

1093, 0113 (4730) 6000 0161
- 559. J.
NEVADA
CHURCHILL COUNTY

Manderburg: USBM IC7093
Field work 1938-1939

TABLE MOUNTAIN DISTRICT

Cottonwood Canyon Ni-Co-Cu

Boyer Copper Mines

Dixie Comstock gold

Kaolin.

WHITE CLOUD DISTRICT (west of Table Mtn.)

Also TOY DISTRICT

WONDER DISTRICT

After the material was air-dried, it was heated in either a revolving or a reverberatory-type furnace to drive off the water of crystallization and excess carbonic acid, leaving a nearly pure anhydrous monocarbonate of soda, or soda ash, which was ground and sacked for shipment.

The foregoing process is based on the principle that if bicarbonate and carbonate of soda are present in a dense solution 1 molecule of bicarbonate will unite with 1 molecule of carbonate to form sesqui carbonate, or trona, which precipitates, while sodium chloride will remain in solution unless the solution density rises above 32° B., and sodium sulfate will remain in solution up to 34° B., providing the temperature stays above 75° F.

By the foregoing process only about 25 percent of the available soda is recovered, but since the cost of handling the solution was merely a question of pumping, the low extraction was not a cause for great concern.

Some soda was also obtained in solid form from Little Soda Lake, where it occurred in a layer about 2 feet thick near the surface.

TABLE MOUNTAIN DISTRICT.

The Table Mountain, Bolivia or Boyer, district is in the Stillwater Range in north-central Churchill County near the Pershing County border. The central part of the district is 57 miles north of Bermond (Frenchman's station) on the Lincoln Highway. It is also accessible from Lovelock on the Victory Highway or from Winnemucca on the Southern Pacific R. R. The distance from Winnemucca to the Boyer ranch in Dixie Valley is 87 miles; the road passes through Grass and Pleasant Valleys.

The district covers a large, vaguely defined area that contains a variety of minerals, including nickel-cobalt, copper, lead-silver, antimony, titanium, gold, and kaolin. From the viewpoint of past production, the gold deposits have been the most important.

Nickel-Cobalt Deposits

There are two nickel-cobalt occurrences in the Table Mountain district that were of sufficient importance to induce a number of attempts at exploitation in former years. The deposits are situated in the vicinity of the old camp of Bolivia about 3 miles up Cottonwood Canyon on the east slope of the Stillwater Range. The mouth of Cottonwood Canyon is 1-1/2 miles N. 35° W. from the Boyer ranch in Dixie Valley. There is a uniform grade up the canyon, but in several places the road has been washed out and some repair work is necessary to make it passable for automobile. Cottonwood Creek of variable flow, is fed by melting snows and springs; the flow may exceed a thousand gallons per minute during certain periods.

The nickel mine at Camp Bolivia was discovered in 1880 by John Mason, Charles Bell, and his brother, William. The Lovelock or Cobalt mine, about 1 mile west, was located at the same time by George Lovelock, Sr. The mines were prospected for a number of years, following their discovery, and the first ore is said to have been shipped to Swansea, Wales, from the Lovelock mine by

W. S. Keyes, a prominent early-day mine operator from Eureka, Nev. In 1887 an English company bonded the property and shipped a few tons of rich ore but did not complete the purchase. Subsequently, it was again bonded to an English syndicate, which organized the Nevada Nickel Co., which shipped about 15 tons of ore to San Francisco. In the late eighties the company erected a sulfuric acid leaching plant at the mine at a cost of \$50,000, but this venture was unsuccessful owing to the fact that the Italian chemist who designed the plant was unfamiliar with the metallurgy of nickel-cobalt ores. Later, a 5-ton-capacity water-jacketed furnace was erected at the Nickel mine, but it blew up a short time after it was placed in operation. In the late eighties a small smelting furnace was also erected at the Lovelock mine by George and Frank Bothwell and associates from New York, and from the size of the slag dumps not more than 100 tons of ore was treated. The Lovelock mine was last worked by the Mines Development Co. of Nevada. This company produced several carloads of ore that assayed as high as 26 percent copper with a small amount of nickel and cobalt. From the same vein that produced the copper ore, a few tons of nickel-cobalt ore was mined that yielded 29 percent nickel. It is also reported that 500 tons of nickel-cobalt ore was shipped from the Lovelock mine to Swansea, Wales, in the early eighties.

