P. R. R.
   Min. Res. 1905, p. 266.
   1906, p. 293.
   1908, pt. 1, p. 470.

6. Fairview. Au, Ag.
   42 miles SSE. Fallon, S. P. R. R.
   Tertiary volcanics.
   Veins.
   Min. Res. 1905, p. 266.
   1906, p. 293.
   1907, pt. 1, pp. 344-345.
   1908, pt. 1, p. 471.
   1909, pt. 1, p. 394.
   Top. sheet Carson Sink.

7. I. X. L. Ag, Au.
   35 miles SE. Lovelocks, S. P. R. R.
   Min. Res. 1906, p. 293.
   Top. sheet Carson Sink.

   35 miles S. Lovelocks, 10 miles NW. White Plains, S. P. R. R.
   1909, pt. 1, p. 394.
   Top. sheet Carson Sink.

9. West Gate. Ag, Pb, Au.
   54 miles ESE. Fallon, S. P. R. R.
   Min. Res. 1905, p. 266.
   Top. sheet Carson Sink.

    35 miles SE. Lovelocks, S. P. R. R.
    Triassic sediments cut by granite and diorite and capped by Tertiary
    volcanics.
    Replacements, contact metamorphic.
    Ransome, F. L., Notes on some mining districts in Humboldt County,
    1909, pt. 1, p. 394.

    7 miles WSW. White Plains, 5 miles W. Huxley, S. P. R. R.
    1909, pt. 1, p. 394.
    Top. sheet Carson Sink.

12. Wonder (Hercules). Ag, Au.
    40 miles ESE. Fallon, S. P. R. R.
    Tertiary volcanics.
    Veins.
    Min. Res. 1905, p. 266.
    1906, p. 293.
    1907, pt. 1, p. 345.
    1908, pt. 1, p. 471-472.
12. Wonder (Hercules)—Continued.
   Top. sheet Carson Sink.

CLARK COUNTY.

13. Bunkerville (Copper King). Cu, Au, Ag.
   38 miles ENE. Moapa, S. P. L. A. & S. L. R. R.
   Paleozoic and Tertiary sediments cut by Tertiary lavas.
   Veins.
   Spurrr, J. E., Geology of Nevada south of the fortieth parallel: Bull. 208, 1903,
   pp. 131-132.
   1907, pt. 1, p. 365.
   1908, pt. 1, pp. 472, 736, 783.
   Top. sheet St. Thomas.

   6 miles E. Nipton, S. P. L. A. & S. L. R. R.
   Pre-Cambrian granite, quartzite cut by acidic and basic dikes.
   Veins.
   Ransome, F. L., Preliminary account of Goldfield, Bullfrog, and other min-
   ing districts in southern Nevada: Bull. 303, 1907, p. 79.
   Min. Res. 1905, p. 270.
   1906, pp. 296-297.
   1908, pt. 1, p. 472.
   Top. sheet Camp Mohave.

   24 miles NNE. Searchlight, B. & S. R. R.
   Pre-Cambrian granite and gneiss cut by acidic intrusives and capped by Tertiary volcanics.
   Veins.
   Ransome, F. L., Preliminary account of Goldfield, Bullfrog, and other mining districts in southern Nevada: Bull. 303, 1907, pp. 63-76.
   Min. Res. 1905, p. 270.
   1907, pt. 1, p. 366.
   1908, pt. 1, p. 473.
   Top. sheet Camp Mohave.

   51 miles SE. Moapa, S. P. L. A. & S. L. R. R.
   Pre-Cambrian complex cut by acidic and basic dikes.
   Veins.
   Min. Res. 1905, p. 270.
   1906, p. 297.
   1907, pt. 1, p. 367.
   1908, pt. 1, p. 472.
   Top. sheet St. Thomas.

   Pre-Cambrian gneiss and granite cut by acidic and basic dikes.
   Disseminated.
17. Great Eastern—Continued.
Top. sheet St. Thomas.
18. Omitted.
19. Logan (St. Thomas). Cu, Ag.
26 miles SE. Moapa, S. P. L. A. & S. L. R. R.
Paleozoic and Mesozoic sediments capped by Tertiary volcanics.
Veins.
Min. Res. 1902, p. 141.
1908, pt. 1, p. 473.
Top. sheet St. Thomas.
15 miles SE. Jean, S. P. L. A. & S. L. R. R.
Granite.
Veins.
21. Searchlight. Au, Ag, Cu, Pb.
Station B. & S. R. R.
Pre-Cambrian complex cut by quartz monzonite and capped by Tertiary volcanics.
Veins.
Ransome, F. L., Preliminary account of Goldfield, Bullfrog, and other mining districts in southern Nevada: Bull. 303, 1907, pp. 63-76.
Min. Res. 1905, p. 270.
1906, p. 296-297.
1908, pt. 1, p. 473-474.
Top. sheet Camp Mohave.
12 miles E. Erie, S. P. L. A. & S. L. R. R.
Top. sheet Camp Mohave.
23. Yellow Pine (Goodsprings). Zn, Pb, Cu, Au, Ag.
8 miles NW. Jean, S. P. L. A. & S. L. R. R.
Paleozoic sediments, cut by dikes.
Replacement.
Min. Res. 1905, p. 270.
1906, pp. 296, 478.
1907, pt. 1, p. 369.
1908, pt. 1, p. 474.
DOUGLAS COUNTY.
24. Gardnerville. Au. (D, Pl.)
3 miles S. Minden, V. & T. R. R.
Diorite, Tertiary volcanics and lake beds.
Veins.
DOUGLAS COUNTY—Continued.

Spurr, J. E., Geology of Nevada south of the fortieth parallel: Bull. 208, 1903, pp. 120-126.
1907, pt. 1, p. 346.
1908, p. 1, p. 475.
Top. sheet Markleeville.

25. Red Canyon. Au, Ag, Pb.
18 miles SE. Minden, V. & T. R. R.
Granite and Tertiary volcanics.
Veins.
Spurr, J. E., Geology of Nevada south of the fortieth parallel: Bull. 208, 1903, pp. 120-126.
Top. sheets Markleeville, Wellington.

31 miles SSE. Minden, V. & T. R. R.
Tertiary volcanics.
Veins.
Spurr, J. E., Geology of Nevada south of the fortieth parallel: Bull. 208, 1903, pp. 120-126.
Top. sheet Wellington.

ELKO COUNTY.

27. Aura (Columbia). Au, Ag (Pb, Zn).
79 miles NNW. Elko, S. P. R. R.
Paleozoic sediments cut by granodiorite.
Veins.
1907, pt. 1, p. 346.

28. Bullion (Railroad). Ag, Au, Cu, Pb, Zn.
27 miles SSW. Elko, 12 miles SE. Palisade, S. P. R. R., W. P. R. R.
Paleozoic sediments cut by granodiorite.
Replacements, contact metamorphic, veins.
Min. Res. 1906, p. 293.
1908, pt. 1, p. 477.
1909, pt. 1, pp. 399-400.

29. Carlin. Au, Ag (D, Pl.)
Station S. P. R. R., W. P. R. R.
Paleozoic sediments cut and capped by Tertiary volcanics.
Veins, replacements.

30. Centennial (Edgemont). Au, Ag (Pb).
92 miles NNW. Elko, S. P. R. R., W. P. R. R.
Paleozoic sediments.
Veins.
30. Centennial (Edgemont)—Continued.
Min. Res. 1905, p. 266.
1906, p. 293.
1907, pt. 1, p. 346.
1908, pt. 1, p. 476.

31. Contact. Cu, Ag.
89 miles NW. Tecoma, S. P. R. R.
Paleozoic sediments cut by granite.
Contact metamorphic, veins.
Schrader, F. C., A reconnaissance of the Jarbidge, Contact, and Elk Mountain mining districts, Elko County, Nev.: Bull. 497, 1912.

32. Cornucopia. Au, Ag.
58 miles NNW. Elko, S. P. R. R., W. P. R. R.
Tertiary volcanics.
Veins.

33. Cornwall Basin (Charleston). Au, Cu.
95 miles NNE. Elko, 50 miles NNW. Deeth, S. P. R. R., W. P. R. R.
Paleozoic sediments cut by granite.
Contact metamorphic, veins.

34. Dolly Varden. Cu, Pb, Ag.
20 miles E. Mizpah, N. N. R. R.

90 miles SSE. Twin Falls, Idaho, O. S. L. R. R.
Paleozoic sediments cut by granite.
Contact metamorphic.
Schrader, F. C., A reconnaissance of the Jarbidge, Contact, and Elk Mountain mining districts, Elko County, Nev.: Bull. 497, 1912.

85 miles S. Twin Falls, Idaho, O. S. L. R. R.

37. Gold Circle (Midas, Summit). Au, Ag.
48 miles ENE. Golconda, S. P. R. R., W. P. R. R.
Tertiary volcanics.
Veins.
1908, pt. 1, p. 477.
1909, pt. 1, p. 399.

38. Good Hope. Au, Ag.
55 miles NW. Elko, S. P. R. R., W. P. R. R.
Tertiary volcanics.
Veins.
Tertiary volcanics.
Veins.
Schrader, F. C., A reconnaissance of the Jarbidge, Contact, and Elk Mountain mining districts, Elko County, Nev.: Bull. 497, 1912.

40. Ruby Valley.  Pb, Ag.
15 miles W. Currie, N. N. R. R.

41. Spruce Mountains.  Pb, Cu, Ag, Au.
Paleozoic sediments cut by rhyolite.
Replacements.
Min. Res. 1905, p. 266.
1906, p. 293.
1907, pt. 1, p. 347.
1908, pt. 1, p. 477.
1909, pt. 1, p. 400.

42. Tecoma.  Pb, Ag, Cu, Au.
10 miles NNE. Tecoma, S. P. R. R.
1909, pt. 1, p. 400.

43. Tuscarora.  Au, Ag.
50 miles NW. Elko, S. P. R. R., W. P. R. R.
Tertiary volcanics.
Veins.
Min. Res. 1905, p. 266.
1906, p. 293.
1907, pt. 1, p. 347.
1908, pt. 1, p. 478.
1909, pt. 1, p. 400.

44. Van Dusen (Mountain City).  Au, Ag (Pb, Zn).
102 miles N. Elko, S. P. R. R., W. P. R. R.
Paleozoic sediments cut by granodiorite and capped by Tertiary volcanics.
Veins.
Min. Res. 1905, p. 266.
1906, pp. 293, 346.
1907, pt. 1, p. 476.

ESMERALDA AND MINERAL COUNTIES.

45. Aurora (Cambridge).  Au, Ag.
37 miles SW. Thorne, S. P. R. R.
Tertiary volcanics.
Veins.
Spurr, J. E., Geology of Nevada south of the fortieth parallel: Bull. 208, 1903, pp. 117-118.
ESMERALDA AND MINERAL COUNTIES—Continued.

45. **Aurora (Cambridge)—Continued.**
   1907, pt. 1, p. 349.
   1908, pt. 1, p. 479.
   Top. sheet Hawthorne.

46. **Bovard.** Au, Ag.
    28 miles E. Schurz, S. P. R. R.
    Tertiary volcanics.
    Veins.
    Spurr, J. E., Geology of Nevada south of the fortieth parallel: Bull. 208, 1903,
    Top. sheet Hawthorne.

47. **Buena Vista (Oneota).** Au, Ag, Pb, Cu, Zn.
    Station, S. P. R. R.
    Tertiary volcanics.
    Veins.
    Spurr, J. E., Geology of Nevada south of the fortieth parallel: Bull. 208, 1903,
    pp. 206–212.
    1907, pt. 1, p. 349.
    1908, pt. 1, p. 479.

48. **Columbus (Candelaria).** Ag, Au, Pb.
    Station, S. P. R. R.
    Paleozoic sediments, Tertiary volcanics.
    Veins.
    Spurr, J. E., Geology of Nevada south of the fortieth parallel: Bull. 208, 1903,
    pp. 113–114.
    Top. sheet Hawthorne.

49. **Cuprite.** Au, Ag.
    Station, B. G. R. R.
    Cambrian sediments cut by dikes of diorite and Tertiary volcanics.
    Veins and replacements.
    Ball, S. H., Notes on the ore deposits of southwestern Nevada and eastern
    California: Bull. 285, 1906, pp. 59–61; A geologic reconnaissance in south­
    Top. sheet Lida.

50. **Dyer.** Au, Ag.
    28 miles S. Coaldale, T. & G. R. R.
    Paleozoic sediments cut by granite.
    Veins.
    Spurr, J. E., Ore deposits of the Silver Peak quadrangle, Nevada: Bull. 225,
    1904, p. 115; P. P. 55, 1906, pp. 84–85.
    Top. sheet Silver Peak.

51. **Goldfield.** Au, Ag.
    Tertiary volcanics underlain by Cambrian sediments cut by granite.
    Veins, replacements.
ESMERALDA AND MINERAL COUNTIES—Continued.

51. **Goldfield**—Continued.


1906, pp. 293-294.


1908, pt. 1, pp. 479-482, 714.


Top. sheets Lida, Goldfield special.

52. **Gold Mountains.** Au, Ag.

7 miles S. Tonopah, T. & G. R. R.

Tertiary volcanics.

Veins.

Spurr, J. E., Ore deposits of Tonopah and neighboring districts, Nevada: Bull. 213, 1903, p. 87.

Top. sheet Lida.

53. **Granite.** Au, Cu.

8 miles W. Schurz, S. P. R. R.

Granite capped by Tertiary volcanics.

Veins.

Spurr, J. E., Geology of Nevada south of the fortieth parallel: Bull. 208, 1903, pp. 115, 117, 118.


Top. sheet Hawthorne.

54. **Hornsilver (Lime Point).** Au, Ag, Pb.

16 miles SW. Cuprite, B. G. R. R.

Granite, Tertiary volcanics.

Veins.


1908, pt. 1, p. 483.

1909, pt. 1, p. 405.

Top. sheet Lida.

55. **Lida (Tule Canyon).** Au, Ag, Pb, Cu.


Cambrian sediments cut by quartz monzonite, and capped by Tertiary volcanics.

Veins and impregnations.


Spurr, J. E., Geology of Nevada south of the fortieth parallel: Bull. 208, 1903, pp. 184-186.


1907, pt. 1, p. 354.
55. **Lida (Tule Canyon)—Continued.**

1909, pt. 1, p. 405.
Top. sheet Lida.

56. **Lone Mountains.** Ag, Pb, Cu, Au.
14 miles NNW. Goldfield, T. & G. R. R.
Cambrian sediments cut by granite and diorite, capped by Tertiary volcanics.
Veins and replacements.
1908, pt. 1, p. 483.
1909, pt. 1, p. 405.
Top. sheet Lida.

57. **Lucky Boy (Hawthorne).** Pb, Ag.
7 miles SW. Thorne, S. P. R. R.
Cambrian sediments cut by granite and diorite.
Veins.
1908, pt. 1, pp. 482, 483.
1909, pt. 1, p. 405.
Top. sheet Hawthorne.

58. **Montezuma.** Au, Ag, Pb, Cu.
Cambrian sediments cut by granite and diorite and capped by Tertiary volcanics.
Veins and replacements.
——— A geologic reconnaissance in southwestern Nevada and eastern California: Bull. 308, 1907, pp. 63-64.
1908, pt. 1, p. 484.
Top. sheet Lida.

59. **Oriental Wash.** Au, Ag, Cu.
Cambrian sediments cut by granite.
Veins.
——— A geologic reconnaissance in southwestern Nevada and eastern California: Bull. 308, 1907, pp. 46, 190-191.
Top. sheet Lida.

60. **Palmetto.** Au, Ag, Pb.
Paleozoic sediments cut by granite.
Veins, contact metamorphic.
1908, pt. 1, p. 484.
Top. sheet Silver Peak.
ESMERALDA AND MINERAL COUNTIES—Continued.

61. Pine Grove. Au, Ag.
   30 miles S. Yerington, N. C. B. R. R.
   1908, pt. 1, p. 484.
   Top. sheet Hawthorne.

62. Rawhide (Regent). Au, Ag.
   28 miles E. Schurz, S. P. R. R.
   Tertiary volcanics.
   Veins.
   1908, pt. 1, pp. 484-485.
   Top. sheet Hawthorne.

63. Santa Fe (Luning). Au, Cu, Ag, Pb, Sb.
   Station S. P. R. R.
   1908, pt. 1, p. 484.
   Top. sheet Hawthorne.

64. Silver Peak (Mineral Ridge). Au, Ag.
   Blair station, S. P. R. R.
   Paleozoic sediments cut by granite and diorite, capped by Tertiary volcanics.
   Veins.
   Spurr, J. E., Ore deposits of Tonopah and neighboring districts, Nevada: Bull. 213, 1902, pp. 85-86.
   1906, p. 294.
   1908, pt. 1, p. 486.
   Top. sheet Silver Peak.

65. Silver Star (Mina, Marietta). Au, Cu, Ag, Pb.
   10 miles W. Mina, S. P. R. R.
   1906, p. 294.
   1907, pt. 1, p. 354.
   1908, pt. 1, p. 486.
   Top. sheet Hawthorne.

   18 miles E. Sodaville, S. P. R. R.
   Tertiary sediments cut by granite and capped by basalt.
   Veins.
   Spurr, J. E., Geology of Nevada south of the fortieth parallel: Bull. 208, 1903, pp. 103-105.
   21528°—Bull. 507—12—14
ESMERALDA' AND MINERAL COUNTIES—Continued.

66. Sodaville (Pilot Mountains)—Continued.
1904, p. 375.
1905, p. 268.
1908, pt. 1, p. 484.
Top. sheet Tonopah.

67. Southern Klondike. Au, Ag, Pb.
14 miles S. Tonopah, T. & G. R. R.
Pre-Cambrian sediments cut by granite and capped by Tertiary volcanics.
Veins.
Spurr, J. E., Ore deposits of Tonopah and neighboring districts, Nevada: Bull. 213, 1903, pp. 86-87.
1906, p. 284.
1909, pt. 1, p. 405.
Top. sheet Lida.

68. Tokop (Gold Mountains). Au, Ag, Cu.
15 miles W. Bonnie Clare, B. G. R. R., L. V. & T. R. R.
Cambrian sediments cut by granite and capped by Tertiary volcanics.
Veins.
—— A geologic reconnaissance in southwestern Nevada and eastern California: Bull. 308, 1907, pp. 188-189.
Ransome, F. L., Preliminary account of Goldfield, Bullfrog, and other mining districts in southern Nevada: Bull. 303, 1907, pp. 80-81.
1906, p. 482.
1909, pt. 1, p. 405.
Top. sheet Lida.

69. Windypah (Fessler). Au, Ag.
25 miles SW. Blair, S. P. R. R.
Paleozoic sediments cut by granite.
Veins.
Top. sheet Silver Peak.

EUREKA COUNTY.

70. Mill Canyon (Buckhorn). Au.
35 miles SSW. Palisade, S. P. R. R., W. P. R. R.
Granodiorite.
Veins.

71. Cortez (Bullion Hill, Mount Tenabo). Pb, Ag, Au, Cu, Zn.
30 miles S. Beowawe, S. P. R. R., W. P. R. R.
Paleozoic sediments cut by granite and porphyries and capped by Tertiary volcanics.
Replacements, veins.
71. Cortez (Bullion Hill, Mount Tenabo)—Continued.

Min. Res. 1905, p. 269.
1906, p. 295.
1907, pt. 1, p. 358.
1908, pt. 1, p. 487.
1909, pt. 1, p. 408.

72. Eureka (Pinto, Prospect, Ruby Hill). Ag, Pb, Au, Cu, Zn, Fe.

Station E. & P. R. R.
Paleozoic sediments, granite porphyry, rhyolite.
Replacements, veins.
—— Silver-lead deposits of Eureka, Nev.: M. VII, 1884.
—— Geology of the Eureka district, Nevada: M. XX, 1892.
Spurr, J. E., Geology of Nevada south of the fortieth parallel: Bull. 208, 1903, pp. 81–84.
Walcott, C. D., Paleontology of the Eureka district: M. VIII, 1884.
Min. Res. 1882, p. 309.
1885, p. 250.
1886, p. 143.
1887, p. 104.
1888, p. 86.
1905, p. 268.
1906, pp. 295, 450.
1907, pt. 1, p. 357.
1908, pt. 1, p. 487.

20 miles NW, Carlin, S. P. R. R., W. P. R. R.
Tertiary volcanics.
Veins.

73. Mineral Hill. Ag, Pb, Au.
5 miles SW, Mineral, E. & P. R. R.
Paleozoic sediments cut by porphyry.
Replacements.
1908, pt. 1, p. 287.

74. Safford. Ag.
6 miles W, Palisade, S. P. R. R., W. P. R. R.
Tertiary volcanics.
MINING DISTRICTS OF WESTERN UNITED STATES.

EUREKA COUNTY—Continued.

74. Safford—Continued.
Veins.

75. Schroeder (Maggie Creek). Pb, Ag, Au, Sb.
9–15 miles NNW. Carlin, S. P. R. R., W. P. R. R.
Paleozoic sediments and Tertiary volcanics.
Veins, replacements.

HUMBOLDT COUNTY.

76. Adelaide (Gold Run). Cu, Ag, Au.
11 miles S. Golconda, S. P. R. R., W. P. R. R.
Triassic sediments cut by granite.
Replacement, contact metamorphic.
1907, pt. 1, p. 359.

