Cimarron Canyon State Park and Colin Neblett Wildlife Area

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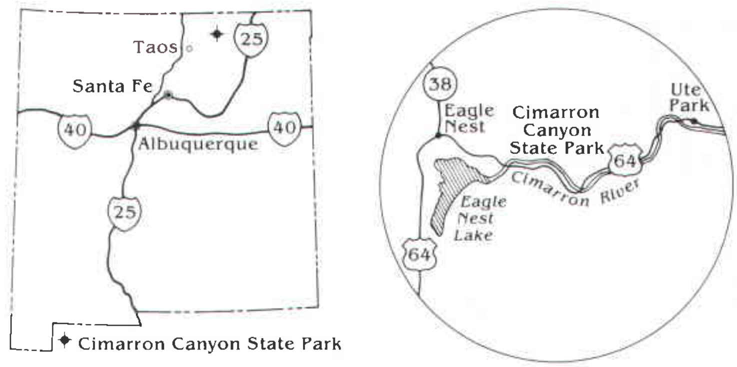
Cimarron is Spanish for wild and untamed and originally was used in New Mexico to refer to the wild bighorn sheep, and later to the wild horses and cattle that once roamed throughout the north-central mountains (Pearce, 1965). Today, the sparsely populated Cimarron country in western Colfax County (Fig. 1) can still be described as wild and untamed with its rugged, timbered mountains (the Cimarron Range), towering cliffs, and the previously unpredictable Cimarron River. The Cimarron River has been tamed somewhat by the Eagle Nest Dam, which controls flooding in the canyon.

Cimarron Canyon State Park extends along Cimarron Canyon from Eagle Nest Lake to Ute Park and along US–64 (Fig. 1). It is part of Colin Neblett Wildlife Area, which consists of 33,116 acres of the central Cimarron Range of the southern Rocky Mountains. The wildlife area is bordered by the Philmont Boy Scout Ranch on the east and Eagle Nest Lake on the west. The state park is managed jointly by the State Park and Recreation Division and the New Mexico Department of Game and Fish; the latter administers the wildlife area. The elevation ranges from 7,400 ft along the river to 12,045 ft at Touch–Me–Not Mountain. Seasonal hunting is allowed in the wildlife area.



Activities in the park include trout fishing (brown and rainbow; Fig. 2), hiking (Fig. 3), picnicking, camping, rock climbing, and winter ice skating and ice fishing. Some of the tent sites along the river are reached by short hiking trails. Local wildlife includes deer, elk, bear, antelope, turkey, chipmunk, squirrel, beaver, coyote, red fox, porcupine, raccoon, bobcat, mountain lion, and a few

