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MINERAL RESOURCES OF LINCOLN COUNTY

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The history of mining in Lincoln County dates back as far as 1865 when gold placers were discovered in Dry Gulch near Nogal. Significant mining was carried on from 1880 to 1906, with $4 million worth of gold, coal, iron, silver, copper, and lead produced. Mining since 1906 has produced only $1.4 million, mainly from magnetite-hematite ores. Figure 1 is a mining district map of the County.

Lincoln County, however, has received new attention by exploration companies in the last few years. Interest has been centered on the iron deposits, on occurrences of molybdenum on Nogal and Sierra Blanca peaks, on silver veins along Bonito Creek, and coal in the Mesaverde Formation along the rims of the Sierra Blanca basinal structure. No new discoveries have been announced thus far.

IRON

There are about 24 known deposits of magnetite-hematite ore in Lincoln County, extending from the Gallinas Mountains in the north to the Capitan Mountains in the south. The deposits are all of the pyrometasomatic type, and are associated with the contacts of Early Tertiary stocks and dikes. The deposits have been described by Kelley (1949), Soulé (1947, 1949), Sheridan (1947), and Griswold (1959). The iron-ore reserves of Lincoln County have been estimated to contain 3,000,000 tons of 45-55 per cent grade (Kelley, 1949). The bulk of this is in one deposit—the Capitan, located about five miles north of the community of Capitan. This deposit is interesting because of the ore control exerted by a collapse structure in the San Andres Formation on the south flank of the Capitan Mountains alaskite intrusion.

Typically, the iron deposits of Lincoln County are within a few hundred feet of the igneous-sedimentary contact. With the exception of the Capitan deposit, the ore bodies are small, being in the less-than-100,000-ton class. The most favorable sediments for replacement are limestone beds of the San Andres and Yeso formations. The primary ore minerals are magnetite and some hematite. Most deposits have been subjected to oxidation, forming irregular masses of hematite-limonite within the original magnetite-rich zones. This conversion has yielded some deposits unsuitable for magnetic concentration.

GOLD

The most famous mining camp in central New Mexico is White Oaks, on the southern slopes of Lone Mountain about ten miles north-northeast of Carrizozo. The mines are about a mile west of the nearly deserted village of White Oaks. The mining heyday for White Oaks was from 1879 to 1904; the gold production during that period amounted to 143,000 ounces valued at $2,860,000. Although periodic attempts have been made to revive the district, little mining has been done since 1934.

The writer has made a cursory examination of the mines (Griswold, 1959), but the geology of the district is largely unmapped. Lone Mountain consists of monzonite intruded into Paleozoic and Mesozoic sedimentary rocks. The mines are in an area where the Mesaverde Formation and Mancos Shale are much invaded by wide north- and northeast-trending dikes of monzonite and mica trap rock. Zones of intense brecciation of the Cretaceous sediments are present. The Cretaceous is everywhere, much altered by the igneous intrusions. Tertiary agglomerate and tuff are reported on the upper ridges of the area (Smith and Budding, 1959). In spite of the complicated structural setting, the gold veins themselves are simple. For the most part, they are in steeply dipping north-striking fractures seldom more than a few inches wide. The gold occurs free as thin plates, wire, and tiny blebs accompanied by iron and manganese oxides, minor amounts of quartz, and gypsum. Frequently the pay zone is composed of several parallel veinlets. Where the veins cut the monzonite, little wall rock alteration is evident. The three most productive mines were deep: Old Abe, 1,500 feet; North Homestake, 1,400 feet; and South Homestake, 660 feet. Little water was found in any of the mines, and oxidation extends to the bottom levels. Judging from the stoped areas of the deep mines, the ore shoots were several times more persistent downward than along strike.

Three other somewhat isolated mines have produced lode gold in Lincoln County: Vera Cruz, located just north of U.S. 380 approximately ten miles east of Carrizozo; Helen Rae-American, three miles southwest of Nogal; and Parsons, in Tanbark Canyon, a side canyon off Bonito Creek, three miles west of Bonito Lake. The Vera Cruz and Parsons mines are in highly altered breccia pipes, whereas the Helen Rae-American is a north-striking fissure vein. The Helen Rae-American had the most productive history, including the small placer gold deposits in Dry Gulch below the vein outcrop.

