

# HISTORY OF MINING IN COLFAX COUNTY

By

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The following notes are from a report by R. F. Pettit, Jr. entitled "Mineral Resources of Colfax County, New Mexico". The present status of the report is that it is on Open File, State Bureau of Mines and Mineral Resources, Socorro, New Mexico. The illustrations that accompany the Open-File report have not been reproduced in this volume.

All the known mineralization in Colfax County occurs in the Cimarron-Baldy and Taos Ranges on the west. The first discovery that excited public interest took place in the early 1860's when rich copper float was brought to Fort Union by a Ute Indian. Tracing the origin of this float resulted in the location of a copper property, probably the one known today as the Mystic claim, near the top of Baldy Peak. In October 1866 the owners of this claim, William Kroenig, W. H. Moore, and associates, sent a party of men, including Larry Bronson, Richard P. Kelly, and Peter Kinsinger, from Fort Union to do the annual assessment work. This party camped for the night on the west side of Baldy, some 4,000 feet below the peak, near the mouth of Willow Creek. Kelly went to the creek to wash out a few pans of gravel. Finding "colors" immediately, he told his companions, and they stayed there several days, washing gold and staking claims. Later they returned to Fort Union without having done the assessment work for which they had been hired. Although their intent was to keep their find a secret, the news leaked out. In the spring of 1867 a rush occurred, during which gold was discovered in most of the creek bottoms on the west side of Baldy. Among the earliest of those in the first rush was Mathew Lynch, who played the largest part in the early placer mining and discovered the first lode mine of the district. His hydraulics were the first in New Mexico, and he was the largest of the placer operators.

The water supply was small and uncertain, and large placering operations could not be based upon it. The early prospectors seem to have realized this immediately, for a survey of possible water sources was made, a construction company was formed, and work was begun on the "Big Ditch" on May 12, 1868. The survey, made by Captain N. S. Davis, an engineer of the United States Army, resulted in the construction of a ditch  $41\frac{1}{8}$  miles long. This ditch diverted nearly 1,000 cubic feet per minute from the headwaters of the Red River, a tributary of the Rio Grande, at a point about 11 miles west of Elizabethtown. Three large lakes were constructed to serve as reservoirs along this ditch, and several smaller reservoirs were built on Baldy Mountain above the placers in order to accumulate enough water to operate the hydraulics. The work was practically complete within six months. The

rapidity of construction and the ingenuity shown is a monument to the ability of the men in charge, and to the engineering which made it possible. Although the ditch has not been used for over 50 years [70 years as of 1966], it is still well marked; and some of the original flumes are still found in place on the sides of vertical cliffs, in locations that cause wonder at the final cost, including reservoir construction, of only \$230,000. Seepage from the ditch and leakage from the flumes, however, caused the loss of the major portion of the water, and the amount delivered was only about 75 cubic feet per minute.

The "Big Ditch" was owned and built by the Moreno Water and Mining Company, of which the original members were L. B. Maxwell, Capt. N. S. Davis, W. H. Moore, William Kroenig, John Dold, Col. V. S. Shelby, and M. Bloomfield. The first water was delivered to Humbug Gulch on July 9, 1869. Because of the tremendous losses of water the company was soon in financial difficulties, and the assets passed into the hands of Col. Shelby, who had loaned the company much of the money used in the construction. Maxwell was the next owner, but he was unable to make it pay and sold it to Mathew Lynch in 1875. Lynch was successful in making it pay, selling water for very high rates and using much of the water for his own large operations.

After the death of Mathew Lynch in 1880, Joseph Lowery succeeded him as the most prominent placer miner in the district, although the Lynch properties were operated by James and Patrick Lynch, brothers of Mathew. Lowery married Elizabeth Moore, and their son, William Lowery, still resides in the district, at Eagle Nest. He conducted the writer over many of the old properties, which are unmarked except in the memories of such oldtimers.

The first dredge began operations on September 19, 1901. The property of the El Oro Dredging Company worked the Moreno Creek bottom from one mile below Elizabethtown up to a point opposite Humbug Gulch, where the maintenance of the dredge became too expensive to permit further work.

