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BULLETIN NO. 69

SILVER OCCURRENCES
OF
WASHINGTON

By

WAYNE S. MOEN



1976

For sale by Department of Natural Resources, Olympia, Washington
Price \$4.00

Cover Photo

*Knob Hill mine at Republic in Ferry County.
This mine, which has been in production since
1910, is a major producer of gold and silver.*

*Photos are from the Washington Division of
Geology and Earth Resources files.*

Sketches by Doyal Foster.

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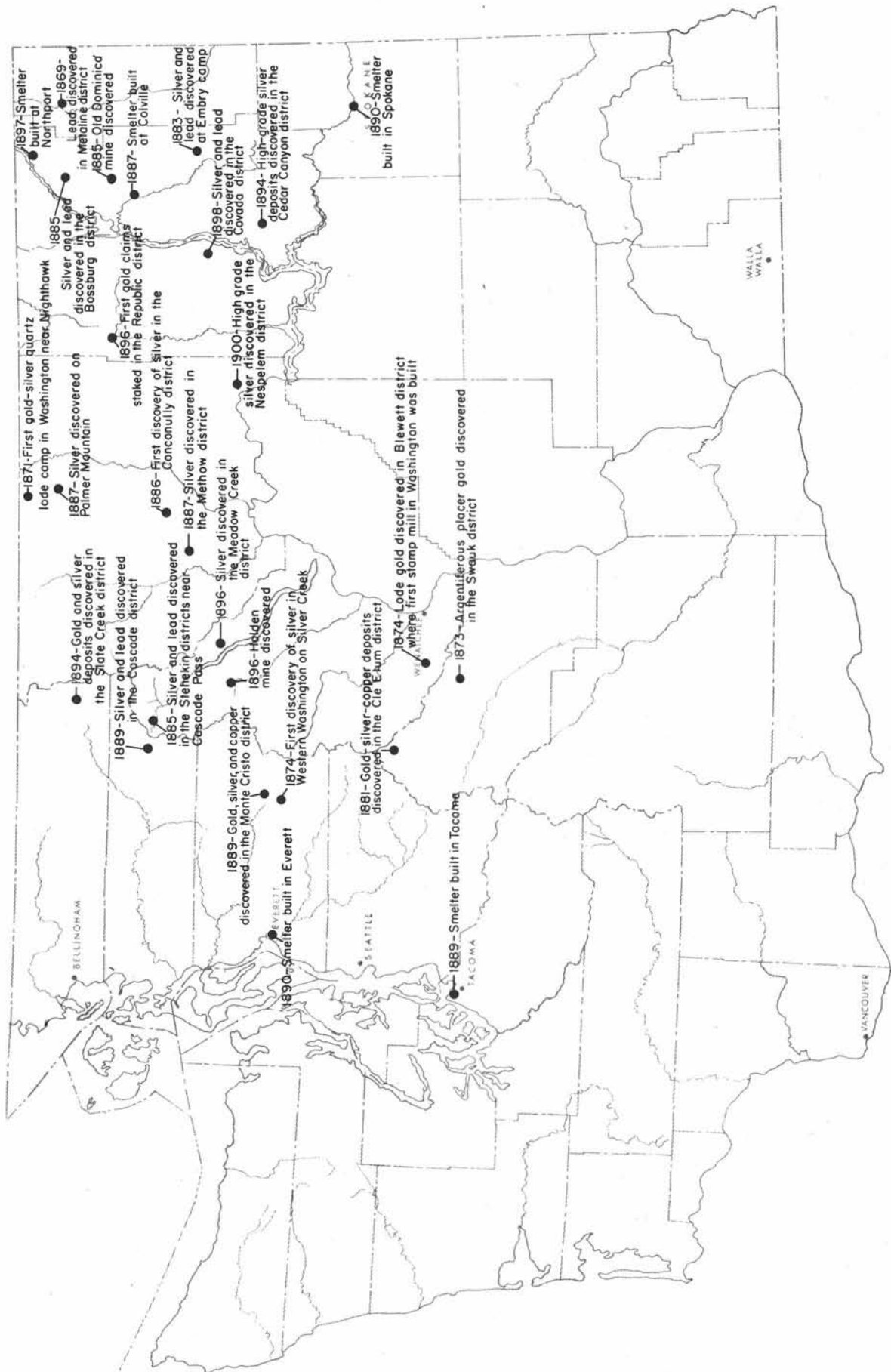
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Historical events relating to early silver mining in Washington

SILVER OCCURRENCES of WASHINGTON

by

Wayne S. Moen

ABSTRACT

Silver was one of the first metals utilized by man, for as early as 2500 to 3000 B.C. the inhabitants of Asia Minor used silver for ornaments and utensils. The Romans were the first to use the metal as the basis of a monetary system, and for hundreds of years silver was used in coins, as well as in jewelry and sterling ware. Currently (1975), the photographic and electronic industries are the largest consumers of silver in the United States. Since 1942, the industrial demand for silver has exceeded our domestic production, and each year the silver deficit increases. In 1973, mines in the United States produced only 37 million ounces of silver, while the net industrial consumption was 193 million ounces. The increasing demand for silver has resulted in higher silver prices. In 1960, silver sold for around 91 cents per troy ounce; in February 1974 it reached a high of \$6.70 per ounce; in August 1975, it sold for around \$4.50 per ounce. Shortages of silver combined with increasing demands in the future will undoubtedly force silver prices even higher.

Washington never has been a major silver-producing state, but it has been a consistent producer of silver since 1860. From 1860 through 1972, mines in the state produced 22.8 million ounces of silver valued at \$20.3 million. The bulk of this silver was a byproduct of gold, copper, lead, and zinc mining operations in Ferry, Chelan, Stevens, and Pend Oreille Counties. In 1972, Washington produced

220,782 ounces of silver as a byproduct of gold mining operations at Republic in Ferry County and lead-zinc mining operations at Metaline Falls in Pend Oreille County.

Silver has been reported at over 1,500 mines and prospects in 26 of the state's 39 counties. However, only at 268 properties does it appear to be present in significant amounts. Counties in which the principal silver deposits are located include Pend Oreille, Stevens, Ferry, Okanogan, Chelan, Kittitas, King, Snohomish, Skagit, and Whatcom.

The silver deposits of Washington occur mainly in narrow quartz fissure veins in a variety of host rocks, which range in age from Paleozoic to Tertiary. However, most deposits appear to be of Cretaceous and early Tertiary age, and are related to granitic intrusions. Ore minerals common to the veins include pyrite, pyrrhotite, galena, chalcopyrite, and sphalerite. The less common ore minerals are tetrahedrite, bornite, stibnite, silver sulfides, native silver, and gold. In many deposits, silver is commonly carried by the galena and tetrahedrite, while in several of the richest deposits mined in the past silver minerals such as pyrargyrite, cerargyrite, argentite, and native silver were predominant.

The silver content of the veins varies considerably. Lead-zinc ore from Stevens and Pend Oreille Counties averages only around 0.02 ounce per ton. Copper ore from Stevens County averaged

around 4 ounces per ton in silver, as did the ore from several gold mines in Ferry County. Several silver mines in Stevens, Okanogan, and Snohomish Counties shipped ore that contained several hundred ounces per ton in silver, whereas select high-grade ore yielded up to 1,000 ounces per ton. In deposits that contained mainly silver, the average silver content of ore mined in the past was round 60 ounces per ton. However, the average silver content of the principal silver mines and prospects in Washington is only

around 6 ounces per ton.

It is doubtful that any silver mines or prospects in the state will develop into major silver producers like silver mines of the Coeur d'Alene mining district of Idaho. Several properties might develop into small producing mines, and exploration might turn up new ore bodies. However, as in the past, the bulk of the silver produced in Washington in the future will be produced as byproducts of gold, copper, lead, and zinc mining operations.

GENERAL DISCUSSION

PROPERTIES, USES, AND CONSUMPTION

Silver, like gold, was one of the first metals cherished by man. As early as 2500 to 3000 B.C., it was fashioned into ornaments and utensils, and for over 2,000 years was the basis of monetary systems throughout the world.

Silver is the whitest of all metals, has a perfect metallic luster, and except for gold is the most malleable and ductile of all metals. Because of its comparative scarcity, brilliant white color, and resistance to atmospheric oxidation, it has been used for centuries in coins, jewelry, ornaments, and silverware. It is one of the best metals for conducting electricity and it is widely used in the manufacture of electrical and electronic products. Because of its unusual chemical properties, it is used extensively by the photographic industry. In 1973, 26 percent of the silver consumed in the United States was used in photographic materials; 22 percent was used in electrical and electronic products; 20 percent was used in sterling ware; 16 percent was used in electroplated and brazing wares; and 8 percent was

used in medical and dental products, catalysts, bearings, and jewelry. Because of silver shortages throughout the world, it has not been used in coins since the late 1960's. However, many commemorative coins are still minted of silver.

Prior to 1942, production of silver in the United States exceeded industrial consumption. However, beginning in 1942, the industrial demand for silver increased rapidly, and by 1974 the net industrial consumption was 178 million ounces, while the mines of the country produced only 34 million ounces (fig. 1). Up until 1971, the silver deficit was balanced by the withdrawal of silver from the U.S. Treasury, as well as by sales of hoarded and reclaimed silver. However, the depletion of Treasury silver has forced silver users to depend upon newly mined silver, reclaimed silver, sale of private silver, and imports of silver from foreign countries. Faced with a silver deficit in 1974, the United States imported 134 million ounces of silver from 16 foreign countries, with the largest imports coming from Canada, Mexico, and Peru.

Silver is a comparatively rare metal, and the average rock is estimated to contain only 0.07 parts

AVERAGE U.S. SILVER PRICES
(1860-1974)

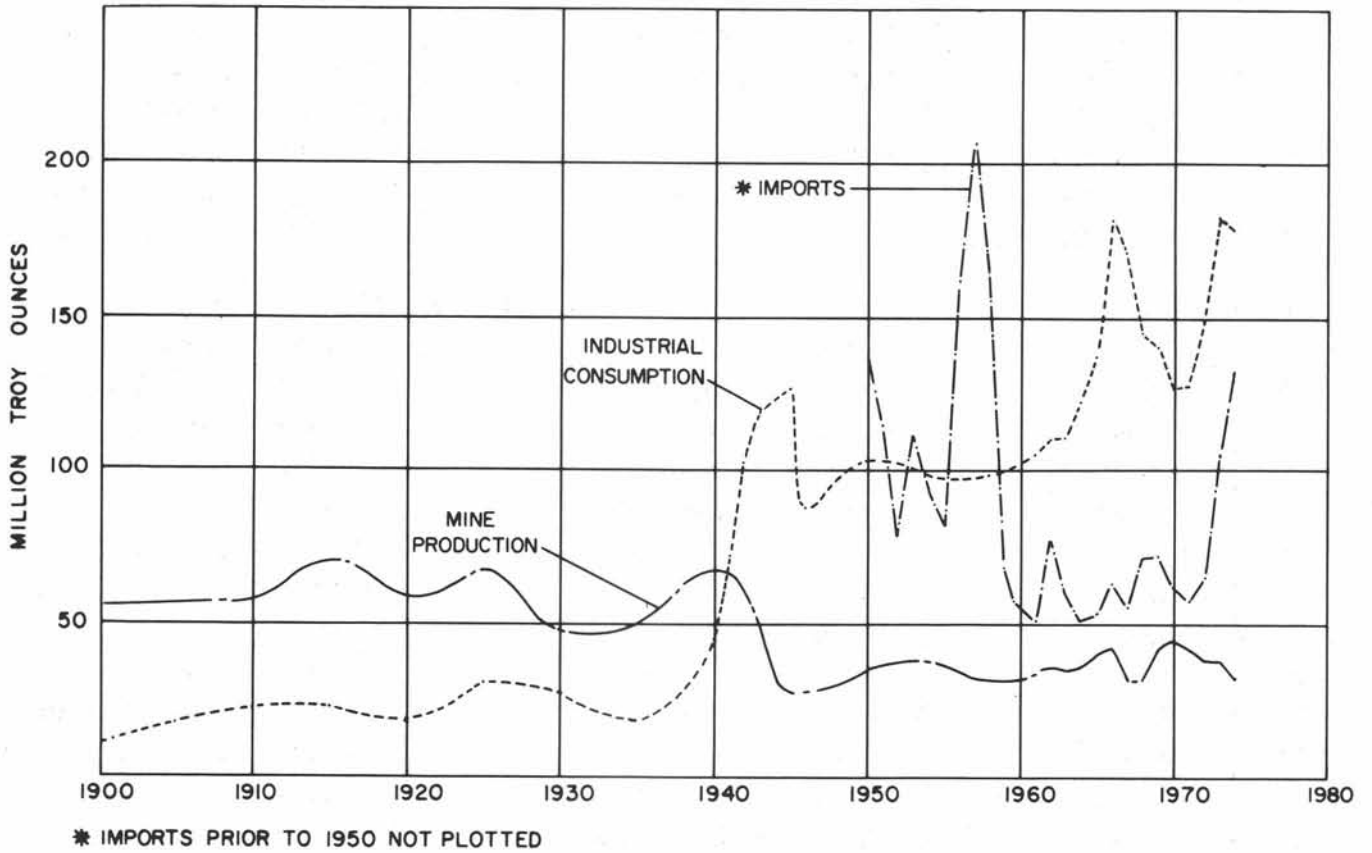
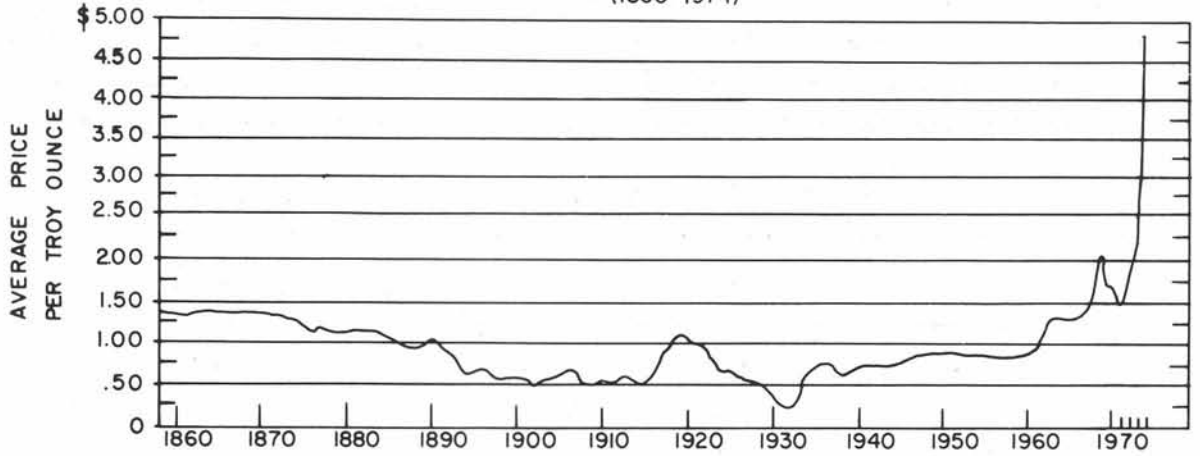