77. Browns. W.
2 miles W. Browns station, S. P. R. R.
Sediments cut by granite.
Contact metamorphic.

78. Cedar. Pb, Ag.
20 miles W. Mill City, S. P. R. R., W. P. R. R.

79. Central (Chafey, Dun Glen). Au, Ag, Pb.
10 miles E. Mill City, S. P. R. R., W. P. R. R.
Jurassic sediments, Tertiary volcanics.
Veins.

79a. Disaster. Au. (D, Pl.)
100 miles NNW. Winnemucca, S. P. R. R., W. P. R. R., W. P. R. R.

80. Fitting (American Canyon). Au, Ag, Hg (Pb, Cu, Zn).
28 miles NE. Lovelocks, S. P. R. R., W. P. R. R.
Triassic sediments cut by granodiorite, capped by Tertiary volcanics.
Veins.
Ransome, F. L., Notes on some mining districts in Humboldt County, Nev.: Bull. 414, 1909, p. 35.
1905, p. 269.
1907, pt. 1, p. 359.
1908, pt. 1, p. 489.
81. Golconda. Mn.
   2 miles ESE. Golconda, S. P. R. R., W. P. R. R.
   Tertiary sediments and volcanics.
   Bedded lenses.
   Min. Res. 1885, p. 349.
   1886, p. 197.
   1907, pt. 1, p. 100.
82. Gold Banks. Au, Ag.
   40 miles SSE. Winnemucca, S. P. R. R., W. P. R. R.
   Triassic sediments cut by granite.
   Veins.
   1908, pt. 1, p. 489.
83. Humboldt (Imlay). Ag, Au, Cu, Pb.
   8 miles S. Mill City, S. P. R. R.
   Jurassic sediments cut by granite and capped by Tertiary volcanics.
   Veins.
   Ransome, F. L., Notes on some mining districts in Humboldt County, Nev.: Bull. 414, 1909, p. 46.
   Min. Res. 1905, p. 269.
   1907, pt. 1, p. 360.
   1908, pt. 1, p. 490.
84. Kennedy. Au, Ag.
   70 miles S. Winnemucca, S. P. R. R., W. P. R. R.
   Triassic sediments cut by granite and capped by Tertiary volcanics.
   Veins.
   Ransome, F. L., Notes on some mining districts in Humboldt County, Nev.: Bull. 414, 1909, pp. 52-54.
   Min. Res. 1905, p. 269.
   1907, pt. 1, p. 362.
   1908, pt. 1, p. 490.
84a. Jackson Creek. Cu.
   75 miles NNW. Humboldt, S. P. R. R.; 30 miles N. Sulphur, W. P. R. R.
   Granite and limestone.
   Veins, contact metamorphic.
85. Lovelocks. Ag, Au.
   10 miles W. Lovelocks, S. P. R. R.
86. National. Au, Ag, Sb.
   74 miles N. Winnemucca, S. P. R. R., W. P. R. R.
   Tertiary volcanics.
   Veins.
   Top. sheet Paradise.
87. Spring City (Paradise Valley). Au, Ag.
   44 miles NNE. Winnemucca, S. P. R. R., W. P. R. R.
   Mesozoic metamorphosed slates.
87. Spring City (Paradise Valley)—Continued.
   Veins.
   1908, pt. 1, p. 490.
   Top. sheet Paradise.

88. Rebel Creek (Willow Creek). Au, Ag, Cu.
   54 miles N. Winnemucca, S. P. R. R., W. P. R. R.
   Mesozoic metamorphosed slates, granite.
   Veins.
   1908, pt. 1, p. 490.
   Top. sheet Paradise.

   45 miles NW. Humboldt, S. P. R. R.; 15 miles N. Sulphur, W. P. R. R.
   Gabbro and aplite.
   Veins, disseminations.
   Ransome, F. L., Notes on some mining districts in Humboldt County, Nev.:
   Bull. 414, 1909, p. 27.

89. Rosebud. Ag, Au, sulphur.
   28 miles NW. Humboldt House, 35 miles NW. Mill City, S. P. R. R.; 52
   miles W. Winnemucca, S. P. R. R., W. P. R. R.; Sulphur station, W. P.
   R. R.
   Jurassic sediments and Tertiary volcanics.
   Veins.
   Adams, G. I., The Rabbit Hole sulphur mines near Humboldt House, Nev.:
   Ransome, F. L., Notes on some mining districts in Humboldt County, Nev.:
   1907, pt. 1, p. 362.
   1908, pt. 1, p. 490.
   1909, pt. 1, p. 413.

90. Seven Troughs (Vernon, Mazuma, Farrel). Au, Ag, Cu, Pb.
   32 miles NW. Lovelocks, S. P. R. R.
   Jurassic sediments cut by granite and capped by Tertiary volcanics.
   Veins.
   Ransome, F. L., Notes on some mining districts in Humboldt County, Nev.:
   1907, pt. 1, pp. 360-362.
   1908, pt. 1, pp. 490-491.
   1909, pt. 1, p. 413.

91. Star (Rye Patch, Unionville). Ag, Pb, Au, Cu, Zn, Sb, Ni, Co.
   14 miles S. Mill City, 10 miles E. Rye Patch, S. P. R. R.
   Triassic sediments and Tertiary volcanics.
   Replacements and veins.
   Ransome, F. L., Notes on some mining districts in Humboldt County, Nev.:
   Bull. 414, 1909, pp. 41-49.
   Min. Res. 1905, p. 269.
   1907, pt. 1, p. 360.
   1908, pt. 1, p. 489.
NEVADA.

HUMBOLDT COUNTY—Continued.

91a. Varyville. Au. (Pl.)
120 miles NW. Winnemucca, S. P. R. R., W. P. R. R.

92. Vicksburg (Ashdown). Au, Ag.
120 miles NW. Winnemucca, S. P. R. R., W. P. R. R.
Min. Res. 1905, p. 269.
1906, p. 295.
1908, pt. 1, p. 489.
Top. sheet Disaster.

92a. Winnemucca (Barrett Springs). Au, Ag.
5 miles WNW. Winnemucca, S. P. R. R., W. P. R. R.
Mesozoic metamorphosed slates, diorite.
Veins.

LANDER COUNTY.

93. Battle Mountain. Au, Ag.
10 miles W. Battle Mountain, S. P. R. R., W. P. R. R.
Tertiary volcanics.
Veins.

94. Bullion (Ténabo, Lander). Ag, Au, Pb, Cu.
30 miles SE. Battle Mountain, 25 miles SE. Beowawe, S. P. R. R., W. P. R. R.
Paleozoic sediments capped by Tertiary volcanics.
Veins.
Min. Res. 1906, p. 296.
1907, pt. 1, p. 364.

95. Campbell (Lander). Ag, Pb, Cu.
38 miles SE. Battle Mountain, S. P. R. R., W. P. R. R.
Paleozoic sediments capped by Tertiary volcanics.
Veins.
Min. Res. 1906, p. 286.

96. Cortez (Mill Canyon). Ag, Au, Cu, Pb.
35 miles S. Beowawe, S. P. R. R., W. P. R. R.
Paleozoic sediments cut by acidic and basic rocks.
Replacements, veins.

97. Dean (Lewis, Mud Springs). Ag, Au.
18–22 miles SE. Battle Mountain, S. P. R. R., W. P. R. R.
Paleozoic sediments cut by granite and andesite.
Veins.
LANDER COUNTY—Continued.

98. Galena (Copper Basin, Bannock). Ag, Au, Pb, Cu, Zn.
12 miles SW. Battle Mountain, S. P. R. R., W. P. R. R.
Tertiary volcanics.
Veins.
1883-84, p. 643.
1905, p. 269.
1907, pt. 1, p. 364.
1908, pt. 1, p. 492.

20 miles SW. Battle Mountain, S. P. R. R., W. P. R. R.
Paleozoic sediments cut by diorite and andesite.
Veins.

100. Reese River (Austin). Ag, Au, Pb, Cu, Zn.
Station N. C. R. R.
Paleozoic sediments cut by granite and capped by Tertiary volcanics.
Veins.
Spurr, J. E., Geology of Nevada south of the fortieth parallel: Bull. 208,
1903, pp. 93-97.
Min. Res. 1905, p. 269.
1906, p. 296.
1907, pt. 1, p. 363.
1908, pt. 1, p. 492.

101. Skookum. Ag, Au.
9 miles NW. Austin, N. C. R. R.
Paleozoic sediments cut by granite.
Veins, contact metamorphic.

102. Spencer.
NE. Austin, N. C. R. R.
Paleozoic sediments, Tertiary volcanics.

103. Washington (Kingston). Au (?).
30 miles SSW. Austin, N. C. R. R.
Paleozoic sediments cut by granite.

LINCOLN COUNTY.

104. Bristol. Ag, Cu, Au, Pb.
20 miles NW. Pioche, S. P. L. A. & S. L. R. R.
Paleozoic sediments cut by rhyolite.
Replacements and veins.
Spurr, J. E., Geology of Nevada south of the fortieth parallel: Bull. 208,
1903, p. 42.

8 miles NNW. Caliente, S. P. L. A. & S. L. R. R.
Paleozoic sediments cut by basic dikes.
Veins.
Spurr, J. E., Geology of Nevada south of the fortieth parallel: Bull. 208,
105. **Chief—Continued.**

Top. sheet Pioche.

106. **Comet.** Pb, Ag.
12 miles W. Pioche, S. P. L. A. & S. L. R. R.
Paleozoic sediments cut by porphyry.
Veins and replacements.
Top. sheet Pioche.

107. **Eagle Valley (Fay, State Line).** Au, Ag.
Tertiary volcanics.
Veins.
Min. Res. 1905, p. 270.
1908, pt. 1, p. 493.
Top. sheet Pioche.

108. **Ferguson (Delamar).** Au, Ag.
30 miles WSW. Caliente, S. P. L. A. & S. L. R. R.
Paleozoic quartzite cut by basic dikes.
Replacements and veins.
Min. Res. 1905, p. 270.
1906, p. 296.
1908, pt. 1, p. 493.
Top. sheet Pioche.

109. **Freiberg.** Au, Ag.
75 miles W. Pioche, S. P. L. A. & S. L. R. R.
Rhyolite (?).
Veins.

110. **Geyser.** Ag, Au, Pb.
81 miles S. Ely, N. N. R. R.

111. **Highland Valley.** Pb, Ag, Au, Cu.
7 miles WNW. Pioche, S. P. L. A. & S. L. R. R.
Paleozoic sediments cut by dikes.
Veins, replacements.
Top. sheet Pioche.

112. **Hiko.** Ag, Pb.
60 miles W. Caliente, S. P. L. A. & S. L. R. R.
Paleozoic sediments.
Veins (?).
113. Jackrabbit. Ag, Au, Pb.
   15 miles NW. Pioche, S. P. L. A. & S. L. R. R.
   Paleozoic sediments.
   Replacements.
   1908, pt. 1, p. 493.

114. Lone Mountain. Ag, Pb.
   16 miles W. Pioche, S. P. L. A. & S. L. R. R.
   Paleozoic sediments (?)..
   Veins, replacements.
   Top. sheet Pioche.

115. Patterson. Ag.
   50 miles SSE. Ely, N. N. R. R.

116. Pioche. Ag, Pb, Au, Cu, Zn, Mn.
   Station S. P. L. A. & S. L. R. R.
   Paleozoic sediments cut by quartz porphyry.
   Replacement, veins.
   Spurr, J. E., Geology of Nevada south of the fortieth parallel: Bull. 208, 1903, pp. 38–45.
   Min. Res. 1905, p. 270.
   1906, p. 296.
   1907, pt. 1, p. 367.
   1908, pt. 1, p. 493.
   Top. sheet Pioche.

LYON COUNTY.

   22 miles SW. Wabuska, S. P. R. R.
   Tertiary volcanics.
   Veins.
   Spurr, J. E., Geology of Nevada south of the fortieth parallel: Bull. 208, 1903, pp. 120–123.
   Top. sheet Wabuska.

118. Ramsey. Au, Ag.
   17 miles S. Clarks, S. P. R. R.
   Tertiary volcanics.
   Veins.
   1908, pt. 1, p. 494.
   1909, pt. 1, p. 418.
   Top. sheet Wabuska.

119. Red Mountain. Fe.
   17 miles NE. Dayton, S. P. R. R.
   Triassic sediments cut by granite.
NEVADA.

LYON COUNTY—Continued.

   Contact metamorphic.
   Top. sheet Wabuska.

120. Silver City (Palmyra, Devils Gate). Au, Ag.
   Station V. & T. R. R
   Tertiary volcanics.
   Veins.
   1906, p. 297.
   1907, pt. 1, p. 359.
   1908, pt. 1, p. 494.
   Top. sheet Carson.

121. Talapoosa. Au, Ag (Cu).
   18 miles S. Fernley, S. P. R. R.
   Tertiary volcanics.
   Veins.
   Hill, J. M., Notes on the economic geology of the Ramsey, Talapoosa, and
   White Horse mining districts, in Lyon and Washoe counties Nev.: Bull.
   470, 1911, p. 108.
   Top. sheet Wabuska.

122. Yerington (Mason). Cu (Pb, Au, Ag).
   Station N. C. B. R. R.
   Triassic sediments cut by granite.
   Contact metamorphic.
   99-119.
   Spurr, J. E., Geology of Nevada south of the fortieth parallel: Bull. 208, 1903,
   p. 117.
   1906, pp. 297, 401.
   1907, pt. 1, p. 611, 370.
   1908, pt. 1, pp. 213, 494.
   Top. sheet Wellington.

MINERAL COUNTY. (See ESMERALDA.)

NYE COUNTY.

123. Bare Mountain. Au, Hg.
   7 miles NE. Beaty, B. G. R. R.
   Paleozoic sediments cut by monzonite porphyry and Tertiary volcanics.
   Veins.
   Ball, S. H., Notes on the ore deposits of southwestern Nevada and eastern
   ——— A geologic reconnaissance in southwestern Nevada and eastern Calif­
   Top. sheet Furnace Creek.

124. Bellehelen. Au, Ag.
   50 miles E. Tonopah, T. & G. R. R.
   Tertiary volcanics.
   Veins.
   Spurr, J. E., Geology of Nevada south of the fortieth parallel: Bull. 208, 1903,
   p. 181.
   1908, pt. 1, p. 496.
   1909, pt. 1, p. 419.

125. Belmont (Philadelphia). Ag, Pb, Cu (Hg).
    72 miles NNE. Tonopah, T. & G. R. R.
    Paleozoic sediments cut by granite.
    Veins.
    Becker, G. F., Geology of the quicksilver deposits of the Pacific slope:
    Spurr, J. E., Geology of Nevada south of the fortieth parallel: Bull. 208, 1903,
    pp. 89–93.

126. Berlin (Elsworth). Au, Ag (Cu, Pb, Zn).
    40 miles NE. Luning, S. P. R. R.
    Tertiary volcanics.
    Veins.
    Spurr, J. E., Geology of Nevada south of the fortieth parallel: Bull. 208, 1903,
    1908, pt. 1, p. 496.
    1909, pt. 1, p. 419.
    Top. sheet Tonopah.

    8 miles E. Leeland, T. & T. R. R.
    Cambrian sediments.
    Veins.
    Ball, S. H., A geologic reconnaissance in southwestern Nevada and eastern
    California: Bull. 308, 1907, p. 175.
    Top. sheet Furnace Creek.

    Tertiary volcanics.
    Veins.
    Ball, S. H., Notes on the ore deposits of southwestern Nevada and eastern
    ——— A geologic reconnaissance in southwestern Nevada and eastern Cali­
    fornia: Bull. 308, 1907, p. 110.

129. Bullfrog (Rhyolite). Au, Ag.
    Station B. G. R. R., T. & G. R. R.
    Tertiary volcanics.
    Veins.
    Ransome, F. L., Preliminary account of Goldfield, Bullfrog, and other min­
    ing districts in southern Nevada: Bull. 303, 1907, pp. 40–62.
    ——— Geology and ore deposits of the Bullfrog district, Nevada: Bull. 407,
    1910.
    1906, p. 298.
    1908, pt. 1, pp. 496–497.
    Top. sheets Furnace Creek, Bullfrog special.

    24 miles E. Goldfield, B. G. R. R., L. V. & T. R. R.
130. **Cactus Springs**—Continued.

Tertiary volcanics.


131. **Cloverdale**. Au, Ag.

32 miles E. Luning, S. P. R. R.

Tertiary volcanics.

Veins.


1908, pt. 1, p. 497.


Top. sheet Tonopah.

132. **Eden**. Au.

70 miles E. Tonopah, T. & G. R. R.

Tertiary volcanics.

Veins.


Top. sheet Kawich.

133. **Gold Bar (Happy Hooligan)**. Au, Ag.

3 miles W. Bullfrog, B. G. R. R., L. V. & T. R. R.

Paleozoic sediments, Tertiary rhyolites.

Veins.


— *A geologic reconnaissance in southwestern Nevada and eastern California*: Bull. 308, 1907, p. 178.

Top. sheet Furnace Creek.

134. **Gold Crater**. Au, Cu.


Tertiary volcanics.

Veins.


— *A geologic reconnaissance in southwestern Nevada and eastern California*: Bull. 308, 1907, pp. 139–140.

Top. sheet Kawich.

135. **Golden**. Au, Ag:

40 miles NE. Sodaville, S. P. R. R.


Min. Res. 1907, pt. 1, p. 373.

136. **Goldyke (Atwood)**. Au, Ag, W, Cu, Pb.

32 miles NE. Luning, S. P. R. R.

136. Goldyke (Atwood)—Continued.
   1908, pt. 1, pp. 497, 724.
   Top. sheet Tonopah.

137. Hannapah. Au, Ag.
   20 miles E. Tonopah, T. & G. R. R.
   Tertiary volcanics.
   Veins.
   Spurr, J. E., Ore deposits of Tonopah and neighboring districts, Nevada: Bull.
   213, 1903, p. 87.

   70 miles NNE. Tonopah, T. & G. R. R.
   Paleozoic sediments cut by porphyry.
   Veins.

139. Johnnie. Au, Ag.
   14 miles SSE. Amargosa, L. V. & T. R. R.
   Paleozoic sediments.
   Veins.
   1908, pt. 1, p. 497.
   Top. sheet Furnace Creek.

140. Kawich (Gold Reed). Au.
   Monzonite porphyry and rhyolite.
   Veins.
   Ball, S. H., Notes on the ore deposits of southwestern Nevada and eastern
   ——— A geologic reconnaissance in southwestern Nevada and eastern Cali­
   Spurr, J. E., Geology of Nevada south of the fortieth parallel: Bull. 208, 1903,
   p. 181.
   Top. sheet Kawich.

141. Lodi Valley (Marble). Ag, Au, Pb.
   63 miles NNE. Luning, S. P. R. R.
   Min. Res. 1905, p. 252.
   1906, p. 299.
   1908, pt. 1, p. 497.
   1909, pt. 1, p. 421.
   Top. sheet Tonopah.

142. Manhattan. Au, Ag. (D, Pl.)
   53 miles N. Tonopah, T. & G. R. R.
   Paleozoic sediments cut by granite and diorite and capped by Tertiary
   volcanics.
   Veins and replacements.
   303, 1907, pp. 84-92.
   1906, p. 299.
   1907, pt. 1, pp. 374, 398.
142. Manhattan—Continued.
   1909, pt. 1, p. 421.
   Top. sheet Tonopah.

143. Milletts. Au, Ag, Pb.
   105 miles N. Tonopah, T. & G. R. R.
   Spurr, J. E., Geology of Nevada south of the fortieth parallel: Bull. 208, 1903,
   pp. 93-97.
   1909, pt. 1, p. 421.
   Top. sheet Tonopah.

144. Monte Cristo. Au.
   20 miles ENE. Bonnie Claire, T. & G. R. R.
   Paleozoic sediments cut by granite and Tertiary volcanics.
   Veins.
   Ball, S. H., A geologic reconnaissance of southwestern Nevada and eastern
   California: Bull. 308, 1907, pp. 141-142.
   Top. sheet Kawich.

   80 miles SW. Caliente, S. P. L. A. & S. L. R. R.
   Paleozoic sediments cut by granite and capped by Tertiary volcanics.
   Veins.
   Ball, S. H., Notes on the ore deposits of southwestern Nevada and eastern
   A geologic reconnaissance of southwestern Nevada and eastern California: Bull. 308, 1907, pp. 44, 45, 122-130.
   Top. sheet Kawich.

146. Reveille. Ag, Pb.
   67 miles E. Tonopah, T. & G. R. R.
   Paleozoic sediments cut by dikes.
   Veins.
   Ball, S. H., A geologic reconnaissance in southwestern Nevada and eastern
   Spurr, J. E., Geology of Nevada south of the fortieth parallel: Bull. 208, 1903,
   pp. 161-163.
   1908, pt. 1, p. 498.

147. Round Mountain. Au, Ag, W. (D, Pl.)
   74 miles N. Tonopah, T. & G. R. R.
   Tertiary volcanics.
   Veins, wash gravels.
   Min. Res. 1906, pp. 298-299.
   1907, pt. 1, pp. 373-374.
   1909, pt. 1, p. 421.
   Top. sheet Tonopah.

148. Silverbow. Au, Ag.
   46 miles E. Goldfield, T. & G. R. R.
   Tertiary volcanics.
   Veins.
   Ball, S. H., Notes on the ore deposits of southwestern Nevada and eastern
148. **Silverbow**—Continued.


1908, pt. 1, p. 499.

