GOLD, SILVER, COPPER, LEAD, AND ZINC IN CALIFORNIA, NEVADA, AND OREGON

By V. C. Heikes

CALIFORNIA

The total production of gold, silver, copper, and lead from placer and lode mines in California in 1932, in terms of recovered metals, was valued at $12,053,677, a decrease of approximately $334,057 from 1931. Gold was the only metal which showed an increase, its value representing nearly 98 percent of the total value of metals recorded for 1932. Silver decreased 44 percent in quantity, lead 38 percent, and copper 91 percent compared with 1931, with large losses in values. The recovery of some zinc was reported in 1931 but none in 1932. Continued low prices of the base metals were a factor in the decreased production of silver, copper, and lead, but the stable price of gold and the decrease in cost of its production resulting from cheaper supplies and labor helped to stimulate the mining industry. Gold production in 1932 was the largest since 1926.

The approximate value of the metals produced in 1932 brought the total value of gold, silver, copper, lead, and zinc produced in the State since 1848 to $2,144,957,862.

Mine production of gold, silver, copper, lead, and zinc in California, 1928–32, in terms of recovered metals

<table>
<thead>
<tr>
<th>Year</th>
<th>Gold</th>
<th>Silver</th>
<th>Copper</th>
<th>Lead</th>
<th>Zinc</th>
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<td>1,136,000</td>
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</table>

1 Subject to revision.

Gold.—California again maintained its lead as a gold-producing State with its lode and placer mines yielding 569,600 fine ounces of gold, valued at $11,774,677, an increase of 9 percent or 46,465 ounces in quantity and $960,515 in value over 1931.

Most of the gold in 1932 was produced from old-established lode mines, such as the Empire-North Star and Idaho Maryland in Nevada County; the Original Sixteen to One and the Kate Hardy in Sierra County; the Argonaut, Central Eureka, and Kennedy in Amador County; and the Yellow Aster in Kern County. The reduced output of gold from mines on the Mother Lode belt in Eldorado, Amador,
Calaveras, Tuolumne, and Mariposa Counties was offset partly by increases in gold from pocket operations in the East belt mines in Tuolumne and Mariposa Counties. Three of the principal mines of the Mother Lode belt produced $235,266 less gold in 1932 than in 1931, but part of this decrease was offset by the gain of $110,833 in gold from six important lode mines in Nevada and Sierra Counties. Thirty-two companies, each with an output of more than 1,000 ounces, produced about 83 percent of the total gold yield of the State in 1932. The 10 largest lode and placer gold producers were the Empire Star Mines Co., Ltd. (gold lode); Natomas Co. (6 dredges); Idaho Maryland Mines Co. (gold lode); Yuba Consolidated Gold Fields in Yuba County (3 dredges); Capital Dredging Co. (3 dredges); Argonaut Mining Co. (gold lode); The Mountain Copper Co., Ltd. (gold lode); Original Sixteen to One Mine, Inc. (gold lode); Kennedy Mining & Milling Co. (gold lode); and the Merced unit of the Yuba Consolidated Gold Fields (1 dredge). Much gold has been recovered in the past from copper ores mined in the State, but in 1932 the output from this source was small.

As the gold-dredging fields of the State become exhausted the production of gold from lode mining is steadily exceeding that from the placers. According to a report of the California Debris Commission for 1932, issued by the War Department, 44 hydraulic placer mines were granted permission to operate, and 1,062 applications for licenses were pending. Surveys have been made in the area under the jurisdiction of the commission of those portions of the Yuba, Feather, Bear, and American Rivers containing great deposits of mining debris. Hydraulic mining is opposed by the agricultural interests in the valley counties, and in some parts of northern California placer mining is restricted 3 months of the year. Since the beginning of dredging in the Oroville district $174,526,417 in gold has been produced, and of this output the Feather River field is credited with $33,621,406, the Yuba River field with $67,049,597, and the American River field with $44,799,178. Various estimates of the future life of the remaining dredging ground have been made, but no definite figures are available. Yuba County, formerly one of the largest gold-dredging areas in the State, is now supplanted by Sacramento County, where the dredge gold output from the Folsom field has increased the last 2 years. Twenty-two dredges in Amador, Butte, Calaveras, Merced, Sacramento, Shasta, Stanislaus, Trinity, and Yuba Counties produced 188,730 ounces of gold, valued at $3,901,395, from 48,851,063 cubic yards of gravel, with an average recovery of 8 cents a cubic yard in gold. In 1931 the dredge gold production was $3,619,355 from 22 boats handling 44,423,652 cubic yards of gravel. Another dredge was added to the Folsom field by the Gold Hill Dredging Co., which moved its 9-cubic-foot dredge from Dayton, Nev., for operation on the American River. The Cal-Oro Dredging Co. completed its boat, which began digging early in 1933 on gravel south of Yreka, Siskiyou County. The gold obtained from drift placers in California is nominal, and the largest output from this method of mining in 1932 was from Calaveras County. The Calaveras Central drift mine near Angels Camp was an important producer, and late in 1932 the Tonopah Belmont Mining Co. took control of the Vallecito-Western drift mine near Angels Camp, a producer of gold for several years. Production was continued by the new company.
Small-scale gold mining.—Increasing interest in small-scale gold mining lured many people to the foothill counties of the Sierras and other gold regions in northern and southern California. Many recovered enough precious metal to pay their living expenses. The experienced prospector also joined in exploring for new gold-bearing quartz veins and reopening old prospects and abandoned veins. The results of the gold rush of 1932, in which the working season was terminated in some places in about 90 days, were disappointing. High water or snow restricted work and hampered the gold seeker in certain regions, while in a few places the work was continuous the entire year.

The records of those who bought gold from the general prospector, miner, and layman in compliance with the California "high-grade" law, administered by the State mineralogist, were reviewed and compiled with the following results, which are of interest to those seeking a livelihood from small-scale gold mining.