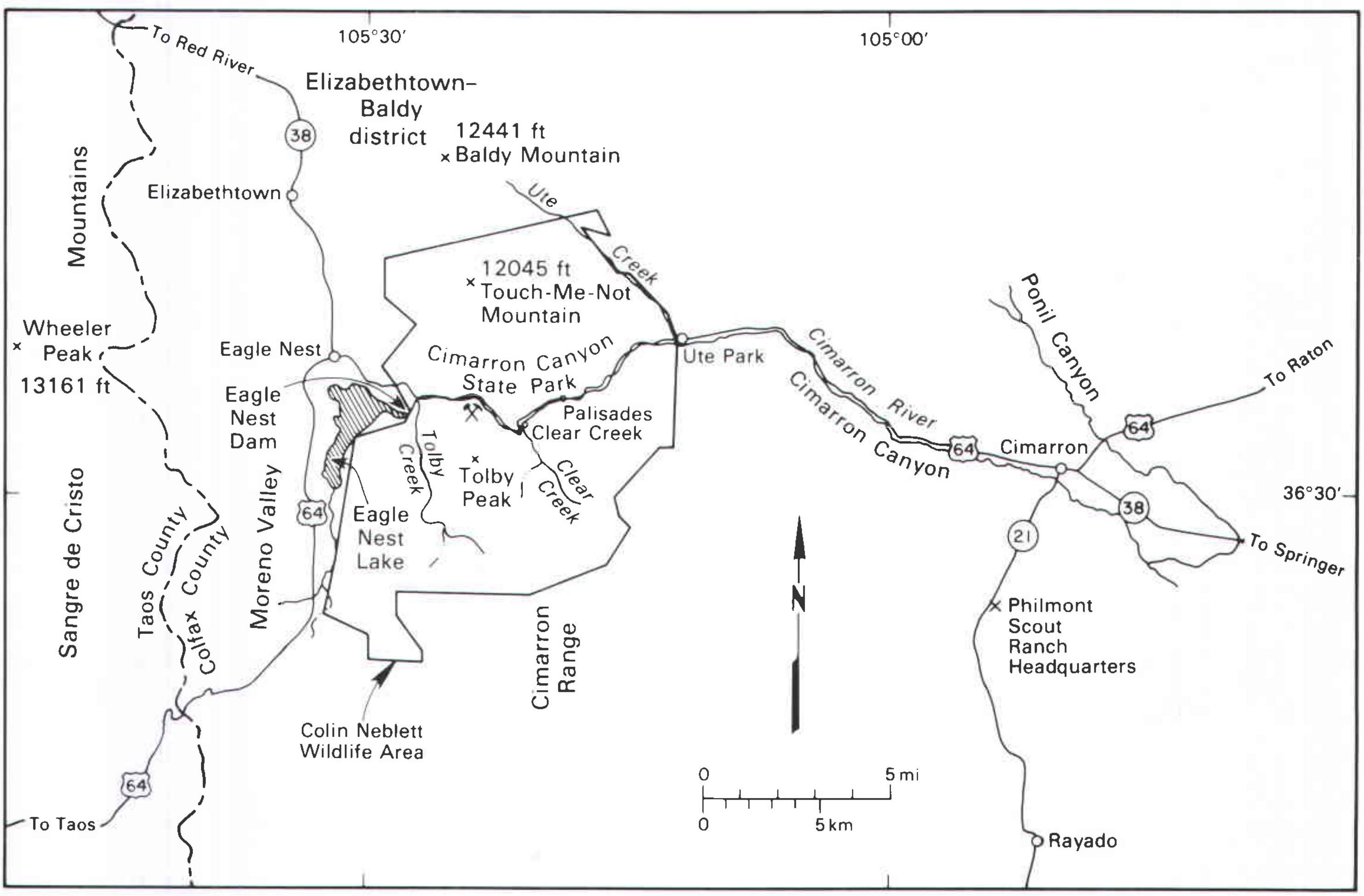


FIGURE 1—Geographic and cultural features of the Cimarron country.

bighorn sheep. Golden and bald eagles and other birds may be seen in the area. Cimarron Canyon State Park is the only New Mexico state park where the camping and day-use fees are waived as long as one member of the group owns a valid New Mexico hunting or fishing license. Fees from license sales are used to help support the state park and wildlife area. Facilities in the state park include several campground and picnic areas, RV facilities, restrooms, and drinking water.

History

Cimarron Canyon has long been a major route through the mountains that separate the Moreno Valley–Taos area from the eastern plains. Nomads came to the area hunting mammoths, whose bones have been found on the Philmont Ranch (Murphy, 1972). The Ponil people lived in the Cimarron country around 1000 AD but had left the area by 1400 (Murphy, 1972). By 1700, the Jicarilla Apache, Moache Ute, and sometimes the Comanche Indians hunted and traveled through the area. At times, the Plains Indians, Apache, Ute, Navajo, and Pueblo Indians would gather near Cimarron for trading and feasting (Keleher, 1984). Early Spanish explorers may have used Cimarron Canyon to reach the eastern plains. The proximity of the Santa Fe trail brought mountain men, including Lucien Maxwell and Kit Carson, into the area to trap and hunt during the early 1800's. In 1867, miners from Elizabethtown improved the Cimarron Canyon Road so that stagecoach lines could run from Cimarron westward to Elizabethtown. Clear Creek, near the center of the state park, was once a stopping place to water horses (Pearson, 1961). The St. Louis, Rocky Mountain, and Pacific Railroad was built from Cimarron to Ute Park, but was never extended to the head of Cimarron Canyon. In the 1940's, Cimarron Canyon Road was paved and became US–64. Shortly thereafter, electric lines were installed through the canyon to the village of Eagle Nest. Today, tourists, truckers, and other motorists travel through Cimarron Canyon between Taos–Red River and Raton–Springer.

Cimarron Canyon State Park and Colin Neblett Wildlife Area were once part of the Maxwell Land Grant. The grant was established in 1841 as the Beaubien and Miranda Grant by the Mexican government to Guadalupe Miranda and Charles Hipolite Troter de Beaubien, but it was not confirmed by the U.S. Government until 1887. Lucien B. Maxwell inherited part of the land grant and purchased the rest. He also added additional acreage until by 1866 the Maxwell Land Grant consisted of about 1.75 million acres, making it one of the largest blocks of privately owned land in the United States (Pearson, 1961; Keleher, 1984).

Lucien Bonaparte Maxwell was a major influence in shaping the future of the Cimarron country. He was born on September 14, 1818 in Kaskaskia, Illinois only a few weeks after Illinois became a state (Murphy, 1983). His grandfather, Pierre Menard, was the first lieutenant governor of Illinois. However, Maxwell did not care for life in the east and thought only of going west. He first traveled to St. Louis before arriving in New Mexico in the mid 1800's. He hunted and trapped and was employed as a hunter for John C. Fremont's 1842 expedition to explore the western United States. Maxwell returned to Taos and married Charles Beaubien's eldest daughter, Luz. Until his death at Ft. Sumner in 1875, Lucien Maxwell was a rancher, farmer, Indian agent, U.S. Postmaster, miner, banker, and entrepreneur. He financed timbering operations, sawmills, the Big Ditch project that brought much needed water from Red River to the mining camps at Elizabethtown, horse racing, the First National Bank of Santa Fe, and numerous other ventures. Although some of his investments were financially disastrous, Maxwell eventually became one of the wealthiest men in the southwestern United States.

A reservation for Apache and Ute Indians had been located originally near Taos, but in 1862 the U.S. Government decided to move the Indians to a more remote area. Maxwell leased to the government 1,280 acres of land in Ponil Canyon northwest of Cimarron where a schoolroom, cookhouse, council chamber, and residence for the Indian agent were built (Murphy, 1972; Keleher, 1984). This reservation was abandoned in 1876 for financial reasons and the Indians were moved to other reservations.