The flush production was soon over, although the ground was placered continuously until 1904 and small operators have worked there intermittently ever since. Value of the placer production up to January 1, 1904 was estimated at \$2,250,000 (Jones, 1904).

The miners organized soon after the first rush; some local regulations, more or less indefinite, were commonly observed as to size and location of claims, assessment, etc., but there is no record of these early regulations.

The Willow Creek district was organized on June 7, 1867, and reorganized August 25, 1867, with boundaries similar to those described in the discussion of the Willow Creek mining district. During the first year 355 claims were recorded in this district. Rules allowed each man four

claims: (1) a ravine claim, 200 feet along the bottom and from bank to bank; (2) a hill claim, 200 feet along the stream by 300 feet toward the ridge; (3) a flat claim, 300 feet by 300 feet; and (4) a quartz or lode claim, 300 feet along the lode, with no width given. One extra claim of any type was allowed the discoverer on a new creek, hill, flat, or lode. Regulations required that each claim be worked one day in every 10, and at least once within 15 days after recording. Recording was not required as long as the claim was being steadily worked or prospected. All these claims were located under the public land laws, and attempts were made to locate land by this means as late as June 10, 1880.

On August 23, 1868, the Cimarron mining district was organized and a recorder appointed. The size of placer claims was limited to 300 by 300 feet. The records were turned over to the county clerk's office shortly after the formation of Colfax County, on August 29, 1869. During this period 92 claims were recorded, the larger part of the good ground having been staked long before. By the same year the Maxwell Land Grant Company had established title to the lands and had commenced suits to dispossess prospectors; most of them drifted away, or became lessees, acknowledging the title of the company.

The most prominent producing creek bottoms along the west slope of Baldy were the Willow, Humbug, Grouse, Big Nigger, and Pine, in approximately the order of their total production. From 1901 to 1903 a dredge operated in the Moreno Valley bottom, which for a time produced the major portion of the gold mined in the State. Very little gold was produced north of Pine Gulch, although colors were panned and claims worked in that area. A little gold came from the slopes on the west side of Moreno Valley, but no source has been found there, and the production was very small. Placers were successfully operated in Ute Creek on the east side of Baldy, and in the South Ponil. . . .

Prospecting by Mathew Lynch and Tim Foley in 1867 led to the discovery of gold in flakes and nuggets on Ute Creek, which drains the southeast side of Baldy. Tracing this gold to its source, the next year they discovered and located the Aztec mine at the head of the creek on the ridge separating Ute Canyon from that of the South Ponil. This was, on the surface, a phenomenally rich find, and a 15-stamp mill was immediately erected. Mining commenced on October 29, 1868. The mine produced approximately \$1,000,000 from veins in sandstone on this property within the next four years, after which the production declined and the property was sold. This rich find stimulated the search for others in the district, and the Montezuma mine was located the same year, followed by the French Henry in 1869, and others. None of these was as rich as the Aztec. Interest in prospecting continued as late as 1930, although the leading properties were all discovered before 1895.

Completed lode-mining locations made under Maxwell Land Grant Company regulations totaled 1,045, and at least 332 of these were deeded to the claimants. In addition to the locations made, some special tracts were sold

under individual agreements, and nearly every claim had its counterpart, the Maxwell Extension. The Maxwell Land Grant Company acquired the more important claims during the period from 1910 to 1920, and, after operating all of them except the Aztec for a short time, closed the mines or turned them over to lessees. Production never reached the volume it attained in the early days, and gradually declined. The company operated the Aztec until 1940, when it was decided that the cost of producing further gold from the property was too great. In 1946 the district was practically idle, although two lessees had placer ground leased, and one of them was active. A revival of the deep mines is certainly possible. . . .

It is probably safe to assume that most of the properties would have operated longer had they been in charge of competent men. An additional difficulty which beset the early mine operators was highgrading. Stories are still in existence of thousands of dollars' worth of high-grade ore being stolen by shift bosses, assayers, mine foremen, and miners. Ores assaying over \$100,000 per ton were found along the shoots, and it must have been nearly impossible to prevent such highgrading. In fact, among the miners it was not even considered dishonest, as the wages paid were not of the highest. The Maxwell Land Grant Company is known to have suffered heavily from highgrading, but made it a practice not to prosecute the persons responsible, although definite proof of theft was obtained in several cases. The total production from the lode mines of the district may have been nearly double the recorded production. Due to the more stringent laws regarding the possession and sale of gold that obtain today, such trouble as mentioned above would undoubtedly be less should there be a revival of mining in the district.