Ninety-four bullion dealers in California, including banks, merchants, and private refiners, all licensed by the State mineralogist of California to purchase gold in 1932, sold to the San Francisco Mint and other refiners 23,870 fine ounces or $493,437 in new gold. This total compares with $162,000 in gold purchased by bullion buyers in 1931. The reports of the bullion buyers indicate that 12,000 individuals produced 30,880 lots of new gold consisting of gold dust, nuggets, and amalgam with a range in value from 9 cents to as much as $100. The average value of each lot sold was $16, and the average amount received by the prospectors for their labors during the season or year was $41.12.

The licensed bullion buyers located in 17 counties served prospectors working in all known mineral areas of California. The bulk of this gold and that of established mines was deposited at the San Francisco Mint, which issued 19,265 deposit certificates, chiefly for gold, compared with 8,153 settlement certificates in 1931. Most of the gold deposited was from California, with important lots from Alaska, the Philippine Islands, and Arizona. Other States represented were Nevada, Oregon, New Mexico, Montana, Utah, and Washington. The minimum amount of gold received at the offices of the Bureau of the Mint was 2 ounces, equivalent to about $40; any amount under this was returned to the sender whose only recourse was to sell the gold to a bullion dealer.

The nearest bullion dealer in California paid full value for gold, and the prospectors have discovered the saving in express and melting charges on each lot sold and the added advantage of getting immediate cash or merchandise.

Amador County bullion buyers at Plymouth and Jackson handled 315.35 fine ounces of gold valued at $6,519 for 550 individuals whose average deposit was $9.73 or $11.24 for the season. Most of the gold originated from the Consumnes River in Eldorado and Amador Counties. Gold was also reported from Sutter, Jackson, Flat, Dry, and Scott Creeks, and a little gold was recovered from gravel at 49 Flat.

In Butte County 6 bullion buyers bought 2,760.28 fine ounces of gold valued at $57,060 from 2,052 individuals, whose lots of gold averaged $12.83 per deposit, or $27.81 for the season. The gold was recovered chiefly from placer gravel of the Feather River in Butte and Plumas Counties and in more than 50 other localities.
Calaveras County bullion buyers at Angels Camp, Mountain Ranch, and Camanche handled 484.62 fine ounces or $10,018 in gold. There were 488 individuals who sold 610 lots of gold dust averaging $16.32 a deposit, or $20.53 for the season. Most of the gold was from the Mokelumne River in Amador and Calaveras Counties. Particular localities mentioned in the reports received from buyers were Rich, Hicks, Wet, and Adobe Gulches and the O’Neil, McKinney, Murray, Jesus Maria, Martins, and Chile Creeks.

Del Norte County gold producers sold most of the gold recovered from beach sands to private refiners of platinum metals. The gold produced in the interior districts was shipped to banks at Grants Pass, Oreg., and to the San Francisco Mint. The burlap table continued to be the popular method for recovering gold from beach sands in Del Norte County.

Eldorado County bullion dealers at Volcanoville, Placerville, Pilot Hill, and Georgetown purchased 648.76 fine ounces or $13,411 in gold, representing 1,059 lots of gold dust from 654 individuals. The average of each lot was $12.66, and $20.51 was the average result of a season's work for each person. Most of the gold was produced from the vicinity of Placerville, Webber Creek, and Big Canyon Creek.

In Fresno and Madera Counties bullion dealers at Fresno, Friant, Orange Cove, Selma, and Coarsegold purchased 414.67 fine ounces or $8,572 in gold, representing 833 lots from 634 individuals. The average lot amounted to $10.29, and the result of the season's work amounted to $13.52 for each individual. Most of the gold was from the abandoned gravel pits near Friant. Many white families and a few Indians were camped near the gravel pits and along the San Joaquin River during the year and made a scanty living from their labors. In the vicinity of Coarsegold most of the gold was from Deadwood, Cabin, Coarsegold Gulch, and the Fresno River.

Humboldt County prospectors sold small lots of gold to a bank at Eureka and shipped bullion direct to the San Francisco Mint. Gold was produced from the beach sands at Gold Bluff and from the bench gravel on the Klamath and Salmon Rivers, most of it originating near Orleans, and sold to a buyer at that point.

Kern and San Bernardino County dealers in gold dust at Cantil, Bakersfield, and Hobo Hot Springs and various Los Angeles refiners of gold bullion handled gold produced by about 200 individuals, whose total output for the season could not be learned, but judging from gold sold at Cantil the average for the season was about $20. Most of the gold came from the vicinity of Randsburg, Goler, Oro Fino, Summit Diggings, Black Mountain, and Boulder Gulch. Other localities in San Bernardino and Kern Counties mentioned frequently were Atolia, Panamint, Lytle Creek, and the Goldstone district.

Mariposa County bullion dealers at Mariposa, Bagby, Hornitos, Coulterville handled 265 small lots of gold for 209 individuals, whose combined output amounted to 160.84 fine ounces, or $3,325 in gold. An average of $12.55 in gold was sold, and the prospector received $15.91 for the season. Most of the gold was from Saxon, Agua Fria, Mariposa, Chispia, Sherlock, and Solomon Creeks; Australian Gulch and Merced River also furnished some gold.

In Nevada County 8 bullion buyers at Nevada City, French Corral, North San Juan, and Bridgeport purchased 3,636.72 fine ounces of gold valued at $75,178 from 1,346 individuals whose gold
lots averaged $27.00 a lot, or $55.85 for the season. Most of the gold was reported from placers on Deer Creek and Yuba River; some of it came from small lots of crushed quartz originating from mine dumps in the Grass Valley region.

Placer County bullion buyers at Auburn, Iowa Hill, Dutch Flat, Colfax, Foresthill, Gold Run, and Sheridan bought 2,277.69 fine ounces or $47,084 in gold from 1,293 individuals whose lots of gold dust averaged $15.08 a lot, or $36.41 for the work of the season. Most of the gold was from the North, South, and Middle Forks of the American River and Buckeye, Blue Canyon, and Indian Creeks. The localities frequently mentioned were Steep Hollow, Dutch Flat, Baltimore, Shirt Tail Canyon, Georgia Hill, and Yankee Jims.