Top. sheet Kawich.

149. **Stonewall Mountain.** Au.


Paleozoic sediments cut by granite, capped by Tertiary volcanics.

Veins.


Top. sheet Lida.

150. **Superior.** Cu.

35 miles NNE. Tonopah, T. & G. R. R.

151. **Tonopah.** Ag, Au, W.

Station T. & G. R. R.

Tertiary volcanics.

Veins.


—— The ore deposits of Tonopah, Nev. (preliminary report): Bull. 219, 1903.


1906, p. 298.

Top. sheets Tonopah, Tonopah special.

152. **Trappmans (Wilsons).** Ag, Au.


Granite and Tertiary volcanics.

Veins.


—— A geologic reconnaissance in southwestern Nevada and eastern California: Bull. 308, 1907, pp. 138–139.

Top. sheet Kawich.

153. **Tybo (Hot Creek).** Ag, Au, Pb.

111 miles ENE. Tonopah, T. & G. R. R.

Paleozoic sediments and Tertiary volcanics.

Veins, replacements.

Spurr, J. E., Geology of Nevada south of the fortieth parallel: Bull. 208, 1903, pp. 84–87.

Nevada.

Nye County—Continued.

154. Union (Ione). Hg, Au, Ag, Pb.
   60 miles S. Austin, N. C. R. R.
   Tertiary volcanics.
   Veins.
   Min. Res. 1908, pt. 1, p. 692:
   Top. sheet Tonopah.

155. Wellington (O'Briens). Au, Ag.
   20 miles E. Cuprite, B. G. R. R.
   Tertiary volcanics.
   Veins.
   Ball, S. H., Notes on the ore deposits of southwestern Nevada and eastern
   ——— A geologic reconnaissance in southwestern Nevada and eastern Cali-
   fornia: Bull. 308, 1907, pp. 46, 48, 95.
   Top. sheet Kawich.

Storey County.

156. Comstock. Au, Ag.
   Virginia City station, V. & T. R. R.
   Diorite and Tertiary volcanics.
   Veins.
   Becker, G. F., Geology of the Comstock lode and the Washoe district:
   M. III, 1882.
   Lord, E., Comstock mining and miners: M. IV, 1883.
   1906, p. 299.
   1907, pt. 1, pp. 378–381.
   Top. sheet Carson.

Washoe County.

   10 miles NW. Puna, W. P. R. R.
   Min. Res. 1908, pt. 1, p. 503.
   Top. sheet Granite Range.

   Renard station, W. P. R. R.
   Min. Res. 1908, pt. 1, p. 503.
   Top. sheet Granite Range.

158a. Leadville. Pb, Ag.
   100 miles NE. Amedee, Cal., N. C. & O. R. R.; 50 miles NNW. Phil,
   W. P. R. R.
   Tertiary volcanics.
   Veins.

159. Peavine. Au (Ag, Cu).
   10 miles N. Reno, S. P. R. R., V. & T. R. R.
   Schists and granite.
   Veins.
   1906, p. 299.
   1907, pt. 1, p. 382.
   1908, pt. 1, p. 503.

21528°—Bull. 507—12——15
159. **Peavine—Continued.**

Top. sheet Reno.

160. **Sheephead.** Au.
15 miles W. Renard, W. P. R. R.
Top. sheet Granite Range.

161. **Steamboat Springs.** Hg.
Station V. & T. R. R.
Tertiary volcanics.
Impregnations.

162. **Washoe (Galena, Jumbo).** Pb, Au, Ag, Zn.
5 miles W. Virginia City, V. & T. R. R.
Granite.
Veins.
Min. Res. 1906, p. 299.
1907, pt. 1, p. 382.
Top. sheet Carson.

163. **Wedekind.** Ag, Au.
4 miles NE. Reno, S. P. R. R.
Tertiary volcanics.
Veins and replacements.
Top. sheet Reno.

164. **White Horse (Olinghouse).** Au, Ag.
9 miles W. Wadsworth, S. P. R. R.
Tertiary volcanics.
Veins.
1906, pp. 299-300.
1907, pt. 1, p. 382.
1908, pt. 1, p. 503.
Top. sheet Wadsworth.

**WHITE PINE COUNTY.**

165. **Aurum (Silver Canyon, Siegel).** Ag (Au).
36 miles SE. Cherry Creek, 10 miles E. Melvin, N. N. R. R.
Paleozoic sediments (?).
Veins and replacements.
Spurr, J. E., Geology of Nevada south of the fortieth parallel: Bull. 208, 1903, pp. 38-47.

166. **Black Horse.** Au (Ag).
49 miles SE. Ely, N. N. R. R.
Paleozoic sediments cut by granite porphyry.
NEVADA.

WHITE PINE COUNTY—Continued.

166. **Black Horse**—Continued.

Veins.

Min. Res. 1905, p. 274.
1906, p. 300.
1907, pt. 1, p. 383.

167. **Ely (Robinson)**. Cu, Au, Ag, Pb.

Station N. N. R. R.

Paleozoic sediments cut by monzonite porphyry.
Disseminated, veins, contact metamorphic.

Spurr, J. E., Geology of Nevada south of the fortieth parallel: Bull. 208, 1903, pp. 47-54.


1906, p. 300.

Top. sheet Ely special.

168. **Gold Canyon (Cherry Creek)**. Au, Ag.

5 miles W. Cherry Creek, N. N. R. R.

Paleozoic sediments.

Veins.

Spurr, J. E., Geology of Nevada south of the fortieth parallel: Bull. 208, 1903, pp. 47-54.

1906, p. 303.
1907, pt. 1, p. 382.
1908, pt. 1, p. 504.

169. **Hunter**. Pb, Cu, Ag.

10 miles SW. Granite, N. N. R. R.

Paleozoic sediments (?).

Veins (?).

Spurr, J. E., Geology of Nevada south of the fortieth parallel: Bull. 208, 1903, pp. 47-54.

Min. Res. 1906, p. 300.

170. **Newark (Strawberry)**. Ag, Pb, Cu, Au.

29 miles NNE. Eureka, E. & P. R. R.

Paleozoic sediments (?).

Veins (?).

Spurr, J. E., Geology of Nevada south of the fortieth parallel: Bull. 208, 1903, pp. 77-84.

Min. Res. 1905, p. 274.
1906, p. 300.
1907, pt. 1, p. 384.
1908, pt. 1, p. 505.

171. **Osceola (Tungsten)**. Au, W.

40 miles SE. Ely, N. N. R. R.

Paleozoic sediments cut by granite porphyry.

Veins.
228 MINING DISTRICTS OF WESTERN UNITED STATES.

WHITE PINE COUNTY—Continued.

171. Osceola (Tungsten)—Continued.
Spurr, J. E., Geology of Nevada south of the fortieth parallel: Bull. 208, 1903, pp. 25-36.
1905, p. 274.
1907, pt. 1, p. 383.
1908, pt. 1, pp. 505, 725.

50 miles E. Cherry Creek, N. N. R. R.
Granite and porphyry (?).
Veins.

173. Schellbourne.
18 miles SE. Cherry Creek, N. N. R. R.
Spurr, J. E., Geology of Nevada south of the fortieth parallel: Bull. 208, 1903, pp. 38-47.

174. Steptoe (Granite). Au, Ag, Pb.
5 miles W. Granite, N. N. R. R.
Paleozoic sediments.
Veins.
Spurr, J. E., Geology of Nevada south of the fortieth parallel: Bull. 208, 1903, pp. 47-54.

175. Ward (Taylor). Ag, Pb.
16 miles S. Ely, N. N. R. R.
Paleozoic sediments cut by monzonite porphyry.
Veins, contact metamorphic.
Spurr, J. E., Geology of Nevada south of the fortieth parallel: Bull. 208, 1903, pp. 47-54.
1908, pt. 1, pp. 505-506.
1909, pt. 1, p. 430.

176. White Pine (Hamilton). Pb, Ag, Cu, Au, Zn.
30 miles W. Ely, N. N. R. R.
Paleozoic sediments cut by granodiorite and monzonite.
Veins, replacements.
Spurr, J. E., Geology of Nevada south of the fortieth parallel: Bull. 208, 1903, pp. 61-68.
1906, p. 300.
1908, pt. 1, p. 505.
1909, pt. 1, p. 430.
NEW MEXICO.

In the State of New Mexico there are at the present time 15 counties in which mining is carried on. In these counties 85 mining districts are recognized by the United States Geological Survey. In 27 of these districts copper is the principal metal produced, in 26 gold predominates, in 16 silver, in 11 lead, in 2 zinc, and in 3 iron.

Distribution of the predominant metals produced in the mining districts of New Mexico.

<table>
<thead>
<tr>
<th>County</th>
<th>Gold</th>
<th>Silver</th>
<th>Copper</th>
<th>Lead</th>
<th>Zinc</th>
<th>Iron</th>
<th>Total</th>
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MINING DISTRICTS IN NEW MEXICO.

[See Pl. X. Additional references will be found in Mineral Resources for 1910 and 1911.]

BERNALILLO COUNTY.

1. Tijeras Canyon. Cu.
   18 miles NE. Albuquerque, A. T. & S. F. R. R.
   Granite.
   Veins.
   Lindgren, W., The ore deposits of New Mexico: P. P. 68, 1910, p. 163.
   Min. Res. 1905, p. 279.
   Top. sheet San Pedro.

COLLAX COUNTY.

   12 miles S. Ute Park, St. L. R. M. & P. R. R.
   Carboniferous and Cretaceous sediments cut by monzonite.
   Contact metamorphic.
   Lindgren, W., The ore deposits of New Mexico: P. P. 68, 1910, p. 105.

3. Moreno (Elizabethtown). Au, Ag, Cu. (D, Pl.)
   12 miles W. Ute Park, St. L. R. M. & P. R. R.
   Paleozoic and Cretaceous sediments cut by monzonite porphyry.
   Veins, contact metamorphic, wash gravels.
   Lindgren, W., The ore deposits of New Mexico: P. P. 68, 1910, pp. 18, 32, 36, 41, 51-54, 57-59, 60, 75, 92-105.
   Min. Res. 1905, p. 279.
   1906, p. 305.
   1907, pt. 1, p. 405.
   1908, pt. 1, p. 511.
4. **Ponil.** Au. (PI.)
   Station St. L. R. M. & P. R. R.
   Wash gravels.
   Lindgren, W., The ore deposits of New Mexico: P. P. 68, 1910, pp. 75, 92, 97.
   Min. Res. 1905, p. 279.
   1907, pt. 1, p. 405.

5. **Ute Creek (Baldy).** Au. (D, PI.)
   6 miles N. Ute Park, St. L. R. M. & P. R. R.
   Paleozoic and Cretaceous sediments cut by monzonite.
   Veins, wash gravels.
   Min. Res. 1906, p. 279.
   1907, pt. 1, p. 405.
   1908, pt. 1, p. 511.

**DONA ANA COUNTY.**

6. **Black Mountain (Kent).** Au, Ag.
   25 miles NE. Las Cruces, A. T. & S. F. R. R.
   Paleozoic sediments cut by monzonite.
   Contact metamorphic, veins.
   Lindgren, W., The ore deposits of New Mexico: P. P. 68, 1910, pp. 86, 87, 209.
   Min. Res. 1905, p. 279.
   Top. sheet Las Cruces.

7. **Hembrillo.** Cu.
   45 miles NNE. Las Cruces, A. T. & S. F. R. R.
   Lindgren, W., The ore deposits of New Mexico: P. P. 68, 1910, p. 205.

8. **Modoc.** Pb, Ag.
   20 miles W. Las Cruces, A. T. & S. F. R. R.
   Paleozoic sediments cut by andesite.
   Contact metamorphic.
   Min. Res. 1905, p. 279.
   Top. sheet Las Cruces.

9. **Organ.** Pb, Ag, Cu.
   15 miles NE. Las Cruces, A. T. & S. F. R. R., stage line.
   Paleozoic sediments cut by quartz monzonite.
   Veins, contact metamorphic, replacements.
   Keyes, C. R., Geology and underground water conditions of the Jornada del Muerto, New Mexico: W. S. P. 123, 1905, p. 23.
   Min. Res. 1905, p. 279.
   1906, p. 306.
   1907, pt. 1, p. 405.
   1908, pt. 1, p. 512.
   Top. sheet Las Cruces.
LIST OF MINING DISTRICTS

BERNALILLO COUNTY
1. Tijeras Canyon
2. Cimarroncito
3. Moreno (Elizabethtown)
4. Penix
5. Ute Creek (Baldey)
6. Black Mountain (Kent)
7. Hembrillo
8. Modoc
9. Organ
10. Texas Creek

COLFAX COUNTY
11. Apache No. 9 (Anderson)
12. Black Hawk
13. Burro Mountains (Cow Springs)
14. Carpenter
15. Central
16. Chloride Flat (Silver City)
17. Fiero
18. Georgetown (Mimbres)
19. Gold Hill
20. Granada Gap (San Simon)
21. Hachita (Eureka, Sylvanite)
22. Kimball (Steins Pass)
23. Lone Mountain
24. Pinos Allos
25. Pyramid (Lordsburg)
26. Red Hill
27. Santa Rita (Hanover)
28. Steeplerock
29. Telegraph
30. Virginia (Lordsburg)
31. Cedar Creek (Alto)
32. Estey (Oscuro)
33. Gallinas
34. Jicarilla
35. Nogal (Bonita, Parsons)
36. Whiteoak

SAN MIGUEL COUNTY
37. Apache No. 2 (Anderson)
38. Glorieta
39. Kingsport (Black Range)
40. Lake Valley
41. Pittsburg (Shandon)
42. Tierra Blanca (Bromide No. 1)

DONA ANA COUNTY
43. Black Mountain (Kent)
44. Hembreillo
45. Modoc
46. Organ
47. Texas Creek

SANTA FE COUNTY
48. Cooper (Pecos)
49. Omitted
50. Red Hill
51. Sonora
52. Steeplerock
53. Telegraph
54. Virginia (Lordsburg)

GRANT COUNTY
55. Apache No. 2 (Anderson)
56. Black Hawk
57. Carpenter
58. Central
59. Chloride Flat (Silver City)
60. Fiero
61. Georgetown (Mimbres)
62. Gold Hill
63. Granada Gap (San Simon)
64. Hachita (Eureka, Sylvanite)
65. Kimball (Steins Pass)
66. Lone Mountain
67. Pinos Allos
68. Pyramid (Lordsburg)
69. Red Hill
70. Santa Rita (Hanover)
71. Steeplerock
72. Telegraph
73. Virginia (Lordsburg)
74. Whiteoak

SANDOVAL COUNTY
75. Abiquiu
76. Black Hawk
77. Carpenter
78. Central
79. Chloride Flat (Silver City)
80. Fiero
81. Georgetown (Mimbres)
82. Gold Hill
83. Granada Gap (San Simon)
84. Hachita (Eureka, Sylvanite)
85. Kimball (Steins Pass)
86. Lone Mountain
87. Pinos Allos
88. Pyramid (Lordsburg)
89. Red Hill
90. Santa Rita (Hanover)
91. Steeplerock
92. Telegraph
93. Virginia (Lordsburg)

LINCOLN COUNTY
94. Abiquiu
95. Black Hawk
96. Carpenter
97. Central
98. Chloride Flat (Silver City)
99. Fiero
100. Georgetown (Mimbres)
101. Gold Hill
102. Granada Gap (San Simon)
103. Hachita (Eureka, Sylvanite)
104. Kimball (Steins Pass)
105. Lone Mountain
106. Pinos Allos
107. Pyramid (Lordsburg)
108. Red Hill
109. Santa Rita (Hanover)
110. Steeplerock
111. Telegraph
112. Virginia (Lordsburg)

OTERO COUNTY
113. Chloride Flat (Silver City)
114. Fiero
115. Georgetown (Mimbres)
116. Gold Hill
117. Granada Gap (San Simon)
118. Hachita (Eureka, Sylvanite)
119. Kimball (Steins Pass)
120. Lone Mountain
121. Pinos Allos
122. Pyramid (Lordsburg)
123. Red Hill
124. Santa Rita (Hanover)
125. Steeplerock
126. Telegraph
127. Virginia (Lordsburg)

SOCONDO COUNTY
128. Chloride Flat (Silver City)
129. Fiero
130. Georgetown (Mimbres)
131. Gold Hill
132. Granada Gap (San Simon)
133. Hachita (Eureka, Sylvanite)
134. Kimball (Steins Pass)
135. Lone Mountain
136. Pinos Allos
137. Pyramid (Lordsburg)
138. Red Hill
139. Santa Rita (Hanover)
140. Steeplerock
141. Telegraph
142. Virginia (Lordsburg)

TAOS COUNTY
143. Chloride Flat (Silver City)
144. Fiero
145. Georgetown (Mimbres)
146. Gold Hill
147. Granada Gap (San Simon)
148. Hachita (Eureka, Sylvanite)
149. Kimball (Steins Pass)
150. Lone Mountain
151. Pinos Allos
152. Pyramid (Lordsburg)
153. Red Hill
154. Santa Rita (Hanover)
155. Steeplerock
156. Telegraph
157. Virginia (Lordsburg)

VALLENCIA COUNTY
158. Chloride Flat (Silver City)
159. Fiero
160. Georgetown (Mimbres)
161. Gold Hill
162. Granada Gap (San Simon)
163. Hachita (Eureka, Sylvanite)
164. Kimball (Steins Pass)
165. Lone Mountain
166. Pinos Allos
167. Pyramid (Lordsburg)
168. Red Hill
169. Santa Rita (Hanover)
170. Steeplerock
171. Telegraph
172. Virginia (Lordsburg)

LEGEND
- Gold predominant
- Copper predominant
- Silver predominant
- Lead predominant
- Iron predominant
- Zinc predominant

MAP OF NEW MEXICO, SHOWING LOCATION OF MINING DISTRICTS

Scale 1:500,000
APPROXIMATELY 40 MILES TO 1 INCH

100 Miles

1972
10. **Texas Creek.** Au, Ag.
   Quartz monzonite.
   Veins.
   Lindgren, W., *The ore deposits of New Mexico:* P. P. 68, 1910, pp. 51–53, 57, 58, 60, 64, 205–213.
   Min. Res. 1905, p. 279.
   1906, p. 512.

**GRANT COUNTY.**

11. **Apache No. 2 (Anderson).** Cu (Au, Ag, W).
   6 miles SSE. Hachita, E. P. & S. W. R. R.
   Paleozoic sediments cut by quartz monzonite.
   Contact metamorphic.
   1908, pt. 1, pp. 513–726.
   1909, pt. 1, p. 437.

12. **Black Hawk.** Ag.
   15 miles W. Silver City, A. T. & S. F. R. R.
   Gneiss cut by monzonite and diorite.
   Veins.

13. **Burro Mountains (Cow Springs).** Cu.
   12 miles SW. Silver City, A. T. & S. F. R. R., stage.
   Pre-Cambrian granite and diorite cut by monzonite.
   Veins, replacements, and stockworks.
   Paige, S., *Metalliferous ore deposits near the Burro Mountains, Grant County, N. Mex.:* Bull. 470, 1911, pp. 131–150.
   1908, pt. 1, pp. 214, 513.
   Top. sheet Silver City.

14. **Carpenter.** Pb, Zn.
   12 miles E. Fierro, A. T. & S. F. R. R.
   Paleozoic sediments cut by granite porphyry and capped by rhyolite and andesite.
   Veins.
   Lindgren, W., *The ore deposits of New Mexico:* P. P. 68, 1910, pp. 37, 64, 65, 218, 268, 272.

15. **Central.** Cu, Pb, Ag (Zn).
   7 miles E. Silver City, A. T. & S. F. R. R., stage.
   Cretaceous sediments cut by quartz monzonite porphyry.
15. **Central—Continued.**

Veins.


1906, p. 307.

1907, pt. 1, pp. 407–408.

1908, pt. 1, p. 513.

1909, pt. 1, p. 437.

Top. sheets Silver City, Santa Rita special.

16. **Chloride Flat (Silver City).** Ag, Pb.

Station A. T. & S. F. R. R.

Paleozoic sediments cut by quartz monzonite porphyry.

Replacements.

Lindgren, W., *The ore deposits of New Mexico*: P. P. 68, 1910, pp. 18, 26, 38, 63–65, 301–305.


1906, p. 307.

1907, pt. 1, p. 408.

1908, pt. 1, p. 514.

1909, pt. 1, p. 437.

Top. sheet Silver City.

17. **Fierro.** Fe, Cu.

Station A. T. & S. F. R. R.

Paleozoic sediments cut by quartz monzonite porphyry.

Contact metamorphic.


1908, pt. 1, p. 513.

Top. sheet Silver City.

18. **Georgetown (Mimbres).** Ag (Pb).

11½ miles NE. Santa Rita, A. T. & S. P. R. R., stage.

Paleozoic sediments cut by quartz monzonite porphyry.

Veins and replacements.


Top. sheet Silver City.

19. **Gold Hill.** Au.

12 miles NE. Lordsburg, S. P. R. R.

Pre-Cambrian gneiss cut by granite and diabase.

Veins.


20. **Granite Gap (San Simon).** Pb, Ag (Cu, Au).


Granite, Paleozoic sediments cut by granite porphyry.

Replacements, contact metamorphic.
GRANT COUNTY—Continued.