Elizabethtown was founded in 1867. By the next year it had a population of 7,000 and was the largest town in the State. It was the first incorporated town in New Mexico, and was the county seat of Colfax County from 1870 to 1872. The population rapidly declined in the middle 1870's, and in 1880 there were fewer than 400 people in the town. There are now only a few families there, and most of the early buildings have disappeared. The name of the town was a tribute to the daughter of John Moore, one of the men present at the founding.

The presence of coal in the area now known as the Raton coal basin was recognized at least as early as 1870, and probably for some time prior to that. Since the presence of coal has never had the stimulative effect of gold in causing "boom" influxes of population, this knowledge did not excite any immediate "coal rush". As early as 1880, the Atchison, Topeka, and Santa Fe Railway Company operated a coal mine in Dillon Canyon. This company expanded its mining to include Blossburg by 1882. The Raton Coal and Coke Company succeeded to these coal rights upon its formation in 1891, having at that time, or shortly after, 10,000 acres of lands underlain by coal. By 1899, the mines were already the largest in the State, and they have held this position nearly continuously since that time. John B. Dawson operated a small mine on his ranch, and sold it to the Dawson Fuel Company (also known as



the New Mexico Fuel Company) before 1888. The report of the territorial governor for 1899 lists several small mines near Raton and in the present Yankee and Sugarite districts.

The St. Louis, Rocky Mountain, and Pacific Company opened its mines at Sugarite in 1912, and operated them for several years. Some time after 1922 they were closed because of labor difficulties and difficult mining conditions. The Sugarite seam contains some unmined coal on this company's lands and a larger amount on lands of the Cherokee and Pittsburgh Coal and Mining Company, which lands formerly belonged to the Yankee Fuel Company. This company was organized and began operations in 1906. In 1912 a dispute over water rights with the city of Raton arose, and a compromise was affected which caused the sale of the coal lands to the Atchison, Topeka, and Santa Fe Railway Company, of which the Cherokee and Pittsburgh Coal and Mining Company is a subsidiary.

In 1899 the Standard Graphite Company of New York started a small mine in Cottonwood Canyon, where there is a seam of graphite 3 feet thick. It is believed that this mine was closed because of difficulty in refining the natural graphite.

## UTE CREEK DISTRICT

This district lies to the east of Baldy Mountain, in the valley of Ute Creek and on a high ridge to the south known as Black Horse Mountain. The district includes the Aztec, Rebel Chief, Montezuma, and Bull of the Woods mines, the Black Horse group, and other less important claims.

### AZTEC MINE

The Aztec mine, the original lode discovery and the largest producer in the district, is situated on the north side of the Ute Creek Valley. It was discovered in 1868 by Mathew Lynch; for years the ownership was in dispute and litigation. It was acquired by the Aztec Gold Mining and Milling Company in 1895, and in 1910 became the property of the Maxwell Land Grant Company, the present owners. The latter company began operations in 1912 and worked the mine intermittently until 1940, when it was closed down.

In the first three years of operation the Aztec mine is estimated by Graton (1910) to have produced gold to the value of \$1,000,000; the value of production from discovery to 1926 is estimated at \$3,500,000. Figures are not available for more recent years.

The ore of the Aztec mine is thought to have been derived from a monzonite porphyry sill that lies 30 to 50 feet below the Pierre-Raton contact. Mineralizing solutions from this igneous body probably rose along the Aztec fault, which strikes about N. 40° W. and dips 20°-45° NE., and along minor faults of similar strike and dip.

Early production was entirely from a quartzitic sandstone at the base of the Raton Formation, where ore was found in quartz veins parallel to the bedding and in vertical fissures. Ore was then discovered along the contact between

the sandstone and the underlying Pierre Shale; this contact strikes N. 66° W. and dips 45°-60° NE. Ultimately large ore bodies were found in the shale. These were known as "shale ore" and occurred chiefly in the No. 4 workings. The minerals at the Aztec mine include quartz, calcite, pyrite, chalcopyrite, galena, and pyrrhotite.

