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New Mexico Geology, v. 1, n. 3 pp. 39-40, Print ISSN: 0196-948X, Online ISSN: 2837-6420.  
<https://doi.org/10.58799/NMG-v1n3.39>

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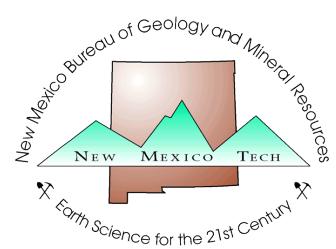
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# Turquoise in New Mexico

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Turquoise deposits are widely distributed in New Mexico in a triangular-shaped region extending from Santa Fe County at the northern apex to Otero, Doña Ana, and Grant Counties in the south. The principal deposits that have been sources of significant production are distributed in four districts: The Cerrillos district near Los Cerrillos in Santa Fe County; the Burro Mountains district in the vicinity of Tyrone, Grant County; the Eureka (Hachita) district near Hachita, Grant County; and the Orogrande (Jarilla) district near Orogrande, Otero County.

Minor occurrences have been recognized in the White Signal and Santa Rita districts in Grant County, the Organ district in Doña Ana County, and the Nogal district in Lincoln County. Other reported occurrences remain unverified; probably the mineral is more widely distributed in minor amounts than has been recognized.

Inasmuch as all known deposits are on patented or unpatented mining claims, and leaseholds on State lands, express permission of the claim owner or lessee must be obtained prior to entering property to collect or prospect for turquoise.

The significance of turquoise to prehistoric inhabitants of the region is evidenced by the ancient workings (with associated primitive mining tools) that led to the rediscovery of major deposits in the late 1800's. Although the beginnings of this industry are obscure, archeological evidence extends to circa 200 B.C. During the interval of approximately 900 to 1650 A.D., turquoise was intensively exploited, and in the form of beads, pendants, inlay and mosaic work, became a widespread trade commodity throughout the Southwest and Mexico. The recovery of more than 65,000 pieces during excavations at Pueblo Bonito in Chaco Canyon indicates the magnitude of turquoise trade with regions lacking local sources.

## Cerrillos district

Deposits in the Cerrillos district are particularly well known from both archaeological and historical records spanning a period from about 900 A.D. through the Spanish Colonial and American occupations of the region. In terms of historic significance and production, Cerrillos turquoise is pre-eminent among the deposits of the United States, evidenced by

numerous technical reports dating from 1858.

Major deposits are localized in two separate clusters 3 mi apart, on Mount Chalchihuitl and Turquoise Hill, a few miles north of Los Cerrillos. Extensive prehistoric workings are noteworthy at both localities. Turquoise occurs as narrow veinlets and nodules ranging in color from pale to bright blue through bluish green to dark green set in a matrix of altered monzonite and latite. Brown limonite staining of the matrix is common; occasional inclusions of pyrite in turquoise have been noted.

Modern production by non-Indian miners began in the 1880's, reached a peak during the 1890's, and declined rapidly during the early years of the 20th century, although intermittent production in the district continued at the Blue Bell mine until 1925. Estimates of production values vary widely, reportedly exceeding \$2 million from operations of the American Turquoise Co. The bulk of this production was from the Tiffany (Castilian) mine at Turquoise Hill, reputed to have yielded a higher proportion of high-grade gem material than any other mine in the United States. Some estimates place the total production of the district as high as \$9 million. Renewed interest in the Cerrillos district in the last few years has stimulated exploration for copper and turquoise, but data on any turquoise production are lacking.

## Burro Mountains district

In the Burro Mountains district, turquoise has been recovered from a number of mines and prospects in an area about 6 mi southwest of the new townsite of Tyrone. Turquoise is widely distributed as veinlets and nodules in fractured zones in granite and quartz-monzonite porphyry highly altered to kaolinite and sericite accompanied by secondary silica. The turquoise exhibits a wide range of color in various shades of blue and green, and includes some of the finest gem-quality material found anywhere in the world. Pure nuggets up to 1500 carats have been recovered.

The "original" discovery was made in 1875 by John E. Coleman at the site of prehistoric mine workings. Major mining activity took place from 1890-1910 at several properties, including the Azure, Parker, and Porterfield (Maroney) mines.

The Azure mine was particularly noteworthy for both the quantity and quality of turquoise produced. Mine development extended across a fractured zone 40 to 60 ft wide on four adit levels, with a large open pit later excavated from the second level to the surface. The best turquoise was recovered within 100 ft of the surface, with a remarkable concentration in the "Elizabeth pocket" extending 150 ft along the vein, across a width of up to 40 ft, and over a vertical distance of 40 to 60 ft. Production estimates for this period range from \$2 million to \$4 million for the Azure mine alone, and up to \$5 million for the entire district. The former turquoise-producing properties now are controlled by Phelps Dodge Corporation.

