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MINING IN THE SOUTHERN PART OF THE SANGRE DE CRISTO MOUNTAINS

By

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INTRODUCTION

The Sangre de Cristo Mountains are a continuation of the Front Range, a major unit of the Rocky Mountain system in Colorado. The Sangre de Cristos enter New Mexico at the Taos-Colfax county line, extending southward for approximately 60 miles, where a major split occurs. The main ridge swings westward and southward to form what is sometimes called the Santa Fe Range. The lesser leg of the split continues southward and is known as the East or Las Vegas Range. Both ranges terminate in foothills just north of the Glorieta - Rowe Mesa. The area between the two legs forms the drainage basin of the upper Pecos River.

The mountains were of much interest to early settlers of the region as a possible source of mineral wealth. The Spaniards did extensive prospecting near Santa Fe, near the Indian Pueblos to the north, and, to a lesser extent, near Pecos and Mora. The search was, of course, for gold and silver. There is no record of a major discovery having been made by the Spaniards, although from the number of old diggings in the canyon and upper reaches of the Santa Fe River, they must have found encouraging showings of precious metals. Some of the pegmatites near Santa Fe, Ribera, and Mora are reported to have yielded sheet mica that was used in the windows of the earliest houses. The Mexican era was comparatively short lived and there is no record of mineral production of importance coming from the Sangre de Cristo Mountains during this period.

With the coming of the Anglo-American settlers interest in the range as a possible source of minerals was revived. Mineral occurrences containing mostly copper, with a little gold and silver, were found in the foothills just east of Santa Fe. These discoveries were of very minor importance, but they touched off a surge of prospecting that carried through the following years and resulted in many mineral discoveries, some of which developed into mines of importance.