Small amounts of coal are found in the basal Raton sandstone in the upper Aztec workings. When this coal is burned, the ash assays 8 cents per ton in gold. In close association with the ore in the older workings is a seam of graphite, lying within the shale near the contact. It is evidently the result of metamorphic action on a thin bed of coal.

The first workings were the Aztec shaft and the Corcoran and Blacksmith tunnels, in sandstone. Openings made later by the Maxwell Land Grant Company include the Aztec Nos. 1, 2, 3, and 4 tunnels, all of which were begun at or near the Aztec fault. Tunnels No. 1 and 4 are in dark shale of the Pierre Formation, and Nos. 2 and 3 in Raton sandstone. . . .

Mining was by open-stope methods. Some stulls and props were used, and a few square sets were placed in the No. 4 workings. Raises and shafts were timbered. Little water was encountered.

The early stamp mills used amalgamation plates for catching the gold. Wilfley tables were added about 1911. In 1925 the stamps were replaced by a 50-ton mill, in which Wilfley tables, crushers, ball mills, jigs, and amalgamation tables were used. Capacity of the mill was enlarged to 100 tons in 1933 and to 140 tons the next year, when flotation cells were added. Water for mill operations was obtained from Ute Creek, and from the Thelma mine some distance below the Aztec on the opposite side of the creek. A tramway carried ore to the mill.

Mining costs between 1912 and 1920 ranged from \$10 to \$15 per ton; the cost of mine and mill operations, including haulage and taxes, in 1939-40 was \$5 per ton. Costs today would be nearer the old than the new figures. In the later operations about one ton of waste was mined for every six tons of ore.

After the mine was closed, in September 1940, the mill was torn down and sold during World War II. The property has remained idle, and most of the workings are caved.

The history of the Aztec mine was troubled by a succession of inept or incompetent managers, and by the necessity of doing a large amount of dead work in order to maintain a supply of ore for the mill. The total known ore supply was rarely more than enough for 90 days' operation, and was frequently at the edge of exhaustion. Nearly all energies were directed toward extraction and few to development and prospecting.

There is reason to believe that additional ore supplies remain in the area of the Aztec mine. Much ore was left in the mine; when stopes became difficult to hold, they were abandoned. No evidence has been found to show a pinching out of the ore with depth. Although the Aztec ore bodies pinch out to the south, they might be found to continue to the north beyond a fault which now limits the mine workings. The amount of ore that might be within

the faults themselves has not been satisfactorily determined. Geological conditions similar to those at the Aztec mine exist over much of Baldy Mountain, and there remains the chance that like ore bodies have been overlooked.

#### REBEL CHIEF MINE

This mine is situated on a group of claims that lie about halfway up the north slope of Black Horse Mountain, across Ute Creek Valley from the Aztec mine. The mine, which is owned by the Maxwell Land Grant Company, was closed in 1939.

The main quartz vein is 6 to 24 inches wide and occurs along the base of a monzonite sill that intrudes the Pierre Shale. There are several smaller veins in the same zone. A nearly vertical vein cuts both shale and sill.

Twelve tunnels were driven to the ore bodies. Mining was by overhand stoping from the tunnels, with stull support. When the quartz veins were encountered, stoping upward began immediately. Stripping of waste, followed by removal of the vein, was the usual procedure. Little horizontal exploration was done. The ore was shipped directly or was milled with stamps. Sulfide ore was not mined, as it is not amenable to treatment.

It is reported that much high-grade ore remains in the mine. According to C. T. Griswold (personal communication), the main vein on a drift off the lowest tunnel was from 6 to 12 inches wide and assayed 5 ounces of gold per ton for a distance of 45 feet. Average values from the Rebel Chief mine were about \$50 per ton; some carloads returned as much as \$74 per ton (figured at the old price of gold).