The mines were worked fairly continuously from 1880 to 1890, when they closed because of litigation and reopened in 1904 only to close again in 1908, since which time they have been inactive. Several years ago the Lovelock mine, comprising two patented claims, and the Nickel mine, of four unpatented claims, were purchased from the county for delinquent taxes by Tasker L. Oddie and Fred H. Luetjens of Reno, Nev.

The workings at the Nickel mine comprise about six short adits and an inclined shaft about 100 feet deep. None of the workings are more than 100 feet from the surface. There is no equipment except several dilapidated camp buildings and the ruins of the old leaching plant, consisting of mill building, leaching vats, and boiler.

In the vicinity of the Nickel mine the formation is diorite, andesite, and fine-grain quartzite, the latter forming a bold and jagged ridge above the mine workings. Some quartzite on the dumps shows the characteristic stain of arsenic minerals, with little evidence of cobalt-nickel mineralization. The nickel-cobalt ore occurs in small stringers up to several inches in width in the sheared and brecciated andesite near a fault contact striking N. 45° E. and dipping NW., the diorite forming the footwall. According to analyses made by Professor Newberry,¹⁵ the samples from the greatest depth contain niccolite, which in the upper levels consists entirely of hydrated arseniate, or annabergite, containing 33.71 percent nickel oxide, 36.44 percent arsenic acid, and 24.77 percent water. The sample lot of 15 tons mined in the early days contained 12 percent nickel, 7 percent cobalt, and 29 percent arsenic. The material on the dumps is all oxidized; no sulfide minerals were detected. A 10-pound sample gathered from the dumps by the writer assayed 7.13 percent nickel and 0.33 percent cobalt.

¹⁵ Newberry, S. B., Mineral Resources of the United States, 1883 and 1884: Geol. Survey, p. 539.

At the Lovelock mine the ore is more complex and in addition to nickel and cobalt contains copper. A number of specimens of erythrite (cobalt bloom) were found on the dumps. Here, likewise, the mineralization occurs in the andesite near a contact with diorite striking N. 40° E. and dipping 50° to 60° NW. A number of ramifying seams of gypsum occur in the andesite. Two 10-pound samples taken from the mine dumps contained 0.40 percent nickel and 0.25 percent cobalt, and 0.46 percent nickel and 0.26 percent cobalt, respectively.

Workings on the Lovelock claims are all superficial in character and total approximately 1,000 feet.

Copper Deposits

A number of copper prospects occur on Treasure Box Hill at the head of Bell Mare Canyon south of Cottonwood Canyon. Deposits are reached on horseback up Cottonwood Canyon past the nickel properties. From Boyer ranch the distance is about 15 miles. The principal properties were located in the early sixties by Alva Boyer, C. S. Kellogg, Jacob Strananger, and Patrick Reid. In the early days several wagon trains of rich, hand-sorted copper ore were mined from surface workings and taken to Sacramento for transportation to Swansea, Wales. In about 1900, a group from Colorado erected a small smelting furnace on the Azurite-Nevada Queen group of claims, which is still intact, but, judging from the condition of the smelter, no ore was reduced. About 1910 the Boyer Copper Mines Co. acquired control of 49 claims and did some development work and diamond drilling, but there was no production. In recent years claims have been idle.

The Treasure Box group of six patented claims is owned by the V. A. Twegg estate, the Crawfton Uniace estate, and John T. Reid, the latter of Lovelock, Nev. The adjoining Azurite-Nevada Queen group of five patented claims is owned by Tasker L. Oddie and Fred E. Luetjens, both of Reno, Nev.

The Azurite-Nevada Queen claims have been prospected by several adits and a number of open-cuts and the Treasure Box group by an old shaft reported to be 170 feet deep, two adits, one 800 feet long, and subsidiary drifts, raises, and winzes, totaling on the two groups of claims about 1,500 feet of workings. Most of the workings are caved and inaccessible. There is no equipment on either property except the old smelter.