Plumas County bullion buyers representing seven establishments at Quincy, La Porte, Belden, Virginia, Keddie, and Crestone Mills purchased 1,800.04 fine ounces of gold valued at $37,210 from 1,109 individuals whose work for the season totaled $33.55, or an average of $12.60 for each lot of gold sold. Most of the gold was from Spanish, Nelson, Squirrel, Rush, Black Hawk, and Sloat Creeks. Frequent mention was made of the Middle and North Forks of the Feather River and streams and tributaries in Plumas and Sierra Counties in the vicinity of La Porte.

In Sacramento County three bullion dealers at Sacramento handled 553.41 fine ounces of gold, chiefly from the foothills of Sacramento, Placer, and Eldorado Counties. A total of 676 individuals averaged $14.69 in gold for each lot sold and $16.92 for the entire season.

Siskiyou County was the most favorable of any county in the State for the small prospector who averaged $57.46 for the work of the season. From records of 10 bullion buyers at Yreka, Etna, Happy Camp, Sawyers Bar, Forks of Salmon, and Hornbrook, 1,550 individuals sold 4,308.49 fine ounces of gold or $89,064, averaging $21.81 per lot. The placers of the Salmon River and its tributaries and of the North Central region were most frequently mentioned by gold seekers.

Shasta County prospectors sold most of their gold to one establishment in Redding, which handled some gold from Trinity and other counties. Altogether, 3,271 small lots of gold dust, nuggets, and retorted material ranging from 9 cents to about $100 was purchased from 1,258 individuals, whose average gold deposit was $7.98 and whose average for the season or year amounted to $20.75. Most of the gold was from French Gulch, Whiskeytown, Churntown, Buckeye, Clear Creek, Squaw Creek, Beegum Creek, Motion Creek, Cottonwood Creek, and the Sacramento River and its tributaries.

In Trinity County producers of gold sold to four licensed bullion buyers at Denny, Lewiston, Hayfork, and Weaverville and at Redding in Shasta County 1,609 lots of gold averaging $15.64 per lot from 628 individuals whose work for the season averaged $40.07. Most of the gold was from the Trinity River and its tributaries.

In Tuolumne County 1,046 individuals sold to four bullion buyers at Sonora and Jamestown 1,152.15 fine ounces of gold, valued at $23,817, or an average of $22.77 for the season. Most of the gold was recovered from placers, but some came from pocket lode mines in the East Belt region and on the Mother Lode. The placer gold was reported from various creeks (Turnback, Woods, Bull, Sullivan, Mormon, and Eagle) and from the Stanislaus and Tuolumne Rivers.
Yuba County, with five bullion buyers at Marysville, Smartsville, and Strawberry, handled gold from various points in Yuba, Sierra, and Plumas Counties amounting to 1,068.44 fine ounces, valued at $22,087. This represents the output of 711 individuals, who averaged $25.27 a lot or $31.06 for the season.

Gold was recovered from beach sands near Santa Cruz and Monterey.

Several districts, formerly old producers in San Diego and Imperial Counties, and all the old diggings, worked before the '49 discovery, in Los Angeles County were again productive, especially near Saugus and Azusa and in the San Gabriel and San Francisquito Canyons.

Silver.—The production of silver in California is largely a by-product of gold mining, although silver ores and lead-silver ores have been mined for silver alone in Inyo, Mono, Napa, and San Bernardino Counties. The output of silver in 1932 was approximately 486,000 fine ounces valued at $137,052. The average price was 28.2 cents a fine ounce compared with 29 cents in 1931. San Bernardino County had the largest yield of silver, due to operations at the Kelly Rand silver property, discovered in 1918 and a large producer during succeeding years. The county was the only one with an output of over 100,000 ounces in 1932. Nevada County, second in output, derives its silver from gold-bearing ores mined in the Grass Valley-Nevada City district.

In Inyo County, the Estelle and Cerro Gordo properties, operated as one unit by the American Smelting & Refining Co., have long been important silver-lead producers, and in 1932 these properties and the Santa Rosa property in the same region contributed largely to the silver output of the State. Due to the low prices of silver and lead, shipments of small lots of lead-silver ore from mines in Inyo and San Bernardino Counties decreased. The yield of silver in Plumas County was chiefly from copper ore, but due to curtailed mining operations the output fell below 50,000 ounces in 1932. Silver ore from the Comanche group in the Blind Springs Hill district, Mono County, was shipped to a smelter in Utah. The Treadwell Yukon Co. did much exploratory work in the Bodie district for about 2 years but withdrew from the field late in 1931, and the district, except for leasing operations, was practically dormant. Nevada and Inyo were the only counties with a yield of silver between 50,000 and 100,000 ounces; Plumas was the only county with a yield between 20,000 and 50,000 ounces. Four counties, Mono, Shasta, Amador, and Kern, named in order of production, produced between 10,000 and 20,000 ounces, and the other producing counties fell below 5,000 ounces each.

Copper.—The production of copper in California in 1932 was approximately 1,360,000 pounds, valued at $71,568. This is a decided decrease in both quantity and value compared with 1931, when 12,931,995 pounds, valued at $1,176,812, was recorded. The average price of copper in 1932 was 6.3 cents a pound compared with 9.1 cents in 1931 and 17.6 cents in 1929 when the production was 33,218,994 pounds. Although Plumas, Shasta, Trinity, and Calaveras Counties have been large producers of copper only one mine in Plumas County, that of the Walker Mining Co., continued production in 1932. The company, however, closed its mine and mill the end of February, retaining a small force to make repairs and improvements. According
to the printed annual report of the company 30,774 tons of ore were broken, and 35,866 tons were produced. The flotation mill treated 34,741 tons, yielding 1,770.84 tons of concentrate. There were also produced 60 tons of copper precipitates averaging 60 to 63 percent of copper. The company sold 2,114 tons of concentrates containing 1,543.70 ounces of gold, 28,674 ounces of silver, and 1,070,057 pounds of copper. In Shasta County, the Mountain Copper Co., Ltd., long recognized as a copper producer, discontinued mining copper ores in 1931 and turned to gold mining. The company now devotes its activity to mining gold-bearing gossan overcapping its copper-ore deposit and treating it in a 500-ton cyanidation plant.

