METALLIFEROUS OCCURRENCES

in

NEW MEXICO

by

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Phase 1

STATE RESOURCES DEVELOPMENT PLAN

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eight miles west of Magdalena, Socorro County, on U. S. Highway 60 and then three and a half miles on a dirt road leading to Cat Mountain Ranch. The prospects lie on the northwest side of Cat Mountain, in and around Section 19, Township 3 South, Range 6 West.

The region was originally examined in the early 1870's by E. L. Smart and Pat McLaughlin, but mining did not commence until 1902. This venture lasted only a short time, since the gold was not recoverable in the milling process. No major activity has developed since that time.

GEOLOGY

Gold in quartz and calcite gangue occurs in veins cutting rhyolite and andesite flows. Basic dikes cut both the flows and the veins.

MINING ACTIVITY

No production is recorded for the region.

CENTRAL MINING AREA

The Central Mining Area, New Mexico's most productive mining locale, lies in eastern Grant County in the southwest portion of the state. The center of the large elliptically-shaped area is about ten miles east-northeast of Silver City, and is approximately coincident with the center of Township 17 South, Range 12 West. The major axis of the area trends northeast-southwest, and is about twelve miles in length. The northeast end of the area is truncated by Shingle Canyon, and the Fort Bayard Military Reservation forms a notch of non-mining land on the northwest side of the area. Access to the area is provided by highways U. S. 260 and N. M. 180; and by the Whitewater branch of the Silver City-Deming line of the Atchison Topeka and Santa Fe Railway Company.

The area has been officially constituted as a district, the Central District, but it has been customary in the past to refer to its subdivisions as districts. On this basis, and because of the geology of the subdivisions varies, it has been decided to treat this locale as a mining area, and to refer to its subdivisions as districts and subdistricts. The districts and subdistricts are shown on the accompanying map, and their area extents are defined below on the basis of the best information available.

1) Bayard (Central) District - drainage area of Twin Sister Creek south of Fort Bayard Military Reservation, Bayard Canyon, Whitewater Creek below confluence of Hanover and Santa Rita

Creeks, and Gold Gulch
2) Copper Flat Subdistrict of Hanover District - drainage area of upper Rapp Canyon (Yellow Dog Gulch)
3) Santa Rita District - drainage area of Santa Rita Creek
4) Hanover (Fierro) District - drainage areas of Hanover Creek, Little Shingle Canyon, and Upper Rapp Canyon
5) Little Shingle Canyon Subdistrict of Hanover District - drainage area of Little Shingle Canyon
6) Georgetown (Mimbres) District - drainage area of Willow Springs Canyon.

The area has produced copper, lead, zinc, silver, gold, molybdenum, manganese, and iron. Tungsten and vanadium are reported to occur in the ores of the area.

HISTORY OF THE SANTA RITA MINES

Cabeza de Vaca, in the journal of his travel through the southwest, mentions copper articles in the possession of Indians (1536). Castaneda, the Recorder of the Coronado expedition, also mentions copper ornaments worn by the Indians (1541). The Indian reports of the source of this copper indicate that it came either from Cananea, Sonora, Mexico, or from Santa Rita, New Mexico, some ninety miles to the north. Although this indicates an early knowledge of the mines, they were unknown to the Spanish and Mexicans until about 1800. The mines were first worked by Europeans in 1804, though Indians had recovered native copper from the area in the late 1700's. This mining activity is preceded in New Mexico only by the Spanish period workings of Chalchihaitl and Mina del Tierra in the Cerrillos district (circa 1680). The mining at Santa Rita was the first major recovery of copper in the United States; the Michigan copper deposits, though known as early as 1653, were not opened for major production until 1844.