#### MONTEZUMA MINE

The Montezuma mine is situated on Black Horse Mountain approximately opposite the Aztec mine. . . . The discovery, originally known as the Big Jacko lode, was made in 1858 by Thomas Martin and others. About \$300,000 was taken from the mine in its early days. From 1932 to 1939 it was operated by I. E. Pippert, and for a few months thereafter by the Maxwell Land Grant Company, the present owners. The mine is now idle.

Gold at the Montezuma mine occurs in pyrite that is finely disseminated in a quartz vein. The vein, which is vertical and 3 to 6 feet wide, cuts small sills and dark siliceous shale. The ore was mined by overhead open stopes that closely followed the shoots. There are twelve tunnels, of which only four have been worked recently. Early values averaged about \$40 per ton; more recent values, about half this amount.

#### BULL OF THE WOODS MINE

The lode of this mine lies just west of the Montezuma property and is an extension of the Montezuma lode. Only the eastern part has been worked, for a production valued at approximately \$150,000. The mine is owned by the Maxwell Land Grant Company.

#### BLACK HORSE GROUP

The Black Horse group consists of three claims that extend in a northwest direction along the top of Black Horse

Mountain. Each claim is 1,500 feet long. The two end claims are 600 feet wide and the middle claim is 900 feet wide. The Paragon claim adjoins the group on the northwest.

Two quartz veins, about 90 feet apart and 2 to 4 feet wide, are found in a monzonite dike that extends the length of the claims. Values have been as high as \$100 per ton, but have averaged about \$10. It was estimated by Graton (1910) that the Black Horse group has produced about \$27,000 in gold, and the Paragon claim about the same amount.

### PONIL DISTRICT

This district lies north and northeast of Baldy Mountain. It includes the valleys of South Ponil and Placer Creeks, and intervening ridges and spurs known as French Henry Mountain and North Baldy Ridge.

#### FRENCH HENRY MINE

The French Henry mine is located on the north side of South Ponil Creek, on French Henry Mountain. The discovery was made in 1869 by Henry Berdeaux. The mine has changed hands a number of times; from 1935 to 1938 it was worked first by C. H. Anderson and later by the French Henry Mining Company, and was finally bought for taxes by the present owner, Henry Ashbaugh.

Numerous faults cut the Pierre and Raton Formations and associated dikes. Ore occurs in the Yellow Dog, French Henry, and Black Joe fault zones and along the Pierre-Raton contact. Values were especially high in a ferruginous fault gouge.

Mining was first done from shafts and later from drifts. Stoping followed the ore directly up from the drifts. Many of the old workings show considerable areas stoped out but are dry and still stand open without support. The Jack tunnel, near the bottom of the slope, is wet and has caved a short distance from its mouth.

In 1936 a 50-ton stamp and amalgamation mill was built. It started operations on \$80 ore, but the supply was small and the ore value soon dropped to \$7.50 per ton. Two years later a larger mill was erected, but again insufficient good ore forced the operators to use material assaying only \$0.35 to \$1.50 per ton. This mill was shut down after less than two months' operation; some ore was found that assayed \$7 to \$10 per ton, but in insufficient amounts. Small pockets in fault gouge had in the past yielded as much as \$455 per ton (at the new price of gold), and numerous small deposits had assayed \$35 to \$175.

#### SMUGGLER MINE

At this mine, which is located near the French Henry mine, ore was found in a nearly horizontal fault plane that in part lies along the Pierre-Raton contact. Small step faults offset the main fault; they are probably pre-mineral in age and may have acted as channels for the ore-bearing solutions. The ore zone was 4 to 8 inches wide, and the ore contained much pyrite and some chalcocite. It was

mined by stoping, in a manner similar to long-wall coal mining. Values ran about \$180 per ton.

#### YELLOW DOG GROUP

This group of claims is adjacent to the Smuggler mine. It contains flat-lying veins similar to that of the Smuggler, and a steeply dipping vein like the main French Henry vein. The Black Joe claim, just south of the French Henry mine, contains a vein of pyritiferous iron oxide 2 to 4 feet wide that assayed \$50 to \$100 per ton. Attempted amalgamation of this ore was unsuccessful.