According to Carpenter,^{16/} the copper ore occurs near the contact of andesite porphyry flow, overlying an earlier mass of strongly faulted green andesite. The main work on Treasure Box Hill was done in a bed of copper-bearing andesite about 100 feet thick. The contact dips about 20° NW. The ore is chiefly chalcopryite disseminated through the green andesite and, according to Carpenter, the lower 30 feet of the bed averages nearly 5 percent copper and \$1 in gold with a trace of silver. In places just above the contact small, iron-capped veins occur in the green andesite and the andesite porphyry. When followed downward, these veins lead to massive chalcocite disseminated in a gangue of breccia, and pieces

^{16/} Carpenter, Arthur Howe, Boyer Copper Deposits, Nevada: Min. and Sci. Press, Vol. 103, 1911, pp. 804-805.

Large black sulfides as large as a man's hand have been found occasionally. Massive bornite, tenorite, and cuprite also occur mixed with the two carbonates - malachite and azurite, - making small deposits of rich ore. Development by the Payer Copper Mines Co. exposed a block of ore 200 feet long, 100 feet wide, and 500 feet deep, measured on the dip, containing 1.7 percent copper and about \$0.70 in gold per ton.

Dixie Comstock Mine

The Dixie Comstock mine, comprising 10 claims, is on the west side of Dixie Valley in the foothills of the Stillwater Range, about 45 miles north of Bermuda on the Lincoln Highway. The property was discovered in April 1934 by Clyde Garrett, and shortly thereafter the controlling interest in the property was acquired by the Comstock Keystone Mining Co. of Virginia City, Nev. In the spring of 1935, a 30-ton-daily-capacity amalgamation mill was erected at the mine, and late in the summer of the same year flotation equipment was added. Incomplete data indicate that the production of gold and a little silver has been about \$150,000 in shipping and milling ore. In 1939 the tailings pile, containing about 6,000 tons, was being reworked by the company, and several lessees were employed in the mine.

Development includes a 200-foot incline, a vertical shaft about 100 feet deep, and drifts, winzes, and other workings, totaling about 1,500 feet. Mining equipment includes a 12-by 10-inch single-stage compressor, a 17-horsepower Hercules geared hoist, and a blacksmith shop. Milling equipment consists of a homemade ball mill 7 by 5 feet, 9-by 12-inch Blake-type crusher, simplex classifier, 4-by 10-foot, amalgamating plate, and four flotation cells. Power is furnished by an 80-horsepower 2-cylinder Fairbanks-Morse Diesel engine belt-connected to a 30-kilowatt alternating-current generator. Camp buildings at the mine can accommodate a crew of 15 men. Water for milling is supplied by a well 30 feet deep near the mine.

Gold, associated with a little silver, occurs in a large vein in a hydrothermally altered igneous formation. Mining is hindered by the intense heat and a large volume of hot water in the mine workings less than 75 feet from the surface.

Kaolin Deposit

An extensive deposit of kaolin occurs in the vicinity of New York Canyon on the west slope of the Stillwater Range about 25 miles southeast of Lovelock, Pershing County, the nearest railroad point. Very little work has been done on the deposit, and no production has been made. According to Buwalda,¹⁷ the clay appears to be a sedimentary deposit lying on a series of Paleozoic sandstones and shales, of which it is probably a member. The clay occurs in a stratum 75 to 100 feet thick extending for about 4 miles along the base of the range. In places

¹⁷ Ries, H., Bayley, W. S., and others, High-Grade Clays of the Eastern United States, With Notes on Some Western Clays: Geol. Survey Bull. 708, pp. 122-123, 1922.

it is covered to a shallow depth by alluvium, but it could easily be mined in large quantities by open-cut method. The material is white and gritty and contains abundant quartz grains, grains of rutile sparsely disseminated and in places stained with iron oxide.