FIGURE 1.—Mine production, industrial consumption, and silver prices in the United States, 1900-1974.

per million (0.002 troy ounces per ton) of the metal. Mines in the United States that are classed as true silver mines are scarce. Only four silver mines produced over 1 million troy ounces of silver in 1971, and three of the mines were in the Coeur d'Alene mining district of Idaho (table 1). Silver ore from

three of the silver mines averaged up to 27 ounces of silver per ton, which is 13,500 times that of the average rock. However, the bulk of the silver mined in the United States comes from base metal mines, the ore of which contains as little as 0.06 ounces of silver per ton. Although silver is only a byproduct

TABLE 1.—Major silver producers in the United States, 1971

Rank	Mine	State	Operating Company	Silver (troy ozs)	Class of ore
1	Sunshine	Idaho	Sunshine Mining	7,043,629	Silver
2	Galena	Idaho	Asarco	3,901,000	Silver
3	Lucky Friday	Idaho	Hecla	3,343,075	Lead
4	Utah Copper	Utah	Kennecott	2,291,969	Copper-gold-silver
5	Bulldog	Colorado	Homestake	2,018,300	Silver
6	Berkeley Pit	Montana	Anaconda	1,970,301	Copper
7	Bunker Hill	Idaho	Gulf Resources	1,715,022	Lead-zinc
8	Crescent	Idaho	Gulf Resources	1,663,417	Silver
9	Burgin (Tintic)	Utah	Kennecott	1,029,975	Lead, lead-zinc
10	Copper Queen and Lavender Pit	Arizona	Phelps Dodge	867,000	.....Do.....
11	U.S. and Lark	Utah	U.S. Smelting & Refining	858,000	Lead-zinc
12	Twin Buttes	Arizona	Anaconda	796,236	Copper
13	Pima	Arizona	Cyprus	778,000	.....Do.....
14	Missouri Lead	Missouri	American Metal Climax	700,000	Lead
15	Star	Idaho	Hecla	647,340	Lead-zinc
16	White Pine	Michigan	Copper Range	634,780	Copper
17	Sierrita	Arizona	Pennzoil (Duval)	616,000	.....Do.....
18	Idarado	Colorado	Newmont	602,038	.....Do.....
19	Morenci	Arizona	Phelps Dodge	595,000	.....Do.....
20	Dayrock	Idaho	Day Mines	593,184	Lead-zinc
21	Mayflower	Utah	Hecla	576,663	Copper-lead-zinc
22	Mission	Arizona	Asarco	489,000	Copper
23	Battle Mountain	Nevada	Pennzoil (Duval)	462,000	.....Do.....
24	Tyrone	New Mexico	Phelps Dodge	446,000	.....Do.....
25	Butte Hill	Montana	Anaconda	429,416	.....Do.....
26	Mineral Park	Arizona	Pennzoil (Duval)	427,000	.....Do.....
Total				35,494,345	

TABLE 2.—Production of silver in the United States, by class of ore, in 1971^{1/}

Class of ore	Ore (tons)	Silver (troy ozs)	Average grade (troy ozs/ton)	Percentage of total ore production
Silver	673,116	15,044,825	22.35	36.0
Copper	217,245,002	13,174,914	0.060	32.0
Copper-zinc and copper-lead-zinc..	5,115,314	6,826,542	1.334	17.0
Lead	8,925,109	5,825,447	0.652	14.0
Gold	1,882,638	405,443	0.215	1.0
Zinc	102,299	24,910	0.243	less than 0.5
Gold-silver	166,660	122,880	0.737	less than 0.5
Old tailings	100,809	138,076	1.369	less than 0.5

^{1/} From U.S. Bureau of Mines Minerals Yearbook, 1971, v. 1, p. 1081-1082.

TABLE 3.—Mine production by states of recoverable silver in the United States in 1973^{1/}

Rank	State	Silver (troy ozs)
15	Alaska	260
2	Arizona	6,974,010
11	California	67,492
4	Colorado	3,762,920
1	Idaho	13,575,596
8	Michigan	850,273
6	Missouri	2,122,197
3	Montana	4,128,149
9	Nevada	562,415
7	New Mexico	1,118,611
12	New York	54,010
14	Oregon	1,036
10	South Dakota	71,937
13	Tennessee	33,310
5	Utah	3,721,882
	Other states	188,675
Total		37,232,773

^{1/} Preliminary figures from U.S. Bureau of Mines.

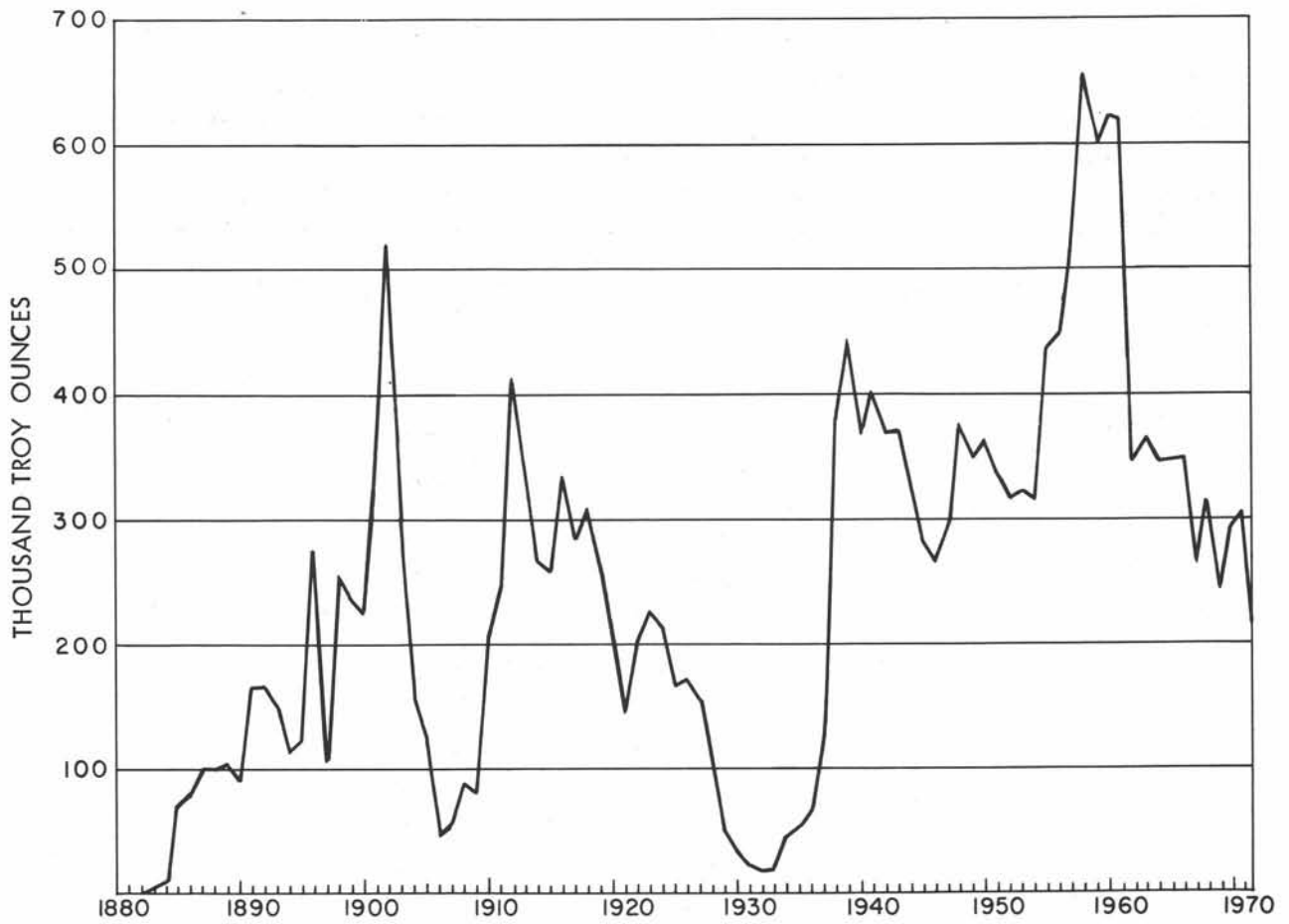


FIGURE 2.—Production of silver in Washington, 1882-1970.

of the base metal mines, they produced 63 percent of the silver mined in the United States in 1971. Table 1 lists the 26 largest silver mines in the United States; the combined production of these mines accounted for 85 percent of the silver produced in 1971. Table 2 lists the production of silver during 1971 according to ore types.

A breakdown of silver (by states) produced in the United States during 1973, is shown in table 3. The largest silver-producing states were Idaho, Arizona, Montana, Colorado, Utah, and Missouri. Around 92 percent of the 37 million ounces of silver produced during 1973 came from these states. Washington's silver production is not listed because the bulk of the silver came from the Knob Hill gold mine, and publishing the figure would disclose individual company confidential data.

SILVER PRICES

Over the past 100 years the price of silver has been as low as 28 cents per troy ounce in 1932 to as high as \$6.70 per ounce on February 26, 1974. Between 1860 and 1960, silver averaged 90 cents per ounce; however, following cessation of Treasury sales in November 1961, there has been a general rise in the price of silver. Silver prices are subjected to daily fluctuations, and prices are published daily in the market section of many newspapers. During the first nine months of 1975, silver averaged around \$4.50 per ounce with a low of \$3.94 in January and a high of \$5.10 in August. Because silver consumption is expected to increase more rapidly than mine production, higher silver prices can be expected in the future.