#### NORTH BALDY RIDGE GROUP

The Harry Bluff, Mary L., and parallel claims are situated on North Baldy Ridge. Small ore bodies have formed where the Pierre shale has been intruded by monzonite dikes and sills. Selected hematite ore has yielded \$292 per ton. The Harry Bluff and Mary L., claims are owned by the estate of Wallace Lyons.

#### HARRY LYONS GROUP

This group of claims lies on the next ridge east of North Baldy Ridge, across the deep canyon of Placer Creek. Veins 4 feet or more in width lie at angles of 60 to 70 degrees against a small dike. Although assays ran from \$50 to \$200 per ton, and one claim showed some values in copper, zinc, and silver, all the ores are non-free-milling and the property has long been idle. There are about 1,500 feet of workings, but they are now caved and inaccessible. Ownership is by the Maxwell Land Grant Company.

#### LOIS CLAIM

The Lois claim is situated about one mile northwest of the Harry Lyons group, and is the farthest north of the properties in the Baldy Mountain area. It was opened in the early 1930's and is thus the most recent discovery in the district. It was operated under lease from the Maxwell Land Grant Company. Workings are now caved, but the ore bodies appear to have been parallel to a sill in shale. A few small rich pockets were reportedly found. Pieces of pyrite and iron-stained shale from the sump and adit assayed less than \$4 in gold (at present price) and \$2 in silver per ton.

#### PONIL MINE

The Ponil mine, now a part of the Aztec workings, was started from the South Ponil Creek side of Aztec Ridge and for a time was operated as a separate mine. According to Matt Gorman, mine superintendent from 1932 to 1938, ore bodies were found along the Pierre-Raton contact, and also in vertical fissures that cut shale and intruded sills of porphyry. In these fissures the ore was associated with quartz. Ore was trucked to the Aztec mill, a distance of about 1½ miles, at a cost of 9 cents per ton.

About 400 feet north of the Ponil opening, the Maxwell Land Grant Company drove a 3,300-foot tunnel toward the northwest. This was called the H tunnel and was driven in the hope of intersecting the Aztec and Lyons faults and finding lode copper ore of the type that had

produced the rich float in Copper Park near the headwaters of South Ponil Creek. V. J. van Lint, present manager of the Maxwell Land Grant Company, believes that the Lyons fault had been cut through and the Aztec fault nearly reached when work was discontinued. The source of the copper ore was not found. At 1,200 feet from the mouth of the tunnel the Pierre-Raton contact was reached and a small stringer of ore assaying \$18 per ton was found. Insufficient work was done to show the extent and quality of this ore body.

#### COPPER PARK PROSPECTS

On the southwest side of Copper Park, along upper South Ponil Creek, are several small copper prospects. Fault planes in a highly altered monzonite were found to be impregnated with cuprite, malachite, chalcopyrite, azurite, and limonite. Samples assayed 11.73 percent Cu, 0.445 percent Pb, and 1.28 percent Zn; no values in gold or silver were found.

### WILLOW CREEK DISTRICT

This district lies southeast of Baldy Mountain, in the drainage area of Willow Creek. It is bounded on the east and north by high ridges extending outward from Baldy Mountain, and on the west by the divide that separates Willow Creek drainage from Anniseta Gulch and other westward-flowing tributaries of the Moreno River.

The district has never been a rich producer of lode gold, but contains creek bottoms that have yielded large placer production. Cretaceous shales crop out in the district; they are cut by dikes that radiate from Baldy Mountain and have metamorphosed and mineralized the shales.

#### LEGAL TENDER MINE

The Legal Tender mine, reportedly the first to be developed in the district, lies on the east side of Willow Creek. The ore body is 1 to 3 feet in width, lies at a contact between monzonite and baked shale, and assays \$20 or more per ton. It dips 80 degrees to the east. Silver and lead minerals were noted in the vein material. Another quartz vein, in porphyry, strikes N. 10° E. and dips 60°-90° W. Production from the Legal Tender mine has amounted to at least \$25,000. The claim is owned by Emma Lou Matkin.

#### AJAX MINE

The Ajax claim lies southeast of the Legal Tender claim, on the opposite side of Willow Creek. It was located in the 1890's and was worked fairly constantly until just before World War II.