20. Granite Gap (San Simon)—Continued.
1906, p. 307.
1909, pt. 1, p. 437.

12 miles SW. Hachita, E. P. & S. W. R. R., stage.
Paleozoic sediments cut by quartz monzonite and kersantite.
Veins, contact metamorphic.
Lindgren, W., The ore deposits of New Mexico: P. P. 68, 1910, pp. 18, 55, 56, 57-58, 59, 60, 335-343.
1906, p. 307.
1907, pt. 1, pp. 407, 408.
1908, pt. 1, p. 514.
1909, pt. 1, p. 437.

22. Kimball (Steins Pass). Ag, Au, Cu.
Steins station, S. P. R. R.
Diorite porphyry and rhyolite.
Veins.
1906, p. 307.
1907, pt. 1, p. 408.

23. Lone Mountain. Ag.
6 miles E. Silver City, A. T. & S. F. R. R.
Paleozoic sediments cut by quartz monzonite and granite porphyry.
Replacements.

24. Pinos Altos. Cu, Au, Pb, Ag, Zn. (D, Pl.)
8 miles NNE. Silver City, A. T. & S. F. R. R., stage.
Paleozoic sediments cut by granodiorite and diorite.
Veins, replacements.
Lindgren, W., The ore deposits of New Mexico: P. P. 68, 1910, pp. 18, 35, 38, 43, 57-58, 59, 61, 62, 64, 75, 297-301.
1907, pt. 1, p. 408.
1908, pt. 1, pp. 514-515.
Top. sheet Silver City.

25. Pyramid (Lordsburg). Ag, Cu, Mo.
8 miles S. Lordsburg, S. P. R. R.
Diorite cut by andesite.
Veins.
25. **Pyramid (Lordsburg)—Continued.**


1906, p. 307.
1907, pt. 1, p. 408.
1908, pt. 1, p. 514.
1909, pt. 1, p. 437.

26. **Red Hill.** Pb, Ag, Au, Cu.

15 miles S. Playas, E. P. & S. W. R. R.

1906, p. 307.
1907, pt. 1, p. 408.
1908, pt. 1, p. 515.

27. **Santa Rita (Hanover).** Cu, Fe.

Station A. T. & S. F. R. R.

Paleozoic and Cretaceous sediments cut by quartz monzonite porphyry and capped by rhyolite.

Veins, contact metamorphic.


1887, p. 76.
1907, pt. 1, pp. 408, 613.

Top. sheets Silver City, Santa Rita special.

28. **Steeplerock.** Au, Ag.

16 miles NE. Duncan, Ariz., A. & N. M. R. R.

Diorite porphyry and rhyolite.

Veins.


Min. Res. 1907, pt. 1, p. 408.
1908, pt. 1, p. 515.

29. **Telegraph.** Ag.

25 miles NW. Silver City, A. T. & S. F. R. R.

Pre-Cambrian granite and gneiss and Paleozoic sediments.

Veins.


30. **Virginia (Lordsburg).** Ag, Cu (Au).

3 miles SSW. Lordsburg, S. P. R. R.

Diorite cut by andesite.
NEW MEXICO.

GRANT COUNTY—Continued.

30. Virginia (Lordsburg)—Continued.

Veins.


1908, pt. 1, p. 514.


LINCOLN COUNTY.

31. Cedar Creek (Alto). Ag (Cu, Au).

10 miles W. Capitan, E. P. & S. W. R. R.


15 miles WNW. Oscuro, E. P. & S. W. R. R.

"Red Beds."

Disseminated.


Min. Res. 1907, pt. 1, p. 413.

1908, pt. 1, p. 519.

32. Gallinas. Au. (Pl.)

5 miles W. Corona, E. P. & S. W. R. R.

Wash gravels.

Lindgren, W., The ore deposits of New Mexico: P. P. 68, 1910, p. 176.


33. Jicarilla. Au, Ag. (Pl, D.)

8 miles ESE. Ancho, E. P. & S. W. R. R.

Quartz monzonite cut by diorite.

Veins.


1908, pt. 1, p. 515.


34. Nogal (Bonita, Parsons). Au, Ag.

12-20 miles ESE. Carrizozo, E. P. & S. W. R. R., stage.

Monzonite porphyry and diorite.

Veins.


1906, p. 308.

1907, pt. 1, p. 409.

1908, pt. 1, p. 515.


35. Whiteoaks. Au, Ag. (D, Pl.)

12 miles NE. Carrizozo, E. P. & S. W. R. R.

Cretaceous sediments cut by monzonite.
35. **Whiteoaks**—Continued.
Veins.
1906, p. 308.
1907, pt. 1, p. 409.

**LUNA COUNTY.**

36. **Cooks Peak.** Pb, Ag, Au, Zn.
17 miles W. Nutt, A. T. & S. F. R. R.
Paleozoic sediments cut by granodiorite porphyry.
Replacements.
1906, p. 308.
1907, pt. 1, p. 409.
1908, pt. 1, p. 516.
Top. sheet Deming.

37. **Florida Mountains.** Ag, Pb (Cu, Au).
12 miles SE. Deming, S. P. R. R., A. T. & S. F. R. R.
Granite porphyry, andesite, and limestone.
Replacements.
1906, p. 308.
1907, pt. 1, p. 409.
1908, pt. 1, p. 516.
Top. sheet Deming.

38. **Fremont.** Pb, Ag.
15 miles SE. Hachita, E. P. & S. W. R. R.
Paleozoic sediments cut by granite porphyry and kersantite.
Veins and replacement.
Lindgren, W., *The ore deposits of New Mexico*: P. P. 68, 1910, pp. 58, 60, 345–348.

39. **Tres Hermanas.** Zn, Pb, Au, Ag.
Paleozoic sediments cut by quartz syenite porphyry.
Veins, contact metamorphic.
1906, p. 308.
1908, pt. 1, p. 516.
40. Victorio (Gage). Pb, Ag, Au, W.
Station S. P. R. R.
Limestone capped by andesite.
Veins, replacements.
Lindgren, W., The ore deposits of New Mexico: P. P. 68, 1910, pp. 18, 43,
62, 63, 64, 287, 290–292.
Min. Res. 1906, p. 308.
1907, pt. 1, p. 409.
1908, pt. 1, pp. 516, 726.
Top. sheet Deming.

LUNA COUNTY—Continued

OTERO COUNTY.

41. Highrolls. Cu, Ag.
2 miles N. Mountain Park, E. P. & S. W. R. R.
42. Jarilla (Orogrande, Silver Hill, Brice). Au, Ag, Cu (Pb). (D, Pl.)
Brice station, E. P. & S. W. R. R.
Paleozoic sediments cut by monzonite porphyry.
Contact metamorphic and veins.
Lindgren, W., The ore deposits of New Mexico: P. P. 68, 1910, pp. 19, 35,
56, 60, 75, 184–187.
Weed, W. H., The copper mines of the United States in 1905: Bull. 285,
1906, p. 118.
1906, p. 309.
1908, pt. 1, pp. 516–517.

43. Tularosa. Cu, Ag.
13 miles ENE. Monterey, E. P. & S. W. R. R.
Paleozoic and Mesozoic sediments, diorite.
Veins, disseminations.
Lindgren, W., The ore deposits of New Mexico: P. P. 68, 1910, pp. 77, 78,
184, 187–190.
1906, p. 309.
1907, pt. 1, p. 410.
1908, pt. 1, p. 517.

RIOT ARRIBA COUNTY.

44. Abiquiu. Cu.
19 miles NW. Chamita, D. & R. G. R. R., stage.
"Red Beds."
Disseminations.
Emmons, S. F., The copper in the red beds of the Colorado Plateau region:
Lindgren, W., The ore deposits of New Mexico: P. P. 68, 1910, pp. 75, 77,
124, 149.
45. Bromide. Cu, Au, Ag.
12 miles W. Tres Piedras, D. & R. G. R. R.
Pre-Cambrian schist.
RIO ARRIBA COUNTY—Continued.

45. Bromide—Continued.
Veins.
Lindgren, W., The ore deposits of New Mexico: P. P. 68, 1910, pp. 49, 50, 51, 124, 126, 130–133.
1907, pt. 1, p. 410.
1908, pt. 1, p. 517.

46. Gallina. Cu, Pb, Ag.
65 miles WNW. Chamita, D. & R. G. R. R.
"Red Beds."
Disseminated.
Lindgren, W., The ore deposits of New Mexico: P. P. 68, 1910, pp. 147–148.

47. Hopewell (Headstone). Au, Ag, Cu. (D, Pl.)
20 miles WNW. Tres Piedras, D. & R. G. R. R.
Pre-Cambrian schists.
Veins, wash gravels.
1907, pt. 1, p. 410.
1908, pt. 1, p. 517.

SANDOVAL COUNTY.

27 miles WNW. Domingo, A. T. & S. F. R. R.
Monzonite and rhyolite porphyry.
Veins, replacements.
Lindgren, W., The ore deposits of New Mexico: P. P. 68, 1910, pp. 68, 69, 70, 71, 141, 150–158.
1907, pt. 1, p. 411.
Top. sheet Jemez.

"Red Beds."
Disseminations.
1906, p. 309.
Top. sheet Jemez.

8 miles ESE. Bernalillo, A. T. & S. F. R. R.
Paleozoic sediments.
Replacements.
Lindgren, W., The ore deposits of New Mexico: P. P. 68, 1910, p. 141.
Top. sheet San Pedro.
NEW MEXICO. 239

SAN MIGUEL COUNTY.

51. Cooper (Pecos). Cu, Au, Ag.
   21 miles NNE. Glorieta, A. T. & S. F. R. R.
   Pre-Cambrian schists.
   Disseminated.
   Lindgren, W., The ore deposits of New Mexico: P. P. 68, 1910, pp. 112-114.
   1906, p. 309.
   1907, pt. 1, p. 411.
   Top. sheet Santa Fe.

52. Omitted.

   20 miles WNW. Las Vegas, A. T. & S. F. R. R.
   Top. sheet Las Vegas.

54. Rociada. Au, Ag, Cu (Pb, Zn).
   29 miles NNW. Las Vegas, A. T. & S. F. R. R.
   Pre-Cambrian gneiss and schist and Paleozoic sediments.
   Veins.
   Top. sheet Las Vegas.

55. Tecolote (Salitre, San Pablo). Cu.
   12 miles SE. Las Vegas, 10 miles N. Bernal, A. T. & S. F. R. R.
   Upper Carboniferous and Cretaceous sediments.
   Disseminated.
   Lindgren, W., The ore deposits of New Mexico: P. P. 68, 1910, pp. 77, 109, 116-123.
   1906, p. 309.
   1907, pt. 1, p. 411.
   Top. sheets Las Vegas, Bernal.

SANTA FE COUNTY.

56. Cerrillos. Pb, Ag, Cu, Au.
   Station A. T. & S. F. R. R.
   Cretaceous sediments cut by monzonite porphyry.
   Veins.
   Clarke, F. W., and Diller, J. S., Turquoise from New Mexico: Bull. 42, 1887, p. 39.
   Lindgren, W., The ore deposits of New Mexico: P. P. 68, 1910, pp. 35, 36, 39, 57, 58, 60, 163-167.
   1906, p. 309.
   1907, pt. 1, p. 411.
   1908, pt. 1, p. 517.
   Top. sheet San Pedro.

57. Glorieta. Fe.
   2 miles S. Fox Siding, A. T. & S. F. R. R.
   Cretaceous sandstone.
   Beds.
   Lindgren, W., The ore deposits of New Mexico: P. P. 68, 1910, pp. 77, 107, 111-112.
SANTA FE COUNTY—Continued.

58. New Placers. Au. (Pl.)
20 miles S. Cerrillos, A. T. & S. F. R. R.
Wash gravels.
Lindgren, W., The ore deposits of New Mexico: P. P. 68, 1910, pp. 17, 75,
76, 163, 164, 170–175.
1906, p. 309.
1907, pt. 1, pp. 411, 613.
1908, pt. 1, p. 517.
Top. sheet San Pedro.

59. Old Placers (Ortiz, Dolores). Au. (D, Pl.)
15 miles S. Cerrillos, A. T. & S. F. R. R.
Monzonite porphyry and diorite.
Contact metamorphic, veins.
Lindgren, W., The ore deposits of New Mexico: P. P. 68, 1910, pp. 17, 75,
76, 167–169.
Top. sheet San Pedro.

20 miles S. Cerrillos, A. T. & S. F. R. R.
Paleozoic and Cretaceous sediments cut by porphyry.
Contact metamorphic, veins.
Lindgren, W., The ore deposits of New Mexico: P. P. 68, 1910, pp. 51–53,
55, 57–58, 60, 62, 64, 171–174.

SIERRA COUNTY.

60. Caballos Mountains. Cu, Ag, Pb (Au, V). (D, Pl.)
15 miles NW. Rincon, A. T. & S. F. R. R.
Carboniferous sediments.
Veins, disseminations.
Hess, F. L., Vanadium in the Sierra de los Caballos, New Mexico: Bull. 530,
1912.
Lindgren, W., The ore deposits of New Mexico: P. P. 68, 1910, pp. 27, 28,
29, 30, 74, 218, 229, 238, 283–285.

Paleozoic sediments capped by andesite and rhyolite.
Veins.
Lindgren, W., The ore deposits of New Mexico: P. P. 68, 1910, pp. 18, 55,
68–71, 218, 260–266.
1906, pp. 309–310.
1907, pt. 1, p. 412.

35 miles W. Engle, A. T. & S. F. R. R.
Paleozoic sediments capped by andesite and rhyolite.
Veins and replacements.
Lindgren, W., The ore deposits of New Mexico: P. P. 68, 1910, pp. 18, 55,
1908, pt. 1, p. 518.
NEW MEXICO.

SIERRA COUNTY—Continued.

63. Hillsboro (Las Animas). Au, Ag, Cu, V, Mg, Fe. (D, Pl.)
   18 miles N. Lake Valley, A. T. & S. F. R. R.
   Paleozoic sediments cut by monzonite porphyry and capped by andesite.
   Veins and replacements.
   Lindgren, W., The ore deposits of New Mexico: P. P. 68, 1910, pp. 18, 30,
   31, 37, 39, 43, 62, 64, 65, 68, 69, 70, 75, 214, 218, 227-228, 238, 239, 272-276,
   277.
   Weed, W. H., The copper-mines of the United States in 1905: Bull. 285, 1906,
   p. 118.
   Min. Res. 1887, p. 76.
   1905, p. 282.
   1906, p. 310.
   1907, pt. 1, p. 412.
   1908, pt. 1, p. 518.

64. Kingston (Black Range). Ag, Pb, Cu.
   27 miles NNW. Lake Valley, A. T. & S. F. R. R.
   Pre-Cambrian granite, gneiss, and schist, flanked by Paleozoic sediments and
capped by andesite and rhyolite.
   Replacements, veins.
   Harder, E. C., Manganese deposits of the United States: Bull. 380, 1909,
p. 274.
   Lindgren, W., The ore deposits of New Mexico: P. P. 68, 1910, pp. 18, 34,
   37, 62, 65, 218, 224, 225, 226, 228, 232, 245, 268-270.
   1907, pt. 1, p. 412.
   1908, pt. 1, p. 518.

65. Lake Valley. Ag, Pb, Mn, Au, Cu.
   Station A. T. & S. F. R. R.
   Paleozoic sediments capped by andesite and rhyolite.
   Replacement, veins.
   Lindgren, W., The ore deposits of New Mexico: P. P. 68, 1910, pp. 18, 30,
   31, 43, 62, 63, 64, 66, 218, 227, 228, 276-282.

66. Pittsburg (Shandon). Au. (Pl.)
   15 miles NW. Rincon, A. T. & S. F. R. R.
   Wash gravels.
   Lindgren, W., The ore deposits of New Mexico: P. P. 68, 1910, pp. 19, 218,
   282-284.
   1906, p. 310.

67. Tierra Blanca (Bromide No. 1). Ag, Pb, Au.
   15 miles NW. Lake Valley, A. T. & S. F. R. R.
   Paleozoic sediments capped by andesite and rhyolite and cut by monzonite.
   Replacement, veins.
   Lindgren, W., The ore deposits of New Mexico: P. P. 68, 1910, pp. 37, 64,
   66, 218, 268-271.
   1906, p. 310.

21528°—Bull. 507—12——16
SOCORRO COUNTY.

68. Canyoncito. Pb, Cu.
7 miles SE. La Joya, A. T. & S. F. R. R.
Pre-Cambrian granite, gneiss, and schist, Paleozoic sediments cut by aplite.
Veins.
Lindgren, W., The ore deposits of New Mexico: P. P. 68, 1910, pp. 74, 218,
240-241.

69. Cooney (Mogollon). Au, Ag, Cu.
85 miles NW. Silver City, A. T. & S. F. R. R.
Tertiary volcanics.
Veins.
Lindgren, W., The ore deposits of New Mexico: P. P. 68, 1910, pp. 18, 42,
43, 44, 47, 68, 69-71, 191-204.
Weed, W. H., The copper mines in the United States in 1905: Bull. 285, 1906,
p. 118.
1906, pp. 310-311.
1907, pt. 1, pp. 412-413.
1909, pt. 1, p. 441.

70. Omitted.

71. Jones Camp. Fe.
47 miles E. San Antonio, A. T. & S. F. R. R.
Paleozoic limestone cut by monzonite.
Contact metamorphic.
Lindgren, W., The ore deposits of New Mexico: P. P. 68, 1910, pp. 51, 53,
203, 204.

28 miles E. San Antonio, A. T. & S. F. R. R.
Paleozoic sediments.
Disseminated.
Lindgren, W., The ore deposits of New Mexico: P. P. 68, 1910, pp. 77, 203.

73. Magdalena (Kelly). Zn, Pb, Au, Ag, Cu.
Station A. T. & S. F. R. R.
Schist overlain by crystalline limestone, shale, and quartzite; Paleozoic
sediments cut by granite, monzonite, quartz monzonite porphyry, and
diabase.
Replacements.
Dutton, C. E., Mount Taylor and the Zuñi Plateau: Sixth Ann. Rept.,
1885, p. 194.
Lindgren, W., The ore deposits of New Mexico: P. P. 68, 1910, pp. 18, 19,
1885, p. 258.
1886, p. 146.
1887, p. 110.
1888, p. 89.
1904, p. 276.
1905, p. 283.
1906, pp. 311, 403, 476.
1907, pt. 1, p. 413.
1908, pt. 1, p. 519.
1909, pt. 1, p. 441.
SOCORRO COUNTY—Continued.

74. Mill Canyon (Hop Canyon). Au, Ag, Cu.
   6 miles S. Magdalena, A. T. & S. F. R. R.
   Tertiary volcanics.
   Veins.
   Lindgren, W., The ore deposits of New Mexico: P. P. 68, 1910, p. 258.

75. Rosedale Au, Ag.
   30 miles SW. Magdalena, A. T. & S. F. R. R.
   Tertiary volcanics.
   Veins.
   1907, pt. 1, p. 413.
   1908, pt. 1, p. 519.

76. San Andreas. Cu, Pb, Bi.
   20 miles E. Alemán, A. T. & S. F. R. R.
   Paleozoic sediments.
   Veins.
   Lindgren, W., The ore deposits of New Mexico: P. P. 68, 1910, pp. 35, 74, 205, 234.
   Min. Res. 1908, pt. 1, p. 713.

77. San Lorenzo. Cu.
   20 miles NW. Socorro, A. T. & S. F. R. R.
   Tertiary volcanics (?).
   Veins (?).

78. Silver Mountain (Water Canyon). Au, Ag, Cu, Pb.
   15 miles SE. Magdalena, A. T. & S. F. R. R.
   Paleozoic sediments cut by porphyry.
   Contact metamorphic.
   Lindgren, W., The ore deposits of New Mexico: P. P. 68, 1910, pp. 36, 37, 242, 245, 246, 247, 258.

79. Socorro. Ag, Au.
   2 miles NW. Socorro, A. T. & S. F. R. R.
   Andesite tuff.
   Veins.
   Top. sheet Socorro.

TAOS COUNTY.

80. Anchor (La Belle). Au, Ag.
   30 miles NNW. Ute Park, St. L. R. M. & P. R. R.
   Quartz monzonite and diorite porphyry.
   Veins.
   Lindgren, W., The ore deposits of New Mexico: P. P. 68, 1910, pp. 60, 82, 88, 89.

81. Omitted.

82. Picuris (Copper Hill). Cu, Ag, Au. (D, Pl.)
   12 miles ENE. Embudo, D. & R. G. R. R.
   Pre-Cambrian granite and schists.
   Veins.
   Lindgren, W., The ore deposits of New Mexico: P. P. 68, 1910, pp. 27, 28, 49-51, 82, 89-91.
83. Red River. Au, Ag.
29 miles NW. Ute Park, St. L. R. M. & P. R. R.
Pre-Cambrian granite and schist cut by monzonite porphyry, rhyolite, and andesite.
Veins.
Min. Res. 1906, p. 312.
1907, pt. 1, p. 413.

84. Twining (Rio Hondo). Cu, Au, Pb, Ag, Sb. (D, Pl.)
34 miles NE. Barranca, D. & R. G. R. R.
Pre-Cambrian granite and porphyry cut by monzonite.
Veins, wash gravels.
Lindgren, W., The ore deposits of New Mexico: P. P. 68, 1910, pp. 75, 83, 84.
Min. Res. 1906, p. 312.
1907, pt. 1, p. 413.

VALENCE COUNTY.