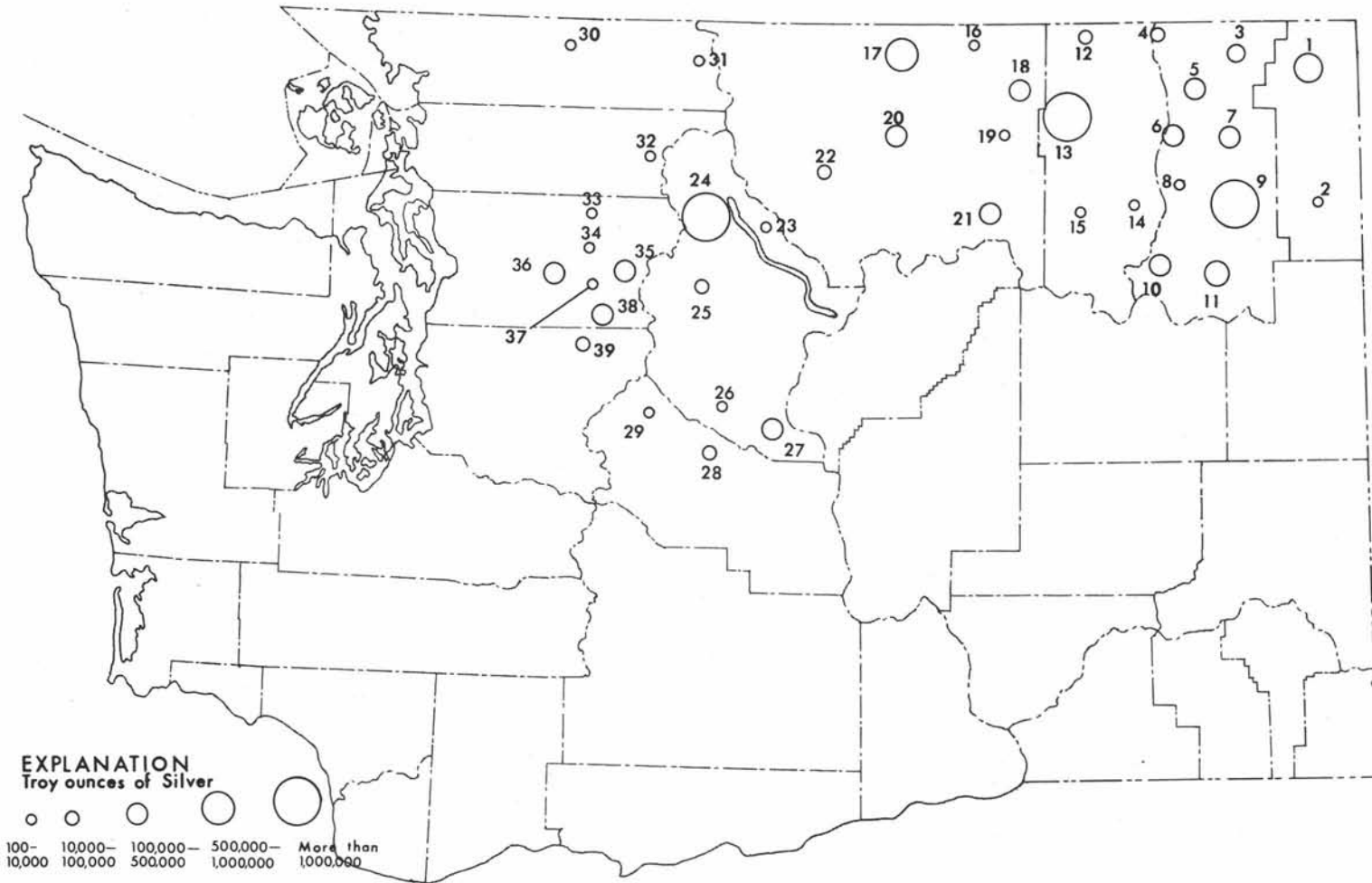
WASHINGTON'S SILVER PRODUCTION

Washington has been a consistent, but minor, producer of silver since 1860. The state is credited

with the production of small amounts of silver prior to 1885; however, this silver came from the refining of gold bullion. From 1860 through 1972, mines of the state produced 22.8 million ounces of silver valued at \$20.3 million. The yearly production was as little as 9,683 ounces in 1894, to as much as 320 ounces in 1876 (see Appendix C). During the past 10 years, the state has produced an average of 300,000 ounces yearly. Prior to 1885, the production of gold in terms of troy ounces exceeded the production of silver. However, from 1885 to 1975, with the exception of 1894, ounces of silver produced has always exceeded ounces of gold produced.

In 1972, the production of silver in Washington amounted to 220,782 ounces, the lowest it had been since 1937. Whereas during some years as many as 15 base metal and precious metal mines produced silver, in 1975, silver was produced only as a byproduct of gold mining operations at the Knob Hill mine at Republic, and as a byproduct of lead-zinc mining operations at the Pend Oreille mine near Metaline Falls.

Production of silver from lode mines in Washington began in 1874, when the first lode gold mines were placed into production; however, silver at that time was secondary to gold. In 1885, silver began to be produced from high-grade lead-silver ores, and by 1900, the lead-silver mines were producing over one-half of the silver mined in the state. In 1916, the silver came mainly from copper ores, and by 1943, silver was produced at the state's lead-zinc, and copper mines. However, at this time the production of silver from lode gold-silver mines exceeded the silver production from base metal mines. By 1957, the production of silver as a byproduct of the base metal mines had declined to less than 10 percent of the state's total silver production. Currently (1975), 97 percent of the silver produced in Washington comes from gold ores and 3 percent comes



MINING DISTRICTS

Pend Oreille County

- 1 - Metaline
- 2 - Newport

Stevens County

- 3 - Northport
- 4 - Orient
- 5 - Bossburg
- 6 - Kettle Falls
- 7 - Colville
- 8 - Summit
- 9 - Chewelah
- 10 - Deer Trail
- 11 - Springdale

Ferry County

- 12 - Danville
- 13 - Republic
- 14 - Covada
- 15 - Keller

Okanogan County

- 16 - Myers Creek
- 17 - Loomis
- 18 - Sheridan
- 19 - Park City
- 20 - Conconully
- 21 - Nespelem
- 22 - Twisp

Chelan County

- 23 - Meadow Creek
- 24 - Railroad Creek
- 25 - Chiwawa
- 26 - Blewett
- 27 - Wenatchee

Kittitas County

- 28 - Swauk
- 29 - Cle Elum

Whatcom County

- 30 - Mount Baker
- 31 - Slate Creek

Skagit County

- 32 - Cascade-Thunder Creek

Snohomish County

- 33 - Darrington
- 34 - Silverton
- 35 - Sultan
- 36 - Monte Cristo
- 37 - Silver Creek
- 38 - Index

King County

- 39 - Miller River

FIGURE 3.—Total silver production by district, 1866-1973.

from lead-zinc ores. Sources of silver in Washington from 1900 to 1972, based on ore types, is shown in table 4.

Ferry County is Washington's leading silver-producing county. Since 1904, it has produced around 7 million ounces of silver. Stevens and Chelan

TABLE 4.—Sources of Washington silver by classes of ore, 1900-1972

Class of ore	YEAR								
	1900	1910	1920	1930	1940	1950	1960	1970	1972
	Percentage								
Siliceous gold-silver ores	50	95	23	5	54	50	96	93	97
Copper ores	2	3	74	84	43	1	1	..	..
Lead ores	48	2	..	..	..	13	..	..	..
Lead-zinc ores .....	..	..	3	11	3	..	3	7	3
Zinc, zinc-lead, zinc-copper, zinc-lead, copper .....	..	..	..	..	..	37	..	..	..
	Tons								
Ore mined (all classes)	..	59,209	85,318	45,456	1,124,564	1,279,595	1,070,000	..	283,514
	Ounces per ton								
Average grade	..	3.47	2.34	0.72	0.39	0.85	0.58	..	0.78

TABLE 5.—Major silver-producing counties in Washington, 1904-1969

Rank	County	Silver (troy ounces)	Value (dollars)
1	Ferry ^{1/}	5,917,851	\$3,651,472
2	Stevens	3,378,763	2,257,584
3	Chelan	2,822,225	2,364,048
4	Okanogan	860,159	678,843
5	Pend Oreille	708,330	614,617
6	Snohomish	249,005	169,697
7	Whatcom	57,837	35,214
8	King	34,503	24,292

^{1/} Ferry County production from 1904 through 1956; confidential data after 1956 not disclosed.

counties are the only other counties having total silver productions that exceed 1 million ounces. Major silver-producing counties of Washington are listed in table 5. Production is from 1904 through 1969; prior to 1904, silver production in the state was not broken down by county.

OUTLOOK FOR SILVER IN WASHINGTON

Although silver is widespread throughout the Northern Cascades and the Okanogan Highlands of northeastern Washington, very few silver deposits appear to be of economic value. At most deposits, silver is associated with other metals such as gold, copper, lead, and zinc; only at a few deposits is silver the predominant metal. As in the past, silver will continue to be chiefly a byproduct of gold, copper, lead, and zinc mining operations; however, because of increasing silver prices, several mines classed as silver mines could become important silver producers. These mines are as follows: (1) United Copper in the Chewelah district of Stevens County. (2) Deer Trail and Queen-Seal mines in the Deer Trail district of Stevens County. (3) Fourth of July, Arlington, Last Chance, and First Thought mines in the Conconully district of Okanogan County. (4) Ruby and Ivanhoe mines in the Loomis district of Okanogan County. (5) Apex and Cleopatra mines in the Miller River district of King County. (6) "45" mine in the Sultan district of Snohomish County. (7) Great Excelsior mine in the Mount Baker district of Whatcom County.

The writer does not wish to imply that these mines are the only mines in Washington capable of becoming silver producers. Other mines and prospects may be equally as important, but sufficient data are

not available to properly evaluate them. Any increases in the price of silver will stimulate exploration for silver at silver districts covered in this report. As in the past, Washington should continue to be a minor but consistent producer of silver.

SCOPE AND PURPOSE OF REPORT

This bulletin represents a compilation of information on silver occurrences in Washington. It contains data presented in a large number of published and unpublished reports that are listed in the reference section. The majority of the silver occurrences listed in this bulletin were obtained from "Inventory of Washington Minerals, Part II, Metallic Minerals" (Hunting, 1956). Other than verifying the location of many occurrences, no new field work was done in the preparation of this report.

The bulletin is divided in three parts: Part I discusses Washington's silver industry, silver-mining history, production, geology and mineralogy of silver deposits, and distribution of silver in Washington; Part II and III describe the principal silver-mining areas of the state and give pertinent information for individual mines and prospects. Part II covers the Okanogan Highlands physiographic province of northeastern Washington, whereas Part III covers the Cascade Mountains province of western Washington.

The purpose of this bulletin is to place under one cover the mines and prospects containing silver so information is readily available to those who may be interested in the state's silver occurrences, whether it be academic, historic, or economic. Other purposes are to update data on individual properties and to correct errors such as locations, production figures, and geological data.

PART I

HISTORY, PRODUCTION, GEOLOGY,
and MINERALOGY of SILVER in
WASHINGTON

SILVER MINING HISTORY

EASTERN WASHINGTON, 1855-1900

DISCOVERY

One cannot discuss the history of silver mining in Washington without discussing metal mining in general, because the bulk of the silver produced in the state has come from gold, copper, lead, and zinc mines. Also, the discovery and mining of placer gold is significant because the first silver produced



Gold panner

in Washington came from the refining of placer gold, some of which contained as much as 25 percent silver.

Prior to 1855, the McClellan party reported the presence of placer gold in the Yakima Valley while searching for a railroad route through the Cascades. As early as 1846, Indians of the Cle Elum Valley were discovered wearing gold ornaments, fashioned from placer gold from the headwaters of the Cle Elum River. Mining of placer gold first took place in 1855 when it was discovered near Fort Colville on the Columbia River. With the discovery of gold near Fort Colville, many prospectors rushed to the area, where as much as \$3 to \$6 per day could be made with a gold pan and a rocker. However, the gold rush was short lived, and prospectors drifted north into the gold field of British Columbia, or

spread out into the remote areas of northeastern Washington in search of new gold deposits.

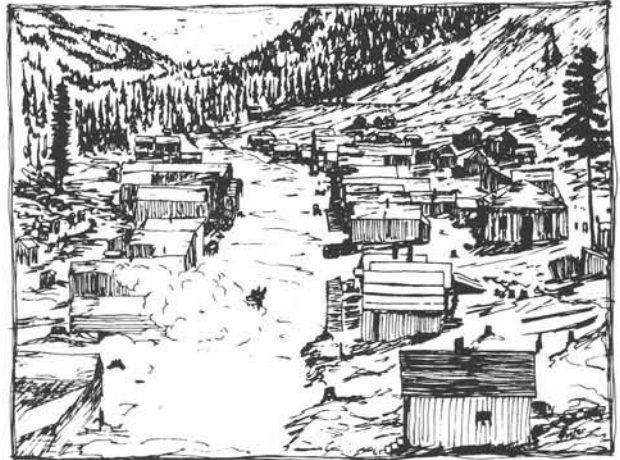
By the early 1870's, lode gold deposits were discovered in mountains south of Kettle Falls, and in 1882 mining claims were being staked in the Calispell Mountain's region of Stevens County. In 1883, the first significant discovery of lead and silver in Washington was made 2 miles east of Chewelah at Embry camp. Following this discovery, other discoveries of gold, silver, copper, lead, and zinc were made, among which was the Eagle that in 1885 was to become the first producing mine of the area. In 1885, a rich deposit of lead and silver was discovered and staked as the Old Dominion claim, 6 miles east of Colville on Old Dominion Mountain. Other discoveries of lead and silver were made in 1885 in the Bossburg district northwest of Colville, and in the Summit district west of Chewelah. The discoveries of rich lead-silver ore in the Colville, Bossburg, Chewelah, and Summit districts of Stevens County gave birth to silver mining in Washington. At first, shipments of ore were made to smelters in Butte, Helena, St. Louis, Denver, and San Francisco. However, in 1887, Mutual Smelting and Mining Company of Washington erected a smelter at Colville and began smelting lead and silver ores from the neighboring mining districts. Mining camps sprang up throughout Stevens County, which prior to 1899 included Ferry and Pend Oreille Counties, and many important discoveries of gold, silver, copper, lead, and zinc were made.