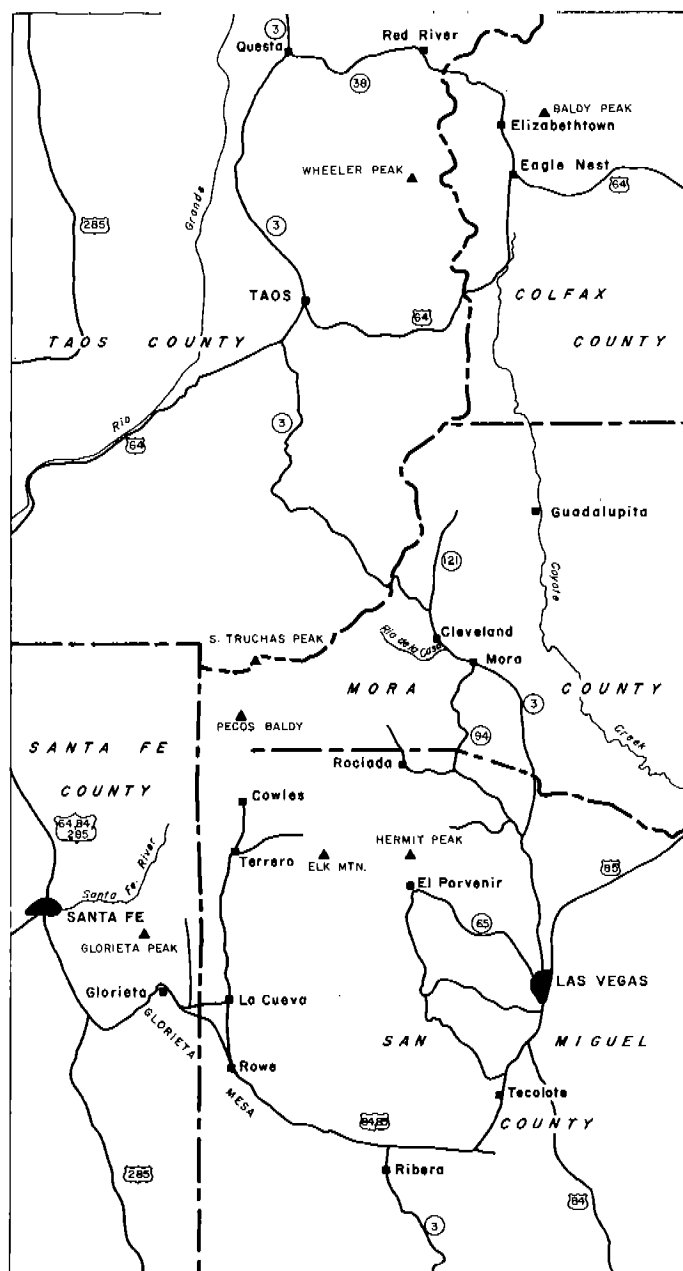
MINING DISTRICTS

In discussing the mines and mining districts of the Sangre de Cristo Mountains, we will begin with the Santa Fe district and progress south and east to the Glorieta Basin, Pecos River, Tecolote, and Ribera areas, and then

north to the Las Vegas or Elk Mountain, Rociada, Mora, Moreno Valley or Elizabethtown, Baldy Mountain, and Red River - Questa localities. The location of these districts is shown on an index map.

Santa Fe District

The Santa Fe district comprises that area included in the Santa Fe River watershed east of the city, and extending over the main ridge of the mountains to include the upper reaches of Dalton and Macho Creeks in the Pecos River watershed. The watershed of the Santa Fe



INDEX MAP OF MINING DISTRICTS

River has been closed to public entry for several years to protect the Santa Fe city water supply. The rocks of the region are predominantly Precambrian.

Although no ore deposits of importance have been found in the district, numerous showings of ore minerals have inspired much prospecting. Small placers of flake gold were found along the Santa Fe River, and small amounts of gold were found in some of the contact zones where pegmatites cut amphibolite. In the *Mikado* sub-district, on the south side of the Santa Fe River, gold associated with galena occurs sparingly along a fissure zone of gneiss; sphalerite and chalcopyrite are also present. Small deposits of gold-bearing copper ore are found on the north and west slopes of Penacho Peak, just southeast of Santa Fe.

In the *Dalton-Macho Creek* portion of the district, some lead-zinc-copper mineralization carrying a little gold and silver occurs in and adjacent to a major fault that strikes northeasterly near the crest of the ridge. Although these deposits have been considered of minor importance, an extensive exploratory drilling program has been underway in the area for several months (spring and summer, 1956).

Some of the prospects in the area are very old; most of them are now caved. In 1945 two natives of Pecos who were cleaning out an old shaft near the crest of the ridge, uncovered a well-preserved, very old, human skeleton. The job of cleaning out was completed, but the boys lost interest in the project. The bones were returned to their resting place and the shaft was partly refilled. Arsenopyrite with sparse flakes of native arsenic are present in the dump and, in places, in the shaft.

Glorieta District

The Glorieta mining district includes the entire Glorieta Basin north of U. S. Highway 85 and extends east to the Pecos River. It also includes a small area near the rim of Glorieta Mesa, immediately south of the village of La Cueva. The most prominent physical feature of the district is Glorieta Peak, which dominates the northwest rim of the basin. The more prominent rocks of the western half of the district are Precambrian granite, diabase, and schist, but in the south and east portion of the district the rocks are sedimentary. The district has never been an important producer. The old Bradley mine, located about 4 miles north of the village of Glorieta, produced gold-silver ore in the late 1890's and early 1900's. The claims were patented about 1900 and the mine has been idle since 1905. Good gold values were found at and near the surface, but petered out at depth. The gold occurs in a shear zone in diabase and at the granite-

diabase contact. The Jones claims (formerly the Fisher claims) show promise of becoming an economic deposit; lead-zinc-copper, gold, and silver mineralization occurs in shear zones in diabase and fine-grained granite. Ole Johnson's Lucky Strike claims cover a copper-bearing shear zone in diabase. The deposit apparently was mined out, and the property abandoned many years ago. Copper showings in sandstone are numerous on the east side of the basin, but no ore bodies have been found. Near the rim of Glorieta mesa, 3 miles south of La Cueva, is an old iron mine, worked prior to and during World War I. This deposit has been described by Kelley (1949).