An Apache Indian is credited with the discovery of the Santa Rita mines about the year 1798. In 1800 an Apache chief showed the outcroppings to Lieutenant Colonel Jose Manuel Corrasco of the Spanish army in return for an act of kindness. Colonel Corrasco did not attempt to work the property, but interested Don Manuel Francisco Elguea, a merchant of Chihuahua, in its business possibilities. Elguea, a subdelegate to the Spanish court, obtained a concession to work the deposit and a contract to supply copper for coinage to the government of New Spain. In 1804 he purchased Carrasco's interest and began production.*

Lt. Zebulon Pike mentioned this mine in his report on the expedition of 1807, although he did not visit it. He is quoted as stating, "It is worked and produces 20,000 mule loads of copper annual-

ining of the deposit. The company built a 5,000 tpd mill at Hurnine rail miles south of the deposits, which was completed in 911. From that time on the Santa Rita mines were major producers. In 1924 Chino Copper Company sold all its assets to Ray Consolidated Copper Company, and this company was in turn absorbed by the Nevada Consolidated Copper Company in 1926. By 1926 production had been expanded to 11,000 tons of ore per day. In 1933 the Kennecott Copper Corporation acquired the assets of the Nevada Consolidated Copper Company, and established it as a wholly-owned subsidiary, the Nevada Consolidated Copper Corporation.

The operations at Santa Rita were suspended from October, 1934 to January, 1937 due to adverse market conditions. During 1937 a molybdenum recovery circuit was added to the mill at Hurley, and the Chino Division of Kennecott Copper Corporation became a major producer of molybdenum. On May 2, 1939, a new smelter was fired for the first time at Hurley to handle ore from the Santa Rita mines. With World II approaching, the demand for copper grew; the Kennecott Copper Corporation met the demand by expansion of concentrator capacity to 20,000 tpd in 1939, electrification of mining operations in 1941, and installation of a fire refining plant in May, 1942.

By 1950 mining capacity had been expanded to 45,000 tpd and milling capacity to 22,500 tpd. During 1951-1954 the town of Santa Rita and the company shops were moved away from the pit area, thus easing about 30,000,000 tons of ore for future mining. It has been recently reported that additional development work has been completed which will insure Santa Rita's continued occupancy of the position as New Mexico's greatest single mineral resource operation.

Anderson (1954) estimated the total production of the Santa Rita mines to be about 3,902,000,000 pounds of copper and considerable amounts of gold, silver, and molybdenum. The writer, on the basis of incomplete production figures since that time, estimates production through December 31, 1961, to have amounted to at least 4,700,000,000 pounds of copper. With copper at, say 25¢ per pound, this amounts to $1,175,000,000 worth of copper.

HISTORY OF THE CENTRAL AREA (EXCEPT SANTA RITA MINES)

The narrative of James O. Pattie, written in the early 1800's, states that, "...within the circumference of three miles (of Santa Rita) there is a mine of copper, gold, and silver, besides a cliff of lodestone."[45a] The lodestone cliff was probably the iron deposits of Fierro; the copper-gold-silver mine is believed to be the Hanover mine. The true discovery of the Hanover mine was made by a German from Hanover in the early or middle 1850's. It is said to have produced between 1858 and 1861 nearly 1,000,000 pounds of copper. At the time of the invasion of General Sibley's Confederate forces, all the machinery and equipment and 187,000 pounds of copper

were confiscated by the Southern troops and taken to San Antonio, Texas.

After the War Between the States ended, activity in the area began anew. By 1869 fifty-seven mining claims were recorded at Fort Bayard, and the San Jose and Ivanhoe mines were first operated about this time. Mining continued slowly for the next twenty years, but the completion of a branch line of the Atchison, Topeka and Santa Fe Railway Company to Hanover in 1891 brought the area into its first great prominence. At this time the Union Hill, Jim Fair, Republic, Iron Head, and other iron properties became important; iron ore was produced in the area continuously between 1891 and 1931.