In the part of Stevens County that later became Pend Oreille County, early-day mining activity centered around the Metaline Falls area. Placer gold had been discovered along the Pend Oreille River as

early as 1865, and the first quartz lode claim had been staked in 1873. However, it was not until 1884 that the area was brought into prominence by the discovery of rich lead, zinc, and silver deposits near Metaline Falls on the Pend Oreille River. Among the first mines to be brought into production were the Josephine, which was discovered in 1884, and the Bella May, discovered in 1886. In the southern part of Pend Oreille County, known as the Newport district, deposits of copper, lead, zinc, and silver were found in 1888 near Calispell Lake. However, the discoveries failed to attract attention as they were not as rich as the deposits that had been discovered elsewhere in Stevens County. Prospecting continued in the Newport district; in 1893, the Comstock claim was staked on a zinc-lead-silver-copper deposit near Bead Lake, and the Kootenai Conquest claim was staked on a deposit of lead, silver, and copper near Newport. Later these properties were to become major producers of lead, silver, and copper in the Newport district.

In Ferry and Okanogan Counties, prior to 1886, not much in the way of prospecting and mining had taken place; much of the land had been set aside as Indian reservations that were closed to mineral entry. In 1872, the Colville Indian Reservation was established and consisted of all of Ferry County and the east half of Okanogan County. In 1879, the Chief Moses Reservation was created from that part of Okanogan County that lay west of the Okanogan River. In the spring of 1886, the Chief Moses Reservation was opened to mineral entry and immediately mining claims were staked on deposits of silver, lead, and copper. In the Conconully Lake area, miners organized the Salmon River mining district; 6 miles northeast of the lake the Galena district was organized; and in 1887, miners organized the Ruby district 6 miles south of the lake. Important discov-

eries in the Salmon River district included the Lone Star, Lady of the Lake, Tough Nut, and the Salmon River group. Among the first discoveries in the Ruby district were the Peacock, Ruby, First Thought, Arlington, and Fourth of July. At several mines in the Salmon River and Ruby districts, near-surface ore assayed as high as \$1,000 per ton in silver.



Ruby silver camp (1891)

In 1886, silver was also discovered 30 miles north of Conconully in the Nighthawk district; by 1887, quartz veins rich in gold and silver were discovered on Palmer Mountain, as well as east of Palmer Mountain near Wannacut Lake. Among the first mines to produce were the Julia and Kaaba-Texas in the Nighthawk district, and the Black Bear, War Eagle, and Ivanhoe mines in the Palmer Mountain district.

In the Methow Valley, which is 18 miles southwest of Conconully, discoveries of gold, silver, and copper were made in 1887 at the Red Shirt property. By 1892, copper, gold, and minor silver had been discovered in the southern part of the Methow Valley at Squaw and Gold Creeks, as well as near the headwaters of the Twisp River, a major tributary of the Methow river. Prospectors followed the Met-

how River upstream, and in 1895 staked placer claims on Robinson and Goat Creeks in the Mazama district. However, most lode deposits of copper, gold, and silver were not staked in the district until 1905. By 1895, with the exception of the area north of Winthrop in north-central Okanogan County, almost all of Okanogan County west of the Okanogan River had been prospected.

East of the Okanogan River prospecting remained at a standstill until February 1896, at which time the north half of the Colville Indian Reservation was opened to mineral entry. Following the opening of the reservation, discoveries of gold, silver, and copper were made in the Meyers Creek district east of Oroville. At the present site of Chesaw, a mining camp sprang up, and served as an outfitting point for prospectors and miners. Gold, silver, and copper were discovered in the area surrounding Chesaw, while east of Chesaw on Buckhorn Mountain, deposits of iron, copper, and gold were found. By 1897, prospectors had searched southeast of Chesaw, towards the mining camp of Republic, and discovered deposits of gold and silver in the Wauconda district. The mining camps of Toroda and Bodie sprang up on Toroda Creek, and the gold camp of Wauconda came into existence at the headwaters of Bonaparte Creek.

Until the opening of the north half of the Colville Reservation in February of 1896, no mining claims had been staked in Ferry County; however, prospectors had illegally prospected parts of the county anticipating the opening of the reservation. When the reservation was opened, claims were immediately staked on gold-bearing quartz veins in Eureka Gulch, and by May 1896, the mining camp of Eureka was established. The first claims to be staked were the Iron Mask, Copper Belle, and Lone Pine, followed closely by the staking of the Quilp, Black Tail, San Poil, and Mountain Lion. Not until August 20, 1897, was the Knob Hill gold vein dis-



Eureka gold camp (1897)

covered, which was to become the district's most important deposit of gold and silver. Within a few years, several gold mills were erected in Eureka Gulch, and by 1899 the camp of Eureka, which had been renamed Republic, was booming. Elsewhere in Ferry County, deposits of copper, gold, and silver were discovered in 1897, south of the international border near Danville. Major discoveries of the area included the Lone Star and Washington, 6 miles west of Danville, and the Lucile Dreyfuss, which was 2 miles south of Danville. Also in 1897, copper, gold, lead, and silver were discovered 9 miles northeast of Republic in the Belcher district. Among the first claims were the Belcher and Hawkeye.

In 1898, most of northeastern Washington had been prospected, and important discoveries of gold, silver, copper, and lead had been made. However, the south half of the Colville Indian Reservation, which contained known mineral deposits, was still closed to mineral entry. On June 30, 1898, the south half of the reservation was opened, and prospectors, mainly from the camp of Republic, rushed to the area. Sixteen miles south of Republic, gold, silver, copper, lead, and zinc were discovered at the headwaters of Gold Creek, and the camp of Park City sprang up. Forty miles south of Republic, near

the mouth of the San Poil River, deposits of copper, gold, silver, lead, nickel, and cobalt were discovered. On the east bank of the San Poil the settlement of Keller was established. By August 1898, prospectors had moved eastward from Keller to the present site of Inchelium, where deposits of lead and silver were discovered in the Covada district. Although mining claims were staked in 1898 and 1899 in the Covada district, placer gold had been mined in the district as early as 1860 and the Indians of the area had known of the district's metal deposits since 1875.



Keller smelter (circa 1905)

The opening of the south half of the Colville Indian Reservation also opened for mineral entry that part of Okanogan County between the Okanogan River on the west and the Ferry County line on the east. In July 1898, several claims had been staked in the vicinity of the Nespelem Indian Agency, but the discoveries failed to create a rush to the area. Not until 1901, when deposits of high-grade silver ore were discovered at the Apache mine, did the Nespelem district attract many prospectors.

In the spring and summer of 1896, shortly after the opening of the north half of the Colville

Indian Reservation, discoveries of gold were made in the northwest corner of Stevens County near Orient. The best known discovery of the Orient district was the First Thought gold mine, which was to become a leading producer of gold in the county. East of Orient towards the mining camp of Northport, as well as south of Orient toward the mouth of the Kettle River, deposits of lead, zinc, copper, iron, gold, and silver were discovered.

By the turn of the century, valuable metal deposits had been discovered in many parts of Pend Oreille, Stevens, Ferry, and Okanogan Counties. Hundreds of mining claims had been staked in country that was for the most part remote, and accessible mainly by trails made earlier by Indians. Wagon roads had been built between the larger settlements in the region, and over these roads supplies were hauled to the mining camps, and ore was hauled to smelters for refining. In many mining districts, concentrating mills were built to extract gold and sulfide minerals from the ore. Some mining camps grew into towns, whereas other camps were short lived and became ghost camps. Had it not been for the prospectors and miners, many parts of northeastern Washington would probably not have been settled until the late 1800's and early 1900's. Regarding the settlement of mining regions, Trimble (1914, p. 106) states:

One of the most important permanent improvements, attributable largely to the precious metal product, was the development of agriculture. Prices for all sorts of provisions were very high in the mines and at the towns and stations on the way thither, and this was particularly true with regard to butter, milk, fresh vegetables, etc. . . . The economic inducement of high prices was needed in order to settle remote valleys, which, but for the miners, would have waited long for settlers.

Elsewhere in eastern Washington, rich deposits of placer gold had been discovered as early as 1860 on Peshastin Creek in Chelan County, and as



Blewett gold camp (circa 1900)

early as 1873 on Swauk Creek in Kittitas County. However, it was not until 1874 that the first lode gold claims were staked in the Blewett and Swauk districts. Although some gold had a high silver content, important discoveries of silver were not made in these districts. In the Lake Chelan area of Chelan County, deposits rich in silver and lead were discovered in the Meadow Creek district in 1891, while beyond the head of the lake and near the headwaters of the Stehekin River, deposits of silver and lead had been discovered in 1885. On July 20, 1896, J. H. Holden discovered a deposit rich in copper, gold, silver, and zinc on Railroad Creek near the head of Lake Chelan. This deposit, would in the future, become one of Washington's major metal-producing mines. Although most mining activity in Kittitas County centered about the Swauk district, by 1881 prospectors had worked their way to the headwaters of the Cle Elum River and discovered deposits of gold, silver, lead, and copper. Deposits of gold, silver, and copper were also found near the headwaters of Gold Creek, and by 1896 small shipments of high-grade ore were being made to the Tacoma smelter. Although several concentrating mills were

built in the Cle Elum and Gold Creek districts, the production of metals from both districts was insignificant.

PRODUCTION

Prior to 1885, the production of silver in Washington came mainly from the refining of placer and lode gold bullion. The bulk of this gold came from the Columbia River placer deposits discovered in 1855, the Similkameen River deposits, discovered in 1859, and the Peshastin-Swauk lode and placer deposits that were discovered around 1873. Mineral production figures for individual counties were not published for years prior to 1903; however, the total gold and silver production in Washington from 1860 to 1884 is reported in the Minerals Yearbook (U.S. Bureau of Mines, 1913, p. 790) as 682,732 ounces of gold and 249,698 ounces of silver.

Excluding silver recovered from the refining of gold bullion, the initial production of silver in Washington began in 1885 when several tons of high-grade lead-silver ore was shipped from the Old Dominion mine to a smelter in San Francisco. This shipment netted \$3,000, which provided the incentive needed to develop other silver mines in Stevens County. Shortly after shipments were made from the Old Dominion mine, the production of lead-silver ore began at the Young America, which is 18 miles northwest of Colville and in the Bossburg district. High-grade silver ore stockpiled at mines in Stevens County encouraged Mutual Smelting and Mining Co. of Washington to build a smelter at Colville in 1887. By 1891, ore from mines in the Colville, Kettle Falls, Bossburg, Chewelah, and Summit mining districts were being smelted at the Colville smelter. Elsewhere in Washington, Tacoma Smelting and Refining Co. built a smelter at Tacoma in 1889; in 1890, Puget Sound Reduction Co. built a smelter at Everett, and

North Pacific Reduction Co. constructed one the same year in Spokane.

In the Conconully area of Okanogan County, the first production of silver was in 1889 when high-grade silver ore was shipped to Montana smelters from the Monitor and Fourth of July mines. North of Conconully in the Palmer Mountain district, ore rich in gold and silver was mined at the Black Bear mine in 1887, and at the Black Bear, War Eagle, and Ivanhoe mine in 1890. Ore shipped to Denver from the Ivanhoe netted \$636 per ton, mainly in silver. Other major gold-silver producers in 1890 included the Julia, Kaaba-Texas, and Number One mines of the Nighthawk district north of Palmer Mountain. By 1891, gold-silver mines in the Nighthawk and Palmer Mountain districts and lead-silver mines in the Ruby and Conconully districts were making regular shipments to smelters. Mills were built to extract free gold from quartz, while other mills made concentrates from low-grade lead-silver ore that could not be shipped at a profit to distant smelters. In 1892, the price of silver began to fall, and in 1893 a silver panic hit the nation. Production at most mines ceased and within a few months many mining camps were deserted.