Pecos River Basin

The Pecos River basin, extending from the Truchas Peaks on the north to Pecos village on the south, and from the crest of the Las Vegas Range on the east to the ridge of the Santa Fe Range on the west, contains one major mining district and several minor districts or subdistricts. Within the Pecos River basin are the Dalton Canyon, Macho-Indian Creek, Holy Ghost (Rito Esperito Santo), and Upper Pecos subdistricts. The mineralization in these subdistricts is similar to that at the Pecos mine, but no ore bodies of any size or importance have ever been found. The major district, formerly called the Copper or Pecos River district, but presently known as the *Willow Creek* district, is located at the junction of Willow Creek and the Pecos River, 14 miles north of Pecos village.

The *Pecos mine* is the only productive mine ever developed in the Pecos River basin. It was formerly known as the Hamilton or Cowles mine of the Pecos River Mining Company, and was first located about 1882. Early attempts were made to develop the property as a copper mine, but the smelters would not accept the ores because of excessive amounts of zinc. Development was intermittent until the property was acquired by the Goodrich-Lockhart Company in 1916. This company, by diamond drilling and underground development, proved up some three million tons of high-grade zinc, lead, and copper ore. In 1925 the property was sold to the American Metal Company, Ltd. The ore bodies were further developed and the mine came into production early in 1927. During that year it became the largest producer of zinc, lead, gold, and silver in New Mexico, and maintained that position for 12 years. The mining camp, Tererro, had a population of more than 2,500 for several years, including 600 men employed in the mining operations. By 1939 commercial ore was depleted and the property was closed down and abandoned.

The mine reached a total depth of 1,750 feet, but

very little ore was mined below the 1,350 level. In recovering the ore, an average of over 14 tons of water was removed from the mine for every ton of ore recovered, and more than 6 million board-feet of timber per year was used to support the underground workings. At the time of closing, some 6 million tons of ore had been recovered from the mine and delivered by aerial tramway to the concentrating plant 12 miles to the south. The tramway, at the time of its construction, was the largest in North America. It had a capacity of 65 tons of ore per hour and some of the spans were remarkably long. The span over Indian Creek was 4,640 feet between supports, and the Dalton Canyon span measured 4,860 feet.

The ore deposits of the Pecos Mine occur in highly sheared Precambrian rocks, including quartz-sericite schist and chlorite- and garnet-bearing amphibolite schist. The main shear zone strikes N. 40° E., dips southeast, and is about 60 feet wide at its widest place. The ore occurs as a replacement of the schists in the main shear zone. Two major ore bodies were developed. They converge toward the northeast and join in a fault zone which shows some post-mineral movement. The larger of the two ore bodies had a maximum width of 48 feet. The ore minerals are sphalerite, galena, chalcopyrite, silver, and gold. In the vicinity of the mine, Precambrian rocks crop out only in a small area where the Pecos River and its tributaries have cut through the overlying limestone and shale of the Magdalena group. At only a few places do the ore bodies reach the overlying sedimentary rocks, and nowhere do they extend into them.

One feature of historical interest in the vicinity of Pecos Mine is a large cave which was used for ceremonies by Pecos-Pueblo Indians. This cave is described in Willa Cather's book, "Death Comes for the Archbishop". From its entrance just north of the mouth of Holy Ghost Creek, the cave extends northwest more than a mile in the Magdalena limestone. The remains of many, many fires, occasional arrowheads, and broken shafts, indicate that the cave was used by hunting parties. After the Pecos Indians abandoned their Pueblo and joined the Jemez people, the ceremonial cave continued to be used occasionally. In 1929, 13 horsemen appeared at the mining company's office at Tererro and were given permission to use the cave; they were in the cave three days. The most recent use is reported to have been in 1943, when nine braves rode over the mountain from Jemez Pueblo and spent several days in the cave.

Tecolote District

The Tecolote district lies a few miles west of Tecolote village. The district is noted chiefly for its large, low-grade sandstone copper deposit. This deposit has been known for many years, and several unsuccessful attempts have been made to work it. It is presently receiving new attention because of the high price of copper. There are a number of pegmatite dikes in the district, some of which are rich in mica. A little exploratory work has been done in a few of them.