In 1866, gold was discovered on Baldy Mountain north of Cimarron Canyon (Fig. 1). By 1867, the gold rush was on as miners and prospectors headed into the mountains to make their fortunes. Maxwell owned all of the land in the area and collected fees, staked claims, and even financed several mining ventures. Elizabethtown became the principal town in the area and, with a population of more than 7,000 in 1868, the largest town in New Mexico (Pettit, 1946). Cimarron Canyon Road was the major route between Elizabethtown and Raton and carried a large amount of traffic. Robberies and other violence were common. In January 1869, Colfax County was formed and Elizabethtown became the county seat until 1872. In February 1870, Elizabethtown became the first incorporated town in New Mexico. However, mining soon declined and by 1880 fewer than

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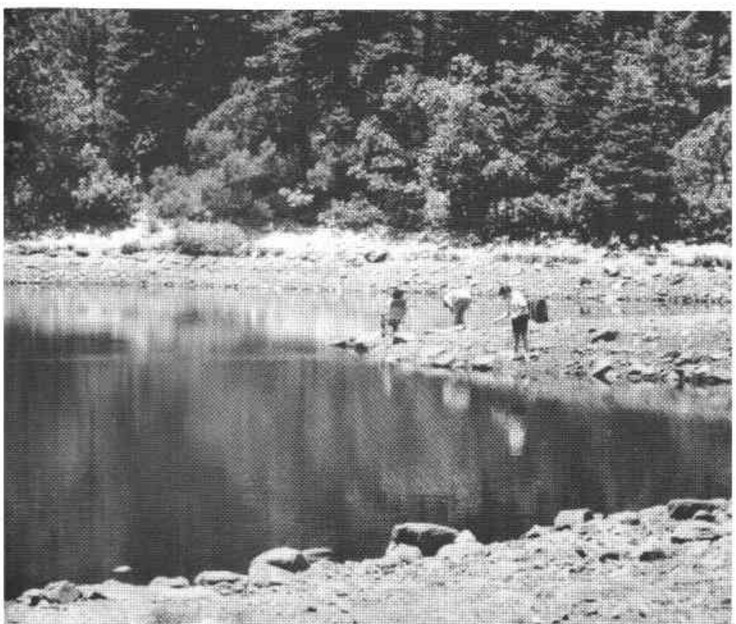


FIGURE 2—Fishing at Gravel Pit Lakes. These lakes are also used for ice skating and ice fishing in the winter.

FIGURE 3—Cimarron River.

400 people lived in Elizabethtown. Today, Elizabethtown, just west of NM–38, is one of New Mexico's most famous ghost towns. During the 1860's and 1870's the Elizabethtown–Baldy area was one of New Mexico's largest gold-producing districts. Prior to 1900 more than $3.7 million worth of gold was produced from placers and more than $2.2 million worth of gold came from lode deposits (Pettit, 1946; Lindgren et al., 1910). Total value of production between 1866 and 1952 is estimated at $10 million, predominantly from gold with some silver, copper, and lead production.

In 1870, Maxwell sold the land grant to an English syndicate which organized the Maxwell Land Grant and Railway Company (often called The Company). Problems immediately began as anti-grant sentiment increased when the new owners started to evict squatters, including the miners at Elizabethtown. Confrontations turned violent, and the Colfax County war began. Confusing evidence and conflicting court decisions over how much land the Maxwell Land Grant originally contained compounded the problems. In September 1875, Reverend Thomas J. Tolby, a Methodist minister who denounced the violence on both sides, was murdered. Tolby Creek and Tolby Peak (Fig. 1) are named for him. Tempers raged and more deaths followed. It wasn't until 1887 that a Supreme Court decision in favor of The Company resolved these problems and ended the war between The Company and the settlers on the land grant. These settlers were forced to either buy their land from The Company or move elsewhere.

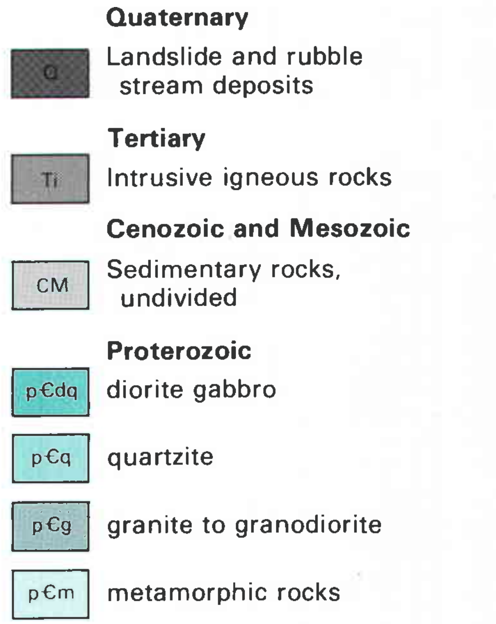
Despite the vast timber, minerals, and other natural resources of the land grant, The Company could not make a profit. Different groups of investors gained control, but none profited. In 1916, The Company, then controlled by a group of Dutch investors, allowed the Springer brothers to build a dam at the head of Cimarron Canyon. The dam was completed in 1918 and Eagle Nest Lake was formed. By 1922, summer cottages and a hotel had been built on the north shore of the lake (now the town of Eagle Nest) and people were vacationing and fishing there (Pearson, 1961). In 1929, the Dutch investors began to sell portions of the land grant.