The Jicarilla Mountains east of Ancho have yielded some placer gold. The placer deposits are restricted to narrow gullies and arroyos that drain the core of the mountain group which is underlain by monzonite porphyry. A few lode mines were worked in the area, but most of the gold came from the placers. Certain arroyos are reported to contain as much as $3.00 per cubic yard in gold, but the almost complete absence of water in the district has prevented large-scale mining.

COAL

The Sierra Blanca coal field is estimated to contain 1,644 million tons of bituminous coal (Read and others, 1950). Of this immense reserve, only a fraction can be

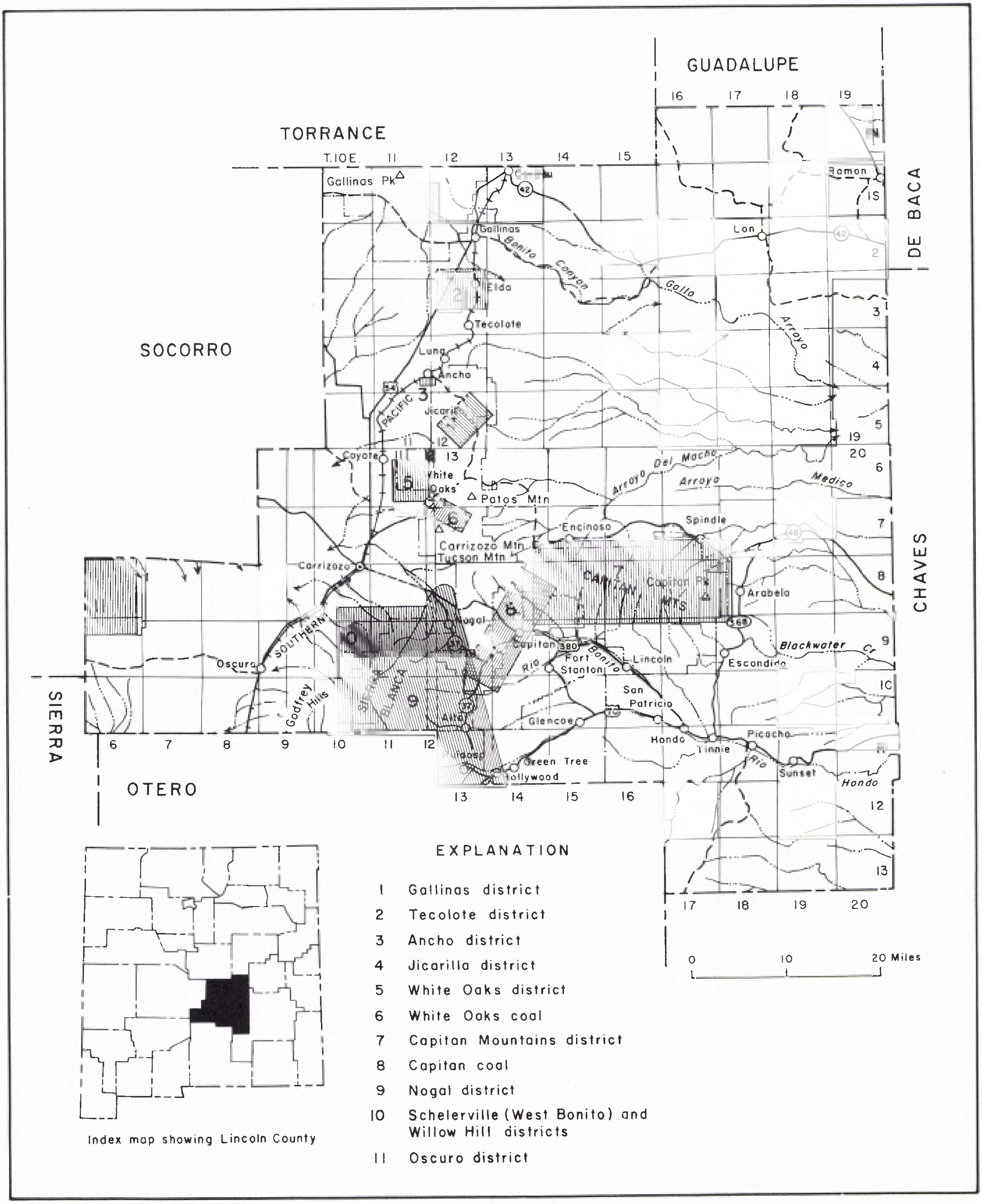

Figure 1. — Map of mining districts in Lincoln County, New Mexico.

considered exploitable because of depth of burial, structure, and thinness of the coal beds. Coal occurs at several horizons in the Mesaverde Formation but thicknesses exceeding 30 inches are rare. Coal mining has been conducted in two principal areas: near Capitan and just east of White Oaks. The total past production from Lincoln County is about 600,000 tons.