In the *Ribera* area, a part of the Tecolote district, mica and associated minerals have been mined from pegmatite dikes. The most persistent and productive operation has been at the Old Priest Mine, located 6 miles north of the Ribera filling station on U. S. Highway 85. This old mine supplied mica to the Spanish settlers for use in their windows, and has been worked at intervals since that time. During the past few years the mine has belonged to the Onega Corporation. In 1955 the mine is reported to have produced beryl, columbite, tantalite, and monazite with a value of \$10,000. Other pegmatites in the immediate area are rich in mica and carry some beryl.

El Porvenir District

The El Porvenir (Hermit Mountain) district, 14 miles northwest of Las Vegas, has been prospected for copper, gold, and silver. At present a large, low-grade deposit of uranium is being explored in the Mineral Hills area. The occurrence of molybdenite and fluorite in Precambrian pegmatites of Hermit Peak is of particular interest.

Elk Mountain District

The Elk Mountain (Las Vegas) district, located just west of the El Porvenir district, includes many large, mica-rich pegmatites. Some of these have been opened up extensively. Small quantities of strategic quality mica were produced in the area during the World War II.

Rociada District

The Rociada district, at the San Miguel-Mora county line 30 miles northwest of Las Vegas, is characterized by mineralization similar to that at the Pecos mine; the lead, zinc, copper, gold, and silver ore occurs in narrow shear zones in Precambrian diabase and granite. Prospecting in the district has been carried on for many years, but no ore bodies of importance have been found. During World War II a pegmatite at the west edge of the district was mined for lepidolite and tantalite. This property is currently under lease to one of the larger mining companies.

Mora - Cleveland District

The Mora - Cleveland district lies 15 miles north of the Rociada district. Many prospects for gold mark this area. A small amount of placer gold was recovered from Rio de la Casa, and several small, very rich pockets of gold ore have been found in the lenses of quartz in the Precambrian rocks near the upper reaches of this creek. Recently, a promising fluor spar deposit was found about 3 miles northeast of Cleveland village.

Coyote Creek District

The Coyote Creek mining district is situated in the valley of Coyote Creek, 12 miles northeast of Mora, near the small village of Guadalupita. Nodular chalcocite occurs in Carboniferous shale. Some production came from this area during World War I, and recently it has been discovered that both the copper minerals and shale contain small amounts of uranium minerals. (Recent brief description by Soule in USBM I. C. 7740.)

Elizabethtown - Baldy District

Between 1904 and 1930 the Elizabethtown - Baldy (Ute Creek) district of western Colfax County produced gold (mostly placer) valued at \$2,100,000. A much greater production, estimated at \$4,500,000, is reported to have come from the area between 1866 and 1904. Elizabethtown, the main mining camp of the area, straddled Moreno Creek near the head of the famous and rich placer diggings. The placer gold was derived from quartz veins and possibly contact metamorphic zones on Baldy Mountain, which is on the east side of the Moreno Valley.

The Baldy (Ute Creek) part of the district, on the east flank of Baldy Mountain, includes the primary deposits, which are in quartz monzonite porphyry, Pierre shale, and the Raton formation. The quartz veins can be traced

for long distances in both the porphyry and the shales; the veins range from a fraction of an inch to several inches in width. A few contact metamorphic deposits are present along the intrusive contact of the porphyry with calcareous shales. Most of the gold occurs in the shales where it is locally associated with pyrite and molybdenite. The ore is erratic in distribution and grade, ranging in value from \$5 to \$250 a ton. Between 1916 and 1933, a 9,000-foot tunnel was driven westward through Baldy Mountain in an unsuccessful attempt to intercept a downward extension of the gold-bearing veins that crop out in the higher elevations of the mountain. The tunnel encountered only thin mineralized seams, characterized by the presence of molybdenite.

Red River - Questa District

The Red River - Questa mining district is located 30 miles northwest of Elizabethtown, just over the main mountain range. The geology, ore deposits, and mining operations in this district have been described by McKinlay (1956) and Schilling (1956).

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