## Eureka district

Turquoise deposits of the Eureka district, on the eastern side of the Little Hatchet Mountains about 6 mi west of Hachita, were rediscovered in 1885 by Sterling Burwell and Con Ryan while exploring ancient diggings for gold they believed had been mined there by Aztecs or early Spaniards. Turquoise mining continued intermittently in the district for the next 25 years. Mines developed during this period included the Azure, Cameo, Galilee, Aztec, and the American Turquoise Company. The turquoise occurred in irregular seams up to one-half inch thick in altered, fractured, and limonite-stained monzonite; also to a lesser extent in andesitic to basaltic volcanic rocks, sandstone and diorite. Clay minerals and jarosite commonly were associated with the turquoise. Fine gem-quality stones were recovered in colors that ranged from pale blue through dark sky blue to greenish blue, the paler varieties tending to be relatively soft. Many stones were finished in attractive yellow and brown iron-stained matrix pieces; cameos were cut from some of the seams in which a tightly bonded brown matrix served as the base for the carving. No production data are available either for past or current operations in the area, but evidently the total yield has been small compared with the Cerrillos and Burro Mountains districts.

## Orogrande district

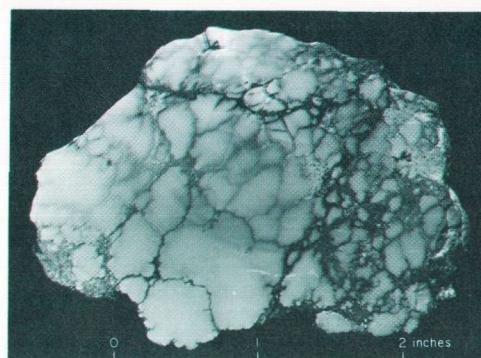
As in the previously described districts, prehistoric workings in the Jarilla Mountains, a few miles north of Orogrande,

provided guideposts to turquoise for early prospectors. Though poorly documented, historic turquoise mining apparently began circa 1891 when 50 kilos of marketable stones were shipped from the district. The turquoise occurred at shallow depths as thin seams along fractures and as reniform, semiglobular, and irregular nodules associated with kaolin, limonite, pyrite, gypsum, and jarosite. Colors ranged from blue to green; some deep-blue stones tending to fade markedly following removal from the mine. Specimens at hand, probably representative of poor-quality material from waste dumps, consist of soft, chalky, pale-blue seams with brown webbing and pale-blue to deep-green, irregular nodules in highly bleached and altered rock of monzonitic aspect. Iron oxide staining is conspicuous; the altered wallrock locally is replaced by secondary silica.

#### Miscellaneous occurrences

Minor amounts of turquoise have been recognized in four other districts that apparently have yielded relatively little or no commercial production. Between 1890 and 1900 at the Chapman turquoise mine in the White Signal district, high-grade turquoise was mined from a shaft and glory hole in kaolinized and sericitized rhyolite. At the Red Hill prospect in the White Signal district, turquoise occurs in narrow veinlets in a wide shattered zone of altered granite. Although most of the turquoise was soft and green, a few nodules of hard, blue stones were recovered. In the Santa Rita district, turquoise has been found in Kennecott Copper Corporation's Chino open-pit copper mine. Two specimens seen by the writer consist of aggregates of small spheroids of turquoise—one is bright blue and contains lesser amounts of quartz, sericite, and sparse pyrite; the other exhibits a fine-textured spiderweb pattern of smaller (1 to 3 mm) bluish-green to dark-green spheroids in a brown to reddish-brown matrix. Small amounts of turquoise were found in kaolinized monzonite in underground workings of the Torpedo mine in the Organ district, near the town of Organ. A specimen in the New Mexico Bureau of Mines and Mineral Resources mineralogical museum, for which the locality is given only as Doña Ana County, may be from the Organ district. This specimen consists of a polished 1- to 2-mm-thick seam of mottled medium-blue and bluish-green turquoise with limonitic matrix inclusions; the seam coats a fracture surface on fine-grained silicified rock. Turquoise occurrences have been reported in the oxidized capping of a brec-

cia pipe at the Parsons mine in the Nogal district a few miles southwest of Nogal, but do not extend into the underground workings.



NEW MEXICO TURQUOISE—NMBM&MR COLLECTION. Courtesy Mark Leo.

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#### Microbiology and mining

(continued from page 36)