85. Copperton (Zuni Mountains). Cu.
23 miles W. Grant, A. T. & S. F. R. R.
Pre-Cambrian granite and granite porphyry overlain by Paleozoic and Mesozoic sediments.
Veins, disseminated.
Top. sheet Wingate.

86. Manzano. Cu.
Mountain station, A. T. & S. F. R. R.
Paleozoic and Mesozoic sediments.
Disseminated.
Lindgren, W., The ore deposits of New Mexico: P. P. 68, 1910, pp. 134, 163.
OREGON.

In the State of Oregon there are 73 mining districts in 16 counties. Gold is the predominant mineral in 63 of these districts, and almost all of these contain some placer deposits. In 7 districts copper predominates, in 1 silver, and in 2 quicksilver.

_Distribution of the predominant metals produced in the mining districts of Oregon._

<table>
<thead>
<tr>
<th>County</th>
<th>Gold</th>
<th>Silver</th>
<th>Copper</th>
<th>Quicksilver</th>
<th>Total</th>
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<td>1</td>
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<td>1</td>
<td>1</td>
<td></td>
<td>3</td>
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<tr>
<td>Curry</td>
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<td>9</td>
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<td>Grant</td>
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<td>1</td>
<td></td>
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</table>

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_MINING DISTRICTS IN OREGON._

[See Pl. XI. Additional references will be found in Mineral Resources for 1910 and 1911.]

**BAKER COUNTY.**

1. **Bonanza (Geiser).** Au, Ag. (D, Pl.)
   8 miles NW. Whitney, S. V. R. R.
   Argillites cut by granodiorite and capped by Tertiary volcanics.
   Veins.
   Lindgren, W., The gold belt of the Blue Mountains of Oregon: Twenty-
   Min. Res. 1906, p. 316.
   1907, pt. 1, p. 423.
   1908, pt. 1, p. 528.
   Top. sheet Sumpter.

2. **Buck Gulch.** Au. (Pl.)
   7 miles W. Sumpter, S. V. R. R.
   Stream gravels.
   Pardee, J. T., Placer gravels of the Sumpter and Granite districts, eastern
   Top. sheet Sumpter.

3. **Burkemont.** Cu.
   Amygdaloidal basalt.
   Disseminations.
   Top. sheet Baker City.
4. **Cable Cove.** Au, Ag, Cu.
   14 miles N. Sumpter, S. V. R. R.
   Granite.
   Veins.
   Min. Res. 1906, p. 316.
   1907, pt. 1, p. 423.
   1908, pt. 1, p. 528.
   Top. sheet Burkemont.

5. **Conner Creek.** Au, Ag. (D, Pl.)
   19 miles N. Huntington, O. W. R. R. & N. Co.
   Argillites.
   Veins and stream gravels.
   Min. Res. 1906, p. 316.
   1907, pt. 1, p. 423.
   1908, pt. 1, p. 528.

6. **Cornucopia.** Au, Ag.
   Triassic (?) sediments cut by granite.
   Veins.
   Min. Res. 1906, p. 316.
   1908, pt. 1, pp. 527-528.
   1909, pt. 1, p. 447.

7. **Cracker Creek (Sumpter).** Au, Ag. (D, Pl.)
   Sumpter station, S. V. R. R.
   Paleozoic sediments and greenstones cut by granite.
   Veins.
   1906, p. 316.
   1907, pt. 1, pp. 422, 423.
   1908, pt. 1, p. 527.
   1909, pt. 1, p. 447.
   Top. sheet Sumpter.

8. **Elkhorn.** Au, Ag.
   14 miles NW. Baker City, O. W. R. R. & N. Co.
   Argillites cut by granodiorite and diorite.
   Veins.
   1907, pt. 1, p. 422.
   Top. sheet Sumpter.
LIST OF MINING DISTRICTS

BAKER COUNTY
1. Bonanza (Geiser)
2. Buck Gulch
3. Burkemont
4. Cable Cave
5. Connor Creek
6. Cornucopia
7. Cracker Creek (Sumpter)
8. Elkhorn
9. Greenhorn
10. Iron Dyke (Homestead)
11. Pocahontas (Auburn, Minersville)
12. Rye Valley (Mormon Basin)
13. Sanger
14. Sparta
15. Rice
16. Virtue
17. Washington

CLACKAMAS COUNTY
18. Chena Creek
19. Eden
20. Myrtle Point (Johnson)
21. Randolph

CROOK COUNTY
22. Howard (Ochoco, Bolivar)
23. Trout Creek (Ashwood)

CURRY COUNTY
24. Beach placer (Denmark, Harbor, Gold Creek, etc.)
25. Chetco
26. Lower Rogue (Mile Creek)
27. Rusty Butte
28. Siskiyou River

DOUGLAS COUNTY
29. Bohemia
30. Crackerjack (Cow Creek)
31. Dothan
32. Drew
33. Nugget (Myrtle Creek)
34. Ellsworth
35. Riddles
36. Starrett (Green Mountain)

GRANT COUNTY
37. Alamo
38. Canyon
39. Crane Creek
40. Granite
41. Quartzburg (Conner)

HARNEY COUNTY
42. Harvey
43. Pueblo (Denio)
44. Omitted

JACKSON COUNTY
45. Applegate
46. Ashland
47. Blue Ledge
48. Draper
49. Gold Hill (Foots Creek, Galls Creek, Sardine Creek)
50. Jacksonville
51. Pleasant Valley (Evans Creek)

JOSEPHINE COUNTY
52. Althouse
53. Applegate
54. Galice
55. Greenbend (Upper Grave Creek)
56. Jumpoff Joe
57. Kerby
58. Louise Creek (Granite Hill)
59. Lower Grave Creek
60. Mt. Reuben

LAKE COUNTY
61. Wolf Creek (Golden)

MARION COUNTY
62. Santiam (Elkhorn)

MALHEUR COUNTY
63. Humboldt
64. Malheur (Mormon Basin)

UNION COUNTY
65. Camp Carson
66. Medical Springs

WHEELER COUNTY
67. Spanish Gulch
OREGON.

BAKER COUNTY—Continued.

   14 miles WNW. Whitney, S. V. R. R.
   Paleozoic sediments cut by granodiorite and diorite.
   Veins.
   Lindgren, W., The gold belt of the Blue Mountains of Oregon: Twenty-
   Top. sheet Sumpter.

10. Iron Dyke (Homestead). Ag, Cu, Pb, Au.
    72 miles NE. Baker City, O. W. R. R. & N. Co.
    Triassic greenstones.
    Disseminations.
    Lindgren, W., The gold belt of the Blue Mountains of Oregon: Twenty-
    1908, pt. 1, p. 528.

11. Pocahontas (Auburn, Minersville). Au. (D, Pl.)
    6 miles NW. Baker City, O. W. R. R. & N. Co.
    Paleozoic argillites cut by diorite.
    Veins, stream gravels.
    Lindgren, W., The gold belt of the Blue Mountains of Oregon: Twenty-

12. Rye Valley (Mormon Basin). Au, Ag. (D, Pl.)
    Paleozoic argillites, granite and granodiorite.
    Veins, stream gravels.
    Lindgren, W., The gold belt of the Blue Mountains of Oregon: Twenty-
    Min. Res. 1906, p. 316.
    1907, pt. 1, p. 423.
    1908, pt. 1, p. 528.
    1909, pt. 1, p. 447.

13. Sanger. Au, Ag. (Pl, D.)
    Triassic sediments.
    Veins.
    Lindgren, W., The gold belt of the Blue Mountains of Oregon: Twenty-
    Weed, W. H., The copper mines of the United States in 1905: Bull. 285, 1906,
    p. 119.
    1908, pt. 1, p. 528.

14. Sparta. Au, Ag. (D, Pl.)
    27 miles ENE. Baker City, O. W. R. R. & N. Co.
    Granite.
    Veins.
    Lindgren, W., The gold belt of the Blue Mountains of Oregon: Twenty-

15. Stice. Au, Ag. (Pl, D.)
    18 miles S. Salisbury, S. V. R. R.
    Paleozoic argillites cut and capped by Tertiary volcanics.
    Veins.
15. **Stice—Continued.**


Top. sheet Baker City.

16. **Virtue.** Au, Ag.

10 miles ESE. Baker City, O. W. R. R. & N. Co.

Paleozoic argillites cut by diorite.

Veins.


1906, p. 316.

1907, pt. 1, p. 422.

1908, pt. 1, p. 526.

1909, pt. 1, p. 447.

Top. sheet Baker City.

17. **Weatherby.** Au, Ag. (D, Pl.)

Station O. W. R. R. & N. Co.

Paleozoic sediments cut by granite and diorite.

Veins.


1908, pt. 1, p. 528.

**CLACKAMAS COUNTY.**

18. **Chena Creek.** Cu, Au.

31 miles W. Boring, P. R. R. L. & P. Co.

**COOS COUNTY.**

19. **Eden.** Au. (Pl.)

24 miles W. Dothan, S. P. R. R.

Stream gravels.

20. **Myrtle Point (Johnson).** Au, Ag. (D, Pl.)

59 miles WSW. Roseburg, S. P. R. R.

Stream gravels.


1909, pt. 1, p. 447.

Top. sheet Coos Bay.

Folio 73, 1901.

21. **Randolph.** Au, Pt. (Pl.)

83 miles W. Roseburg, S. P. R. R.

Beach placers.

Min. Res. 1887, p. 142.

Top. sheet Coos Bay.

Folio 73, 1901.

**CROOK COUNTY.**

22. **Howard (Ochoco, Bolivar).** Au, Ag, Hg. (D, Pl.)


Min. Res. 1906, pp. 494-495.

1908, pt. 1, pp. 691-692.

23. **Trout Creek (Ashwood).** Cu, Zn, Au, Ag.

OREGON.

CURRY COUNTY.

24. **Beach placers (Denmark, Harbor, Gold Creek, etc.).** Au, Pt. (Pl.)
100–150 miles SW. Roseburg, S. P. R. R.
Beach gravels.
Min. Res. 1887, p. 142.
1905, pp. 1175–1258.
1909, pt. 1, p. 448.

25. **Chetco.** Au, Pt. (Pl.)
124 miles SW. Grants Pass, S. P. R. R.
Beach gravels.
1906, p. 316.
1907, pt. 1, p. 424.

26. **Lower Rogue (Mile Creek).** Au. (Pl.)
52 miles SW. Dothan, S. P. R. R.
Stream gravels.
Top. sheet Port Orford.
Folio 89, 1903.

27. **Rusty Butte.** Au. (Pl.)
84 miles SW. Dillard, S. P. R. R.
Stream gravels.
Top. sheet Port Orford.
Folio 89, 1903.

28. **Sixes River.** Au. (Pl.)
78 miles SW. Dillard, S. P. R. R.
Stream gravels.
Top. sheet Port Orford.
Folio 89, 1903.

DOUGLAS COUNTY.

29. **Bohemia.** Au, Ag (Zn, Pb, Cu).
20 miles ESE. Wildwood, 12 miles SE. Disston, O. & S. E. R. R.
Tertiary volcanics.
Veins.
1908, pt. 1, p. 533.

30. **Crackerjack (Cow Creek).** Au. (Pl.)
8 miles E. Glendale, S. P. R. R.
Stream gravels.

31. **Dothan.** Au. (Pl.)
Station S. P. R. R.
Stream gravels.
1906, p. 316.
DOUGLAS COUNTY—Continued.

32. **Drew**. Hg, Au. (D, Pl.)
   33 miles E. Riddles, S. P. R. R.

33. **Nugget (Myrtle Creek)**. Au, Ag, Cu. (D, Pl.)
   12½ miles E. Myrtle Creek, S. P. R. R.
   Cretaceous sediments, metagabbro, and serpentine.
   Veins, disseminations, stream gravels.
   1907, pt. 1, p. 424.
   1908, pt. 1, p. 529.
   1909, pt. 1, p. 448.
   Top. sheet Roseburg.
   Folio 49, 1898.

34. **Olalla**. Au. (Pl.)
   9 miles WSW. Dillard, S. P. R. R.
   Stream gravels.

35. **Riddles**. Au, Cu, Ni. (D, Pl.)
   Station S. P. R. R.
   Mesozoic sediments cut by basic dikes.
   Disseminated.
   1886, p. 171.
   1887, pp. 127–128.
   1888, p. 109.
   1892, pp. 170–177.
   1905, p. 408.
   Top. sheet Riddles.

36. **Starvout (Green Mountain)**. Au. (Pl.)
   25 miles E. Glendale, S. P. R. R.
   Stream gravels.
   Top. sheet Riddles.

GRANT COUNTY.

37. **Alamo**. Au, Ag. (D, Pl.)
   20 miles WNW. Whitney, S. V. R. R.
   Paleozoic argillites cut by diorite.
   Veins, stream gravels.
   Top. sheet Sumpter.

38. **Canyon**. Au. (D, Pl.)
   30 miles SW. Austin, S. V. R. R.
   Paleozoic argillites, serpentine, and diabase.
   Veins, stream gravels.
38. Canyon—Continued.

1907, pt. 1, p. 424.

39. Crane Creek. Au. (Pl.)
20 miles NW. Sumpter, S. V. R. R.
Stream gravels.
Top. sheet Sumpter.

40. Granite. Au, Ag. (D, Pl.)
14 miles WNW. Sumpter, S. V. R. R.
Paleozoic argillites cut by diorite and granodiorite and capped by Tertiary volcanics.
Veins.
1906, p. 317.
1908, pt. 1, pp. 529-530.
1909, pt. 1, p. 448.
Top. sheet Sumpter.

41. Quartzburg (Comer). Au, Ag, Cu, Pb (Co).
18 miles SW. Austin, S. V. R. R.
Paleozoic argillites and greenstones cut by diorite and diabase.
Veins.
1905, pp. 291, 409.
1906, p. 317.
1907, pt. 1, p. 425.
1908, pt. 1, pp. 529-530.
Top. sheet Sumpter.

42. Susanville (Galena). Au, Ag, Pb. (D, Pl.)
27 miles NW. Austin, S. V. R. R.
Paleozoic argillites and greenstones cut by granite and capped by basalt.
Veins.
1908, pt. 1, pp. 529-530.
1909, pt. 1, p. 448.
Top. sheet Sumpter.

43. Harney. Au. (Pl.)
117 miles WSW. Vale, O. S. L. R. R.
1909, pt. 1, p. 448.

44. Pueblo (Denio). Cu.
111 miles NW. Winnemucca, Nev., S. P. R. R., W. P. R. R. Granite (?).
MINING DISTRICTS OF WESTERN UNITED STATES.

HARNEY COUNTY—Continued.

44. Pueblo (Denio)—Continued.

45. Omitted.

JACKSON COUNTY.

46. Applegate. Au. (D, Pl.)
14 miles SW. Jacksonville, R. R. V. R. R.
Paleozoic sediments and greenstones.
Stream gravels, veins.
1908, pt. 1, pp. 520-531.
1909, pt. 1, p. 448.
Top. sheets Grants Pass, Ashland.

47. Ashland. Au. (Pl, D.)
Station S. P. R. R.
Paleozoic sediments, granodiorite, and greenstones.
Stream gravels and veins.
1908, pt. 1, p. 531.
Top. sheet Ashland.

33 miles SSW. Jacksonville, R. R. V. R. R.
Granodiorite (?).
Veins (?).
Top. sheet Ashland.

49. Draper. Au, Ag.
10 miles S. Gold Hill, S. P. R. R.
Greenstones and slates.
Veins.
Min. Res. 1908, pt. 1, p. 531.
Top. sheet Grants Pass.

50. Gold Hill (Foots Creek, Galls Creek, Sardine Creek). Au. (D, Pl.)
Station S. P. R. R.
Greenstones and slates.
Veins, stream gravels.
1906, p. 317.
1908, pt. 1, pp. 530-531.
1909, pt. 1, p. 448.
Top. sheets Grants Pass, Ashland.

51. Jacksonville. Au, Ag. (D, Pl.)
Station R. R. V. R. R.
Greenstones and slates.
Veins, stream gravels.
OREGON.

51. **Jacksonville**—Continued.
1906, p. 317.
1907, pt. 1, p. 426.
1908, pt. 1, p. 531.
Top. sheets Ashland, Grants Pass.

52. **Pleasant Valley (Evans Creek)**. Au. (Pl.)
20 miles N. Gold Hill, S. P. R. R.
Stream gravels.
Diller, J. S., and Kay, G. F., The mines of the Riddles quadrangle, Oregon:
Bull. 340, 1908, pp. 150-151.
Min. Res. 1906, p. 531.
Top. sheet Riddles.

53. **Althouse**. Au. (D, Pl.)
35 miles SSW. Grants Pass, S. P. R. R.
Greenstones.
Stream gravels, veins.
1908, pt. 1, p. 532.
Top. sheet Grants Pass.

54. **Applegate**. Au. (Pl.)
14 miles SSE. Grants Pass, S. P. R. R.
Stream gravels.
1908, pt. 1, pp. 532-533.
Top. sheet Grants Pass.

55. **Galice**. Au, Ag, Cu. (D, Pl.)
16 miles NW. Merlin, S. P. R. R.
Argillites cut by diorite.
Veins.
1907, pt. 1, p. 426.
1908, pt. 1, pp. 532-533.
1909, pt. 1, p. 449.

56. **Greenback (Upper Grave Creek)**. Au, Ag, Cu. (Pl, D.)
9 miles E. Leland, S. P. R. R.
Serpentine, greenstone, Paleozoic sediments.
Stream gravels, veins.
Diller, J. S., and Kay, G. F., The mines of the Riddles quadrangle, Oregon:
Bull. 340, 1908, pp. 140-142, 149-150.
1906, p. 318.
1907, pt. 1, p. 426.
1908, pt. 1, pp. 532-533.
1909, pt. 1, p. 449.
Top. sheet Riddles.

57. **Jumpoff Joe**. Au, Ag. (D, Pl.)
8 miles N. Grants Pass, S. P. R. R.
Greenstone and serpentine.
Stream gravels, veins.
Diller, J. S., and Kay, G. F., The mines of the Riddles quadrangle, Oregon:
Bull. 340, 1908, pp. 143-145, 150.
1906, p. 318.
1907, pt. 1, p. 426.
1908, pt. 1, pp. 532-533.
Top. sheet Riddles.

58. Kerby. Au. (Pl.)
30 miles SSW. Grants Pass, S. P. R. R.
Stream gravels.
1906, p. 318.
1907, pt. 1, p. 426.
1908, pt. 1, pp. 532-533.

59. Louse Creek (Granite Hill). Au. (D, Pl.)
5 miles N. Grants Pass, S. P. R. R.
Greenstone, serpentine, granodiorite.
Veins and stream gravels.

58. Kerby. Au. (Pl.)
30 miles SSW. Grants Pass, S. P. R. R.
Stream gravels.
1906, p. 318.
1907, pt. 1, p. 426.
1908, pt. 1, pp. 532-533.

60. Lower Grave Creek. Au. (D, Pl.)
10 miles W. Leland, S. P. R. R.
Mesozoic slates and greenstones.
Veins, terrace and stream gravels.
1907, pt. 1, p. 427.
1908, pt. 1, pp. 532-533.
Top. sheets Grant Pass, Riddles.

24 miles SSW. Dothan, S. P. R. R.
Veins.

62. Waldo. Cu, Au, Ag. (Pl, D.)
38 miles SSW. Grants Pass, S. P. R. R.
Gabbro and serpentine.
Terrace and stream gravels, stockworks.
Min. Res. 1887, p. 142.
1905, p. 292.
1906, pp. 318, 409.
1907, pt. 1, p. 427.
1908, pt. 1, pp. 532-533.
1909, pt. 1, p. 449.
JOSEPHINE COUNTY—Continued.

63. Wolf Creek (Golden). Au, Cu. (D, Pl.)
   Station S. P. R. R.
   Greenstone.
   Stockworks, veins, terrace and stream gravels.
   1908, pt. 1, pp. 532-533.
   1909, pt. 1, p. 449.
   Top. sheet Riddles.

LAKE COUNTY.

64. Coyote Hills. Au.
   61 miles N. Alturas, Cal., N. C. & O. R. R.
   Tertiary volcanics.
   Veins.

LANE COUNTY.

65. Black Butte. Hg.
   17 miles S. Cottage Grove, S. P. R. R.
   Tertiary volcanics.
   Veins, stockworks.
   Min. Res. 1908, pt. 1, p. 691.

66. Blue River. Au, Ag (Pb, Cu).
   45 miles E. Springfield, S. P. R. R.
   Tertiary volcanics, chiefly rhyolite.
   Veins.
   1906, p. 318.

67. Bohemia (Champion). Au, Ag, Zn, Pb, Cu (Hg).
   14 miles S. Disston, O. & S. E. R. R.
   Tertiary volcanics.
   Veins and disseminations.
   1906, p. 319.
   1908, pt. 1, p. 533.
   1909, pt. 1, p. 450.

68. Fall Creek. Au, Ag.
   15 miles ESE. Springfield, S. P. R. R.

MARION COUNTY.

69. Santiam (Elkhorn). Au, Ag, Pb, Cu.
   14 miles NE. Gates, S. P. R. R.

MALHEUR COUNTY.

70. Humboldt. Au. (D, Pl.)
   Argillites cut by granodiorite.
   Veins, stream gravels.
70. Humboldt—Continued.
Lindgren, W., The gold belt of the Blue Mountains of Oregon: Twenty-

71. Malheur (Mormon Basin). Au, Ag. (D, Pl.)
22 miles SW. Durkee, O. W. R. R. & N. Co.
Paleozoic argillites cut by diorite.
Veins.
Lindgren, W., The gold belt of the Blue Mountains of Oregon: Twenty-
1908, pt. 1, p. 533.
1909, pt. 1, p. 450.