In December 1922, Waite Phillips, a Tulsa oil man, purchased a tract of land that he called the Philmont Ranch. In 1938, Phillips donated more than 35,000 acres of his ranch to the Boy Scouts of America. Then in 1941 he donated an additional 91,538 acres to the scouts for a gift totaling more than 127,000 acres (Zimmer, 1990). Today thousands of Boy Scouts and Explorer Scouts enjoy the backcountry of Philmont. The homes of Lucien Maxwell and Kit Carson at Rayado, south of Cimarron, have been restored and serve as museums. Furthermore, Philmont serves as a buffer zone protecting the wilderness qualities of the wildlife area.

In the 1930's, The Company realized the estate's natural beauty and sought to protect the Cimarron Canyon area from logging, hunting, and real estate development. They hoped to sell the Cimarron Canyon tract to the state or federal government for a game preserve. Finally, in 1949 the New Mexico Fish and Game Department purchased the 33,116 acre Cimarron Canyon tract for $374,532 (New Mexico Department of Game and Fish, Annual Report, July 1, 1987 to June 30, 1988, p. 77).

The wildlife area was known initially as the Cimarron Canyon Wildlife Area; the name was changed later to honor Colin Neblett. Neblett was a Santa Fe judge, sportsman, and conservationist who helped form the State Game and Fish Commission, which advises the Game and Fish Department. Neblett served on the commission in 1936 (Young, 1984).

In 1979, the area along the Cimarron River was transferred to the State Park and Recreation Division to form Cimarron Canyon State Park. Campgrounds and other facilities were built and maintained. In 1988, about 200,000 people utilized the park facilities and thousands of others passed through on US–64.



Geology

Cimarron Canyon exposes nearly two billion years of complex geologic history. The canyon separates the older Proterozoic rocks to the south from younger Tertiary rocks to the north (Fig. 4). The oldest rocks in the area are Proterozoic metamorphic and igneous rocks.

Two distinct terranes are separated by the Fowler Pass fault (Wobus, 1989). The rocks on the northeast side of the fault include felsic metamorphic rocks, phyllite, schist, and metasiltstone that have been intruded by Proterozoic stocks of gabbro to diorite to granodiorite and granite (p€dq, p€q, p€g, Fig. 4). Dark outcrops of the gabbro (p€dq, Fig. 4) crop out west of the Palisades (Wobus, 1989). The rocks on the southwest side of the fault include quartzite, amphibolite, and granite. These were once sedimentary or igneous rocks that were heated and squeezed under tremendous pressure deep within the earth's crust (metamorphosed) forming the lineation and banding characteristic of many of them. They consist predominantly of quartz, feldspar, hornblende, and minor amounts of biotite and epidote. The granite southwest of Fowler Pass fault has been dated as Middle Proterozoic, about 1.4 to 1.5 billion years old (Brookins and Leyenberger, 1981; Leyenberger, 1983). The metamorphic rocks are only slightly older, geologically speaking, between 1.6 and 1.9 billion years.

Only remnants of the thick sequence of sedimentary rocks (CM, Fig. 4) that were deposited from Pennsylvanian (320 million years ago) through early Tertiary (57 million years ago) are exposed in the wildlife area because Tertiary sills (Ti, Fig. 4) have intruded and disrupted the sequence. However, geologists can still speculate on the geologic history during the Pennsylvanian through early Tertiary Periods by studying more complete rock sequences elsewhere along the eastern slopes of the southern Rocky Mountains (Robinson et al., 1964; Smith and Ray, 1943).

Red and gray conglomerate, sandstone, shale, and gray limestone belonging to the Sangre de Cristo Formation (Pennsylvanian–Permian, about 320–245 million years ago) were deposited unconformably on top of the Proterozoic rocks. The younger rocks were deposited by streams and rivers. The red color comes from oxidation of magnetite grains that forms a thin coating of red hematite or limonite on the individual mineral grains within the rock.

The Chinle Formation, part of the Dockum Group (Triassic, about 245–208 million years ago), unconformably overlies the Sangre de Cristo Formation and consists of red, brown, tan, and green shale, siltstone, and fine-grained sandstone. These rocks were also deposited by streams and rivers. The finer grain size of the sediments in the Chinle Formation compared to those in the Sangre de Cristo Formation suggests that the source of the younger sediments was farther away than the source of the Sangre de Cristo sediments.

The beginning of the Jurassic Period (about 208 million years ago) marks a time of change to a drier, more arid climate with the deposition of the Entrada Sandstone, a light-gray, massive sandstone. The crossbedding and rounded, frosted quartz grains are similar to those found in sand dunes typical of many modern deserts; this suggests to geologists that the sandstone was formed by similar dunes millions of years ago. The Jurassic Morrison Formation unconformably overlies the Entrada Sandstone and consists of red, gray, and brown shale, sandstone, siltstone, and thin gray limestone. This unit was deposited by streams and rivers.