Up until 1889, the bulk of silver produced in northeastern Washington came from silver-rich lead ore that was mined mainly in Stevens and Okanogan Counties. However, in 1890, silver recovered from copper ores exceeded that recovered from lead ores, the major producer being the Eagle mine of the Chewelah district in Stevens County. In later years the production of silver from copper ores of the Chewelah district would make the district a leading silver producer of the state.

In 1892, operations at the Colville smelter ceased, and in 1897, after having produced \$625,000 in lead-silver ore that contained 40 to 800 ounces in silver per ton, mining operations ceased at the Old

Dominion mine. Between 1890 and 1900, an average of 12 mines produced silver in Stevens County from lead-silver and copper-silver ores. The leading mines were the Old Dominion, Young America, Bonanza, Daisy, Silver Crown, Summit, Silver Trail, Deer Trail, Tenderfoot, and Silver Seal. On the average, only 12 mines produced silver yearly, while at least 100 mines were in the assessment or development stages and never reached the production stage.

From 1885 through 1899, silver production in Washington totaled 2,212,376 ounces compared to 231,807 ounces of gold. This represents 9.5 ounces of silver for each ounce of gold, whereas prior to 1885 the ratio had been 2.6 ounces of gold for each ounce of silver. In 1884, only 912 ounces of silver had been produced in Washington, but in 1899, production reached 289,661 ounces. Other metals produced in 1899 included 33,156 ounces of gold, 76,410 pounds of copper, and 1,032,069 pounds of lead, with the bulk of the total state's production coming from Stevens, Ferry, and Okanogan Counties.

By 1900, silver-bearing ore had been discovered in almost all mining districts of northeastern Washington. However, silver constituted the major metal of ore that had been mined in only 22 of over 60 mining districts that had been organized.

EASTERN WASHINGTON, 1900-1970

PEND OREILLE COUNTY

General History

Although mining claims had been staked in the Metaline district as early as 1873, and in the Newport district in 1888, by 1900 there was not yet a major producing mine in the county. The inacces-

sibility of the region made it one of the most sparsely settled areas of northeastern Washington. In 1905, river-boat transportation into the Metaline district was made possible by the removal of Little Falls, which up until this time has been an obstacle to navigation on the Pend Oreille River. With the removal of Little Falls it became possible to transport ore 40 miles upriver to railheads at Newport, and in 1905, the first shipments of lead-silver ores were made from several mines in the Metaline district. However, it was not until 1910, when Idaho and Washington Northern railroad built a line between Newport and Metaline that mining was firmly established. In 1910, lead mining began at the Josephine mine that had been discovered in 1884; in 1911, the first shipment of zinc ore from Washington was made from the Oriole mine. In 1911, Pend Oreille County was formed from the eastern half of Stevens County.



Grandview mine and mill (circa 1930)

Although zinc mining began in Pend Oreille County in 1911, the county did not become a major producer of zinc until 1929, at which time Pend Oreille Mines & Metals Co. began operations at the Josephine mine. Mining operations at the Grandview began in 1924, and upon completion of a flotation mill in 1929 the Grandview became another major zinc producer in the district. In 1937, American Zinc, Lead & Smelting Co. began lead-zinc mining

operations at the Bella May mine that had been discovered in 1886, and by 1937, the major lead-zinc mines of Pend Oreille County were in production. Mining was carried out at the Bella May until 1951, and in 1964, mining ceased at the Grandview mine, which made the Pend Oreille (Josephine) mine the only remaining lead-zinc producer in Pend Oreille County. Since 1964, the Pend Oreille mine has been a constant producer of lead and zinc, as well as minor copper and silver, and currently (1975), is the state's only operating lead-zinc mine.

In the Newport district of Pend Oreille County mining claims had been staked as early as 1888, but not until 1917 was ore shipped from the district. In 1917, 3 tons of lead-silver ore was shipped from the Eagle mine, and other small shipments were made sporadically until 1923 when the mine shut down. In 1923, Bead Lake Gold and Copper Co. produced several hundred tons of copper-lead ore from their Comstock and Conquest claims near Bead Lake. Several hundred tons of ore was produced again in 1928, after which the company suspended operations. The property remained idle until 1960, at which time Lucky Joe Mining Co. reopened the mine and built a small flotation mill; however, after 4 years of minor production, operations ceased. In 1975, no metal mines were operating in the Newport district.

Production

From 1902 through 1969, Pend Oreille County produced \$145,944,035 in metallic minerals, the bulk of which was lead and zinc. Of this total, only \$14,440 came from mines in the Newport district. Silver produced in the county amounted to 708,330 ounces and was valued at \$614,617; almost all silver was produced as a byproduct of lead-zinc mining operations. Although silver has been produced in

Pend Oreille County since 1905, the Metaline and Newport mining districts are not considered silver mining districts. Thirty mines in these districts have produced silver, but only at the Pend Oreille mine has the total production exceeded 100,000 ounces. At the Grandview mine, which was the second largest lead-zinc producer in the county, the total silver production is reported (Fulkerson and Kingston, 1958, p. 22) as 76,261 ounces. Only at the Rocky Creek and Ries (Eagle) mines did the production of silver exceed that of other metals; however, the total combined production from these mines was only 1,601 ounces.

STEVENS COUNTY

General History

At the turn of the century over 3,000 mining claims had been staked in Stevens County, but only 12 mines had become significant producers. Along the Columbia River most rich placer deposits had been worked out, but some small-scale placer mines were still operating. The smelter at Colville had shut down in 1892, but at Northport the Northport Smelting & Refining Co. smelted Canadian copper ore, as well as small amounts of lead-silver ore from Stevens County mines. Silver continued to be the county's most important metal, although the production of lead, copper, and gold was increasing.

Between 1900 and 1910, the Orient district became the most productive metal district in the county. Substantial amounts of gold and silver were produced at the First Thought mine near Orient, while copper, gold, and silver came from the Napoleon mine near Boyds. Throughout the rest of the county other mines produced mainly lead and silver. In the Bossburg district, the Young America and



Northport smelter (circa 1918)

Bonanza mines were important lead-silver producers, as was the Old Dominion mine in the Colville district. On Deep Creek east of Northport high-grade lead ore was being mined at the Last Chance mine. In the Chewelah district, United Copper and Copper King mines were mining and milling copper ore rich in silver, while at the Eagle and J. Gould mines rich lead-silver ores were being mined. One of the most productive silver districts from 1900 to 1910 was the Deer Trail, where high-grade lead-silver ores were mined at the Legal Tender, Providence, and Queen mines. In July 1910, the First Thought mine near Orient ceased operations, and gold production in Stevens County declined sharply. However, the production of silver, copper, and lead remained about the same as it had been since 1900; the most productive mining districts were Chewelah, Northport, and Bossburg.

The year 1912 showed a significant increase in the production of copper, due mainly to mining operations at United Copper, the state's leading copper producer. Other important copper-silver mines in the Chewelah district were the Amazon, Copper King, and High Grade. From 1912 to 1920, production of silver in Stevens County averaged around 150,000 ounces yearly.

Between 1916 and 1920, increased mining operations in the Northport district resulted in an

increase in the production of lead and silver. The leading producers of the Northport district were the Electric Point, and Lead Trust, United Treasure, Great Western, and Byran. Prior to 1916, zinc had not been mined in Stevens County, but in 1916 shipments of zinc ore were made from the Byran mine, and in 1917 zinc was shipped from the Young America mine. These shipments marked the beginning of zinc mining, which later became a major industry in Stevens County.

By 1920, the Northport district had become the county's major zinc-producing district, and in 1923, the Black Rock mine produced 3 million pounds of zinc. Other zinc producers in the Northport district were the Great Western and Northwest mines; however, production from these mines was minor. Although in the early 1920's mining was an important industry in northeastern Washington the mines could not support the smelter at Northport.

In 1922, after 24 years of sporadic operations the smelter ceased operations. Initially the smelter was built to smelt gold, silver, and copper ore from mines near Rossland and Trail in British Columbia; however, starting in 1916, the smelter handled lead ore mainly from mines of the Coeur d'Alene region of Idaho. In addition to ores from Canada and Idaho, minor amounts of ore from several Washington mines were custom smelted at the Northport smelter.

In the mid 1920's, an average of 15 mines operated yearly in Stevens County. Lead continued to be the county's major metal, and the major producers were the Gladstone and Electric Point mines in the Northport district, the Old Dominion mine in the Colville district, and the Cleveland mine in the Deer Trail district. The bulk of the silver produced in 1925 came chiefly from the Old Dominion, which had reopened in 1915, and United Copper, a steady producer since 1906.



United Copper camp (circa 1910)

In 1927, a sharp decline in mining took place in Stevens County when several lead and zinc mines suspended operations. Whereas in 1926, the mines produced \$468,646 in gold, silver, copper, lead, and zinc, in 1927 the county's total production of these metals was only \$84,340—the lowest it had been since 1903. This decline in production was caused mainly by the depletion of ore bodies at the Old Dominion and Gladstone mines. In 1930, other major producing mines in the county suspended operations, including the Bonanza, which had been in operation since 1907, and United Copper, a leading producer of copper and silver in the Chewelah district since 1906. In the mid 1930's, mineral production increased slightly because of increased production at the First Thought gold mine near Orient, and because of the reopening of the Old Dominion and Daisy mines.

During the depression years of the 1930's, miners began reworking gold placer deposits along the banks of the Columbia River. By 1940, ten placer mining operations were working the river gravels for gold between the Spokane River and the Canadian

border; however, the mining operations were small, and yearly production for individual operators seldom exceeded several hundred dollars. Although the 1930's brought about a general decline in lead and zinc production throughout the county, the Electric Point and Gladstone mines were mining about 80 percent of the lead produced in the county. World War II, which started in the late 1930's, brought about an increase in the production of base metals throughout the United States, and by 1940, 14 mines in Stevens County were operating. Among the major producers were the First Thought (gold), Chinto (copper-silver), Electric Point (lead), and Byran (lead).

In 1942, Government Order L-108 halted gold mining in the United States, which forced the closure of the First Thought mine, as well as other gold mines in Washington. However, the loss in gold

production for the county was offset by a large increase in 1941 in the production of zinc at the Blue Ridge mine in the Northport district. Further increases in zinc production occurred in 1944, when the Deep Creek mine in the Northport district began mining operations. In addition to zinc, these mines produced considerable amounts of lead and silver. Other major producing mines were the Bonanza and Old Dominion, both of which were lead-silver mines. At the Old Dominion, mining was confined to old dump material, and the reworking of tailings from early-day mining operations.

The end of World War II in 1945 created an industrial demand for lead and zinc, which resulted in an increase in mine production for Stevens County. By 1947, metal production in the county had risen to \$1,251,190, which, except for 1917, was the greatest it had been since 1902. The Northport district



Admiral mine and mill (circa 1950)

was the most active district and produced 80 percent of ore mined in Stevens County. Major producing mines were the Deep Creek (lead-zinc), Last Chance (lead-zinc), Admiral (zinc), Gladstone (lead), and Electric Point (lead). In the Bossburg district the Bonanza mine operated a 100-ton-per-day flotation mill that produced silver, copper, lead, and zinc concentrates, while in the Deer Trail district a 75-ton flotation mill at the Cleveland produced silver, lead, and zinc concentrates. However, in 1948, mining at the Cleveland mine, which had begun in the late 1890's, ceased. After 1947, metallic mineral production in Stevens County increased steadily, and in 1955 production reached \$6,181,852. Zinc accounted for 70 percent of the production, followed in order of decreasing value by lead, copper, silver, and gold. Major producing mines at this time were the Van Stone zinc mine, which had begun mining operations in the Northport district in 1952, Lead Trust, Deep Creek, and Admiral mines. Elsewhere in the Northport district, minor amounts of lead and zinc were produced at the Gladstone, Red Top, Last Chance, Electric Point, and Morning mines.

In other districts of the county, mining ceased and many mines stood idle or were abandoned; by 1958, mining operations at all major lead-zinc mines had ceased. The production of gold, silver, copper, lead, and zinc in Stevens County dropped from a high of \$1.7 million in 1957 to a low of \$11,000 in 1958. Small shipments of silver-lead-zinc ore were made from several mines in the years that followed, and exploration work was undertaken at the Bonanza mine by the Bunker Hill Co., and at the Anderson mine by American Zinc. In 1964, American Smelting and Refining Co. reopened the Van Stone mine, which had closed in 1955; in 1966, American Zinc Co., after building a 1,400-ton-per-day flotation mill, placed the Calhoun mine into production. The combined production from these two mines was several

million dollars yearly. In addition to zinc, the mines produced minor lead, copper, silver, and gold. Low zinc prices in 1968 resulted in the closure of the Calhoun mine, leaving the Van Stone the only major operating lead-zinc mine in Stevens County. In 1969, attempts were made by Arco Industries to place the Daisy-Tempest mine, near Daisy, and the Bluebird mine, near Kettle Falls, into production. For several months, copper, silver, and lead ores from these mines were concentrated at a 200-ton flotation mill near Colville; however, mining was not profitable, and operations ceased. In 1970 and 1971, small amounts of silver-lead-zinc ore were mined by Silver Crown Mining Co. at the Casteel and Hubbard mines near Northport. After milling the ore at a 100-ton flotation mill, concentrates were shipped to the Trail smelter; however, after making several small shipments, mining and milling operations ceased in late 1971. Early in 1971, the Van Stone mine shut down when ore in their open pit was exhausted. Thus, mining, which had begun in Stevens County in 1885, had for all practical purposes, at least temporarily, come to an end.