_Lead._—The mine production of lead in California in 1932 was 2,346,000 pounds (partly estimated) valued at $70,380, a decrease of 1,411,256 pounds in quantity and $88,638 in value compared with 1931. The average price of the metal in 1932 was 3 cents a pound compared with 3.7 cents in 1931. Lead ores were mined chiefly in Inyo and San Bernardino Counties, and the important producers were the Estelle and Cerro Gordo and the Santa Rosa mines in the Cerro Gordo district of Inyo County. The American Smelting & Refining Co. took over the Estelle and Cerro Gordo mines in 1929 and has since been operating them as one unit, shipping the ore to the Selby smelter on San Francisco Bay where most of the California lead ores are treated. Some ore from eastern San Bernardino County, chiefly from the Panamint, Shadow, and Providence Mountains, is sold to Utah smelters and to the Selby smelter.

_Review of mines and mills._—New construction work at milling plants in California in 1932 included the enlargement of several old plants by replacing gravity concentration with flotation equipment. Installations replacing vanner and table concentration were noted in Amador County at the Kennedy mill near Jackson, and an experimental flotation plant was constructed at the Amador Star mine near Plymouth. In Nevada County the Idaho Maryland Mines Co. operated its two amalgamation-flotation mills continuously. Six flotation cells were added to the Golden Center 20-stamp mill. In the same county are four other mills, the Murchie, Hoge, Empress, and Spanish, which used the flotation process during part of 1932. In Eldorado County a new departure from the regular crushing device was made at the Beebe mine near Georgetown where a Hadsell mill with steel-shod wheels 24 feet in diameter was constructed. The Beebe ore is an altered silicified schist averaging $3.50 a ton in gold. During a test of the Hadsell mill lasting several months an average of 208 tons of ore a day was crushed at a low cost per ton, yielding a product of which 2 percent was plus 60 mesh and 65 percent minus 200 mesh. The mill is designed to separate the sands and slimes and recover the gold from the sands by cyanidation. The slimes are fed to a 6-cell Kraut machine, and the flotation concentrate is mixed continuously with the sands for cyanidation. Bullion 0.639 to 0.849 fine in gold was shipped to the San Francisco Mint. At the Sliger mine near Garden Valley a 100-ton flotation plant supplemented the 25-stamp amalgamation mill in December. In Calaveras County the flotation process proved successful at the Mar John property near Sheep ranch, where the ore was crushed to 2½ inches through jaw crushers and to 80 mesh through 10 stamps to a ball mill in closed circuit with a Dorr classifier. The flotation concentrate was sold to a custom cyanidation plant.
The deepest producing properties in California are the Argonaut and Kennedy mines in Amador County, each with workings at a vertical depth of over 5,000 feet. Nevada County mines, chiefly in the Grass Valley-Nevada City region, are developed to a vertical depth of over 4,000 feet; some of the richest ore is mined in the upper levels at a depth of about 2,000 feet. The five leading mines produced more gold in the last 2 years than any district in California. In 1932 the output was $3,395,000 in gold compared with $3,191,820 in 1931.

The Empire Star Mines Co., Ltd., at the end of the year had put the Murchie mine on a profit-earning basis after an expenditure of about $500,000. The flotation mill and mine equipment were materially improved; the shaft was also reconditioned and sunk an additional 300 feet. Operating costs were lower for the Murchie than for any mine in the Grass Valley-Nevada City district. According to the annual report of the Empire Star Mines Co., Ltd., for the calendar year 1932, the North Star and Pennsylvania properties were practically without pay ore by midsummer, but by making a 10 percent cut in all wages and salaries paid by the company and with the reduced cost of powder all mines continued in operation although the North Star mine remained unprofitable. During 1932 underground development totaled 22,757 feet and diamond drilling 1,787 feet. The company mined 207,322 tons of ore, including lease ore, compared with 267,500 tons in 1931. The mills reduced 228,156 tons of ore with a 95.96 percent extraction compared with 214,534 tons milled and an extraction of 95.90 percent in 1931. The average gold recovery per ton of ore was $8.789 compared with $9.435 in 1931 and $9.442 in 1930. This drop in mill heads was slightly compensated by a further drop in total costs to $6.92 a ton compared with $7.08 in 1931.

The Idaho Maryland mine according to the annual report of its holding company, the Idaho Maryland Consolidated Mines, Inc., produced 58,245 tons of ore in 1932. Of this quantity 36,805 tons were treated in the Brunswick flotation plant and 21,440 tons in the Idaho Maryland amalgamation-flotation mill. The total gold and silver recovered from ore milled amounted to $979,420, an average of $16.82 a ton compared with $13.84 in 1931. The average loss in the tailings at both plants was $1.14 a ton compared with $2.13 in 1931. With bullion and smelter charges deducted the net value of the year’s output was $954,712. Total expenditures amounted to $485,936.94, including compensation insurance, local and State taxes, mine development, metallurgical experiments, and alterations but without interest or smelter charges. The total cost was $8.34 a ton of ore milled.

The Hoge Development Co. continued development work in 1932 by adding 1,000 feet of drifts and 1,500 feet of raises to its property. About 6,000 tons of ore were treated at the Murchie mill of the Empire Star Mines Co., Ltd., and a similar quantity was treated at the Hoge flotation plant after its completion in September. The property of the Golden Center Mines Co. is opened by a 1,300-foot inclined shaft and 10,472 feet of drifts. The gold associated with sulphide minerals carrying silver, copper, and lead was recovered in a 20-stamp amalgamation gravity concentration mill until September when flotation cells replaced table concentration. Gold bullion was shipped to the San Francisco Mint and lead concentrate to the Selby smelter and to a metallurgical plant in South San Francisco.
NEVADA

The value of the mine production of gold, silver, copper, lead, and zinc in Nevada, in terms of recovered metals, decreased from $11,673,787 in 1931 to about $5,135,792 in 1932. Compared with the 1931 production there were decreases in the output and value of all metals, substantial ones being recorded in the output and value of copper, lead, and zinc. Silver decreased 46 percent in both quantity and value compared with 1931.