During the Cretaceous Period (about 125–66 million years ago), shallow seas covered much of New Mexico. The Dakota Sandstone consists of red, gray, and brown sandstone

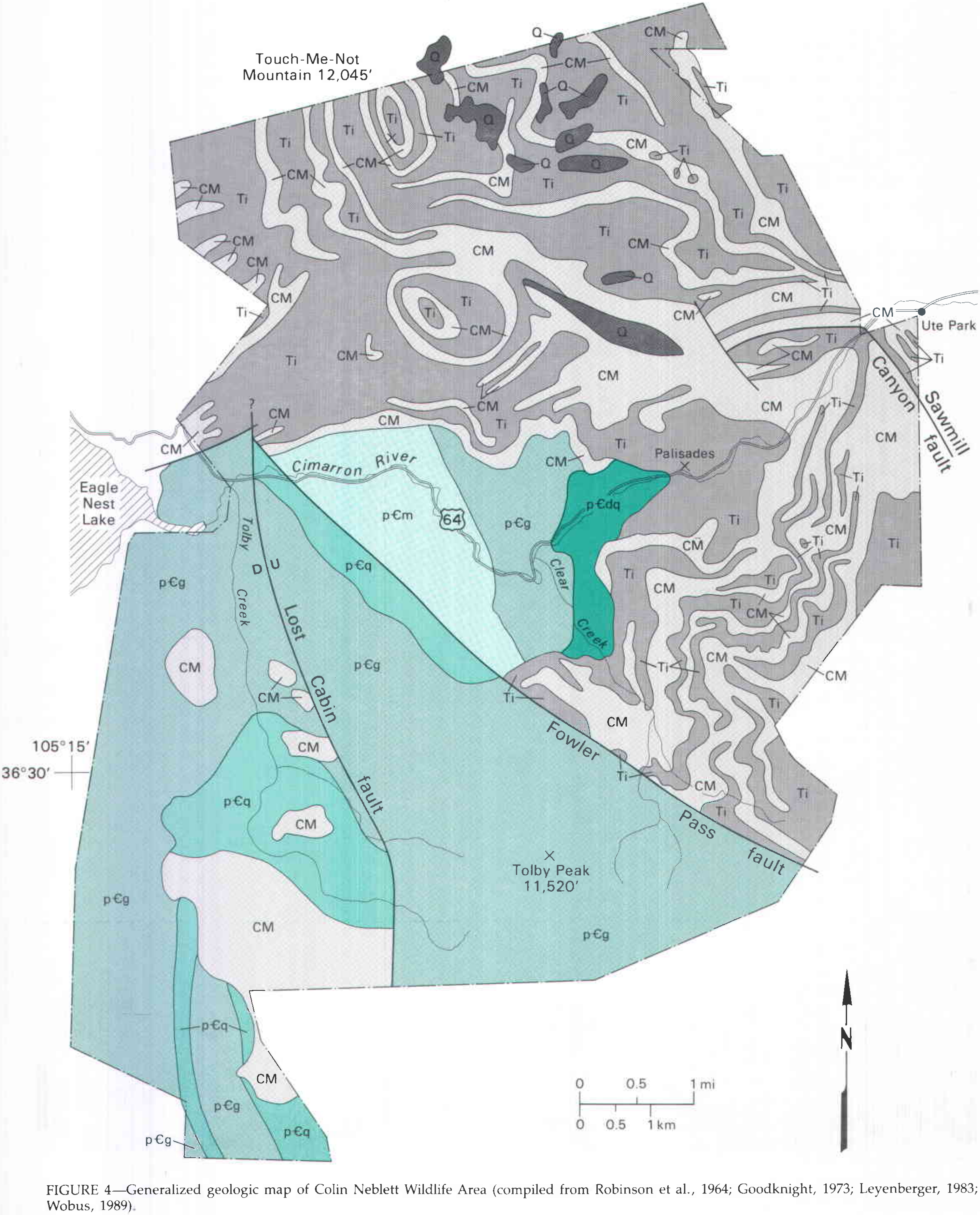


FIGURE 4—Generalized geologic map of Colin Neblett Wildlife Area (compiled from Robinson et al., 1964; Goodknight, 1973; Leyenberger, 1983; Wobus, 1989).

with thin interbeds of shale that were deposited in a shallow marine beach setting. The black shales and gray limestones overlying the Dakota Sandstone belong, in ascending order, to the Graneros Shale, Greenhorn Limestone, Carlile Shale, Niobrara Formation, and Pierre Shale. The rocks were deposited as mud at the bottom of the sea so marine plant and animal fossils are sometimes found in them. Eventually the seas receded, leaving a continental coastal and alluvial plain (McLemore, 1990), but these rocks are not exposed in Cimarron Canyon.

After deposition of most of the sedimentary rocks, the Cimarron Range along with most of the Southern Rocky Mountains were uplifted during the Laramide, the period of mountain building and magmatic activity that occurred about 75–40 million years ago. Igneous sills and dikes (Ti, Fig. 4) were probably intruded into the sedimentary rocks at this time. Fowler Pass, Sawmill Canyon, and other faults were formed during this mountain uplift (Goodknight, 1976).

The Palisades in the eastern part of Cimarron Canyon State Park are one of the most spectacular geologic features in northern New Mexico (Fig. 5). These cliffs were formed by a light-gray, fine-grained Tertiary sill (Ti, Fig. 4) that intruded the Cenozoic and Mesozoic sedimentary rocks (CM, Fig. 4) and Proterozoic metamorphic rocks (p€m, Fig. 4). This sill was dated by K/Ar methods as 34.7 million years old by Armstrong (1969); however, more recent studies indicate the sill is as young as 26 million years (Mutschler et al., 1987; Kish et al., 1990).