PRODUCTION

According to the U.S. Bureau of Mines, from 1902 to 1971 no fewer than 200 metal mines at one time or other operated in Stevens County. Production of gold, silver, copper, lead, and zinc totaled around \$59.4 million, the distribution of which is as follows:

Zinc	\$39,004,830
Lead	14,002,953
Copper	2,638,005
Silver	2,414,122
Gold	1,369,801

Although as many as 200 metal mines were in operation from 1902 to 1971, at only 19 mines did the

TABLE 6.—Major mines of Stevens County

Property	Total tonnage	District	Chief metals
Admiral	22,464	Northport	Zinc, lead
Black Rock	17,771	Northport	Zinc, lead
Blue Ridge	56,217	Northport	Zinc, lead, copper, silver
Bonanza	101,994	Bossburg	Lead, zinc, silver
Calhoun	900,000	Northport	Zinc
Cleveland	26,459	Deer Trail	Lead, silver
Copper King	13,027	Chewelah	Copper, silver
Deep Creek	763,307	Northport	Lead, zinc
Electric Point	51,200	Northport	Lead
First Thought	81,621	Orient	Gold, silver
Gladstone	19,942	Northport	Lead
Last Chance	11,529	Northport	Lead, zinc, silver
Lead Trust	6,323	Northport	Lead, zinc
Loon Lake	7,317	Springdale	Copper
Napoleon	157,728	Orient	Copper, gold, silver
Old Dominion	4,088	Colville	Silver, lead
United Copper	355,132	Chewelah	Copper, silver
Van Stone	8,200,000	Northport	Zinc, lead
Young America	13,389	Bossburg	Lead, zinc, silver

total production exceed 4,000 tons. These properties, along with total tonnage of ore mined, chief metals, and districts are shown in table 6.

Production figures published by Fulkerson and Kingston (1958, p. 14-19) for 1902 through 1956 show that mines of the Northport district produced 75 percent of metals in terms of dollars mined during this interval. During this same interval, mines of the Chewelah district produced 61 percent of the silver. A breakdown for the dollar value of metals produced by the districts, as well as ounces of silver produced is shown in table 7.

TABLE 7.—Metal production in Stevens County,
1902-1956

Mining district	Total metal production ^{1/}	Total silver (troy ozs)
Northport	\$29,150,762	182,916
Bossburg	3,926,068	307,288
Chewelah	3,642,116	1,746,467
Orient	1,158,297	32,020
Deer Trail	396,372	188,465
Colville	373,472	362,467
Kettle Falls	87,741	54,115

^{1/} Includes gold, silver, copper, lead, and zinc.

FERRY COUNTY

General History

At the turn of the century, mining activity in Ferry County centered about the Republic district where mining was carried out at the Quilp, Lone Pine-Surprise, Black Tail, San Poil, El Caliph, Ben Hur, and Republic mines. However, with the closure of a large custom mill in the district in 1901, mining slumped.



Republic mill (circa 1900)

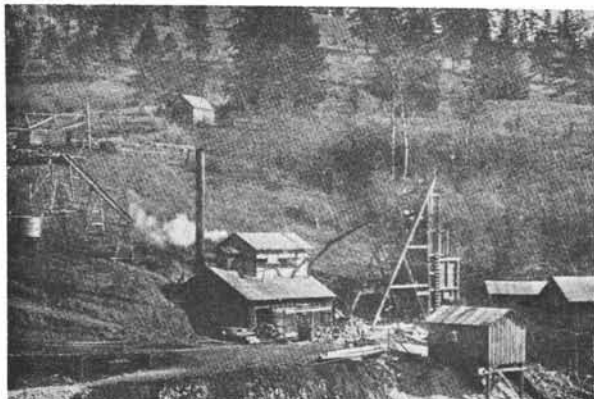
In 1902 and 1903 two railroad companies extended their lines to Republic, which made it possible to ship crude gold ore to distant smelters. However, because the ore proved to be highly siliceous, and because of high railroad rates, mining once again declined. In 1909, freight rates were reduced, and the mines resumed operations. Production for 1909 was 10,179 ounces of gold and 53,677 ounces of silver, most of which came from the Republic, Quilp, Mountain Lion, and Lone Pine mines. In 1910, mining operations began at the Knob Hill mine, and 9 mines in the district produced 37,874 tons of ore that averaged \$25.71 per ton in gold and silver. The Republic mine was the district's leading producer,

having produced \$1,400,000 in gold and silver since 1897.

The year 1911 was a peak production year for Ferry County. Thirteen mines, eight of which were in the Republic district, produced \$896,848 in gold, silver, and copper. Ore from the Republic mines averaged \$22.52 in gold and silver, and contained about 4 ounces of silver for each ounce of gold. Full-scale production of copper at the Lone Star and Washington began in 1911, and continued through 1918. By 1912, total production for the county reached \$5 million, of which 83 percent was gold. Small shipments of copper ore had been made from the Lone Star and Washington mine in the Danville district, and several small shipments of silver-lead ore had been made from mines in the Covada district.

Copper mining was undertaken in 1916 at the Talisman mine in the Orient district, as well as at the Belcher mine in the Belcher district from 1913 to 1917. Since 1903, several mines in the Belcher district had been shipping gold-silver-copper-bearing ore to smelters in Canada. The total copper production in the county, from 1911 to 1918, amounted to \$428,351, which represents 88 percent of the county's copper production from 1903 to 1950.

By 1920, mining had declined considerably, and only seven mines in Ferry County were operating. In the Republic district the Quilp, Last Chance, San Poil, and Knob Hill mines produced only 12,343 tons of ore that averaged \$11.53 a ton in gold and silver. In the Covada district, small shipments of silver ore were made from the Longstreet and several other mines. In the Keller district, development work was underway at the Shamrock mine, which had produced silver, lead, and zinc in 1914, as well as at the Manila mine where copper ore was being stockpiled. Although a 100-ton copper smelter had been built at



Last Chance mine (circa 1900)

Keller by Keller and Indiana Consolidated Smelting Co., it was never placed into operation.

By 1925, mining in the county was stagnant. In the Republic district, only the Knob Hill and Quilp mines were operating, and only \$162,541 in gold and silver was produced. No ore was milled in the district, but was shipped as crude ore to the Trail smelter because of its high silica content. By 1930, mine production in the county had dropped to an all-time low of \$10,177. Because there was no longer a demand for siliceous ores at smelters, most large gold producers in the Republic area had been idle since 1928. In 1934, when gold rose from \$20.67 to \$35 per ounce, gold production increased to \$161,491 and silver to \$15,589, making Ferry County the state's leading silver producer. In addition to 21 producing lode mines, which produced gold, silver, copper, and lead, 15 placer mines operating along the shores of the Columbia River produced 104 ounces of placer gold. In 1937, gold and silver production in the Republic district increased sharply when Knob Hill Mines, Inc. placed into operation a 400-ton-per-day cyanidation plant. Further improvements in the recovery of gold were made in 1940, when flotation units were added to the plant. In 1940, the district produced \$849,448 in gold and silver from siliceous



Knob Hill mine (1950)

ores; 14 lode mines were operating, 12 of which were in the Republic district. Mines in the Republic district produced 179,983 tons of ore, compared to 201 tons from the Danville district and 29 tons from the Covada district.

From 1940 to 1950, an average of only five mines were active in the county, with the bulk of gold and silver coming from the Knob Hill mine. The average yearly production was around 20,000 ounces of gold and 100,000 ounces of silver. Outside of the Republic district, some copper, lead, and zinc was mined from 1948 through 1950 at the Talisman mine in the Orient district. Since 1950, the Knob Hill mine has been the only major producing mine in Ferry County, as well as the state's major gold producer.

Production

The estimated production of gold, silver, copper, lead, and zinc for Ferry County from 1896 to 1970 is around \$48.3 million. Gold accounts for 85 percent of the total, silver 13 percent, copper 1.9 percent, and lead and zinc less than 1 percent. The bulk of gold and silver produced in Ferry County came from the siliceous gold ore of the Republic

TABLE 8.—Major mines of Ferry County,
1900-1970

GOLD AND SILVER	
Republic district	Republic Princess Maude Quilp Surprise Lone Pine Pearl Last Chance Ben Hur Knob Hill Tom Thumb Mountain Lion Morning Glory El Caliph California San Poil Trade Dollar
Belcher district	Belcher Copper Key
Danville district	Lucile Dreyfus
SILVER	
Covada district	Gwin Longstreet Meteor
Sheridan district	Sheridan Zalla M.
COPPER	
Danville district	Lone Star and Washington
Orient district	Talisman

district. Copper came mainly from the Danville district, and lead and zinc from the Covada and Keller district. Between 1904 and 1957, Ferry County produced 5,917,851 ounces of silver. Prior to 1904, production figures for individual counties

were not published. However, the U.S. Bureau of Mines estimates silver production of the Republic district from 1896 to 1903 at 558,288 ounces. A rough estimate of silver produced from 1957 to 1970, would be around 3.5 million ounces, making the county's total silver production almost 10 million ounces. Mines that were major producers in Ferry County, between 1900 and 1970, are shown in table 8.

OKANOGAN COUNTY

General History

By 1900, most of Okanogan County had been prospected, and several thousand mining claims staked. About a dozen mines were making small shipments of gold, silver, and lead ore to smelters, while around 150 properties were in development stages. In the Conconully district, the Arlington, Fourth of July, and Nevada mines were mining silver ore; however, many silver mines in the district had remained idle since the silver panic of 1893. In the Palmer Mountain and Wannacut Lake districts, several concentrating mills had been built, and gold-silver concentrates were being shipped to the Tacoma smelter from Golden Zone, Black Bear, War Eagle, Ivanhoe, Triune, and Horn Silver mines. In the Methow district, the Hidden Treasure and Hunter mines on Squaw Creek were producing ore that contained gold, silver, and copper, while in the Wauconda district development work was underway at the Wauconda and Bodie prospects. In the Sheridan district, which was east of the Wauconda district, small shipments of high-grade silver ore were being made by the Zalla M., Sheridan, and American Flag mines. In the Meyers Creek district east of Oroville, mining in 1900 was at a standstill; four small amalgamation mills had been built in the district, but the mills proved to be

inefficient due to the pyritic nature of the ore. Prior to 1900, the district had produced around \$100,000 in gold, \$40,000 of which came from placer deposits on Mary Ann Creek.

From 1900 to 1923, an average of only eight mines operated yearly in Okanogan County; the most productive districts being Conconully, Meyers Creek, and Palmer Mountain. Silver was the most valuable metal produced, followed in order of decreasing value by gold, copper, and lead. The only significant producer of silver in 1925 was the Apache mine near Nespelem. Several shipments of high-grade silver ore had been made since 1911; some ore contained as much as 300 ounces of silver per ton. Between 1925 and 1934, several small gold mines operated, but the yearly combined production from the mines never exceeded \$7,000.

Because of the increase in the price of gold in 1934, 12 of the county's gold mines resumed production. Major producing mines were the Bodie, Poland China, Hiawatha, Josie, Spokane, and Ruby.

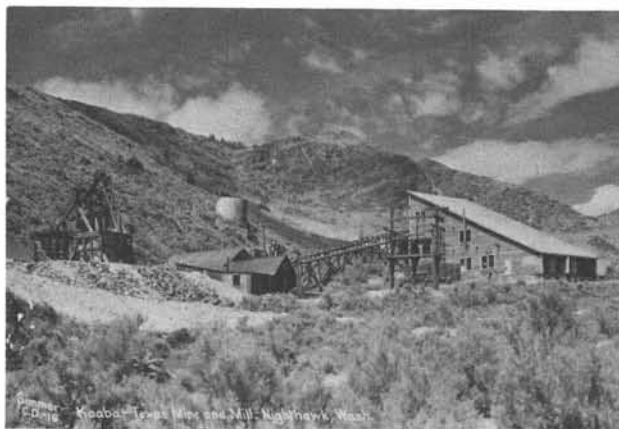


Ruby mine (1920)

Whereas in 1933, only \$13,785 in gold was produced in Okanogan County, in 1936, gold production rose to \$125,979. The bulk of the gold came from the Bodie mine, where nearly 19,000 tons of ore was mined and milled in a 70-ton amalgamation and

gravity-concentration plant. Mining operations were suspended at the Bodie mine early in 1938, which resulted in a sharp decline in the county's gold production; however, this decrease in gold production was offset by an increase in the production of silver, the bulk of which came from the Arlington mine near Conconully. In 1938, the county's mines produced 85,731 ounces of silver, as compared to 1,120 ounces of gold.