Fire-tested at $1,150^{\circ}\text{C.}$, the absorption was 32.4, porosity 48.9, and color white; at $1,300^{\circ}\text{C.}$ absorption was 28.9, porosity 45.2, and color cream white.

Dixie Marsh

Dixie marsh (also known as Humboldt salt marsh) is about 40 miles north of Frenchman's station on the Lincoln Highway, and it covers an area of nearly 40 square miles in the lowest portion of Dixie Valley between the Stillwater and Clan Alpine Ranges. The valley was known as Osobb Valley by the geologists of the Fortieth Parallel Survey.

The marsh was first exploited for salt in the sixties by John and Wm. Guthrie of Winnemucca, Nev., and associates. Prior to the completion of the Central Pacific R. R. across the State in 1869, considerable quantities of salt were hauled by "bull" teams to the Humboldt, Reese River, and Comstock districts in Nevada, and some was shipped as far as Silver City, Idaho, for metallurgical use. With the decline of silver milling by the Washoe and Reese River processes, the production of salt ceased and, owing to the isolation of the deposit from consuming centers, no attempts were made to mine salt for other purposes. Some borax was produced from the north end of the marsh in the early seventies.

Several projects were initiated for the recovery of potash from the brines and saline muds in the marsh before and during the World War, but these efforts proved fruitless as far as production of potash is concerned. The Federal Geological Survey tested the salines in Dixie marsh with special reference to potash in 1916, and during the same year prospecting for potash was taken up by the Railroad Valley Co. of Tonopah, Nev. The Railroad Valley Co. sank three holes ranging from 71 to 98 feet in depth, and sampling results of the salts obtained by evaporating the brines showed 28.70 to 38.70 grams of solids per 100 cubic centimeters of material. The percentage of K_2O in the total solids ranged from 0.19 to 0.75 percent, too low to be considered of economic importance. The approximate amount of other salts present in the solids is NaCl , 27 percent; Na_2SO_4 , 5 percent; and Na_2CO_3 , 4 percent.

In December 1917, a group from Fallon, Nev., again took up the Dixie Valley potash project and formed the Nevada Potash Syndicate, but the venture proved unsuccessful. In recent years there has been no activity.

The Dixie marsh was formerly the site of a shallow lake, the evaporation of which produced a mixture of salts including sodium chloride, sodium sulfate, and sodium carbonate, with smaller amounts of sodium borate and potash salts associated with silt and mud. Sodium chloride occurs as an efflorescence in the lowest part of the basin, covering an area of about 9 square miles. The surface salt layer is underlain by a series of salt and saline mud strata to a maximum depth of probably several hundred feet. When the salt deposit was exploited, it

was simply hoed into piles and shipped without refining. The borate mineral was chiefly ulexite or "cotton balls" that occurred as aggregates of acicular crystals.

Other Mines and Prospects

In the Table Mountain area on both sides of the Stillwater Range are a number of prospects that were active in the sixties, and a few have made a small production.

About 15 miles north of the I. X. L. district on the west slope of the range is the Marvel district, which was the scene of a little activity about 1911, when a group from San Francisco did some prospecting on several small and badly faulted gold veins near the summit of the range. The veins are in a sedimentary formation that has been intruded by diorite. There is no record of any production.

In the northern part of the Table Mountain district in Pershing County is the Linda-Jo mine, which was discovered and worked by Charles Gilbert in the late seventies. The economic minerals are lead-silver and a little gold occurring in a quartz vein in limestone. The discoverers are reported to have shipped about \$30,000 in ore from shallow surface diggings. A note on this property is contained in an early report by the State minerologist¹⁸ and is as follows:

Recently some very rich ore has been found in the Linda-Jo mine. Five and one-half tons taken to Winnemucca for treatment gave assays as high as \$3,000 per ton, and it is estimated that the whole amount will yield nearly \$1,000 per ton. The vein is about 5 feet in width, 1 foot of which yields the rich ore. A shaft has been sunk on the vein to a depth of 16 feet.