Mine production of gold, silver, copper, lead, and zinc in Nevada, 1928–1932, in terms of recovered metals

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<th>Year</th>
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<th>Copper</th>
<th>Lead</th>
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1 Subject to revision.

Gold.—The gold from mines in Nevada decreased from $2,941,473 in 1931 to about $2,695,607 in 1932. The decline in gold production in 1932 recalls the period from 1892 to 1895 when the output dropped below $2,000,000 a year, reaching the lowest point in 1893 with a production of $985,700. Mine production was revived in 1896 by the gold discoveries at Delamar, which again promises to become an important gold-producing district. Gold contributed over 52 percent of the total gross value of metals produced in the State in 1932. Five companies, each producing between 10,000 and 20,000 ounces, yielded 52 percent of the State total; these 5 companies combined with 6 other companies, each producing between 1,000 and 10,000 ounces, yielded over 71 percent of the total gold output of the State. Due to the decrease in mining activity in all parts of Nevada, the yield of gold did not increase as it did in some other gold-producing States. In the Robinson district, White Pine County, where considerable gold has been recovered heretofore from the mining of copper ores, a substantial decrease was recorded; but in the Goldfield district, Esmeralda County, the output of gold exceeded that in 1931. The mines of the Tonopah district produced about the same amount of gold as in 1931. The leading gold-producing companies in Nevada in 1932 were the Elko Mines Co. at Jarbridge; the Bradshaw, Inc., at Goldfield; the Nevada Consolidated Copper Co. at Ely; and the Gold Hill Development Co. and the Nevada Porphyry Gold Mines, Inc., both at Round Mountain. A record of the exact number of people prospecting in Nevada for placer gold during 1932 is not available, but engineers of the Nevada State Bureau of Mines estimate that 600 to 700 men were at work in placer areas. The gold produced in regularly worked placer districts increased over that of the previous year, but just how much was produced by small-scale mines was not determined. The principal placer areas producing in 1932, named in order of production, were Round Mountain, Battle Mountain, Manhattan, Osceola, and Lynn.
Silver.—The silver production from mines in Nevada decreased from 2,562,071 fine ounces in 1931 to about 1,390,100 ounces in 1932 and the value from $743,001 to about $392,008. The Tonopah district produced about 591,300 ounces, a decrease of 232,572 ounces compared with 1931. Lessees continued to work in the properties of the Tonopah Mining, Tonopah Belmont, and Tonopah Extension mines and cleaned up ore and material in the mines and milling plants of these companies. The Desert cyanidation custom plant of the Tonopah Mining Co. at Millers closed in May after 25 years of operation, and dismantling of the mill was well under way in October. Other important silver producers were the Nevada Consolidated Copper Co. at Ely, the Gold Hill Development Co. at Round Mountain, and the Ely Revenue at Ely.

Any revival in the price of silver will benefit mining as it is a by-product in almost all of the copper, lead, and zinc ores mined in Nevada.

The ores of the Tonopah, Tybo, Pioche, Cortez, Comstock, Rochester, Eureka, and 60 or more other districts past producers of silver promise much activity, but at present no large-scale silver mines are operating. The principal mines in many districts are ready to resume operations whenever it becomes possible to do so, but the continued low prices of silver and the possible disruption of railroad service may cause a long shut-down. The mines are fully equipped with modern operating facilities including reduction plants.

Copper.—In 1932 the mine production of copper in Nevada was 31,473,600 pounds, a decrease of 41,160,897 pounds or 57 percent from 1931. The total value decreased 70 percent or $4,626,902. Concentrates yielded most of the copper in 1932, as the low price of the metal cut down shipments of crude ore. Most of the copper was produced in the Robinson district, White Pine County, by the Nevada Consolidated Copper Co. and the Consolidated Coppermines Corporation, both companies suffering heavy losses. The operations of both mines and reduction works were on a part-time basis. Some blister copper was shipped to Italy during the year.

Lead and zinc.—The lead output from mines in Nevada decreased from 15,860,634 pounds in 1931 to about 1,195,200 pounds in 1932, and the value decreased from $586,843 to about $35,856. The largest producer was the Combined Metals Reduction Co., in Lincoln County. Zinc-lead ore was shipped from the Yellow Pine district in Clark County to eastern oxide plants. Nevada’s zinc output in 1932 was estimated at 982,800 pounds valued at $29,484 compared with 20,861,348 pounds valued at $792,731 in 1931.

Review of mines and mills.—Production in Churchill County in 1932 was confined to a mill clean-up and to small lots of gold ore mined in the Fireball district and treated by amalgamation at Olinghouse. Gold-silver ore was shipped to a smelter from the Fairview district.

In Clark County the Crescent, Eldorado Canyon, and Searchlight districts produced gold chiefly from the Eldorado-Rand, Quartzette, and Duplex mines. Oxidized zinc-lead ore from the Yellow Pine district, aggregating 600 tons, was reduced at the Ozark works in Kansas. The ore was principally from the Yellow Pine, Bullion, and Anchor mines. A new discovery of gold was made in the Chiquita claim adjoining the Keystone, a former gold-producing mine, and gold bullion was shipped to the San Francisco Mint.
The production of molybdate of lead and vanadium minerals attracted attention to the Shenandoah property at Goodsprings. Some molybdate of lead was forwarded to Wilmington, Calif., for the foreign market, and arrangements were made to equip a mill at Kingman, Ariz., for future treatment.

Elko County mines produced gold, silver, and a little copper in 1932. Jarbridge and Gold Circle were the two largest district producers of gold.