UNION COUNTY.

72. Camp Carson. Au, Ag, Pb, Cu. (Pl, D.)
Granite.
Veins, stream gravels.
Lindgren, W., The gold belt of the Blue Mountains of Oregon: Twenty-

73. Medical Springs. Cu (Au, Ag).
22 miles SSE. Union, C. R. R. of O.
Paleozoic sediments cut by diorite.
Contact metamorphic.
Weed, W. H., The copper mines of the United States in 1905: Bull. 285,
1906, p. 119.

WHEELER COUNTY.

74. Spanish Gulch. Au. (Pl, D.)
Min. Res. 1905, p. 293.
SOUTH DAKOTA.

The Black Hills cover parts of three counties in western South Dakota. In this region there are 26 mining districts. In 14 districts the principal values are in gold, in 3 lead predominates, in 2 copper, in 1 silver, in 4 rare metals, and in 2 iron.

Distribution of the predominant metals produced in the mining districts of South Dakota.

<table>
<thead>
<tr>
<th>County</th>
<th>Gold</th>
<th>Silver</th>
<th>Copper</th>
<th>Lead</th>
<th>Iron</th>
<th>Rare metals</th>
<th>Total</th>
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<td>Custer</td>
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<td>9</td>
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<td>Pennington</td>
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<td>1</td>
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<td>4</td>
<td>26</td>
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</tbody>
</table>

MINING DISTRICTS IN SOUTH DAKOTA.

[See Pl. XII. Additional references will be found in Mineral Resources for 1910 and 1911.]

CUSTER COUNTY.

   10 miles E. Custer, C. B. & Q. R. R.
   Pre-Cambrian complex (?).
   Veins, impregnations (?).
   Top. sheet Hermosa.

2. Custer. Au. (D, Pl.)
   5 miles S. Custer, C. B. & Q. R. R.
   Pre-Cambrian complex.
   Veins, impregnations.
   1908, pt. 1, p. 535.
   1909, pt. 1, p. 452.
   Top. sheet Harney Peak.

3. French Creek. Au.
   Custer station, C. B. & Q. R. R.
   Pre-Cambrian complex (?).
   Veins, impregnations (?).
   Top. sheets Harney Peak, Hermosa.

4. Iron Mountains. Fe, Ag, Pb.
   12 miles ENE. Custer, C. B. & Q. R. R.
   Pre-Cambrian complex.
   Veins, impregnations.
   Top. sheet Hermosa.

5. Junction. Au. (D, Pl.)
   10 miles NW. Custer, C. B. & Q. R. R.
   Pre-Cambrian complex.
   Veins, impregnations.
   Top. sheet Harney Peak.

21528°—Bull. 507—12—17 257
6. **Spokane**. Ag, Pb.
- 8 miles W. Hermosa, C. & N. W. R. R.
- Pre-Cambrian complex.
- Veins, impregnations.
- Top. sheet Hermosa.

**LAWRENCE COUNTY.**

7. **Carbonate**. Pb, Ag, Au.
- 2 miles E. Maurice, C. B. & Q. R. R.
- Carboniferous sediments cut by porphyry.
- Replacements and veins.
- Top. sheet Spearfish.

8. **Deadwood**. Au, Ag, W. (D, Pl.)
- Algonkian schists and Cambrian sediments.
- Veins and quartz-bearing conglomerate.
- Top. sheet Spearfish.

9. **Elk Mountain (Ragged Top)**. Au.
- 10 miles S. Spearfish, C. B. & Q. R. R.
- Carboniferous limestone cut by phonolite.
- Veins.
- Top. sheet Sturgis.

10. **Galena (Strawberry Gulch)**. Pb, Ag, Au. (D, Pl.)
- 4 miles NNW. Elk City, 2 miles E. siding, C. B. & Q. R. R.
- Algonkian schists cut by porphyry.
- Impregnation.
- 1907, pt. 1, p. 431.
- 1908, pt. 1, p. 538.
- Top. sheet Sturgis.

11. **Nigger Hill (Tinton)**. Sn, W. (D, Pl.)
- 9 miles W. Terry, C. B. & Q. R. R.
- Algonkian schists cut by pegmatite.
LIST OF MINING DISTRICTS

CUSTER COUNTY
1. Chilkoot
2. Custer
3. French Creek
4. Iron Mountains
5. Junction
6. Spokane

LAWRENCE COUNTY
7. Carbonate
8. Deadwood
9. Elk Mountain (Ragged Top)
10. Galena (Strawberry Gulch)
11. Nigger Hill (Tinton)
12. Ruby (Portland)
13. Spearfish
14. Two Bit Creek (Spruce Gulch)
15. Whitewood (Lead, Garden, Homestake, Lead City)

PENNINGTON COUNTY
16. Black Hills
17. Blue Lead
18. Harney Peak
19. Hat Mound
20. Hill City
21. Hornblende
22. Keystone
23. Mystic
24. Rochford
25. Rocherville
26. Silver

MAP OF PART OF SOUTH DAKOTA, SHOWING LOCATION OF MINING DISTRICTS

Scale 2,500,000
APPROXIMATELY 40 MILES TO 1 INCH

1912
11. **Nigger Hill (Tinton)—Continued.**

Veins (?).


Min. Res. 1883-84, p. 613.

1885, pp. 370-371.


1888, p. 148.


1903, p. 336.

1909, pt. 1, p. 588.

12. **Ruby (Portland).** Au, Ag.

6 miles NW. Englewood, C. B. & Q. R. R.

Cambrian sediments cut by porphyry.

Veins.


13. **Spearfish.** Sn.

Station C. B. & Q. R. R.

Pegmatite.

Top. sheet Spearfish.


14. **Two Bit Creek (Spruce Gulch).** Au, Ag. (D, Pl.)


Cambrian sediments cut by acidic intrusives.

Veins.


Top. sheet Sturgis.

15. **Whitewood (Lead, Garden, Homestake, Lead City).** Au, Ag, W.

Station C. B. & Q. R. R., G. N. R. R.

Algonkian schists cut by acidic intrusives.

Veins and impregnations.


15. Whitewood (Lead, Garden, Homestake, Lead City)—Continued.

- 1905, p. 295.
- 1908, pt. 1, pp. 536-538.

Top. sheet Spearfish.

PENNINGTON COUNTY.


- 10 miles W. Rochford, C. B. & Q. R. R.
- Pre-Cambrian schists.
- Veins and impregnations.


- Big Bend station, R. C. B. H. & W. R. R.
- Pre-Cambrian schists.
- Veins and impregnations.


- 7 miles SSE. Hill City, C. B. & Q. R. R.
- Pegmatite.

Min. Res. 1883-84, pp. 611-613.

- 1885, p. 370.
- 1887, pp. 136-138.
- 1888, pp. 144-148.
- 1889-90, pp. 120-121.
- 1891, p. 164.
- 1903, p. 336.
- 1906, p. 323.

Top. sheet Harney Peak.


- 6 miles ENE. Pactola, R. C. B. H. & W. R. R.

20. Hill City. Au. (D, Pl.)

- Station C. B. & Q. R. R.
- Pre-Cambrian complex.
- Stream gravels, veins.
20. **Hill City**—Continued.
   1908, pt. 1, p. 538.
   1909, pt. 1, p. 454.
   Top. sheet Harney Peak.

21. **Hornblende.** Au, Ag.
    10 miles SW. Rochford, C. B. & Q. R. R.
    Pre-Cambrian complex.
    Veins and impregnations.
    1907, pt. 1, p. 432.
    1908, pt. 1, p. 539.
    1909, pt. 1, p. 454.

22. **Keystone.** Sn, Au, Ag. (D, Pl.)
    10 miles ESE. Hill City, C. B. & Q. R. R.
    Pre-Cambrian complex cut by pegmatite.
    Veins and lenses.
    Min. Res. 1883-84, pp. 602-611.
    1885, p. 370.
    1887, pp. 136-138.
    1888, pp. 149-151
    1905, p. 297.
    1906, p. 323.
    1907, pt. 1, p. 432.
    1908, pt. 1, p. 538.
    1909, pt. 1, p. 454.
    Top. sheet Hermosa.

23. **Mystic.** Au. (D, Pl.)
    Station C. B. & Q. R. R.
    Pre-Cambrian complex.
    Veins, impregnations.

24. **Rochford.** Au.
    Station C. B. & Q. R. R.
    Pre-Cambrian complex.
    Veins, impregnations.

25. **Rockerville.** Au, Cu. (D, Pl.)
    Pre-Cambrian complex.
    Veins, impregnations.
    Top. sheet Hermosa.

26. **Silver.** Pb, Ag, Sb.
    Silver City station, R. C. B. H. & W. R. R.
    Pre-Cambrian complex.
    Veins, impregnations.
TEXAS.

In the trans-Pecos country of Texas there are only three counties in which metal mining is carried on to any extent. Eleven districts are known to the Geological Survey. Four of these produce silver as the predominant metal, three quicksilver, two copper, one zinc, and one tin.

Distribution of the predominant metals produced in the mining districts of Texas.

<table>
<thead>
<tr>
<th>County</th>
<th>Silver</th>
<th>Copper</th>
<th>Quicksilver</th>
<th>Zinc</th>
<th>Rare metals</th>
<th>Total</th>
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<td>Presidio</td>
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<td>11</td>
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</tbody>
</table>

MINING DISTRICTS IN TEXAS.

[See Pl. XIII. Additional references will be found in Mineral Resources for 1910 and 1911.]

1. Alpine. Ag, Pb.
   Station S. P. R. R.
   Top. sheet Alpine.

2. Chisos and Study Butte. Hg.
   120 miles SE. Marfa, S. P. R. R.
   Cretaceous sediments cut by Tertiary volcanics.
   Veins.
   1907, pt. 1, pp. 680–682.
   Top. sheet Chisos Mountains.

   115 miles SE. Marathon, S. P. R. R.
   Cretaceous sediments cut by Tertiary intrusives.
   Veins.
   1895, pp. 394–397.
   1907, pt. 1, pp. 680–682.
   Top. sheet Chisos Mountains.

4. Terlingua. Hg.
   108 miles SSE. Marfa, S. P. R. R.
   Cretaceous sediments cut and capped by Tertiary volcanics.
   Veins, replacements.
   Hillebrand, W. F., and Schaller, W. T., Mercury minerals from Terlingua,
   Tex.: Bull. 405, 1909.
   262
LIST OF MINING DISTRICTS

BREWSTER COUNTY
1. Alpine
2. Chisos and Study Butte
3. Mariscal
4. Terlingua

EL PASO COUNTY
5. Eagle Mountain
6. El Paso (Franklin Mts.)
7. Guadalupe Mountains
8. Quitman Mts. (Bonanza)
9. Sierra Blanca (Lascar)
10. Sierra Diablo (Hazel)

PRESIDIO COUNTY
11. Shafter

MAP OF WESTERN TEXAS, SHOWING LOCATION OF MINING DISTRICTS

SCALE 2,500,000
APPROXIMATELY 40 MILES TO 1 INCH
25 0 25 50 100 Miles
25 75 100 Kilometers
TEXAS.

BREWSTER COUNTY—Continued.

4. Terlingua—Continued.
1905, pp. 394–397.
1907, pt. 1, pp. 680–682.
Top. sheets Terlingua, Terlingua special.

EL PASO COUNTY.

5. Eagle Mountains. Zn.
5 miles SW. Torbet, S. P. R. R.
Carboniferous sediments.
Top. sheet Eagle Mountains.

Granite.
Veins.
Min. Res. 1905, p. 305.
1906, p. 544.
1908, pt. 1, p. 541.
Top. sheet El Paso.
Folio ’166, 1909.

65 miles NNE. Sierra Blanca, S. P. R. R.
Paleozoic sediments.
Disseminations.
Min. Res. 1905, p. 305.
1907, pt. 1, p. 433.
1908, pt. 1, p. 541.

8. Quitman Mountains (Bonanza). Ag, Pb, Zn.
20 miles SW. Sierra Blanca, S. P. R. R.
Granite, limestone, greenstone.
Vein.
Top. sheet Sierra Blanca.

9. Sierra Blanca (Lascar). Cu, Pb, Ag.
Allamore station, T. & P. R. R.
Pre-Cambrian sediments, porphyry.
Contact metamorphic.
1909, pt. 1, p. 455.
Top. sheet Sierra Blanca.

10. Sierra Diablo (Hazel). Ag, Cu, Pb.
10 miles NW. Allamore, T. & P. R. R.
Pre-Cambrian sediments.
Veins and impregnations.
EL PASO COUNTY—Continued.

10. Sierra Diablo (Hazel)—Continued.
   Min. Res. 1905, p. 305.
   1908, pt. 1, p. 541.
   1909, pt. 1, p. 455.
   Top. sheet Sierra Blanca.

PRESIDIO COUNTY.

11. Shafter. Ag (Pb, Au).
   44 miles SSW. Marfa, S. P. R. R.
   Carboniferous sediments cut by porphyry.
   Replacements.
   Min. Res. 1905, p. 305.
   1906, p. 334.
   1907, pt. 1, p. 433.
   1908, pt. 1, pp. 539, 541
   1909, pt. 1, p. 455.
   Top. sheet Shafter.
Twenty-one counties of Utah contain 86 mining districts which are producing according to statistics collected by the United States Geological Survey. Gold is the predominant metal in 22 districts, silver in 20, copper in 15, lead in 14, and iron in 6. The predominant metal in 6 districts is not certain, and of 3 camps producing rare metals 2 have deposits of uranium and vanadium and 1 antimony.

**Distribution of the predominant metals produced in the mining districts of Utah.**

<table>
<thead>
<tr>
<th>County</th>
<th>Gold</th>
<th>Silver</th>
<th>Copper</th>
<th>Lead</th>
<th>Iron and manganese</th>
<th>Rare metals</th>
<th>Unknown</th>
<th>Total</th>
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**MINING DISTRICTS IN UTAH.**

[See Pl. XIV. Additional references will be found in Mineral Resources for 1910 and 1911.]

**BEAVER COUNTY.**

1. **Beaver Lake.** Ag, Cu, Pb.
   Paleozoic sediments cut by monzonite.
   Disseminations, replacements.
   1907, pt. 1, p. 444.
   Top. sheet Frisco special.

2. **Bradshaw.** Au, Ag, Pb, Fe.
   10 miles E. Milford, S. P. L. A. & S. L. R. R.
   Paleozoic sediments cut by acidic intrusives.
   Replacements, veins.
2. **Bradshaw**—Continued.
   1909, pt. 1, p. 446.
   Top. sheet Beaver.
3. **Granite**. Pb, Ag, Cu, Bi.
   Paleozoic limestone cut by acidic intrusives.
   Contact metamorphic.
   1907, pt. 1, p. 444.
   Top. sheet Beaver.
4. **Indian Peak**. Pb, Ag.
   Tertiary volcanics.
   Veins.
   Min. Res. 1907, pt. 1, p. 444.
5. **Lincoln (Jarloose)**. Pb, Ag, Cu, Au, Zn.
   20 miles SE. Milford, S. P. L. A. & S. L. R. R.
   Paleozoic sediments cut by acidic intrusives, Tertiary volcanics.
   Replacements.
   Min. Res. 1907, pt. 1, p. 444.
   1908, pt. 1, p. 554.
   1909, pt. 1, p. 466.
   Top. sheet Beaver.
6. **Newton**. Au, Ag.
   55 miles E. Milford, S. P. L. A. & S. L. R. R.
   Veins.
   1909, pt. 1, p. 466.
   Top. sheet Beaver.
7. **North Star**. Ag, Au, Cu, Pb, Zn.
   12 miles SW. Milford, S. P. L. A. & S. L. R. R.
   Paleozoic sediments cut by monzonite.
   Replacements.
8. **Pine Grove**. Au, Ag.
   40 miles NW. Lund, S. P. L. A. & S. L. R. R.
   Paleozoic sediments cut by porphyry.
   Replacements.
9. **Preuss (Newhouse)**. Cu, Au, Ag.
   Newhouse station, S. P. L. A. & S. L. R. R.
   Paleozoic sediments cut by monzonite.
   Impregnations, replacements, contact metamorphic.
   1905, p. 315.
   1908, pt. 1, pp. 218, 554.
   1909, pt. 1, p. 466.
   Top. sheet Frisco special.
10. **Rocky.** Cu, Au, Ag, Fe.
   10 miles NW. Milford, S. P. L. A. & S. L. R. R.
   Paleozoic sediments cut by monzonite.
   Contact metamorphic.

11. **Frisco.** Pb, Cu, Ag, Au, Zn.
    Station S. P. L. A. & S. L. R. R.
    Paleozoic sediments cut by monzonite and capped by Tertiary volcanics.
    Replacements, veins.
    Min. Res. 1882, pp. 308-309.
    1883-84, pp. 416-418.
    1888, p. 59.
    1904, p. 276.
    1905, p. 315.
    1906, pp. 341-343, 408.
    1908, pt. 1, pp. 554-555.
    Top. sheet Frisco special.

12. **Star.** Pb, Ag, Cu, Au, Zn.
    20 miles SSW. Milford, S. P. L. A. & S. L. R. R.
    Paleozoic sediments cut by quartz monzonite.
    Replacements, veins.
    1906, pp. 343, 476.
    1907, pt. 1, pp. 445-446.
    1908, pt. 1, p. 555.

13. **Washington.** Ag, Cu, Pb, Au.
    50 miles NW. Lund, S. P. L. A. & S. L. R. R.
    Tertiary volcanics.
    Veins.

**BOXELDER COUNTY.**

14. **Ashbrook.** Ag, Au.
    83 miles S. Burley, Idaho, O. S. L. R. R.

15. **Lucin.** Cu (Au, Ag, Pb).
    8 miles E. Tecoma, S. P. R. R.
    Paleozoic sediments.
    Replacements.
    Min. Res. 1903, p. 343.
    1907, pt. 1, p. 446.
    1908, pt. 1, pp. 555-556.
    1909, pt. 1, pp. 172, 467.

16. **Newfoundland.** Cu, Bi.
    45 miles ESE. Lucin, S. P. R. R.
    Min. Res. 1904, p. 375.

17. **Park Valley.** Au, Ag, Cu, Pb.
    13 miles NW. Kelton, S. P. R. R.
    Min. Res. 1905, p. 316.
    1906, p. 343.
    1907, pt. 1, p. 446.
    1908, pt. 1, p. 556.
268  MINING DISTRICTS OF WESTERN UNITED STATES.

BOXELDER COUNTY—Continued.

18. Promontory.  Cu, Ag.
   Lakeside station, S. P. R. R.

CACHE COUNTY.

   10 miles SSW. Wellsville, O. S. L. R. R.

20. Paradise (La Plata).  Pb, Ag.
   5 miles S. Hyrum, O. S. L. R. R.
   Min. Res. 1908, pt. 1, p. 556.

EMERY COUNTY.

   10 miles W. Woodside, D. & R. G. R. R.
   Min. Res. 1906, p. 344.
   Top. sheet Price River.

22. San Rafael.  V, Cu.
   18 miles SW. Green River, D. & R. G. R. R.
   Jurassic and Triassic sediments.
   Disseminations.
   Min. Res. 1904, p. 344.
   1907, pt. 1, p. 446.
   Top. sheet San Rafael.

GARFIELD COUNTY.

23. Coyote Creek.  Sb.
   38 miles SSE. Marysvale, D. & R. G. R. R.
   Paleozoic and Mesozoic sediments capped by Tertiary volcanics.
   Disseminations.
   1906, pp. 511–512.
   1907, pt. 1, p. 708.
   Top. sheet Escalante.

24. White Canyon (Hite).  Au.  (Pl.)
   85 miles SW. Richfield, D. & R. G. R. R.
   Stream gravels.
   Min. Res. 1906, p. 344.
   1908, pt. 1, p. 556.
   Top. sheet Henry Mountains.

GRAND COUNTY.

   10 miles S. Little Grande, D. & R. G. R. R.
   Triassic sediments.
   Replacements.
   145–146.
   Min. Res. 1907, pt. 1, p. 100.
   1908, pt. 1, p. 152.
   Top. sheet La Sal.
26. Miners Basin. Au, Ag, Cu.
   45 miles S. Cisco, D. & R. G. R. R.
   Monzonite porphyry.
   Veins, stockworks.
   Hill, J. M., Notes on the northern La Sal Mountains, Grand County, Utah:
   Bull. 530, 1912.
   Min. Res. 1905, p. 316.
   1907, pt. 1, p. 446.
   1908, pt. 1, p. 556.
   Top. sheet La Sal.

27. Richardson. V.
   27 miles S. Cisco, D. & R. G. R. R.
   Triassic and Cretaceous sediments.
   Replacements.
   Hill, J. M., Notes on the northern La Sal Mountains, Grand County, Utah:
   Bull. 530, 1912.
   Min. Res. 1904, p. 343.
   Top. sheet La Sal.

   49 miles SE. Thompsons, D. & R. G. R. R.
   Glacial (?) gravels.
   Hill, J. M., Notes on the northern La Sal Mountains, Grand County, Utah:
   Bull. 530, 1912.
   Min. Res. 1906, p. 344.
   1908, pt. 1, p. 556.
   Top. sheet La Sal.