The ore is a dark heavy, finely granular rock that is a highly contact-metamorphosed shale adjacent to a body of porphyry. The principal ore zone trends north. The minerals present are typical of contact-metamorphic deposits and include pyrite, garnet, epidote, scheelite, hornblende, magnetite, hematite, and scapolite. Gold in recently extracted ore averaged one ounce per ton; it is not visible in the ore, but is thought to be disseminated in the magnetite and possibly in the pyrite. Frequent assays have



guided the mining. Considerable high-grade ore has been found in small pockets.

A washing and jigging plant below the mine is equipped to handle a large tonnage of ore per day. The plant has also been used to wash placer material from the creek bottom.

#### MYSTIC MINE

The Mystic claim is situated at the top of Baldy Mountain and extends into the Ponil and Ute Creek districts. The mine workings are in the part of the claim lying in the Willow Creek district. The Mystic is the only mine in the Baldy Mountain area that was worked solely for copper. It has been worked intermittently for years, the most recent operations being in 1937 and 1938. The copper occurs chiefly as oxides, in veins with iron oxide and along fractures in the shale. Cuprite, malachite, chrysocolla, and molybdenite have been reported. . . .

The Mystic mine was an extremely difficult property to work, owing to difficulty of access, low temperatures, and large amounts of water in the workings. Heavy snows make the mine inaccessible for 5 to 7 months of the year. Mine waters frequently remain frozen throughout the summer.

The veins were followed into the mountain along drifts, from which some stoping was done. There are three tunnels on the property, the lowest of which is about 400 feet below the summit of Baldy Mountain. The tunnels are nearly completely caved. Freezing of the water made the raises hard to maintain; they tended to cave or to become choked with ice.

Ore was hand picked and was packed down on burros to the rail terminus, now dismantled, at Ute Park. From there it was shipped to Pueblo, Colorado. The total of 1,000 tons, ranging from 20 to 25 percent copper, was probably shipped in this manner. One carload is reported to have run 42 percent. Values of samples gathered from the Mystic dumps ranged as follows: Au, 0.04-0.18 oz.; Ag, 0.09-0.14 oz.; and Cu, 20.54-25.67 percent.

The amount of ore remaining in the Mystic mine is unknown. Although the ore bodies are reported to have ended toward the center of the peak, they have never been adequately explored. Should additional deposits be found, a road could be constructed up Willow Creek. The property is owned by F. E. Wilkerson.

#### MONARCH NO. 2 CLAIM

Just south of the Mystic claim is the Monarch No. 2 claim, on which an open cut has exposed a 2-foot vein of iron ore. This vein is thought to be an extension of the Iron Mountain veins. Samples cut by the writer assayed 0.04 oz. Au, 0.14 oz. Ag, 39.16 percent Fe, and 33.00 percent  $\text{SiO}_2$ . The claim is owned by the Maxwell Land Grant Company.

### MORENO DISTRICT

The Moreno is the largest district in the Baldy Mountain area. It lies on the west slope of the mountain, in and

between Anniseta, Grouse, Humbug, Little Nigger, Big Nigger, and Pine Gulches. These are west-flowing tributaries of the Moreno River.

#### RED BANDANNA GROUP

Claims included in this group are the Red Bandanna, Empire, Moreno, Centennial, Galena, and American Flag. The group lies in Grouse Gulch. The claims have been worked intermittently from discovery in the 1880's until just before World War II.

Ore on the Red Bandanna claim is found as stringers in a large porphyry dike. There is a 130-foot shaft on the property, and a long tunnel that was driven nearly parallel with the vein for most of its length. A large stoped area above the tunnel is now caved. Assays ran as high as \$140 per ton, but the average value of mined ore was only about \$7. The Moreno and Centennial claims are located on a similar vein, the same or a parallel dike, about 900 feet south of the Red Bandanna claim. On the Moreno claim a shaft was sunk to a depth of 130 feet, on a shale-porphyry contact. Gold values up to \$135 per ton were found in hematite, and several thousand dollars' worth was produced.