Between the Boyer ranch and Dixie mine, a distance of about 12 miles on the east side of the Stillwater Range, are several quartz veins carrying gold. A group of claims owned by Tasker L. Oddie and Fred H. Luetjens was worked in 1938 by lessees, who shipped about 25 tons of ore averaging \$40 per ton. Near the quartz veins are irregular feldspathic masses containing aggregates of small crystals of rutile and octahedrite. Other gangue minerals, in addition to the feldspar, are quartz, calcite, and mica. No attempt has been made to prospect the titanium deposits.

On the west side of the range, east of Camp Bolivia, is the almost forgotten Cornish Camp, situated in St. Clair Canyon. In the early seventies, John C. Fall and associates, of Unionville, Nev., did considerable prospecting here on quartz veins carrying silver, but there is no record of any production.

In the Copper Kettle district in Grimes Canyon on the west side of the range, a number of copper claims were located in 1908 by J. R. Bunch, Andrew Robert, and others. In 1917 several carloads of copper ore was shipped, and in 1929 11 tons

¹⁸ Whitehill, H. R., Report of the State Minerologist of the State of Nevada for the years 1877 and 1888: Carson City, Nev., pp. 65-66.

was shipped from the Copper Kettle mine. Ore occurs near a contact of diorite and altered porphyry and contains chalcocite, cuprite, copper carbonates, and some silver.

In New York Canyon are some old prospects that were active in the sixties, and it is said that George Hearst had his first Nevada mining experience here. An arrastra was built in the mouth of the canyon by Judge Sam Bonfield of Winnemucca in the sixties, in which a small amount of ore was treated.

In Fenstonemaker Canyon, also on the west side of the Stillwater Range, are several antimony prospects that were discovered in the early days, but they have been inactive for many years and there is no record of any production.

TOY DISTRICT

The Toy district is in the northwest corner of Churchill County near the Pershing County boundary line. It lies in a group of low hills in the southwestern part of the Trinity Range and forms the northwest border of the Humboldt River Valley. The only important property in the district from the viewpoint of past production is the Toy tungsten mine.

According to John T. Reid of Lovelock, the first locations in the district were made in 1885 by Paul Trombley for gold and silver, but no deposits of these metals were found and the claims were soon abandoned. In 1907 Peter Anderson and son, A. M. Anderson, of Lovelock, located a group of four claims for gold. In 1908, lessees, while prospecting the Anderson claims, discovered a heavy white concentrate by panning. Some of the rock was sent to David Atkins, a mining engineer of San Francisco, who at the time was interested in the scheelite deposits at Atolia, Calif. Atkins determined the white concentrate to be scheelite, and the claims were purchased by Atkins and associates, who formed the St. Anthony Mines Co., a subsidiary of the Atolia Mining Co. of Calif. The determination of scheelite in the Toy mine is of especial interest, since it was the first one of the many contact metamorphic deposits of tungsten ore subsequently discovered in the United States. The claims were patented and little work was done until 1915, when the price of tungsten concentrates rose considerably owing to the demand imposed by the World War. In 1915, 20 tons of scheelite ore was mined and shipped to Atolia, Calif., for experimental purposes. In the same year a 75-ton gravity-type concentrator was erected at Fanning siding on the main line of the Southern Pacific R. R. 2-1/2 miles from the mine and 2 miles southwest of Toy siding on the same railroad. The claims were developed and the mill was operated in 1916 and 1917 by the company, and for a short time by lessees in 1918, when the price of tungsten dropped and operations were discontinued. It is said that the first shipment of concentrates from the Fanning mill more than paid for the purchase price of the property, the cost of equipping the mine, and the erection of the concentrator. Since 1918 the property has been inactive. The mill was dismantled in 1921.

Toy Mine

The Toy mine, comprising the Tip Top group of five patented claims owned by the Atolia Mining Co., is 4-1/2 miles by road a little south of west from Toy section house and 20 miles southwest of Lovelock, the county seat of Pershing

County. The property is developed by a single-compartment inclined shaft 200 feet deep, several short adits, open-cuts, and other workings totaling about 1,500 feet. The only equipment on the ground is a 50-ton ore bin.