IRON COUNTY

   17 miles NW. Modena, S. P. L. A. & S. L. R. R.
   Tertiary volcanics.
   Veins.
   Harder, E. C., Manganese deposits of the United States: Bull. 380, 1909,
   p. 274.
   Min. Res. 1906, pp. 344-345.
   1907, pt. 1, pp. 100, 447.
   1908, pt. 1, p. 557.
   Top. sheet St. George.

   Paleozoic and Cretaceous sediments cut by andesite porphyry.
   Contact metamorphic.
   ——— Iron ores of the western United States and British Columbia: Bull.
   285, 1906, p. 199.
   Leith, C. K., and Harder, E. C., The iron ores of the Iron Springs district,
   southern Utah: Bull. 338, 1908.
   Min. Res. 1883-84, p. 288.
   Top. sheets St. George, Iron Springs special.
31. **Pinto Iron.** Fe.
   32 miles SSE. Modena, S. P. L. A. & S. L. R. R.
   Paleozoic sediments cut by andesite.
   Contact metamorphic.
   Min. Res. 1883-84, p. 288.
   Top. sheet St. George.

32. **Stateline.** Au, Ag, Pb.
   17 miles NNW. Modena, S. P. L. A. & S. L. R. R.
   Tertiary volcanics.
   Veins.
   Min. Res. 1906, p. 345.
   1907, pt. 1, p. 447.
   1908, pt. 1, p. 557.

**JUAB COUNTY.**

33. **Detroit (Joy).** Cu, Au, Ag, Mn, Bi.
   35 miles NNW. Oasis, S. P. L. A. & S. L. R. R.
   Paleozoic sediments cut by granite.
   Contact metamorphic.
   1907, pt. 1, p. 100.
   1908, pt. 1, p. 154.

34. **Fish Springs.** Ag, Pb, Au.
   65 miles NW. Oasis, S. P. L. A. & S. L. R. R.
   Paleozoic sediments cut by porphyry.
   Replacements (?).
   Min. Res. 1905, p. 316.
   1906, p. 345.
   1907, pt. 1, p. 447.
   1908, pt. 1, p. 557.
   Top. sheet Fish Springs.

35. **Mona.** Cu, Au, Ag (Sb).
   Mona station S. P. L. A. & S. L. R. R.
   Top. sheets Manti, Tintic special.
   Folio 65, 1899.

36. **Mount Nebo.** Ag, Pb.
   1908, pt. 1, p. 557.
   Top. sheet Manti.

37. **Spring Creek.** Au, Ag.
   105 miles NW. Oasis, S. P. L. A. & S. L. R. R.
   Top. sheet Fish Springs.
38. **Tintic.** Au, Ag, Pb, Cu.
   Paleozoic sediments cut by monzonite.
   Replacements and veins.
   Top. sheet Tintic special.
   Folio 65, 1900.

39. **West Tintic.** Ag, Pb, Fe.
   Paleozoic sediments cut by monzonite.
   Replacements and veins.
   Min. Res. 1883-84, p. 289.
   1909, pt. 1, p. 473.
   Top. sheet Sevier Desert.

40. **Leamington (Oak City).** Ag, Pb, Au.
   12 miles S. Leamington, S. P. L. A. & S. L. R. R.
   Min. Res. 1905, p. 320.
   1906, p. 348.
   1909, pt. 1, p. 473.
   Top. sheet Sevier Desert.

41. **Argenta (Mill Creek).** Pb, Ag, Au, Fe.
   20 miles S. Morgan, U. P. R. R.
   Min. Res. 1883-84, p. 288.
   1905, p. 320.
   1906, p. 348.
   1907, pt. 1, p. 453.
   1908, pt. 1, p. 561.
   1909, pt. 1, p. 473.
   Top. sheet Salt Lake.

42. **Morgan.** Cu, Ag.
   10 miles N. Morgan, U. P. R. R.
   1908, pt. 1, p. 561.

43. **Kimberly (Gold Mountain).** Au, Ag.
   15 miles SW. Sevier, D. & R. G. R. R.
   Tertiary volcanics.
   Veins.
   Lindgren, W., The Annie Laurie mine, Piute County, Utah: Bull. 285, 1906, pp. 87-90.
   Top. sheet Beaver.
44. Omitted.

45. Ohio (Marysvale, Mount Baldy). Au, Ag, Cu, Pb, Hg.
Station D. & R. G. R. R.
Tertiary volcanics and Triassic sediments.
Veins.
Butler, B. S., and Gale, H. S., Alunite, a newly discovered deposit near Marysvale, Utah: Bull. 511, 1912.
Lindgren, W., The Annie Laurie mine, Piute County, Utah: Bull. 285, 1906, pp. 87-90.
Min. Res. 1905, p. 320.
1906, p. 348.
1907, pt. 1, p. 453.
1908, pt. 1, p. 561.
1909, pt. 1, p. 473.
Top. sheet Beaver.

46. Big Cottonwood. Ag, Pb, Au, Cu, Zn.
Sandy station, D. & R. G. R. R.
Paleozoic sediments cut by granite.
Replacements, veins, contact metamorphic.
Min. Res. 1885, p. 249.
1905, p. 321.
1906, pp. 348-349, 444.
Top. sheets Salt Lake, Cottonwood special.

47. Hot Springs.
10 miles N. Le Grande, D. & R. G. R. R.
Top. sheet Salt Lake.

48. Little Cottonwood (Alta). Ag, Pb, Au, Cu, Mn, Fe.
Paleozoic sediments cut by granite.
Replacements, veins.
Min. Res. 1885, p. 249.
1905, pp. 320-321.
1906, pp. 348-349, 449.
Top. sheets Salt Lake, Cottonwood special.

49. West Mountain (Bingham). Cu, Au, Ag, Pb (Zn, Fe, Mn).
Bingham Canyon, D. & R. G. R. R.
Paleozoic sediments cut by monzonite.
Replacements, disseminations, veins.
SALT LAKE COUNTY—Continued.

49. West Mountain (Bingham)—Continued.
Top. sheets Bingham mining map, Tooele Valley.

SAN JUAN COUNTY.

50. Blue Mountains (Monticello). Au, Ag, Cu.
95 miles SSE. Thompson's, 75 miles W. Placerville, Colo., R. G. S. R. R.
Top. sheet Abajo.

51. Omitted.

52. Bluff. Au, Ag. (Pl.)
On San Juan and Grand rivers, 70 miles W. Cortez, Colo., R. G. S. R. R.
Stream gravels.
Top. sheets Henry Mountains, Abajo.

SEVIER COUNTY.

53. Henry. Ag, Au.
5 miles SE. Sevier, D. & R. G. R. R.
Tertiary volcanics.
Veins.
Top. sheet Beaver.

54. Salina Creek. Pb, Cu (Ag).
Salina station, D. & R. G. R. R.
Top. sheet Fish Lake.

SUMMIT COUNTY.

55. Uinta (Park City). Ag, Pb, Au, Cu, Zn.
Station D. & R. G. R. R., U. P. R. R.
Pre-Cambrian and Paleozoic sediments cut by granodiorite and andesite.
Veins, replacements, and contact metamorphic.
——— and Woolsey, L. H., Geology and ore deposits of the Park City district, Utah: P. P. 77, 1912.
21528°—Bull. 507—12——18
SUMMIT COUNTY—Continued.

55. Uinta (Park City)—Continued.
Min. Res. 1885, p. 249.
1886, p. 143.
1887, p. 104.
1888, p. 86.
1905, pp. 325–328.
1908, pt. 1, pp. 567–570.
1909, pt. 1, pp. 479–481.
Top. sheets Salt Lake, Coalville, Park City special.

TOOELE COUNTY.

56. Blue Bells. Au (Ag, Pb).
Lofgreen station, S. P. L. A. & S. L. R. R.
Top. sheet Tooele Valley.

57. Camp Floyd (Mercur). Au, Ag, Pb (Hg).
Mercur station, S. L. & M. R. R.,
Paleozoic sediments cut by porphyry.
Replacements.
1906, pp. 358–359, 494.
1908, pt. 1, pp. 570–571.
Top. sheet Tooele Valley.

58. Clifton (Gold Hill). Cu, Au, Ag, Pb.
90 miles NE. Cherry Creek, Nev., N. N. R. R.
Paleozoic sediments cut by porphyry.
Contact metamorphic.
1906, p. 359.
1908, pt. 1, p. 571.

59. Columbia. Ag, Pb.
Lofgreen station, S. P. L. A. & S. L. R. R.
Top. sheet Sevier Desert.

60. Desert.
45 miles SW. Center, S. P. L. A. & S. L. R. R.
Top. sheet Tooele Valley.

61. Dugway. Pb, Cu, Ag.
76 miles WSW. Center, S. P. L. A. & S. L. R. R.
Paleozoic sediments cut by porphyry.
1906, p. 359.

25 miles SSW. Center, S. P. L. A. & S. L. R. R.
Granite.
62. **Erikson—Continued.**

Veins.
Top. sheet Sevier Desert.

63. **Granite Mountains.** Pb, Ag.
85 miles W. Center, S. P. L. A. & S. L. R. R.
Paleozoic sediments cut by porphyry (?).
Veins (?).

64. **Lakeside.** Pb, Ag.
Dell station, W. P. R. R.
Top. sheet Tooele Valley.

65. **North Tintic.** Pb, Ag, Zn (Au).
5 miles N. Eureka, D. & R. G. R. R.
Paleozoic sediments.
Replacements and veins.
1906, pp. 359–360, 476.
1907, pt. 1, p. 465.
1909, pt. 1, pp. 483–484.
Top. sheets Sevier Desert, Tintic special.
Folio 65, 1900.

66. **Ophir.** Ag, Au, Pb, Cu, Zn (Fe).
8 miles E. St. John, S. P. L. A. & S. L. R. R.
Paleozoic sediments cut by monzonite.
Veins and replacements.
Min. Res. 1885, p. 249.
1905, pp. 328, 330.
1906, pp. 360, 408.
1907, pt. 1, p. 465.
1908, pt. 1, p. 572.
1909, pt. 1, p. 484.
Top. sheet Tooele Valley.

67. **Rush Valley (Stockton).** Ag, Pb, Au (Cu, Zn, Fe).
Stockton station, S. P. L. A. & S. L. R. R.
Paleozoic sediments cut by acidic and basic dikes.
Veins, replacements.
1906, p. 360.
1908, pt. 1, p. 572.
1909, pt. 1, p. 484.
Top. sheet Tooele Valley.

68. **Silver Islet.** Pb, Cu, Ag.
9 miles N. Wendover, W. P. R. R.
Limestone.
Replacements.
1909, pt. 1, p. 484.

69. **Tooele.**
Station S. P. L. A. & S. L. R. R.
Top. sheet Tooele Valley.
70. Willow Springs. Ag, Pb.
    80 miles NE. Cherry Creek, Nev., N. N. R. R.
    Top. sheet Fish Springs.

71. Carbonate. Au, Ag, Cu.
    82 miles NNW. Dragoon, U. R. R.
    Top. sheets Marsh Peak, Ashley.

72. Green River (Cub Creek). Au. (Pl.)
    70 miles SE. Carter, Wyo., U. P. R. R.
    Stream gravels.
    1908, pt. 1, p. 572.
    1909, pt. 1, p. 448.
    Top. sheet Ashley.

73. Spring Creek. Fe.
    70 miles SE. Carter, Wyo., U. P. R. R.
    Jurassic and Cretaceous sediments.
    Bedded.
    Boutwell, J. M., Iron ores in the Uinta Mountains, Utah: Bull. 225, 1904,
    p. 225.
    Top. sheet Ashley.

74. American Fork. Ag, Au, Pb, Cu (Zn).
    Paleozoic sediments.
    Replacements.
    1906, p. 361.
    1907, pt. 1, pp. 466-467.
    1908, pt. 1, p. 573.
    Top. sheets Salt Lake, Cottonwood special.

75. Lehi.
    Top. sheet Salt Lake.

76. Provo. Pb, Ag.
    Top. sheet Salt Lake.

77. Santaquin. Ag, Pb.
    Station S. P. L. A. & S. L. R. R
    Top. sheet Manti.

78. Silver Lake. Ag, Pb.
    Top. sheet Salt Lake.

79. Tintic. Au, Ag, Pb.
    Eureka station, D. & R. G. R. R.
    Paleozoic sediments cut by monzonite.
    Replacements and veins.
    Harder, E. C., Manganese deposits of the United States: Bull. 380, 1909,
    p. 279.
    Tower, G. W., and Smith, G. O., Geology and mining industry of the Tintic
79. **Tintic—Continued.**
Min. Res. 1882, pp. 228-229.
1887, p. 104.
1905, p. 330.
1907, pt. 1, p. 466.
1908, pt. 1, p. 572.
Top. sheets Manti, Tintic special.
Folio 65, 1900.

80. **Utah.**
10 miles N. Elberta, D. & R. G. R. R.
Top. sheets Tooele Valley, Salt Lake.

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**UTAH COUNTY—Continued.**

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**WASATCH COUNTY.**

81. **Blue Ledge.** Cu, Ag, Au.
5 miles W. Heber, D. & R. G. R. R.
Top. sheet Salt Lake.

82. **North Fork.** Au, Ag, Cu.
40 miles SE. Park City, D. & R. G. R. R.
Paleozoic sediments.
Top. sheets Uinta, Hayden Peak.

83. **Rhodes Plateau (Woodland).** Fe.
30 miles ESE. Park City, 30 miles ENE. Heber, D. & R. G. R. R.
Paleozoic sediments.
Replacements.
Boutwell, J. M., *Iron ores of the Uinta Mountains, Utah*: Bull. 225, 1904,
pp. 221-228.
Top. sheet Coalville.

84. **Snake Creek.** Au, Ag, Pb, Zn, Cu.
10 miles SW. Heber, D. & R. G. R. R.
Top. sheets Salt Lake, Coalville.

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**WASHINGTON COUNTY.**

85. **Bull Valley.** Fe.
Paleozoic sediments cut and capped by Tertiary lavas.
Contact metamorphic.
Top. sheet St. George.

86. **Harrisburg (Silver Reef).** Ag.
75 miles SE. Modena, S. P. L. A. & S. L. R. R.
"Red Beds."
Impregnations.
1907, pt. 1, p. 467.
1908, pt. 1, p. 573.
Top. sheet St. George
MINING DISTRICTS OF WESTERN UNITED STATES.

WASHINGTON COUNTY—Continued.

87. Tutsagubet. Cu, Pb, Ag (Au).
   Paleozoic limestone.
   Replacements.
   1907, pt. 1, p. 467.
   Top. sheet St. George.

WEBER COUNTY.

88. Sierra Madre. Cu, Au, Ag, Pb, Fe.
   Pre-Cambrian granite and gneiss, Paleozoic sediments.
   Veins.
   1906, pp. 343-344.
   1908, pt. 1, p. 556.
WASHINGTON.

In Washington 59 mining districts are scattered through 15 counties. In 31 of these districts the gold values are highest, in 11 copper is most valuable, in 6 lead, in 5 silver, and in 3 iron. There is one camp producing antimony, one tungsten, and one tin and tungsten, all classed as rare-metal districts.

Distribution of the predominant metals produced in the mining districts of Washington.

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<th>County</th>
<th>Gold</th>
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<th>Copper</th>
<th>Lead</th>
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MINING DISTRICTS IN WASHINGTON.

[See Pl. XV. Additional references will be found in Mineral Resources for 1910 and 1911.]

CHELAN COUNTY.

1. Bridge Creek (Stehekin). Au, Ag.
   100 miles N. Wenatchee, G. N. R. R.
   Granite, gneiss, and schist.
   Veins.
   Top. sheet Stehekin.

2. Entiat. Au, Ag.
   20 miles N. Wenatchee, G. N. R. R.
   Schists.
   Veins.
   Top. sheet Chelan.

3. Horseshoe Basin (Pershall). Au, Ag, Pb, Cu.
   140 miles N. Wenatchee, G. N. R. R.
   Top. sheet Stehekin.
4. **Lakeside.** Au.
40 miles N. Wenatchee, G. N. R. R.
1908, pt. 1, p. 578.
Top. sheet Chelan.

5. **Leavenworth.** Au, Ag. (D, Pl.)
Station G. N. R. R.
1908, pt. 1, p. 577.
Top. sheet Chiwaukum.

6. **Peshastin (Blewett).** Au, Ag, (D, Pl.)
12 miles S. Dryden, G. N. R. R.
Paleozoic sediments, peridotite, granodiorite.
Veins.
Weaver, C. E., Geology and ore deposits of the Blewett mining district: Bull. Washington Geol. Survey No. 6, 1911.
Top. sheets Chiwaukum, Mount Stuart.
Folio 106, 1904.

7. **Railroad Creek.** Au, Ag, Cu, Mo.
87 miles N. Wenatchee, G. N. R. R.
Gneiss and schist cut by granite.
Veins.
Top. sheet Stehekin.

8. **Wenatchee.** Au.
7 miles W. Wenatchee, G. N. R. R.
Sediments cut by rhyolite.
Veins.
Min. Res. 1908, pt. 1, p. 578.

---

**CLALLAM COUNTY.**

9. **Ozette River.** Au. (Pl.)
120 miles W. Port Townsend, P. T. S. R. R.
Beach placers.
Min. Res. 1908, pt. 1, p. 578.

10. **Shishi Beach.** Au. (Pl.)
120 miles E. Port Townsend, P. T. S. R. R.
Beach gravels.

11. **Yellow Banks.** Au. (Pl.)
130 miles W. Port Townsend, P. T. S. R. R.
Beach gravels.
LIST OF MINING DISTRICTS

CHELAN COUNTY
1. Bridge Creek (Stehekin)
2. Entiat
3. Horsethief Basin (Pershall)
4. Lakeside
5. Leavenworth
6. Peshastin (Blewett)
7. Railroad Creek
8. Wenatchee

CLALLAM COUNTY
9. Ozette River
10. Shi Shi Beach
11. Yellow Banks

FERRY COUNTY
12. Belcher
13. Columbia River (placers)
14. Danville
15. Lone Star
16. Metach (Coyote)
17. Republic (Eureka)
18. Sampson

KING COUNTY
19. Mossy Creek (Miller Creek)
20. Money Creek (Miiar Creek)

KITTITAS COUNTY
21. Fish Lake
22. Swauk (Liberty)

LEWIS COUNTY (See Skamania)

LINCOLN COUNTY
23. Crystal

OKANOGAN COUNTY
24. Conconully (Ruby)
25. Myers Creek (Chesaw)
26. Moses (Nezper, Poth City)
27. Nighthawk
28. Osoyoos Lake (Oroville)
29. Okanogan Mountain (Louisa, Wannacut Lake)
30. Squaw Creek (Matlock)
31. Twisp
32. Upper Methow
33. Wagonch

PIERCE COUNTY
34. Carbon River

SKAGIT COUNTY
35. Bald Mountain
36. Thunder Creek

SKAMANIA and LEWIS COUNTIES
37. Mineral
38. St. Helens
39. Snowshoemish County
40. Darrington
41. Granite Falls
42. Index

SNOHOMISH COUNTY
43. Mount Baker
44. Slate Creek (Barron)

SPokane COUNTY
45. Silver Hill

STEVENS COUNTY
46. Bossburg
47. Chewelah
48. Deep Creek Lake
49. Deer Park
50. Deer Trail
51. Metaline
52. Meyers Falls
53. Nighthawk
54. Old Dominion (Colville)
55. Orient
56. Silver Queen
57. Whatcom County
58. Mount Baker
59. Slate Creek (Barron)

MAP OF WASHINGTON, SHOWING LOCATION OF MINING DISTRICTS

Scale 1,200,000
APPROXIMATELY 40 MILES TO 1 INCH
0 25 50 75 100 Miles

Legend:
- Gold predominant
- Copper predominant
- Silver predominant
- Lead predominant
- Iron
- Rare metals
WASHINGTON.

FERRY COUNTY.

Belcher siding, G. N. R. R.
Paleozoic sediments cut by quartz monzonite.
Replacements, contact metamorphic.
Top. sheet Republic.

13. Columbia River. Au. (Pl.)
11 miles NE. Creston, N. P. R. R.
Stream gravels.

Station G. N. R. R.
Paleozoic sediments and greenstones.
Replacements and veins.
1908, pt. 1, p. 578.
Top. sheet Republic.

15. Lone Star. Cu.
6 miles W. Danville, G. N. R. R.
Paleozoic sediments cut by quartz monzonites.
Veins and replacements.
Top. sheet Republic.

34 miles SSW. Meyers Falls, G. N. R. R.
Metamorphosed Paleozoic sediments cut by diorite.
Veins.
1908, pt. 1, p. 578.

17. Republic (Eureka). Au, Ag.
Station G. N. R. R.
Tertiary volcanics.
Veins.
1906, p. 366.
1908, pt. 1, p. 578.
Top. sheet Republic.

18. Sanpoil. Cu, Pb, Ag, Ni.
30 miles N. Wilbur, N. P. R. R.
Metamorphosed Paleozoic sediments cut by quartz monzonite.
Veins, replacements.

KING COUNTY.

19. Money Creek (Miller Creek). Au, Ag, Pb, Cu, Sb.
Berlin station, G. N. R. R.
Granite.
Veins.
KING COUNTY—Continued.

19. Money Creek (Miller Creek)—Continued.
   1906, p. 367.
   Top. sheet Skykomish.
   Snoqualme Pass, C. M. & P. S. R. R.
   Marble, limestone, and granite.
   Bedded.