Silver was discovered in the Mimbres district in 1866. However, its importance was not recognized until 1873. From then until 1892 the district was actively exploited, and in that period production was valued at about $3,500,000. Under the stimulus of the new railroad, many new copper, lead, and zinc properties were opened, and smelters were built to handle ores from the San Jose and Ivanhoe mines in 1899. A flood in 1900 uncovered an extension of the San Jose ore deposit to the south of the San Jose mine; this extension became the site of the Ground Hog and Lucky Bill mines. In 1903, a rich strike was made on the Pactolus claim in Gold Gulch; the excitement it caused soon died when other strikes did not materialize.

From 1900 until the depression era 1930-1940, the Central area remained quite active. However, during the years 1930-1940 many mines in the area were forced to close due to poor markets. By early 1939 the certainty of war in Europe stimulated markets to the point that many of the mines were able to reopen and to carry out exploration and expansion activities. With the entrance of the United States into the war on December 7, 1941, operations in the Central area were placed on a maximum production basis. In addition to maximum production on existing properties, many new producers were opened; such as Peru Mining Company's Copper Flat and Kearney Zinc mines, United States Smelting, Refining and Mining Company's reopened Bullfrog mine and new 600 tpd mill, and Kennecott Copper Corporation's Oswaldo zinc mine.

The impetus of wartime production had effect in the Central area for several years after 1945. However, by 1950 and through 1958, several mines were working at reduced rates or were closed. As far as is known, operations in the area are still curtailed somewhat, although the Central area still represents a major source of New Mexico's metal production.

GENERAL GEOLOGY

Sedimentary Sequence

The general stratigraphic section for the Central area is shown

MINERAL DEPOSITS OF THE BAYARD DISTRICT

This discussion also applies to the mineral deposits occurring in the southwestern portion of the Santa Rita district.

The succession of rocks in the Bayard district is the same as that occurring in the Santa Rita district. The mineral deposits of the district are complex quartz-sulphide veins. The veins were implaced during three distinct periods: two during the late Cretaceous, and one during Tertiary time. The ore minerals are sulphide of copper, lead, and zinc, bearing silver and minor gold; the principal gangue mineral is quartz. Near surface the veins have been oxidized; in some cases the oxidation has produced lead-vanadium concentrations. The principal deposit of the district is the Ground Hog or San Jose vein which was implaced in the Ground Hog fault zone.

Gulches in the district carry very minor gold placers derived from erosion of the oxidized portions of the veins.

MINERAL DEPOSITS OF THE HANOVER DISTRICT

This discussion also applies to mineral deposits in the Copper Flat and Little Shingle Canyon subdistricts.

The mineral deposits of the Hanover district are contact metamorphic deposits in limestone, and occur around the margins of the Hanover-Fierro granodiorite stock. The Lake Valley (Mississippian) and Magdalena (Pennsylvanian) limestones, which arch over the intrusive, have been highly metamorphosed. The extent of metamorphism decreases away from the stock, producing a zoning of the mineral deposits. At the margins of the stock the limestones have been highly silicified. Occurring in this zone of silicification are replacement deposits of iron oxides (magnetite and hematite). From a few hundred to one thousand feet from the contact, the metamorphism of the limestone is less intense. The mineral deposits in this zone are primarily the sulphides of zinc. Near the outer margin of the zinc zone, lead sulphides become an important ore constituent. Copper sulphides occur sparingly throughout this zone. Beyond this zone the limestones have been metamorphosed only to dolomites. Near the surface both the iron and zinc deposits have been oxidized. In the iron deposits this produced additional hematite; in the sulphide deposits, limonite gossans and carbonate ores of lead and zinc.

A few fissure vein occurrences of manganese are noted in the Little Shingle Canyon subdistrict. Tungsten is reported to occur in a small zinc deposit in the Copper Flat subdistrict.

MINERAL DEPOSITS OF THE GEORGETOWN (MIMBRES) DISTRICT

The mineral deposits of the district occur as flat-lying blanket deposits in the upper Fusselman (Silurian) limestone directly beneath the contact with the Percha (Devonian) shale. The limestone