In 1939, production of gold in Okanogan County reached \$270,130, which was to be an all-time high for the county. The increase in gold production was due mainly to increased production of the Alder mine near Twisp, where mining had begun in 1937. In addition to the Alder, 26 other mines in Okanogan County produced copper, gold, and silver in 1939. In mid-1942, mining operations at the Alder ceased, which resulted in a drastic drop in the county's gold production. Whereas, in 1942 gold production totaled \$10,500, in 1943 it totaled only \$70. However, 1943 marked the beginning of significant lead-zinc production in Okanogan County. Whereas prior to 1943, not much more than \$3,000 in lead had been produced in any given year, \$22,800 in lead, as well as \$11,448 in zinc was produced in 1943. The bulk of the production came from the Kaaba-Texas



Kaaba-Texas mine and mill (1938)

mine in the Nighthawk district. From 1943 to 1951, Kaaba-Texas mine was the major silver-copper-lead-zinc producer in the county. Gold mining resumed at the Alder mine in 1950, and until 1953 the mine was once again the county's leading gold producer. In addition to gold, the mine produced substantial amounts of silver, copper, lead, and zinc. When the mine closed in 1953, it had produced around \$850,000.

In the Conconully district most lead-silver mines had shut down when the rich near-surface ores had been mined out. Mining in the district resumed again in 1954 at the Mohawk and Peacock mines, but operations were suspended in 1957 due to the low lead and silver content of the ore.

The last attempt at silver mining in the Conconully district took place from 1960 to 1964, at which time small shipments of high-grade silver ore were made from the Fourth of July mine on Ruby Hill to the Trail smelter in Canada. In 1965 and 1968, mining on a small scale took place at the Andy O'Neil mine near Nespelem, and small amounts of lead-silver ore was shipped to the Kellogg smelter in Idaho. The closure of the Andy "O" in 1968 brought an end to mining, for the time being, in Okanogan County. Although there have not been any producing mines in Okanogan County since 1968, exploration of the county's metallic mineral deposits takes place almost every year. In recent years, extensive exploratory work has taken place in the Mazama, Lost Lakes, Palmer Mountain, Meyers Creek, and Conconully districts.

Production

Production of gold, silver, copper, lead, and zinc in Okanogan County from 1889 to 1968 is estimated at \$3,217,525. For the most part, the bulk of the silver came from lead-silver and gold-

silver ores, whereas only minor silver came from copper and zinc ores. Total silver produced in the county is about 1,000,000 ounces. Of this total 954,671 ounces was reported by the U.S. Bureau of Mines as being produced between 1903 and 1968. The remaining 146,329 ounces is the estimated production between 1889 and 1903. Total silver production, compared to gold, copper, lead, and zinc production follows:

Gold	\$1,505,359	53,236 ounces
Silver	885,329	1,000,000 ounces
Copper	394,031	2,103,332 pounds
Lead	287,576	2,717,185 pounds
Zinc	145,230	1,444,460 pounds

Although over 100 properties in the county's 16 mining districts have a record of production, only 34 mines are considered major producing mines. The bulk of the gold came from the Palmer Mountain and Methow-Squaw Creek districts; most silver came from the Conconully and Nespelem district; most copper came from the Palmer Mountain and Twisp districts; and almost all the lead and zinc produced in the county was from the Nighthawk district. Major producing districts and the major mines are shown in table 9.



Silver miners (circa 1900)

TABLE 9.—Major producing mines of Okanogan County, 1900-1970

GOLD		SILVER	
Palmer Mountain district	Black Bear Bullfrog Pinnacle	Conconully district	Arlington First Thought Last Chance Fourth of July Tough Nut Leuena
Methow-Squaw Creek district	Hidden Treasure Highland Holden-Campbell Methow (London) Friday	Nespelem district	Apache Little Chief
Twisp district	Alder Red Shirt	Palmer Mountain district	Ivanhoe
Meyers Creek district	Poland China Reco Gray Eagle	Nighthawk district	Ruby Horn Silver
Wannacut Lake district	Triune	Sheridan district	Sheridan
Oroville district	Okanogan Free Gold	COPPER	
Wauconda district	Bodie	Palmer Mountain district	Copper World Extension
LEAD AND ZINC		Oroville district	Golden Chariot
Nighthawk district	Four Metals Kaaba-Texas	Conconully	Blue Lake
Park City district	Mountain Boy	Twisp district	Alder

CHELAN COUNTY

General History

At the turn of the century, mining in Chelan County centered about the Blewett mining district. Several small stamp mills had been erected in Culver Gulch, the largest of which was the 20-stamp mill

of the Blewett Gold Mining Co. Among the main producing mines in the gulch were the Tip Top, Pole Pick, Peshastin, Culver, and Blewett. Ore from the mines averaged only \$3 to \$10 per ton in gold; however, ore containing up to several thousand dollars per ton in gold was occasionally mined. Whereas in the Republic district the gold-silver ratio was 1:4, the gold-silver ratio of Blewett ore was 4:1. By



Blewett mill (1904)

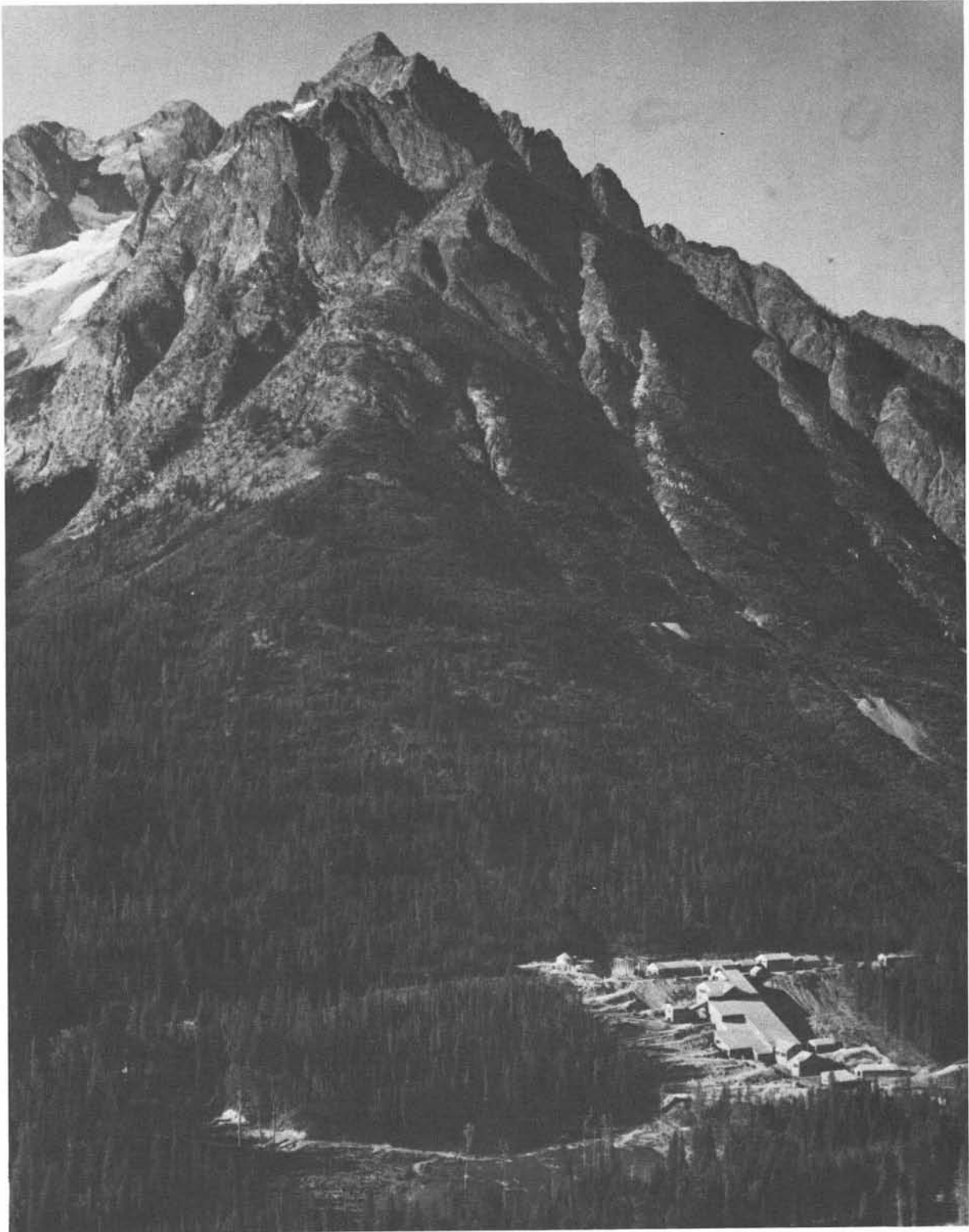
1903, only three gold mines in the district were operating, while 51 properties were in assessment or development stages.

In 1903, gold was discovered in Crum Canyon of the Entiat district. Ore from the Rex and Ethel mines averaged \$40 per ton in gold, while some ore ran as high as \$1,700 per ton. In the Stehekin district very little work had been done on lead-silver deposits, which were discovered in 1885 in the Horseshoe Basin area at the headwaters of the Stehekin River. From the head of Lake Chelan, this remote area near the crest of the Cascades was accessible only by 30 miles of poor trail. In 1905, Horseshoe Basin Mining and Development Co. and Cascade Gold and Copper Co. purchased most claims in the basin and began development work.

From 1900 through 1916, production from gold mines in Chelan County averaged around

\$10,000 yearly, almost all of which came from mines in the Blewett district. From 1917 through 1928, mining in the county was stagnant with not much more than 50 tons of ore being produced yearly. In 1929, Howe Sound Mining Co. acquired the Holden property on Railroad Creek, in the Chelan district, and began an extensive development program. Also in 1929, Royal Development Co. erected a 200-ton flotation mill at their copper prospect on Phelps Ridge in the Chiwawa district. Low-grade copper ore was mined and milled in 1930, 1935, 1936, and 1937; however, operations ceased in 1937 when mining proved unprofitable.

In 1938, full-scale mining began at the Holden mine, and Chelan County became the state's major producer of gold, silver, and copper. In the Wenatchee area, American Smelting and Refining Co. mined ore at the Golden King mine in 1938 and



Holden mine (1937)

1939, and in 1944, Knob Hill Mines, Inc. took over the property and produced gold ore until 1946. However, not until the Lovitt Mining Co. took over the property in 1949 did the Golden King become a successful gold mine. In 1950, most gold, silver, and copper produced in Washington came from the Holden and Golden King mines. The closure of the Holden in 1961 left Washington without a major copper-producing mine. In 1967, mining operations at the Golden King mine ceased, which left the state with only one major gold producer—the Knob Hill mine at Republic. Thus, in 1967, the production of precious and base metals in Chelan County, which had begun in 1874, came to an end.

Production

Chelan County has been one of the leading producers of metals in Washington. According to production figures published by the U.S. Bureau of Mines, the county produced \$73.75 million in gold, silver, copper, lead, and zinc, from 1903 to 1965.

Gold	\$33,460,800
Silver	2,190,093
Copper	32,996,349
Lead	5,894
Zinc	5,103,344
Total	\$73,756,480

Production figures for years prior to 1903 have never been published; however, Weaver (1911, p. 71) estimates the gold production from 1874 to 1901 at \$1,500,000, almost all of which came from the Blewett district. From 1870 to 1935, production of silver in the county was minor. Yearly production seldom exceeded 100 ounces, and in 1912, it reached a high of 823 ounces, all of which came from gold ore. However, in 1935, with the opening of the

Royal copper mine in the Chiwawa district, silver production rose to 2,884 ounces; in 1936, the mine produced 7,694 ounces of silver, and in 1937, it produced 4,282 ounces. When the Holden mine went into production in 1938, the production of gold, silver, and copper in Chelan County reached an all-time high. The bulk of the production in the county came from the Holden and Golden King mines, which in 1938, produced a total of 31,525 ounces of gold, 124,590 ounces of silver, and 11,861,000 pounds of copper.