KITTITAS COUNTY.

20. Fish Lake. Au, Ag, Cu.
   40 miles N. Roslyn, N. P. R. R.
   Top. sheet Skykomish.
21. Swauk (Liberty). Au, Ag, Fe. (D, Pl.)
   15 miles ENE. Clealum, N. P. R. R.
   Tertiary sediments cut by basalt.
   Veins.
   1906, p. 367.
   1907, pt. 1, p. 474.
   1908, pt. 1, p. 579.
   Top. sheet Mount Stuart.
   Folio 106, 1904.

LEWIS COUNTY. (See Skamania.)

LINCOLN COUNTY.

22. Crystal. Ag, Pb.
   15 miles N. Davenport, N. P. R. R.
   Schists and slates.
   Veins.

OKANOGAN COUNTY.

23. Conconully (Ruby). Pb, Ag, Au, Cu.
   26 miles S. Nighthawk, G. N. R. R.
   Granite, schist, and gneiss cut by dikes.
   Veins.
   1908, pt. 1, p. 580.
   Top. sheet Chopaka.
24. Myers Creek (Chesaw). Au, Ag, Cu. (D, Fl.)
   5 miles S. Myncaster, Canada, G. N. R. R.
   Paleozoic sediments and greenstones cut by granite and syenite.
   Veins, contact metamorphic.
OKANOGAN COUNTY—Continued.

24. Myers Creek (Chesaw)—Continued.
   Umpleby, J. B., Geology and ore deposits of the Myers Creek mining district:
   1907, pt. 1, p. 474.
   1908, pt. 1, p. 579.
   Top. sheet Osoyoos.

25. Moses (Nespelem, Park City). Au, Ag, Pb, Cu.
   37 miles N. Almira, N. P. R. R.
   Veins.

   Station G. N. R. R.
   Paleozoic sediments and greenstones cut by granite.
   Veins.
   Umpleby, J. B., Geology and ore deposits of the Oroville-Nighthawk mining

   Oroville station, G. N. R. R.
   Paleozoic sediments and greenstones cut by andesite.
   Veins, disseminations.
   Umpleby, J. B., Geology and ore deposits of the Oroville-Nighthawk mining
   Top. sheet Osoyoos.

27. Palmer Mountains (Wannacut Lake, Loomis). Au, Cu, Ag.
   14 miles S. Nighthawk, G. N. R. R.
   Greenstones and Paleozoic sediments cut by granite.
   Veins.
   Smith, G. O., and Calkins, F. C., A geologic reconnaissance across the Cas­
   cade Range near the forty-ninth parallel: Bull. 235, 1904, p. 95.
   1907, pt. 1, pp. 580, 723.
   Top. sheet Chopaka.

28. Squaw Creek (Methow). Au, Ag, Cu, Sb.
   53 miles N. Mansfield, 73 miles NNE. Wenatchee, G. N. R. R.
   Gneiss cut by granite.
   Veins.
   1907, pt. 1, p. 475.
   1908, pt. 1, p. 579.
   Top. sheet Methow.

29. Twisp. Au, Ag, Cu.
   97 miles N. Wenatchee, G. N. R. R.
   Top. sheet Methow.

30. Upper Methow. Ag, Cu, Au.
   119 miles N. Wenatchee, G. N. R. R.
   Gneiss and schist cut by granite.
   Veins.
31. Wauconda. Au, Ag.
19 miles NW. Republic, G. N. R. R.
Paleozoic sediments cut by granite.
Veins.

PIERCE COUNTY.

Fairfax station, N. P. R. R.
Syenite.
Veins.

SKAGIT COUNTY.

10 miles S. Lymon, G. N. R. R.
Schist and slate cut by diorite.
Veins.
Top. sheet Mount Vernon.

34. Thunder Creek. Ag, Au.
36 miles W. Rockport, G. N. R. R.
Veins.

34a. Hamilton. Fe.
Hamilton station, G. N. R. R.
Sandstones, limestones, shale, and slate.
Beds.

SKAMANIA AND LEWIS COUNTIES.

35. Mineral. As.
Station T. E. R. R.

41 miles E. Castlerock, N. P. R. R.
Syenite cut by porphyry.
Veins.

SNOHOMISH COUNTY.

37. Darrington. Au, Ag, Cu.
Station N. P. R. R.
Schist, slate, serpentine.
Veins.

38. Granite Falls. Au, Ag, Cu.
Station N. P. R. R.
1907, pt. 1, p. 475.

39. Index. Cu, Ag, Au.
Station G. N. R. R.
Granite cut by basic dikes.
WASHINGTON.

SNOHOMISH COUNTY—Continued.

39. Index—Continued.
Veins.
Weaver, C. E., Geology and ore deposits of the Index mining district: Bull.
Weed, W. H., The copper mines of the United States in 1906: Bull. 285,
1906, p. 123.
1908, pt. 1, p. 580.
Top. sheet Skykomish.

40. Monte Cristo. Au, Ag, Cu, As.
Station N. P. R. R.
Mesozoic granites and Tertiary volcanics.
Veins.
Min. Res. 1905, p. 337.
1907, pt. 1, p. 475.
Top. sheet Skykomish.

41. Silver Creek. Cu, Au, Ag, Pb.
8 miles SW. Monte Cristo, N. P. R. R.
Granite and Tertiary volcanics.
Veins.
Top. sheet Skykomish.

42. Stilaguamish (Silverton). Cu, Au, Ag, Pb.
Station N. P. R. R.
Granite, diorite.
Veins.
Top. sheet Skykomish.

SPOKANE COUNTY.

43. Silver Hill. Sn, W.
12 miles SSE. Spokane, N. P. R. R., G. N. R. R.
Pre-Cambrian gneiss and schist cut by acidic and basic dikes and capped
by basalt.
Veins.
1908, pt. 1, p. 723.
Top. sheet Spokane.

STEVENS COUNTY.

44. Bossburg. Pb, Ag.
Station G. N. R. R.
Paleozoic sediments.
Replacement, veins.
45. Chewelah. Cu, Ag, Pb, Zn, Au, Fe.
Station G. N. R. R.
Paleozoic sediments cut by diorite and other basic intrusives. 
Veins.
Min. Res. 1905, p. 337.
1907, pt. 1, p. 476.

46. Deep Creek Lake. Fe.
12 miles SE. Northport, G. N. R. R.
Granite, Paleozoic sediments.
Bedded.

47. Deer Park. W.
5 miles NE. Loon Lake, 10 miles N. Deer Park, G. N. R. R.
Granite and metamorphosed Paleozoic sediments.
Lenses and veins.

18 miles WSW. Springdale, G. N. R. R.
Paleozoic sediments cut by acidic and basic dikes.
Veins.
Min. Res. 1904, p. 331.
1905, p. 337.
1906, p. 367.
1907, pt. 1, p. 476.
1908, pt. 1, pp. 581, 723.

49. Metaline. Pb, Zn, Ag.
Station I. & W. N. R. R.
Paleozoic sediments.
Disseminated and replacements.
1908, pt. 1, p. 581.

50. Meyers Falls. Au, Ag, Cu.
Station G. N. R. R.
Paleozoic sediments cut by porphyry.
Veins.
Min. Res. 1905, p. 337.
1907, pt. 1, p. 476.
51. **Northport.** Pb, Ag, Zn.
   Station G. N. R. R.
   Paleozoic sediments cut by acidic and basic dikes.
   Veins, replacements.
   1907, pt. 1, p. 476.

52. **Old Dominion (Colville).** Pb, Ag.
   7 miles E. Colville, G. N. R. R.
   Paleozoic sediments cut by granite.
   Contact metamorphic.

53. **Orient.** Au, Ag, Cu.
   Station G. N. R. R.
   Tertiary volcanics.
   Veins, impregnations.
   Min. Res. 1905, p. 337.
   1908, pt. 1, p. 581.

54. **Silver Queen.** Pb, Ag.
   8 miles S. Meyers Falls, G. N. R. R.
   Paleozoic sediments cut by granite.
   Replacement veins.

**WHATCOM COUNTY.**

55. **Mount Baker.** Au, Ag, Cu.
   12 miles ESE. Glacier, B. B. & B. C. R. R.
   Metamorphosed sediments cut by porphyry.
   Veins.
   Smith, G. O., and Calkins, F. C., A geological reconnaissance across the
   Cascade Range near the forty-ninth parallel: Bull. 235, 1904, pp. 95-96.
   Min. Res. 1905, p. 337.
   1906, p. 368.
   1907, pt. 1, p. 477.

56. **Slate Creek (Barron).** Au, Ag. (Pl.)
   60 miles NE. Rockport, G. N. R. R.
   Stream gravels.
   Russell, I. C., A preliminary paper on the geology of the Cascade Moun­
   Min. Res. 1906, p. 368.
   1907, pt. 1, p. 477.
   1908, pt. 1, pp. 581-582.
WYOMING.

In the State of Wyoming 11 counties are producers of metallic minerals and 36 mining districts are recognized by the United States Geological Survey. In 19 of these districts copper is the principal metal produced and in 13 gold values predominate. Three districts are assigned to iron, but in one of these chromium is mined exclusively. One locality is in the prospect stage and its predominant metal is uncertain.

Distribution of the predominant metals produced in the mining districts of Wyoming.

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MINING DISTRICTS IN WYOMING.

[See Pl. XVI. Additional references will be found in Mineral Resources for 1910 and 1911.]

ALBANY COUNTY.

   Station L. H. P. & P. R. R.
   1907, pt. 1, p. 479.
   1908, pt. 1, p. 584.
   Top. sheet Medicine Bow.

2. Douglas Creek (Holmes). Cu, Au, Ag, Pt, Pd. (D, Pl.)
   10 miles WNW. Albany, L. H. P. & P. R. R.
   Gneiss and quartzite cut by basic dikes.
   Veins.
LIST OF MINING DISTRICTS

ALBANY COUNTY
1. Centennial (La Plata)
2. Douglas Creek (Holmes)
3. Horse Creek
4. Iron Mountain
5. Jelm Mountain
6. Laramie Peak (Enterbrook)

BIGHORN AND PARK COUNTIES
7. Bald Mountain
8. Clark Fork
9. South Fork
10. Sunlight
11. Wood River (Kirwin)

CARBON COUNTY
12. Encampment (Battlo, Purgatory, Three Forks)
13. French Creek
14. Rankin
15. Seminole

CONVERSE COUNTY
16. Deer Creek
17. Waboonet

CROOK COUNTY
18. Bear Lodge
19. Hurricane

FREMONT COUNTY
20. Atlantic
21. Birdsye (Copper Mountain)
22. De Pass
23. Lewiston
24. Owl Creek
25. South Pass
26. Willow Creek

JOHNSON COUNTY
27. Bull Camp
28. Kelley Creek (Buffalo)

LARAMIE COUNTY
29. Hartville (Sunrise, Platte Canyon)
30. Fish Creek
31. Rawhide Butte
32. Silver Crown (Hecla)

NATRONA COUNTY
33. Casper Mountain

PARK COUNTY
(See Bighorn)

 UINTA COUNTY
34. Coxcomb
35. Horse Creek
36. Snake River placers (Hoback) (Pine Bar)

MAP OF WYOMING, SHOWING LOCATION OF MINING DISTRICTS

LEGEND
- Gold predominant
- Copper predominant
- Iron and chromium
- Gold, silver, copper, lead (predominant metal uncertain)

Scale 2,500,000
Approximately 40 miles to 1 inch
100 Miles
100 Kilometers

1912
ALBANY COUNTY—Continued.

2. Douglas Creek (Holmes)—Continued.
   Min. Res. 1902, pp. 244-250.
   1905, p. 339.
   1906, pp. 369-370.
   1907, pt. 1, p. 479.
   1908, pt. 1, p. 584.
   1909, pt. 1, p. 493.
   Top. sheet Medicine Bow.

3. Horse Creek. Cu.
   Station C. & S. R. R.
   Pre-Cambrian schist and granite.
   Veins (?)..
   1906, p. 370.
   1908, pt. 1, p. 584.
   Top. sheet Sherman.
   Folio 173, 1910.

4. Iron Mountain. Fe, Ti.
   8 miles west of Iron Mountain, C. & S. R. R.
   Pre-Cambrian complex.
   Lenticular masses and dikes.
   Ball, S. H., Titaniferous iron ore of Iron Mountain, Wyo.: Bull. 315, 1907,
   pp. 206-212.
   Top. sheet Sherman.
   Folio 173, 1910.

5. Jelm Mountains. Cu, Au, Ag.
   33 miles SW. Laramie, U. P. R. R.
   Pre-Cambrian complex.
   Veins.
   Beeler, H. C., Mineral and allied resources of Albany County, Wyo., Wyoming
   1908, pt. 1, p. 584.
   Top. sheet Laramie.
   Folio 173, 1910.

   22 miles S. Douglas, C. B. & Q. R. R.
   Granite.
   Veins.
   Beeler, H. C., Mineral and allied resources of Albany County, Wyo., Wyoming
   ——— The North Laramie Peak copper district, Wyoming Geol. Survey, 1904.
   1908, pt. 1, p. 584.

BIGHORN AND PARK COUNTIES.

   30 miles E. Kane, C. B. & Q. R. R.
   Cambrian sediments.
   21528°—Bull. 507—12——19
7. **Bald Mountain**—Continued.
   Free gold in conglomerate.
   Top. sheet Bald Mountain.
   Folio 141, 1906.

8. **Clark Fork.** Au. (Pl.)
   23 miles SSW. Belfry, N. P. R. R.
   Stream gravels.
   Top. sheet Crandall.
   Folio 52, 1899.

9. **South Fork.** Au, Ag, Cu.
   52 miles SW. Cody, C. B. & Q. R. R.
   Tertiary volcanics.
   Veins.
   Top. sheet Ishawooca.
   Folio 52, 1899.

10. **Sunlight.** Cu, Au, Ag.
    95 miles ESE. Gardiner, N. P. R. R.
    Tertiary volcanics.
    Veins.
    Top. sheet Crandall.
    Folio 52, 1899.

11. **Wood River (Kirwin).** Au, Ag, Pb, Cu.
    76 miles SSW. Cody, 97 miles WSW. Basin, C. B. & Q. R. R.
    1906, p. 370.
    1907, pt. 1, p. 481.
    1908, pt. 1, p. 585.
    Top. sheet Kirwin.

**CARBON COUNTY.**

12. **Encampment (Battle, Purgatory, Three Forks).** Cu, Ag, Au.
    Station S. & E. R. R.
    Pre-Cambrian complex.
    Stockworks and veins.
12. **Encampment (Battle, Purgatory, Three Forks)—Continued.**


1906, pp. 370, 410.

1907, pt. 1, pp. 480, 621, 622.

1908, pt. 1, pp. 219, 584-585.

1909, pt. 1, p. 493.

Top. sheet Encampment special.

13. **French Creek.** Cu, Au.

30 miles E. Encampment, S. & E. R. R.

Pre-Cambrian complex cut by basic dikes.

Top. sheet Medicine Bow.

14. **Rankin.** Cu.

10 miles N. Rawlins, U. P. R. R.

15. **Seminole.** Cu, Fe.

60 miles N. Rawlins, U. P. R. R.

Schists and quartzites.

Lenses.


Min. Res. 1882, p. 147.

1883-84, p. 285.

**CONVERSE COUNTY.**

16. **Deer Creek.** Cr.

15 miles SW. Glenrock, C. & N. W. R. R.

Serpentine.

Lenses.


17. **Warbonnet.** Cu.

25 miles SW. Douglas, C. & N. W. R. R.


**CROOK COUNTY.**

18. **Bear Lodge.** Au, Ag. (D, Pl.)

15 miles SW. Aladdin, W. & M. R. R. R.

Cretaceous and Tertiary sediments cut by Tertiary volcanics.


Top. sheet Aladdin.

Folio 128, 1905.

19. **Hurricane.** Au. (Pl.)


Wash gravels.


1907, pt. 1, p. 481.

1908, pt. 1, p. 585.

Top. sheet Sundance.
Folio 127, 1905.

FREMONT COUNTY.

20. Atlantic. Au. (D, Pl.)
34 miles S. Lander, W. & N. W. R. R.
Pre-Cambrian complex.
Veins.
Jamieson, C. E., Geology and mineral resources of a portion of Fremont County, Wyo., Wyoming Geol. Survey, 1911, pp. 75, 80.
1906, p. 371.
1907, pt. 1, p. 482.
1908, pt. 1, p. 586.
1909, pt. 1, p. 449.

17 miles N. Shoshone, W. & N. W. R. R.
Pre-Cambrian granite and Paleozoic sediments cut by basic dikes.
Veins.
1907, pt. 1, p. 481.
1908, pt. 1, p. 586.

22. De Pass. Cu, Ag.
20 miles NNE. Shoshone, W. & N. W. R. R.
Paleozoic sediments.
Min. Res. 1907, pt. 1, p. 481.

23. Lewiston. Au. (Pl.)
44 miles S. Lander, W. & N. W. R. R.
1907, pt. 1, p. 482.

24. Owl Creek. Cu, Au, Ag.
45 miles NW. Riverton, W. & N. W. R. R.
Pre-Cambrian granite and schist.
Veins.

25. South Pass. Au. (D, Pl.)
39 miles S. Lander, W. & N. W. R. R.
Pre-Cambrian complex.
Veins.
FREMONT COUNTY—Continued.

   Beeler, H. C., Wyoming mines and minerals in brief, Wyoming Geol. Sur­
   vey, 1904, pp. 7-8.
   —— A brief review of the South Pass gold district, Fremont County, Wyo.,
   Wyoming Geol. Survey, 1904.
   Jamieson, C. E., Geology and mineral resources of a portion of Fremont
   County, Wyo., Wyoming Geol. Survey, 1911, pp. 75-80.
   1906, p. 371.
   1907, pt. 1, p. 482.
   1908, pt. 1, p. 586.
   1909, pt. 1, p. 449.

26. Willow Creek.
   22 miles WSW. Kerby, C. B. & Q. R. R.
   Pre-Cambrian granite and schist.
   Veins.
   Min. Res. 1907, pt. 1, p. 482.

   69 miles SW. Clearmont, C. B. & Q. R. R.
   Granite cut by diabase.
   Veins.
   1907, pt. 1, p. 482.
   1908, pt. 1, p. 586.
   Top. sheet Fort McKinney.
   Folio 142, 1906.

28. Kelley Creek (Buffalo). Au. (Pl.)
   35 miles SW. Clearmont, C. B. & Q. R. R.
   Cambrian conglomerate.
   Gold in conglomerate.
   1907, pt. 1, p. 482.
   Top. sheet Fort McKinney.
   Folio 142, 1906.

LARAMIE COUNTY.

29. Hartville (Sunrise, Platte Canyon). Fe (Cu).
   Stations C. B. & Q. R. R.
   Pre-Cambrian complex and Paleozoic sediments.
   Replacements.
   Ball, S. H., Copper deposits of the Hartville uplift, Wyoming: Bull. 315,
MINING DISTRICTS OF WESTERN UNITED STATES.

LARAMIE COUNTY—Continued.

29. Hartville (Sunrise, Platte Canyon)—Continued.

Min. Res. 1882, p. 147.
1883-84, pp. 229, 285, 342, 758-759.
1885, p. 342.
1888, p. 76.
1889, p. 59.
1905, p. 76.
1907, pt. 1, p. 482.
1909, pt. 1, p. 493.
Top. sheet Hartville.
Folio 91, 1903.

30. Fish Creek. Cu.
39 miles W. Junction, C. B. & Q. R. R.

34 miles NNW. Torrington, C. B. & Q. R. R.
Granite, schist.
Veins.
Min. Res. 1907, pt. 1, p. 482.
1908, pt. 1, p. 585.

32. Silver Crown (Hecla). Cu, Au, Ag.
5 miles N. Granite Canyon, U. P. R. R.
Pre-Cambrian schists and granite.
Veins, impregnations.
Top. sheet Sherman.
Folio 173, 1910.

NATRONA COUNTY.

25 miles S. Casper, W. & N. W. R. R.
1906, p. 371.

PARK COUNTY. (See Bighorn.)

UINTA COUNTY.

34. Cockscomb. Cu.
25 miles N. Evanston, U. P. R. R.
"Red Beds."
Disseminated.
Veatch, A. C., Geography and geology of a portion of southwestern Wyoming: P. P. 56, 1907, p. 163.
35. **Horse Creek.** Au, Ag. (D, Pl.)
   114 miles N. Kemmerer, U. P. R. R.
   Jurassic slates and limestones.
   Disseminated.

36. **Snake River placers (Hoback, Pine Bar).** Au, Ag. (Pl.)
   140 miles E. St. Anthony, Idaho, O. S. L. R. R.
   Stream and terrace gravels.
   1907, pt. 1, p. 482.
## ALPHABETIC LIST OF MINING DISTRICTS.

In the following list all the districts shown on Plates III to XVI are named in alphabetic order. In the State column "California, N" indicates the northern counties of California (Pl. IV), and "California, S" the southern counties (Pl. V). The numbers agree with those used in the plates and in the preceding lists.

### Mining districts in the western United States.

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<tr>
<th>Mining district</th>
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### Notes:
- State abbreviations are used throughout. One and two digit state numbers are used to indicate mining districts. Numbers indicate districts and states in the order in which they are listed. Initials are given for each district in the long list and the number is given in the short list.
### Mining districts in the western United States—Continued.

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