Santa Fe River and Hyde Memorial--New Mexico State Park series

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Santa Fe River and Hyde Memorial

Santa Fe River Park stretches along the Santa Fe River in the downtown portion of the nation's oldest capitol. Tree-lined walkways lead to picnic benches, making the winding river area a very pleasant spot.

In the Sangre de Cristo Mountains, Hyde Memorial State Park is often used as a base camp for backpackers venturing into the Santa Fe National Forest. Offering picnicking and camping space with group shelters available by reservation, the park also has a sledding area and skating pond for winter use, playground, general store/ski repair shop and concessionaire-operated restaurant/lodge (no overnight accommodations) available for groups. Santa Fe Ski Basin is nearby.

Although Santa Fe River Park and Hyde Memorial Park are located within 10 mi of each other, their differences are numerous. Santa Fe River Park is a level 5-acre tract in the heart of Santa Fe, at an elevation of approximately 7,000 ft. Hyde Memorial Park is a mountainous 350-acre tract in the southwest Sangre de Cristo Mountains east of Santa Fe. Elevations in the park range from 8,300 to 9,280 ft. These two parks are among the most popular and widely used parks in New Mexico.

Santa Fe River Park

Santa Fe River Park extends along the north bank of the Santa Fe River, between the river channel and East Alameda Street. Although the park is three city blocks in length, it is very narrow, approximately 80 ft at its widest point. The east boundary is Delgado Street; the west, Shelby Street.

Most of the park is a flat, grassy area, but the western part slopes gently toward the river. Numerous cottonwood and evergreen trees lend their beauty and provide welcome shade in the summer. During the tourist season, this park is a serene retreat in the center of Santa Fe for visitors and local residents.

History

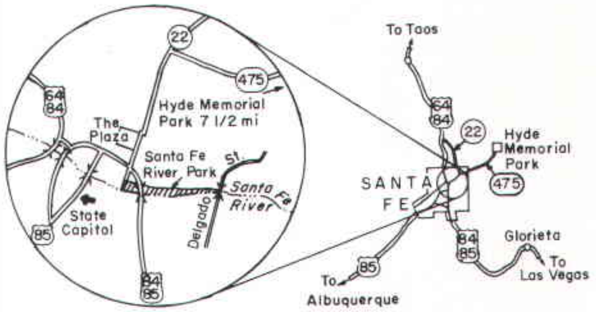
The park was established in 1935 on several adjoining irregularly shaped parcels of land acquired by the State through quitclaim deeds. Little is known of the history of the park area before 1935, except that the old Santa Fe Trail crossed the river at or near the present site of the College Street Bridge.

Facilities

Picnic tables and benches are located throughout the park. If picnickers wish to cook, they should bring a portable stove, as no fireplaces are available. Neither drinking water nor toilet facilities are provided in the park; however, the numerous State government buildings nearby alleviate these inconveniences.

Recreation

Santa Fe River Park is an excellent place for picnicking, strolling, or resting and meditating. Overnight camping is not permitted. Pets are permitted provided they are kept on a leash.



The surrounding area abounds with many points of interest. The state Capitol is approximately ½ mi to the southwest. The plaza and the Palace of the Governors are only three blocks north. The oldest church in Santa Fe, San Miguel Mission, and a building purported to be the oldest house in the United States are along De Vargas Street, one block south. Many other religious and historical sites as well as a great variety of specialty shops combine to make central Santa Fe one of the most interesting urban areas in the country.

Geologic setting

Although the park site has been modified extensively by man, several observations regarding the geology of the area can be made. The park lies on an extensive deposit of alluvium, which is defined as an unconsolidated accumulation of rocks, boulders, sand, and silt that have been transported and deposited by streams, in this case the Santa Fe River. The thick soil cover in the park could have accumulated either naturally or it could have been deposited by man. Regardless of its origin the soil masks the underlying alluvium.

The present channel of the Santa Fe River is confined by retaining walls which prevent the stream from eroding its banks. In addition, rectangular prisms of loose rock covered by wire fencing, have been constructed at the base of the retaining walls. These prisms, called riprap, have been installed to prevent the stream from undercutting the retaining walls. At one point, approximately 100 ft east of the foot bridge at the west end of the park, a riprap barrier has been placed across the stream channel to minimize headward, or upstream, erosion.

Water flow in the Santa Fe River is controlled by a system of four dams and reservoirs upstream from Santa Fe. During most of the year, the river bed at the park is dry. Occasionally, the stream channel will contain a trickle of water released upstream. During the summer months, a violent thunderstorm can suddenly transform the river into a raging torrent.

Although the park lacks natural rock outcrops, interesting exposures of various rock types may be seen in masonry structures in and around the park. Most of the older walls are made of rounded stones picked up in, or very near, the river bed. These rocks are the large pieces of alluvium, and each particular rock type is characteristic of one of the geologic units that occurs in the upstream drainage area.