The Elkoro Mines Co. at Jarbridge, according to the annual report of its holding company for 1932, had exhausted all known ore on the property in September. The mine and 100-ton cyanidation plant have produced about 20,000 ounces of gold annually since 1918. In 1932, the company treated 40,517 tons of ore with a net operating profit of $138,878.

At Midas in the Gold Circle district lessees at the Missing Link and Elko Prince holdings of the Gold Circle Consolidated and the Buena Gold Mines Co. made important shipments of gold and silver bullion recovered by amalgamation and cyanidation. Some siliceous ore was also shipped to smelters in Utah.

The outstanding development in Elko County was the opening of a large deposit of copper ore in the Rio Tinto property at Mountain City. The first car of ore shipped to a smelter in June assayed 47 percent of copper, a little silver, and a trace of gold.

Esmeralda County produced chiefly gold and silver ore from mines at Goldfield, Gold Mountain, Silver Peak, Gilbert, and the western part of the Tonopah district. The mineral output of the latter is mentioned under Nye County.

Goldfield district production in 1932 was confined to the Goldfield Consolidated mine and the property of the Goldfield Deep Mines Co., each worked by lessees who shipped ore to the smelters. The Bradshaw, Inc., continued to treat the old Goldfield mill tailing by cyanidation and handled 281,000 tons of tailing during 1932. The district output amounted to $360,951 in gold, 9,257 ounces of silver, and 6,054 pounds of copper.

At Silver Peak various leasing interests of the Lucky Boy and Black Mammoth companies and the Calumet Gold Mining Co. produced about 1,800 tons of ore from the Mary mine. The ore was treated in the Black Mammoth and Liberty Divide or Oromonte amalgamation-flotation mills and the old Mary mine tailing in the Fanchini cyanidation plant. The total output of the district amounted to approximately $91,000 in gold, and some silver was shipped as crude ore, bullion, and concentrate.

Production in Eureka County was confined chiefly to the Eureka district, from which lessees shipped lead ore mined from the Richmond-Eureka property and the Bear, Cyanide, and Diamond-Excelsior groups to Utah smelters. The Buckhorn mine near Blackburn produced and shipped gold and silver ore to a smelter. In the Lynn district about 50 men worked placers, and one enterprising company found good pay gravel after removing considerable overburden.

In Humboldt County the production consisted of gold and silver from Buckskin mine in the National district and from small lode mines near Ten Mile, Daveytown, and Paradise. The Basque mine
produced milling ore yielding a little gold bullion. Some placer
gold was reported from the Sawtooth and Leonard Creek districts.
Lander County mines were important producers of copper until
2 years ago. Now copper ore is held in reserve for better prices, and
gold ore discovered by lessees of the Copper Canyon Mining Co.
near Battle Mountain has been worked since 1931. The output of
over $100,000 in gold from the lode and placer properties in the
county was greatly in excess of that in 1931.
Production in Lincoln County in 1932 was greatly reduced due to
the restricted operation of copper and lead-zinc mines. In the
Pioche district the Combined Metals Reduction Co. produced from
its no. 2 or Caselton shaft silver-lead ore containing a little copper
and zinc, which was shipped to a smelter in Utah. A little lead-zinc
ore of milling grade from the no. 1 shaft of the company was shipped
to its flotation mill at Stockton, Utah, for treatment when metal
prices recover. At Delamar in the Ferguson district new discoveries
of gold ore were made in the Magnolia and April Fool mines. The
gold output of the county was chiefly from Delamar and amounted
to $47,500 in gold compared with $18,783 in 1931.
In Lyon and Storey Counties at Silver City and in the Comstock
district mining was active but was done principally by lessees on
various properties. Engineers investigating some of the old mines
carried on extensive examinations. The output of the region was
chiefly gold and silver, and in 1932 approximately $75,000 in gold
and 140,000 ounces of silver were reported compared with $115,000
in gold and 27,000 ounces of silver in 1931. The Donovan custom
mill operated its amalgamation and cyanide units to full capacity,
treating chiefly ore from Silver Hill mine where 20 sets of lessees
worked during most of 1932.
At the Overland mine and 10-stamp mill, owned by the Comstock
Silver Mining Co., some gold-silver bullion was produced by lessees.
At the close of 1932 a new flotation mill of 150 tons capacity was
nearing completion at the portal of the Hale and Norcross tunnel for
the Arizona Comstock Corporation. This flotation mill was designed
to mill ores from the Chollar-Potosi, Hale and Norcross, and Savage
mines.
Several shipments of gold ore were made from the Milwaukee mine,
and many small lots of ore from other mining claims in the region were
treated by the miners at the Trimble amalgamation plant. A shaft
was sunk on the Woodville-Justice property, and the Teddy O’Neal
mine near the Milwaukee mine was operated by lessees. The
McTigue amalgamation plant at Silver City was overhauled and
completely equipped for treating ores by flotation. Most of the lessee
ore produced from the Santiago and Haywood group was treated in
the Trimble mill. In the Palmyra district the Stone Cabin Consolidated
near Como started operation of its flotation mill built originally
to treat ore from the Pony Meadow property.
In Mineral County most of the ore in 1932 was mined in the
vicinity of Mina in the Gold Range, Oimeo, Summit Springs, and Pilot
Range districts. The Sunnyside mines in the Silver Star district
and the Olympic lease were the most important producers of gold.
The Simon Silver-lead Mines property at Simon was idle.
Nye County produced more gold in 1932 than any other county in
Nevada. Gold amounted to about $728,000 and silver to about
500,000 ounces compared with $682,246 in gold and 1,352,509 ounces of silver in 1931. Mines in the Tonopah, Manhattan, and Round Mountain districts were operated by lessees. In the Manhattan district the White Caps Gold Mining Co. was the principal producer of ore, and lessees shipped about 5,000 tons of gold ore to smelters in Utah. Ore from the Nevada Coalition Gold Mines Co. property and various other lode claims worked by lessees was treated in the War Eagle stamp-amalgamation mill. The placer output was much larger than in 1931. At Tybo no new ore was produced, but (according to the annual report of the Treadwell Yukon Co. for 1932) 4,491 tons of zinc concentrate were in storage at the end of the year. The concentrate assayed 0.037 ounce of gold, 12.75 ounces of silver, 1.94 percent of lead, and 49.23 percent of zinc to the ton. The company discontinued development at Tybo and other properties in Nevada on October 1.