Geologists sometimes have difficulty naming fine-grained or aphanitic igneous rocks because the minerals that compose the matrix are not easily identifiable. The Tertiary sill that forms the Palisades and Touch–Me–Not Mountain consists of phenocrysts of plagioclase, biotite, hornblende, and quartz surrounded by a fine-grained, gray matrix. This texture is called porphyritic and the rock name includes the word porphyry. Based on mineralogy and chemical composition, the Palisades consist of biotite-diorite porphyry (Armstrong, 1969). Other geologists have called the rock type of the Palisades a monzonite porphyry (Lindgren et al., 1910), quartz monzonite porphyry (Smith and Ray, 1943), dacite porphyry (Robinson et al., 1964; Cannon, 1976), a granodiorite porphyry (Goodknight, 1973), or a transition from trachydacite to dacite (Kish et al., 1990). Although these terms describe the rock properly according to its composition (de la Roche et al., 1980), some terms are inconsistent with its texture. Therefore, the term porphyritic dacite seems the best description of these sills.

The porphyritic texture is produced by the magma crystallizing in stages at shallow depths. The first stage cooled slowly so that the phenocrysts were formed. The cooling then speeded up producing the fine-grained matrix. During this second stage, the melt partially attacked and remelted the phenocrysts, thereby rounding them (Robinson et al., 1964). The long columns and Palisade towers were shaped from joints formed during crystallization and cooling followed by uneven weathering. Water seeped into the cooling joints and fractures, froze and expanded in winter to enlarge the opening, then thawed. This sequence occurred over and over again for thousands of years. Sometimes the fractures were enlarged so much that eventually rocks fell. Remnants of some rock falls are found in the Cimarron River and at the rest stop at the Palisades.

The Cimarron Range was uplifted slowly throughout the middle and late Tertiary. Streams formed at the crest of the mountains and water slowly began to erode and carry away sand and rock material from the crest. Even today, the rivers and streams are slowly eroding the mountains; boulders and smaller rocks from the higher ridges and peaks are found in the streams and accumulate in wide spots in the canyons, such as Gravel Pit Lakes in Cimarron Canyon (Fig. 2).

The Cimarron River is the only water course that has cut through the Cimarron Range (Robinson et al., 1964) because it has had more water with which to erode and cut through the mountains. The other streams in the Cimarron Range drain small areas at the crest of the mountains whereas the Cimarron River drains the entire Moreno Valley (Fig. 1), a large lowland area separating the Cimarron Range and the Sangre de Cristo Mountains.

The Cimarron River was able to capture the waters from the Moreno Valley as the result of a set of special circumstances (Robinson et al., 1964). Ellis (1935) suggested that the Moreno Valley was occupied by a huge glacier during the Tertiary; however, Ray (1940) and Smith and Ray (1943) could find no evidence to support the presence of a glacier. The Moreno Valley formed as the Cimarron Range and Sangre de Cristo Mountains were uplifted. Streams from both mountain ranges flowed into the valley and then southward toward the eastern plains. Near the end of the Tertiary, the southern end of the valley was blocked by lava flows. Trapped streams became sluggish and began to fill the closed basin. Swamps and lakes developed and the valley slowly filled with sediment. Eventually, streams breached the Cimarron Range at a low spot along the eastern hills and the present course of the Cimarron River was set.

High on Touch–Me–Not Mountain and other mountains in Cimarron country, one can find areas of bare, unvegetated rock surfaces, typically called talus slopes (Q, Fig. 4). These talus deposits were formed after the mountains were uplifted. The same sequence of weathering caused by water action that contributed to formation of the Palisades eventually caused the rock to break into

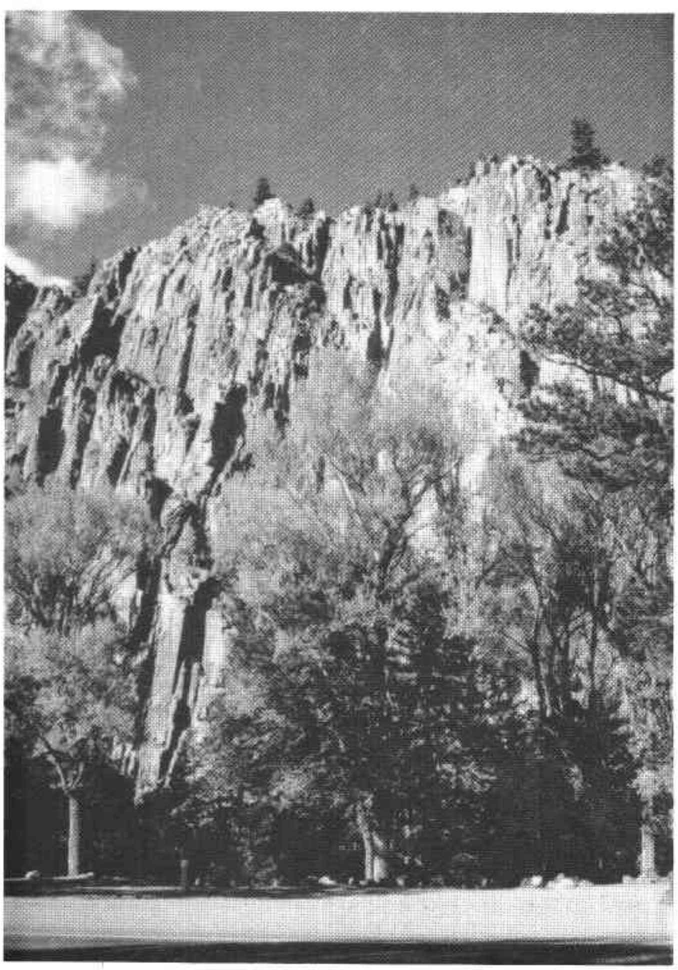


FIGURE 5—The Palisades consist of predominantly porphyritic dacite to trachydacite porphyry and are nearly 350 ft tall.

angular boulders. These boulders do not move far unless they are on a steep slope. There they will move slowly downhill forming a long talus slope of broken rubble (Robinson et al., 1964).