The scheelite occurs in lens-shaped deposits along a limestone-granite contact traceable on the surface along the north side of a small ravine for nearly $3\frac{1}{4}$ mile. The limestone is thin-bedded, with a prevailing strike of about S. 70° W. and dipping from 50° to 80° SE. Along the contact three ore bodies have been mined, and the width of the stopes, as seen from the surface, ranges from 3 to 10 feet. As a rule, the ore occurs in the limestone, but in places some ore has been mined within the granite for several feet from the contact. The scheelite is fine-grained associated with garnet, quartz, calcite, diopside, and other contact metamorphic minerals stained with iron oxide near the surface from the alteration of pyrite.

The tailings at the old Fanning mill site have been located as a placer claim by Arthur T. Green and associates, of Lovelock. The tailings have been scattered over a considerable area, but probably about 6,000 tons could easily be gathered for re-treatment if the scheelite content justified a re-treatment operation. Water for former milling operations was obtained from a well at the edge of the Humboldt Sink a short distance from the mill site.

Hardscrabble Claim

The Hardscrabble tungsten claim owned by Herbert Hamlin, of Reno, Nev., is 2 miles west of Toy section house and about the same distance east of the Toy mine. This claim was part of a group located in 1915, when the St. Anthony Mines Co. became active in the district. The claims were allowed to lapse, and the principal claim on which virtually all the work was done was relocated by Hamlin in 1936. At the time of the writer's visit the property was inactive. Development consists of several shallow shafts, the deepest not more than 20 feet, a short adit, and several open-cuts. From the appearance and extent of the workings, no scheelite ore has been produced. There is no equipment on the property.

The formation is thin-bedded shale striking northwest and dipping 40° NE. The shale is intruded by granite, and along the contact the shale is metamorphosed into a fine-grained aggregate of contact minerals, composed chiefly of garnet and epidote. The scheelite is fine-grained and invisible to the unaided eye.

WHITE CLOUD DISTRICT

The White Cloud district is in the vicinity of the canyon of the same name on the west slope of the Stillwater Range, 33 miles northeast of Stillwater and 35 miles southeast of Lovelock, Pershing County, on the Southern Pacific R. R. The camp of Coppereid is in the central part of the district. According to a news item in an early issue of the Reese River Reveille, a newspaper published at Austin, Nev., the district was discovered by Maj. B. B. Bee and Frederick Smith in 1868, but because of difficulties with the Indians it was not organized until 1869. The first work in the district was done in the early seventies by

John C. Fall of Unionville, Nev., who was one of the prominent early-day mine operators in the State. A small copper smelter which operated for a short time, was erected at the mouth of White Cloud Canyon in the nineties. The Nevada United Mining Co., under the management of J. T. Reid of Lovelock, carried on extensive prospecting operations from 1906 to 1912. Since 1912 there has been no activity. The only production has been several carloads of hand-sorted copper ore from surface workings. One carload shipped by the Nevada United Mining Co. averaged 26 percent copper and contained \$1 in gold and 1 ounce of silver to each percent of copper.

Nevada United Mining Co.

The Nevada United Mining Co., controlled by John T. Reid of Lovelock, Nev., owns a group of six patented claims at Copperoid in White Cloud Canyon on the west slope of the Stillwater Range. When the company was active, the number of patented claims totaled 33, but all except six reverted to the county for non-payment of taxes.

The workings comprise an adit 3,050 feet in length, several shorter adits, and scattered surface workings totaling about 5,000 feet. There is no mining equipment on the property.

The prevailing formation is granite porphyry intruded into a sedimentary series composed of limestone, calcareous shales, and several beds of gypsum. The sediments have been metamorphosed by the granite intrusion into hornfels, and small bodies of copper ore of contact metamorphic origin occur in a broad zone of mineralized limestone. The copper is associated with masses of specular hematite with variable strike and dip. Along the contact zone the minerals are garnet, epidote, fluorite, quartz, pyrrhotite, pyrite, sphalerite, and chalcoppyrite, in addition to the hematite. Near the surface the primary copper mineral, chalcoppyrite, has been altered to malachite and chrysocolla.