From 1938, until 1958, the Holden mine produced a total of 212,000,000 pounds of copper, 40,000,000 pounds of zinc, 2,000,000 ounces of silver, and 600,000 ounces of gold. The combined production of \$66.5 million made it one of the richest metal deposits in the state. Total production through 1964 from the Golden King mine was around \$13.5 million, and consisted of about 367,500 ounces of gold and 420,000 ounces of silver. Although there have been many small producing mines in Chelan County, very few mines produced in excess of \$50,000.

TABLE 10.—Major mines of Chelan County, 1874-1964

GOLD	
Wenatchee district	Golden King
Entiat district	Rex Rogers
Blewett district	Culver Black Jack Peshastin North Star Pole Pick Blewett Tip Top
Chelan district	Holden
Chiwawa district	Royal (Red Mountain)

KITTITAS COUNTY

General History

In Kittitas County, around 1900, mining activity centered about the Swauk mining district where placer gold deposits had been discovered in 1873. Many miners had sold their claims to large companies, hydraulic mining had replaced sluice boxes and rockers, and Liberty and Meaghersville had become the district's main mining camps. Although most gold came from placer-mining operations, several lode deposits were being mined on a small scale. No more than a dozen mines produced placer gold yearly, and seldom did the production exceed \$5,000



Arrastra at Liberty (1924)

dollars. By 1916, Liberty had become a deserted town, for most miners had moved to Meaghersville where the settlement of Liberty presently stands.

In 1922, Swauk Mining & Dredging Co. placed a gold dredge into operation at the confluence of Swauk and Williams Creeks; however, operations were soon suspended because mining was not profitable—the dredge was too small to handle large boulders. In 1926, Kittitas Gold Mining Co. placed into operation the largest gold dredge that ever operated in Washington. Because of numerous problems, the operation lasted only around 2½ months.

With a rise in the price of gold from \$20 to \$35 in 1934, attempts were once again made to place several lode and placer gold mines into operation. A slight increase in gold production occurred in the district, but within several years most mines were again inactive. In 1940, Clear Creek Dredging Co. of California placed a large portable washing plant into operation on Swauk Creek, and produced over \$50,000 in gold. Like other placer mining operations this operation also failed, and in 1941, only \$665 in gold was produced in the district.

From 1941 until 1960, except for several small-scale placer mining operations, gold mining in the Swauk district was at a standstill. Although most lode gold mines in the district yielded very little gold, the gold discovered by Clarence and Ollie Jordin on Flag Mountain is worthy of mention. Beginning in 1932, the brothers had discovered several pockets of crystalline gold, containing up to several hundred ounces of gold. In July 1950, at the Ace of Diamonds mine, Clarence Jordin discovered his largest pocket, which contained around \$10,000 in crystalline gold.

The last attempt to mine placer gold on a large scale in the Swauk district began in 1960, when Golden Thunderbird Mining Co. erected a portable washing plant on Williams Creek near Liberty. Many

TABLE 11.—Silver production of eastern Washington's major silver-producing counties, 1903-1956

Year	County					
	Pend Oreille	Stevens	Ferry	Okanogan	Chelan	Kittitas
	Troy ounces					
1903	...	101,567	157,478	38,973	...	13
04	...	70,226	38,745	10,792	...	...
05	...	26,196	34,945	10,690	613	c
06	45	6,327	26,463	6,558	2	c
07	...	17,100	14,321	3,612	53	106
08	...	53,296	7,906	25,526	96	109
09	...	21,569	53,694	3,248	117	89
1910	...	13,281	185,357	3,317	137	57
11	1,602	40,664	185,239	12,204	480	55
12	...	233,535	152,336	23,999	823	36
13	...	148,167	162,596	16,420	189	61
14	...	91,480	163,674	8,039	28	71
15	...	109,750	103,472	41,852	84	67
16	85	174,612	138,293	18,796	177	76
17	1,552	161,013	98,080	14,617	10	97
18	394	168,669	101,376	32,110	151	38
19	288	156,562	65,684	28,893	2	15
1920	...	134,037	33,274	17,007	...	15
21	...	75,189	29,099	38,017	6	46
22	220	103,108	32,725	68,312	4	68
23	509	87,560	97,991	30,926	...	19
24	1,291	132,931	70,347	477	...	11
25	1,043	108,206	41,710	1,479	1	5
26	1,818	90,693	59,160	188	...	452
27	2,913	19,952	114,863	...	5	5
28	721	22,398	65,198	185	...	30
29	2,250	22,598	3,628	4	316	589

Continued on next page

Note: Prior to 1903, silver production was not reported on an individual county basis. After 1956, silver production not reported to avoid disclosing confidential company information.

. . . denotes no production; c denotes production but concealed with other counties.

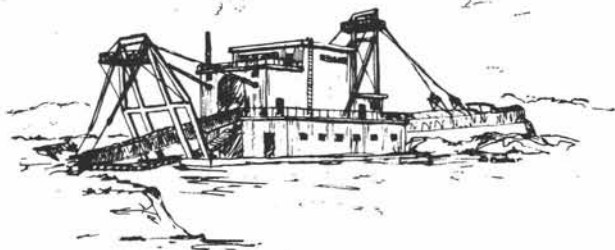
TABLE 11.—Silver production of eastern Washington's major silver-producing counties, 1903-1956—Continued

Year	County					
	Pend Oreille	Stevens	Ferry	Okanogan	Chelan	Kittitas
	Troy ounces					
1930	1,219	19,454	1,542	26	1,107	18
31	4,595	9,303	7,021	68	14	24
32	2,606	656	13,521	71	36	142
33	3,263	1,043	13,020	894	26	151
34	1,151	17,724	24,114	568	25	76
35	...	17,920	26,983	3,506	2,894	78
36	3,317	7,982	36,324	9,854	7,694	62
37	12,587	14,221	82,238	9,607	5,161	283
38	14,584	31,561	119,688	85,731	124,590	17
39	11,603	35,786	159,670	44,522	184,059	152
1940	8,609	22,372	110,579	13,949	199,343	520
41	10,807	22,147	173,392	1,741	175,891	3
42	9,630	17,460	164,987	457	174,790	...
43	7,335	15,830	173,115	31,095	141,930	...
44	15,580	16,830	132,075	53,100	103,694	...
45	11,191	6,667	117,599	24,314	121,434	...
46	7,375	21,516	103,260	27,964	93,968	5
47	10,674	58,253	133,053	42,673	48,968	...
48	9,521	44,992	179,295	4,645	137,242	...
49	11,396	48,604	153,429	7,635	135,662	...
1950	20,432	47,973	152,671	5,055	137,483	32
51	22,896	44,166	c	15,007	113,155	...
52	29,910	40,319	c	3,189	c	28
53	34,574	29,702	c	4,993	c	c
54	22,616	15,682	c	c	c	...
55	26,329	43,865	c	c	c	20
56	29,373	22,303	c	11,501	78,355	309
Total	357,904	3,065,017	4,315,230	858,406	1,990,815	4,050

WESTERN WASHINGTON, 1874-1970General History

On the western slopes of the Cascade Mountains, placer gold deposits had been worked as early as 1868 in the Sultan Basin area of Snohomish County, and as early as 1875 on Slate Creek in Whatcom County. However, it was not until the late 1880's and early 1890's that most of the silver-bearing lode deposits of western Washington were discovered. The first discoveries of silver were made in 1874 in the Silver Creek district of Snohomish County. A small rush followed, but it was not until 1882, at which time a trail was built from Index to the townsite of Galena at the mouth of Silver Creek, that prospecting in the district reached its peak. Many mining claims were staked on deposits of silver, lead, and gold that were discovered along Silver Creek, and in 1890, ore that assayed 30 percent lead and 350 ounces per ton in silver was shipped to a Denver smelter. This initial shipment was followed by other small shipments in 1892, consisting of ore rich in lead, silver, and gold from the Vandalia, Idaho, and Billy Lee mines. Although numerous metal deposits were discovered in the Silver Creek district the deposits proved to be small, and no major mines developed.

One mile north of the headwaters of Silver Creek, and in a basin at the headwaters of the south fork of the Sauk River, Joseph Pearsall discovered a ledge of galena on July 4, 1889, which he named the "Independence of 1776." This proved to be the initial discovery of the Monte Cristo mining district. Prospectors rushed to the district, and several hundred claims were staked; at the confluence of "76" Creek and Glacier Creek, the mining camp of Monte Cristo sprang up.



Swauk Creek gold dredge (1926)

nuggets were recovered, the largest of which was 6 ounces; however, not enough gold was recovered to make the venture profitable. The company was reorganized in 1965 as Gold Placers Inc., and equipment capable of moving larger volumes of gold-bearing gravels was used. This placer mining operation like others in the past also proved unprofitable. Mining elsewhere in Kittitas County from 1900 through 1973 was insignificant. Small shipments of copper, gold, and silver ores were made from several mines at the headwaters of the Cle Elum River, but the combined production of the mines did not exceed \$10,000.

Production

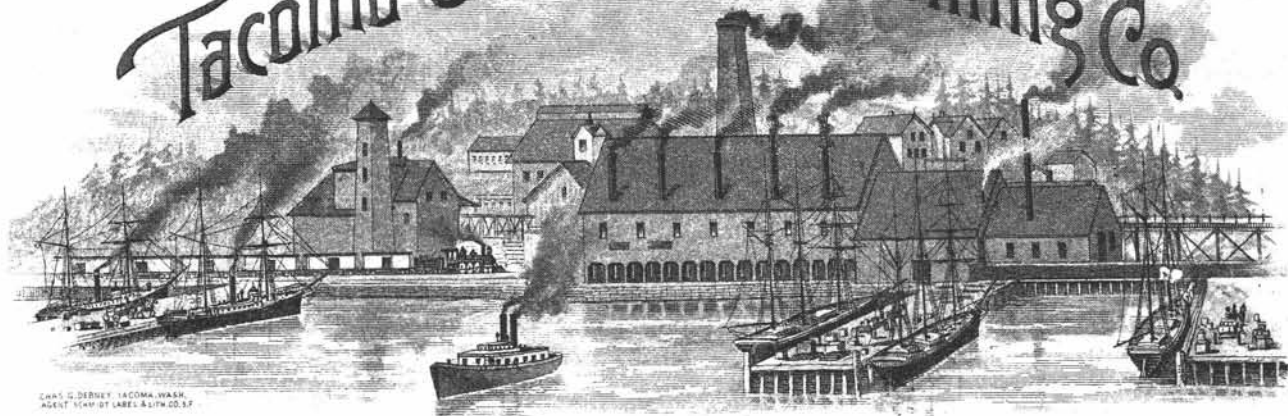
The estimated production of gold, silver, copper, and lead in Kittitas County from 1884 to 1970 is \$2,251,729, and is distributed as follows:

<u>Gold</u>	<u>Silver</u>	<u>Copper</u>	<u>Lead</u>
\$2,227,169	\$22,863	\$1,639	\$58

The bulk of the gold came from placer mines that operated in the Swauk district prior to 1903. From 1884 through 1902, around \$2 million in gold and \$20 thousand in silver was produced in Kittitas County. Most silver came from the refining of placer gold, much of which contained 25 percent silver.

WORKS OF THE

Tacoma Smelting & Refining Co.



TACOMA, WASH.

Tacoma smelter (1890)

Although many discoveries were dug upon by the prospectors, extensive development of the district's mineral deposits did not take place until 1891, at which time the Rockefeller syndicate purchased controlling interest in the Monte Cristo, Pride of the Mountains, and Rainy claims, and organized the Monte Cristo Mining Co. In 1890, the syndicate built a smelter at Everett, and in 1892 and 1893 they constructed a railroad from Everett to the mines at Monte Cristo. A 300-ton-per-day concentrating mill was built at Monte Cristo to handle ore from the Mystery Hill and Pride of the Mountains mines. These mines became the major producing mines of the district, as well as the first major producing metal mines in western Washington. Around 250 men were employed at the two mines and concentrating mill, and an average of 1,200 tons of gold-silver concentrates was produced monthly. From 1890 through 1908, the district produced around 334,000 tons of ore that

averaged 0.40 ounce of gold and 5 ounces of silver per ton. The greatest share of this production came from the Mystery Hill and Pride of the Mountains mines. Other producing mines were the Justice, Foggy, O & B, Peabody, and Rainy. In January 1907, railroad service to Monte Cristo was discontinued and by 1908, the concentrator, as well as most mines, had shut down; this brought mining in the Monte Cristo district to an end. Inasmuch as there was no longer a need for the smelter at Everett, it was sold to American Smelting and Refining Company, and dismantled. Metals produced in the Monte Cristo district from 1890 through 1907 were valued at around \$3.67 million. Although the dollar value of gold exceeded that of silver, the district produced 1,670,000 ounces of silver compared to 133,600 ounces of gold. The main factor that forced the mines to close was the declining gold and silver content of the ore. When the mines first began production in