There are a few mineral prospects located in Cimarron Canyon State Park and Colin Neblett Wildlife Area, but the history of them is unknown. They were probably developed in the late 1800's as part of the mining boom at Elizabethtown. The largest, the Horseshoe mine along US–64 (⚒, Fig. 1), consists of a short adit or tunnel dug into the hillside along quartz veins in Proterozoic metamorphic rocks. Pyrite, probably containing traces of gold, and malachite are found in dump samples. Other small prospects are scattered throughout the area (Leyenberger, 1983; Goodknight, 1973), but none of them ever produced economic quantities of ore. The area is protected from mineral exploration and development and has not been evaluated for its mineral resources.

Summary

Cimarron Canyon State Park and Colin Neblett Wildlife Area are popular attractions in north-central New Mexico because of the diverse recreational activities, spectacular scenery, and abundance of wildlife. Cimarron Canyon, formed by complex geologic processes, has served as a major travel route since prehistoric times, and today it is a major thoroughfare connecting Taos and Red River to the west with Raton and Springer on the high plains to the east. One of the more spectacular geologic attractions, the Palisades, is found in Cimarron Canyon State Park where many thousands of people admire the towering cliffs and rock formations each year.

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References

Armstrong, R. L., 1969, K—Ar dating of laccolithic centers of the Colorado Plateau and vicinity: Geological Society of America, Bulletin, v. 80, pp. 2081–2086.

Brookins, D. G., and Leyenberger, T. L., 1981, Rb–Sr isochron ages of two Precambrian igneous rock units, Colfax County, New Mexico: Isochron/West, no. 32, pp. 21–24.

Cannon, R. P., 1976, Petrology and geochemistry of the Palisades sill, New Mexico: M.S. thesis, University of North Carolina; New Mexico Bureau of Mines and Mineral Resources, Open-file Report 81, 90 pp.

de la Roche, H., Leterrier, J., Grandclaude, P., and Marchal, M., 1980, A classification of volcanic and plutonic rocks using R_1R_2-diagram and major element analyses—its relationship with current nomenclature: Chemical Geology, v. 29, pp. 183–210.

Ellis, R. W., 1935, Glaciation in New Mexico: University of New Mexico Bulletin 276, Geol. Ser., v. 5, pp. 1–31.

Goodknight, C. S., 1973, Structure and stratigraphy of the central Cimarron Range, Colfax County, New Mexico: Unpublished M.S. thesis, University of New Mexico, Albuquerque, 84 pp.

Goodknight, C. S., 1976, Cenozoic structural geology of the central Cimarron Range, New Mexico: New Mexico Geological Society, Guidebook to the 27th field conference, pp. 137–140.

Keleher, W. A., 1984, Maxwell Land Grant, A New Mexico item: University of New Mexico Press, Albuquerque, 166 pp.

Kish, S. A., Ragland, P. C., and Cannon, R. P., 1990, Petrochemistry of the Cimarron pluton, northern New Mexico: New Mexico Geological Society, Guidebook to 41st Field Conference, in press.

Leyenberger, T. L., 1983, Precambrian geology of Cimarron Canyon, Colfax County, New Mexico: Unpublished M.S. thesis, University of New Mexico, 93 pp.

Lindgren, L., Graton, L. C., and Gordon, C. H., 1910, The ore deposits of New Mexico: U.S. Geological Survey, Professional Paper 68, 361 pp.

McLemore, V. T., 1990, Sugarite State Park: New Mexico Geology, v. 12, no. 3, pp. 38–42.

Murphy, L. R., 1972, Philmont, a history of New Mexico's Cimarron Country: University of New Mexico Press, Albuquerque, 261 pp.

Murphy, L. R., 1983, Lucien Bonaparte Maxwell, Napoleon of the Southwest: University of Oklahoma Press, Norman, 275 pp.

Mutschler, F. E., Larson, E. E., and Bruce, R. M., 1987, Laramide and younger magmatism in Colorado—new petrologic and tectonic variations on old themes; *in* Drexler, J. W., and Larson, E. E. (eds.), Cenozoic volcanism in the southern Rocky Mountains updated: A tribute to Rudy C. Epis—Part I: Colorado School of Mines Quarterly, v. 82, pp. 1–64.

Pearce, T. M., 1965, New Mexico place names, a geographical dictionary: University of New Mexico Press, Albuquerque, 187 pp.

Pearson, J. B., 1961, The Maxwell Land Grant: University of Oklahoma Press, Norman, 305 pp.

Pettit, R. F., Jr., 1946, Mineral resources of Colfax County, New Mexico: New Mexico Bureau of Mines and Mineral Resources, Open-file Report 15, 50 pp.

Ray, L. L., 1940, Glacial chronology of the southern Rocky Mountains: Geological Society of America, Bulletin, v. 51, pp. 1851–1917.

Robinson, G. D., Wanek, A. A., Hays, W. H., and McCallum, M. E., 1964, Philmont country, the rocks and landscape of a famous New Mexico ranch: U.S. Geological Survey, Professional Paper 505, 152 pp.