In recent years, the Sierra Blanca field has been examined as a possible source for providing low-cost fuel for steam electric power. Such a use would demand a large reserve of easily strippable coal. Thus far, searches for a large reserve have not been successful because of the complicated structure in the White Oaks and Capitan areas and the extreme depths in other parts of the field.

MOLYBDENUM

Molybdenite was accidentally discovered during the early period of gold-silver prospecting in Nogal and Bonito creeks in the Sierra Blanca. The presence of molybdenite did not cause concern to the early miners and was soon forgotten. In 1957, the Climax Molybdenum Co. (now American Metals Climax, Inc) drilled four diamond drill holes on a molybdenite prospect, known as the Rialto, on the east slope of Nogal Peak. Results of this drilling were discouraging and no further work was done. During the summer of 1963, interest rose again in the area when a large copper company staked many claims over a new molybdenite discovery on the northern slopes of Sierra Blanca Peak, about four miles south of the Rialto prospect. As of this writing, another mining company is reported ready to re-examine the Rialto deposit.

The Rialto deposit is contained within a syenodiorite stock that invaded early Tertiary basaltic andesite (Griswold and Missaghi, 1964). The stock is roughly circular in outcrop shape and has an average diameter of one mile. The surrounding volcanic rocks are bleached and pyritized as much as 1,000 feet outward from the stock contact. Hydrothermal alteration associated with the deposition of molybdenite is evident in the southern part of the stock. The molybdenite occurs both as true disseminations and as flakes in quartz-pyrite veinlets. Minor amounts of chalcopyrite accompanied the deposition of molybdenite. The meager amount of exploratory work done thus far on the deposit prevents an accurate estimate of the ore tonnage or grade. An interesting feature of the area is that the old Parsons gold mine is located on the south end of the stock. This mine worked low-grade gold ore contained within an intensely altered breccia pipe. Geochemical sampling by the writer (Griswold and Missaghi, 1964) has revealed anomalous amounts of molybdenum in the breccia.

LEAD-ZINC-COPPER-SILVER-GOLD

The Sierra Blanca contains numerous complex ore veins. The primary ore minerals are galena, sphalerite, chalcopyrite, argentite, and auriferous pyrite. The oxidized parts of the veins contain locally rich silver ore shoots of native and halide silver. The East Utah Mining Company is now actively exploring several such veins along upper Bonito Creek. The veins are simple fissure structures, frequently related to pre-ore andesite and latite porphyry dikes that cut the basaltic andesite volcanics. Although these veins are in the same vicinity as the previously discussed molybdenite occurrences, there is no direct genetic relationship.

FLUORSPAR-BASTNAESITE

The Gallinas Mountains west of Corona contain numerous but small fluorspar deposits. Some deposits carry as much as one per cent bastnaesite, a rare-earth carbonate mineral. Kelley (1949) and Kelley and others (1946) described the geology of the area, and Rothrock and others (1946) described the individual deposits. The core of the Gallinas Mountains is Tertiary syenite and monzonite that have intruded Abo, Yeso, and Glorieta formations. The intrusions occur mostly as sills, laccoliths, and dikes. The fluorspar and bastnaesite deposits are related to both pipe-shaped breccia zones and fault zones. The breccia type probably accounts for the largest tonnage of fluorspar-bastnaesite reserves. The breccias are composed of fragments of Permian sediments that have been much altered and partly replaced by fluorspar, barite, calcite, and quartz. The bastnaesite occurs as tiny, brownish yellow tabular crystals, and because of the similarity to both brownish calcite and barite crystals, the mineral is difficult to recognize in the field. Galena, sphalerite, bornite, chalcocite, and pyrite are present in some deposits.

The mineral assemblage of the deposits is suggestive of a carbonatite, but because the deposits are located in a carbonate-rich host, it is difficult to establish just how much carbonate was introduced during mineralization.

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