According to Reid, the main adit crosscutting metamorphosed limestone and shales has a course of S. 30° E., and at a point 1,300 feet from the portal, a body of disseminated sphalerite about 20 feet in width was exposed. This deposit assayed 4-1/2 percent zinc but carried no gold or silver. The point in the adit where the zinc deposit was found is about 500 feet vertically from the surface. At 2,600 feet from the portal of the adit some lead, zinc, silver ore was penetrated that assayed 5 percent zinc, 4 percent lead, and 3 ounces in silver per ton. No lateral work was done on either of the deposits. At the end of the adit a large mass of iron ore was cut, on the north side of which several feet of copper ore, consisting chiefly of chalcoppyrite, was found. The face of the adit is about 1,800 feet vertically beneath the surface. No copper deposits large enough for profitable exploitation were found during the course of prospecting operations. When the adit was driven, the work was hampered considerably by a large flow of water, which during the period of maximum flow amounted to more than 1,000,000 gallons per day.

WONDER DISTRICT

The Wonder district is on the west slope of a southern spur of the Alpine range, sometimes called the Augusta Mountains, in west Churchill County. It is 55 miles by road east of the town of Fallon, the nearest railroad point; 40 of the 55 miles are over the paved Lincoln Highway and the remaining distance is over fair desert road with an easy grade from the highway to the camp, the rise being approximately 2,000 feet in 15 miles. The elevation of Wonder is 5,500 feet.

The first location in the Wonder District was made in April 1906 by T. J. Stroud on the Jackpot group of claims, and the Nevada Wonder mine was located shortly afterward by Murray Scott, William Mays, and others. The discovery of rich silver-gold ore started a stampede from Fairview that began in May in the same year, and in a few weeks over 1,000 locations were made. The discovery attracted considerable attention, and it was not long before a camp of several thousand people was established. In the first few years of the camp's history, a number of companies were organized, but the bulk of the metal yield was derived from the Nevada Wonder mine, incorporated in Delaware on September 19, 1906. Later this mine was taken over by a group of eastern capitalists, who began a systematic development campaign and in 1913 constructed a 200-ton cyanide mill at the mine. Electric power was brought in from Bishop, Calif., and at the time this transmission line had the distinction of being the longest in the world. The Nevada Wonder Mining Co. controlled, by stock ownership, the claims of the Wonder Extension, reorganized North Star, and Hidden Treasure mining companies, totaling 401 acres, 328 of which were patented. In 1910 water was brought to the camp by a gravity pipe line from Horse Creek, a distance of 10 miles. The company ceased operations in December 1919, after a very profitable history. The total amount of dividends paid was \$1,549,002. In 1924 the mine equipment was dismantled and most of it sold. In 1935 the mine and the equipment remaining was purchased by L. F. Curtis of Reno, Nev. In recent years, mining in the district has been by lessees, largely at the Nevada Wonder mine.

The production of the district from 1907 to 1937, inclusive, was \$5,952,764, as shown in table 4.

Nevada Wonder Mine

The Nevada Wonder mine comprises five patented mining claims owned by L. F. Curtis, of Reno, Nev. Development consists of a main three-compartment vertical shaft 1,342 feet deep and an auxiliary shaft 2,000 feet distant sunk to a depth of 800 feet, from which various subshafts and winzes attain a maximum depth of 2,000 feet from the surface. Total underground workings comprise about 8 miles. The lower workings are caved and inaccessible.

Equipment on the property includes a 25-horsepower single-drum gasoline hoist, Rix portable compressor, ore bins, wood head frame, blacksmith shop, and mining tools. In the early part of 1939 several sets of lessees were employed in the upper levels of the mine, and the ore was trucked to the custom milling plant at Westgate for treatment. In the first 6 months of 1938 lessees produced 1,347 tons of ore having a gross smelter value of \$43,040.39 or an average of \$31.95 per ton.

NEVADA
CHURCHILL COUNTY

From 1907 to 1937 the NEVADA WONDER MINE produced, in terms of recovered metal:

398, 355 tons values at \$5,952,764 or \$14.84/Ton.