At Round Mountain, lode mines and placers produced gold and silver valued at $518,386 in 1932 compared with $408,910 in 1931 and $203,169 in 1930. The Gold Hill Development Co., according to its annual report for 1932, opened up its property with an additional 3,503 feet, part of which was on the deepest level of the mine. Further progress in sinking or crosscutting to the Gold Hill vein was brought to a halt at a depth of 645 feet owing to an excessive flow of water. All available commercial ore, except portions of the shaft pillars, was practically exhausted at the end of the year. Due to conditions requiring additional pumping facilities the company recommended discontinuance of operations in the mine and closed the mill. The output of the Gold Hill mine for 1932 was 38,050 dry tons of ore, which was milled in the company cyanidation plant and averaged 0.337 ounce of gold and 1.91 ounces of silver, valued at $7.494, a ton. The recovered bullion contained 11,755.02 ounces of gold and 34,898 ounces of silver, representing 91.59 percent of the total gold and 47.87 percent of the silver. The average cost of milling was $2.196 a ton and that of mining $3.94 a ton, which includes a stoping cost of $3.15 a ton and a development cost of $0.787 a ton.

During repairs to its Sunnyside stamp-amalgamation mill the Nevada Porphyry Gold Mines, Inc., at Round Mountain slowed down operations, but its placers were worked continuously. Water for placer mining was piped 9 miles from the Toyabe Range. Some gold was recovered by amalgamation from ore of the Monte Cristo Mine, the owner of which operated a small tube mill. About 300 feet of development work was done in the mine.

In Pershing County most of the mine production was from the Seven Troughs and adjoining districts. The Seven Troughs mine and large cyanidation plant remained closed. Some placer gold was reported from small dry-washing operations in the Humboldt district near Inlay. Placer ground also was worked in the Rosebud and Sierra districts but with indifferent success.

In Washoe County the White Horse district was the largest producer of gold from the operations of many lessees who worked in various properties of the district, chiefly the Springfield mine. The ore was treated in the Springfield amalgamation mill.

In White Pine County the value and quantity of the mine production of metals was substantially less than in 1931, but the total value exceeded that of any other county in Nevada. Ten lode mines in the
county in 1932 produced 1,375,100 tons of ore and tailings from which were recovered $339,847 in gold, 104,400 ounces of silver, 30,864,500 pounds of copper, and 2,000 pounds of lead. This compares with $778,464 in gold, 184,842 ounces of silver, 71,350,587 pounds of copper, and 77,874 pounds of lead produced in 1931. The placer production, chiefly from Osceola, was valued at $3,543 in 1931 and $10,467 in 1932. The Nevada Consolidated mill and smelter near McGill treated all the ore of milling and smelting grade produced from mines in White Pine County. In the Cherry Creek district a continued demand for convertor lining material caused increased shipments of low-grade siliceous ore and tailings. Most of the material was from the Nevada Standard property.

OREGON

The total value of gold, silver, copper, lead, and zinc from lode and placer mines in Oregon in 1932, in terms of recovered metals, was approximately $439,295 compared with $319,703 in 1931, an increase of about $119,592. Gold was the chief metal produced, with an output of approximately 21,000 ounces valued at $434,109 compared with 15,350 ounces valued at $317,315 in 1931. The silver yield was incidental to the production of gold and increased from 7,254 ounces valued at $2,104 in 1931 to about 9,000 ounces valued at $2,538 in 1932. The production of copper increased from 1,700 pounds valued at $155 in 1931 to approximately 32,500 pounds valued at $2,048 in 1932. Lead increased from 3,497 pounds valued at $129 in 1931 to about 8,000 pounds valued at $240 in 1932. The recovered zinc was entirely from the experimental treatment of ores and amounted to about 12,000 pounds valued at $360.

Mine production of gold, silver, copper, lead, and zinc, in Oregon, 1928–32, in terms of recovered metals

<table>
<thead>
<tr>
<th>Year</th>
<th>Gold</th>
<th>Silver</th>
<th>Copper</th>
<th>Lead</th>
<th>Zinc</th>
<th>Total value</th>
</tr>
</thead>
<tbody>
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<td>1928</td>
<td>$225,905</td>
<td>30,124</td>
<td>330,295</td>
<td>386,403</td>
<td>13,246</td>
<td>$295,446</td>
</tr>
<tr>
<td>1929</td>
<td>353,328</td>
<td>30,000</td>
<td>355,746</td>
<td>20,626</td>
<td>11,252</td>
<td>435,003</td>
</tr>
<tr>
<td>1930</td>
<td>297,702</td>
<td>9,000</td>
<td>176,300</td>
<td>9,113</td>
<td>12,526</td>
<td>325,143</td>
</tr>
<tr>
<td>1931</td>
<td>317,315</td>
<td>7,254</td>
<td>1,700</td>
<td>3,497</td>
<td>12,000</td>
<td>319,703</td>
</tr>
<tr>
<td>1932</td>
<td>434,109</td>
<td>9,000</td>
<td>32,500</td>
<td>8,000</td>
<td>12,000</td>
<td>439,295</td>
</tr>
</tbody>
</table>