Smith, J. F., Jr., and Ray, L. L., 1943, Geology of the Cimarron Range, New Mexico: Geological Society of America, Bulletin, v. 54, pp. 891–924.

Wobus, R. A., 1989, Proterozoic supracrustal rocks and plutons of the Cimarron Canyon area, north-central New Mexico; *in* Grambling, J. A., and Tewksbury, B. J. (eds.), Proterozoic geology of the southern Rocky Mountains: Geological Society of America, Special Paper 235, pp. 111–118.

Young, J. V., 1984, The state parks of New Mexico: Albuquerque, University of New Mexico Press, 160 pp.

Zimmer, S., 1990, A ranch for Boy Scouts: Waite Phillips and Philmont: New Mexico Geological Society, Guidebook to 41st field conference, in press.

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(Continued from page 64)

Goldfield Corporation, 1989b, Annual report, Form 10–K, for the fiscal year ended 31 December 1988: Goldfield Corporation, Melbourne, Florida, 43 pp.

Goldfield Corporation, 1989c, News (letter), 2 March 1989: Goldfield Corporation, Melbourne, Florida, 3 pp.

Greeley, M. N., and Eveleth, R. W., 1988, The mineral industry of New Mexico: preprint from New Mexico chapter, Minerals Yearbook (1989), U.S. Department of Interior, U.S. Bureau of Mines, Washington, D.C., 11 pp.

IMC, 1988, First annual report, for the fiscal year ended June 30: IMC Fertilizer Group, Inc., Northbrook, Illinois, 36 pp.

Industrial Minerals, 1988a, Mineral Notes: Metal Bulletin Journals Ltd., London, no. 249.

Industrial Minerals, 1988b, Prices: Metal Bulletin Journals Ltd., London, no. 255.

Industrial Minerals, 1988c, World of minerals: Metal Bulletin Journals Ltd., London, no. 255.

McLemore, V. T., and Chenoweth, W. L., 1989, Uranium resources in New Mexico: New Mexico Bureau of Mines and Mineral Resources, Resource Map 18, 36 pp. text.

Metals Week, 1988a, Copper: McGraw–Hill Inc., New York, v. 59, no. 9.

Metals Week, 1988b, Ferroalloys: McGraw–Hill, Inc., New York, v. 59, no. 11.

Metals Week, 1988c, Ferroalloys: McGraw–Hill, Inc., New York, v. 59, no. 19.

Metals Week, 1988d, Ferroalloys: McGraw–Hill, Inc., New York, v. 59, no. 42.

Metals Week, 1988e, Ferroalloys: McGraw–Hill, Inc., New York, v. 59, no. 48.

Metals Week, 1988f, Metals Week daily prices, major metals: McGraw–Hill, Inc., New York, v. 59, no. 52.

Metals Week, 1988g, Metals Week daily prices, precious metals: McGraw–Hill, Inc., New York, v. 59, nos. 1–52.

Metals Week, 1988h, Ferroalloys: McGraw–Hill, Inc., New York, v. 59, nos. 1–52.

Metals Week, 1988i, Copper: McGraw–Hill, Inc., New York, v. 59, no. 47.

Mining Record, 1988a, Westar pours gold at Lordsburg mine: Mining Record Company, Denver, v. 99, no. 21.

Mining Record, 1988b, Canyon Resources/Phelps Dodge joint venture gold mine: Mining Record Company, Denver, v. 99, no. 23.

Mining Record, 1988c, Canyon Resources—goals and increasing profits: Mining Record Company, Denver, v. 99, no. 48.

Mississippi Chemical, 1988a, Annual report for the fiscal year ended June 30, 1988: Mississippi Chemical, Yazoo City, Mississippi, 32 pp.

Mississippi Chemical, 1988b, Annual report, Form 10–K, for the fiscal year ended June 30, 1988: Mississippi Chemical, Yazoo City, Mississippi, 79 pp.

New Mexico Mining Association, 1988, Public Service [Company] awards contract for New Mexico uranium purchase: New Mexico Miner, v. 50, no. 2, p. 2.

NovaGold Resources Inc., 1988, Amended preliminary prospectus: NovaGold Resources Inc., Nova Scotia, Canada, June 3, 1988, 69 p.

Pay Dirt, 1988a, Trans–Resources makes bankruptcy court deal: Southwestern edition, Bisbee, Arizona, no. 590.

Pay Dirt, 1988b, Chino smelter back on line after three-week turnaround: Southwestern edition, Bisbee, Arizona, no. 591.

Phelps Dodge Corporation, 1989a, Annual report for the fiscal year ending December 31, 1988: Phelps Dodge Corporation, Phoenix, Arizona, 33 pp.

Phelps Dodge Corporation, 1989b, Annual report, Form 10–K, for the year ending December 31, 1988: Phelps Dodge Corporation, Phoenix, Arizona, 68 pp.

Sharon Steel Corporation, 1981, Annual report for the fiscal year 1980: Sharon Steel Corporation, Miami Beach, Florida, 48 pp.

Sharon Steel Corporation, 1984, Annual report for the fiscal year 1983: Sharon Steel Corporation, Miami Beach, Florida.

Silver City Daily Press, May 14, 1988.

U.S. Bureau of Mines, 1968–1987, Minerals Yearbook, Vol. 1, Metals and Minerals, "Sulfur" chapter: U.S. Department of the Interior, Washington, D.C. □