The Galena and American Flag claims extend across the bottom of Grouse Gulch. On the Galena, a nearly vertical vein 4 to 6 inches wide is enclosed in a porphyry dike. A shaft was sunk to a depth of 65 feet, and a 50-foot drift from the bottom of the shaft had been completed when a flood in Grouse Gulch filled the workings with debris. An attempt to reach the vein from a higher level was unsuccessful, and no further work was done. Assays averaged \$300 to \$400 per ton, with highs of \$2,000. The Galena and American Flag claims contain a small stringer of galena, one of the few reported occurrences of unoxidized lead ore in the Baldy Mountain area.

The Red Bandanna mill is a complete cyaniding plant with a daily capacity of 25 to 50 tons. With additional crushing and grinding equipment it could attain a capacity of 100 tons daily. The mill ran for a time on Red Bandanna ore, and, when this proved too low in grade, on ore trucked in from Iron Mountain. The mill was shut down about 1941.

The Red Bandanna, Empire, Moreno, and Centennial claims, and the Red Bandanna mill, are owned by Merco, Incorporated, and the Galena and American Flag claims by Emma Lou Matkin.

#### CHESTER CLAIM

The Chester Claim lies high on the ridge that separates the headwaters of Big Nigger Gulch from those of Pine Gulch. The claim contains several hundred feet of drifts and stopes, but these are now inaccessible. A stamp mill is still standing.

Ore, which occurred along the Pierre-Raton contact, is reported to have been of high grade; but it was apparently exhausted at an early date, as the mine has not been worked since 1881. The ore body may be cut off by a fault seen by the writer on the surface above the workings.

Specimens from the dump assayed 0.09 oz. Au and 0.17 oz. Ag per ton.

#### GOLDEN ERA GROUP

The Golden Era group lies north of the Chester claim, at the head of Pine Gulch. It includes the War Eagle, Golden Era, Fairfax, Twinn, and City View claims. A small quantity of very high-grade ore was produced; it was packed over Baldy Mountain to the Black Horse arrastra. The workings are now caved, and samples could not be cut because of the condition of the openings. Pieces from the Twinn dump contained traces of gold and silver; pieces from the War Eagle dump showed no values. Tungsten-bearing material from the Twinn claim probably included the minerals wolframite and ferberite. The Golden Era group is owned by the heirs of Joseph Lowery, who was associated with early development of the property.

#### IRON MOUNTAIN PROSPECT

Iron Mountain is situated in the south part of the Moreno district, at the head of Mexican and Anniseta Gulches. Limy Cretaceous beds, 5 to 7 feet thick, have been replaced by a mixture of magnetite and specular hematite. Some exploration for iron ore has been done, but production is limited to gold that occurs in small quantities with the iron oxide. The ore mined for gold was of two types—soft ore, presumably limonite, and hard ore, probably magnetite and hematite. The soft ore averaged \$27 per ton in gold and occasionally assayed as high as \$140. The hard ore yielded only \$5 or less per ton. Value of the ore produced at Iron Mountain for the Red

Bandanna mill averaged \$7 per ton. About 500 tons of soft and hard ore was produced.

#### OTHER CLAIMS

Many other claims in the Moreno district have been developed to varying extents. Numerous high-grade pockets of ore were found, but they proved of small extent. The Tomboy and Mountain Queen claims carried such pockets, and on the Mattie Bell claim some stringers reportedly assayed \$400 per ton.

#### DEEP TUNNEL

This prospect tunnel was driven completely through Baldy Mountain, from Big Nigger Gulch in the Moreno district to the upper end of Copper Park in the Ponil district. The work was done by the Deep Tunnel Gold and Copper Mining Company, which received from the Maxwell Land Grant Company a concession to the mineral rights on 277 acres providing the tunnel was holed through. After numerous difficulties and reorganizations the tunnel was completed and title to the mineral interests received. The owning company is now Merco, Incorporated. The tunnel failed to find any ore, although some molybdenite was discovered near the west portal and some copper near the east portal. A mill built to handle the expected ore supply has been dismantled.

#### REFERENCE CITED

Graton, L. C., 1910, Colfax County, in Lindgren, Waldemar, Graton, L. C., and Gordon, C. H., The ore deposits of New Mexico: U.S. Geol. Survey Prof. Paper 68, p. 91-108.