1 Subject to revision.

Gold mining was confined principally to the placers, although a few lode mines in the State were productive. The three dredges operating in Baker, Grant, and Jackson Counties produced slightly more than 36 percent of the total gold, their combined output increasing about $20,000 over that of the preceding year. Shortage of water prevented continuous operation of the dredge in Jackson County. Gold produced from placers and lode mines in eastern Oregon was handled chiefly by banks in Baker and Grant Counties. About $58,000 in gold was shipped to the offices of the Bureau of the Mint at Boise and San Francisco and to private refiners. Most of the gold of the small producers was purchased by mine operators or merchants. Small placers throughout the State were active, and their production
contributed substantially to the gold output in 1932. In eastern Oregon the Empire dredge in Grant County was the largest gold producer, followed by the Superior dredge in Baker County. A placer on Salmon Creek above the old Nelson mine northwest of Baker was operated with a power shovel. Pine Creek gravel deposits east of Hereford have produced gold for 34 years, but water has not been available for large-scale mining. At the Yellow Nugget placer near the mouth of Pine Creek gravel was handled with a power shovel and hauled a quarter of a mile in trucks to water pumped from Burnt River. At Harper's placer, 3 miles from the mouth of Pine Creek, a power shovel handled about 300 yards of material a day. Most of the gold was very coarse, and one nugget found during the season weighed 12 ounces. The Elliott drift placer in the same region was developed and worked when water was available. In Stice's Gulch a power shovel worked to bedrock and obtained pay gravel. Seven miles west of Baker in Washington Gulch water was available during a short season to permit the operation of hydraulic giants. A shaft was sunk 50 feet to the original bedrock. Two hydraulic giants were operated in Rye Valley on the Silbaugh property. In Grant County hydraulic giants washed gravel on the Marysville property near Canyon City; at Vinegar, Olive, and Vincent Creeks; and in the Susanville district.

The Macy and Virginia 10-stamp mills were rehabilitated. The Cornucopia mill near the portal of the Union-Companion adit was rebuilt. New mills were added to the Evans mine on Ruby Creek, the Pedro Mountain mine 13 miles west of Durkee, and the Shoestring property in the Rye Valley region. A small mill was erected at the Crystal Palace mine in the Sparta district. Some milling equipment was added to the plant on the Bull Run mine, and eight men were employed in developing the Record lode mine north of Hereford. At the Sanger mine some specimen quartz of free gold was mined during development. Men working on Elkhorn Mountain, 16 miles west of Baker, on the Hurdy Gurdy and Denny Fraction claims reduced rich gold quartz in hand mortars; the lower-grade ore was shipped. The Imperial mine in the Cable Cove district was worked with a crew of 14 to 18 men, and some high-grade ore was developed. At the Columbia and Taber Fraction properties the old tunnels were retimbered and 3 car lots of ore shipped to Tacoma. The Twin Baby Mining Co. or Vindicator property on the Baker-Union County line near Medical Springs was under new management, and the shaft was sunk 100 feet to the 350 level. Development of the White Swan property was continued, and some gold ore was milled from the Banzette property.

In Grant County the Rabbit mine and 5-stamp mill were operated continuously, and the shaft was deepened. At the Buffalo mine a little ore was treated by flotation, and concentrate containing gold, silver, and lead was shipped with small lots of crude ore to the Bunker Hill smelter in Idaho. In Malheur County the Golden Eagle lode claim was under development. A 200-foot shaft was sunk on the Sunday Hill mine, and a little gold ore was milled.

In western Oregon the principal banks at Grants Pass, Medford, and Ashland handled $128,349 in new gold (including the purchases of five merchants), of which most was in small lots ranging from 10 cents to several dollars. This new gold was purchased from 1,016
individuals representing prospectors and small working parties who averaged $126.32 in gold during the year or season, chiefly from placer ground in Josephine and Jackson Counties. Most of the gold was reported from Evans, Foots, and Sterling Creeks in Jackson County and Grave and Althouse Creeks in Josephine County. Gold producers in Coos, Curry, Douglas, and Linn Counties also sold gold in Grants Pass.

Next to dredging, hydraulic gravel mining had special interest. The Flynn placer mine on the Illinois River, 3 miles from Takilma, the Plataurica hydraulic property in Fry Gulch, and the Llano de Oro hydraulic placer near Waldo were all producers. In the Althouse Creek region many small-scale producers of gold added to the regular output of the Ramsey claims, 12 miles from Holland. The Tigertown hydraulic mine was worked on a small scale, and the John Apple hydraulic mine, 7 miles south of Holland, produced gold. Placers on Sucker Creek were active; the Barnett was hydraulicicked to full capacity. Small-scale placer mining progressed on California Bar, and some gold was sold to the local storekeepers. Hydraulic placers were worked on Jump-Off Joe Creek and tributaries. The chief gold producers were the Weymouth and placers on Jack’s, Briggs, Hogum, Starveout, and Silver Creeks. A power shovel and trucks to transport gravel to a washing plant were placed on Louise Creek at the Lindar gravel property. Sardine Creek had the largest mechanical placer outfit in southern Oregon, a 1¼-yard power shovel handling 100 yards of gravel hourly. On the banks of the Rogue River in Josephine and Jackson Counties small groups were at work. Drift placers were worked in 12 places within the city limits of Jacksonville, by shafts 12 feet in gravel to bedrock, and very few large wash boulders were encountered. Some beach mining was carried on in Coos and Curry Counties, and the Mule Mountain district in Curry County was actively prospected.

Lode mining was productive in few instances in southwestern Oregon, but plans for financing several mines were under way. A Straub mill was installed on the Brady mine at Whiskey Creek, and the Mead property on Jones Creek was opened with a crosscut drift. A new mill was ready to operate in December on ore from the Towne mine at Jacksonville, and the Opp mine enlarged its reserve of milling ore. A 20-ton mill was constructed at the Sunbeam mine, 15 miles south of Grants Pass. At the head of Louise Creek gold ore averaging $75 a ton was developed in the Granite Hill mine. The Humdinger mine, actively developed in 1931, was turned back to the owner, and no production was reported for 1932. In Jackson County the Ashland mine was developed, and some bullion was sold to the San Francisco Mint. Bullion was shipped from the American Boy mine southwest of Medford. The Chieftain and Continental lode mines in Douglas County and the quartz property of the Bartels Mining Co. in Lane County were producers of gold. Considerable development work was done at the Continental, and at the Chieftain the 15-ton flotation mill was operated. In Marion County the Amalgamated Mining Corporation operated a mill and shipped lead-zinc concentrate to Midvale, Utah.