69,340 oz. Au	\$1,456,890
4,524,150 oz. Ag	4,494,132

and very minor copper and lead.

Major production stopped in 1919.

Country rocks are a complex series of Tertiary eruptives-rhyolite, dacite, andesite and basalt. The WONDER rhyolite is the principal ore bearing formation. A number of veins occur, most of which contain small deposits of silver-gold ore, but the principal vein from which the major part of the production has been mined is the NEVADA WONDER, whose outcrop extends $1\frac{1}{4}$ miles along the strike.

The NEVADA WONDER vein lies partly on the contact between rhyolite and the intrusive body of dacite, but toward the north the vein leaves the contact and lies entirely within the rhyolite. The strike is N25W and the dip is 75 degrees NE. The widths of the ore shoots range from a few feet to a maximum of 30 feet, averaging between 5 and 6 feet. The values are silver and gold in a gangue of quartz, feldspar and occasional small quantities of fluor spar. The gangue is generally stained yellowish-brown with limonite; some of the ore is white. No water is present in the workings, and oxidation extends to the 1300 foot elevation in the mine. The silver is in the form of argentite and halogen salts, and the gold is both native and combined with argentite. The silver haloids found are embolite, iodobromite and iodyrite. The ratio of gold to silver by weight, according to production statistics has been 1 to 94. Oxide of manganese occurs in small dendritic forms, while copper and lead occurs only in traces.

Near the surface, where the walls of the vein were firm and stood well, the ore was mined by the shrinkage method. Below the 400 level, the walls were less firm, and mining was done by the cut and fill system, waste for filling having been obtained from raises driven either into the hanging or footwall.

CHALK MOUNTAIN DISTRICT

The Chalk Mountain district is in the southeastern part of Churchill County, in the vicinity of Chalk Mtn. at the south end of Dixie Valley. The mountain, isolated from the main Alpine Range, is 3 miles long, 2 miles wide and rises to 1000 feet above the valley. It is composed of whitish dolomitic limestone, forming a conspicuous landmark. The district is midway between Wonder and Fairview, sometimes being considered part of the latter, which lies about 8 miles south. Mineral production is included under the Fairview District.

Prospected in early days but not taken seriously until 1923, when acquired by a Minneapolis Group when they took over the Chalk MOUNTAIN SILVER LEAD MINES COMPANY. Development uncovered several deposits of ore.; about ~~etc~~ eight other small companies were organized in the district, were active during 1925-1926; they produced little, and all became inactive after short periods of prospecting. Lessees were still active on the property of the major company as late as 1939.

Production of the district has totalled several hundred thousand dollars of shipping ore, all produced by CHALK MTN. AG-PB*MINES.

CHALK MOUNTAIN SILVER LEAD MINES COMPANY, covers 12 patented claims, on the east slope of the mountain. Principal production was between 1923 and 1929. In 1925, 1,505 tons of ore to smelter had a value of \$86,923 and contained 99 ounces gold, 59,651 ounces silver, 861,355 pounds lead. To June 1927, total production amounted to 2,300 tons, valued at \$135,000 for an average (net) of \$58.70 per ton. Some ore was shipped in 1928 and 1929. In 1929 a 50 ton gravity mill was built, to treat lower grade ore but it was not a metallurgical success. In 1930 mill was sold and operations suspended; since then production has all been small and by leasers.

Mined developed by a 40 foot shaft, two 110 foot shafts, and one 517 foot, double compartment shaft, with lateral work on six levels. Total workings are about 5000 feet.

Formation is dolomitic limestone intruded by granodiorite. Limestone is locally folded and crossed by a number of faults, with which ore bodies are associated. Ore occurs as irregular replacement deposits ranging from 1 to 12 feet along fissures and bedding planes of the limestone. Ore minerals are cerussite, anglesite, cerargyrite, wulfenite, vanadinite and argentiferous galena, in a porous gangue of quartz, calcite, altered limestone and iron oxide. Ore is largely oxidized to the lowest level of the mine and the high iron content makes it desirable for fluxing.

Note This is one of the better mines of the county, and might be an example of what one goes after if looking for 'high grade' reserves.