When suitable local alluvial rocks became scarce, quarried building stone, characterized by square dimensions, was brought into the area. These two contrasting types of materials are well illustrated by comparing the masonry bridge at the west end of the park to the stone wall adjacent to the foot path running along the south side of the river, west of the park.

A few fossils, mainly remains of the shells of oysterlike and clamlike creatures, occur in the orange-colored blocks of limestone at the top of the retaining wall about 100 ft east of Shelby Street. This site is adjacent to the riprap prisms which cross the river channel.

Hyde Memorial Park

Hyde Memorial Park is approximately 8½ mi northeast of central Santa Fe. Most of the 350-acre tract is forested and very hilly. Santa Fe National Forest surrounds and effectively isolates the park from the suburbs of Santa Fe.

Hyde Memorial Park is accessible by a paved road which is open all year. To reach the park from Santa Fe, start at the northeast corner of the plaza, drive north on Washington Road for a distance of about ½ mi, and then turn right (east) onto Artist Road (NM 475). Approximately 8 mi beyond this intersection the road enters the park and follows a valley that practically bisects the park.

The park is heavily forested by a dense stand of evergreens, mostly ponderosa pine. Other types of vegetation include aspen, ferns, scrub oak, and a number of species of shrubs and wild flowers.

Various species of wild life are commonly seen roaming the park and the surrounding national forest. Deer, raccoon, fox, coyote, porcupine, and squirrel are most common. Black bear and wild turkey are occasionally reported.

History

Hyde Memorial Park was established in 1938 on land that had been bequeathed by the widow of Benjamin Talbot Babbit Hyde, a noted educator and naturalist. The property was given to the State on the condition that it would be used for a public park. Hyde Memorial Park was New Mexico's first mountain-forest park.

Facilities

The park is open all year and provides many opportunities for various outdoor activities. The facilities are maintained by a resident State Park Superintendent who lives next to the highway near the entrance to the park.

Numerous camp sites and picnic sites are clustered throughout the park, mainly in the less hilly section near the paved road. Nearly all of these sites are accessible by car. Each includes a table with benches and fireplace. Several tables are protected by *Adirondack shelters*—covered, three-wall, lean-to structures. A modest daily fee is charged for camping. When available, free fire wood is provided by park personnel. Well water, suitable for drinking and cooking, is available, with at least one water tap for each group of campsites. The water lines are disconnected during the winter. Sanitary facilities consist of fiberglass pit toilets.

Two larger picnic shelters, suitable for groups of 75–100 people, are available. Each shelter is equipped with a large barbecue pit, but neither has electricity or running water. Reservations are required for their use and may be made by contacting:

New Mexico State Park and
Recreational Commission
141 East De Vargas Street
Santa Fe, New Mexico 87501
Telephone (505) 827-2726

Two children's playgrounds are located within the park, each with large swing set and metal slide.

Five graded and well-marked hiking trails wind through the more remote sections of the park. Two of them connect with other trails in the Santa Fe National Forest.

During the winter, two sledding trails and a small skating pond are available without charge.

Recreation

This park is an excellent place to picnic and hike. Caution should be exercised, however, as some of the trails are steep and climbing at this altitude requires considerable exertion.

Beautiful scenery, quietness, and excellent facilities combine to make the park ideal for camping. During the summer, many visitors camp in the park and visit Santa Fe during the day. Hardier souls who wish to economize and enjoy skiing could camp in the park during winter and commute to the Santa Fe Ski Basin approximately 7 mi farther up the highway.

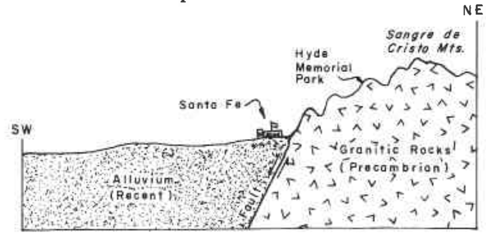
Hyde Memorial Park also can provide a pleasant day of ice skating or sledding with the children, followed by a picnic around a roaring fire.

Geologic setting

The underlying bedrock is largely mantled by a forest soil cover. Nevertheless, exposures of bedrock are not uncommon. Two of the three major rock types have been recognized within the park. One type, igneous rocks, consists of rocks that have formed as a result of the crystallization and hardening of molten rock material. The other type, metamorphic rocks, are those rocks that have undergone structural or mineralogical changes resulting from pressure or heat effects different than those under which the rocks originated.

The park is situated within a large complex of igneous and metamorphic rocks that extends at least 40 mi eastward of the park, 20 mi southward, and northward into Colorado. Surface exposures are truncated by a fault lying between Hyde Memorial Park and Santa Fe. Displacement along this fault is such that Santa Fe has been lowered relative to the park. The igneous-metamorphic complex probably extends west of the fault and lies at considerable depth beneath Santa Fe.

All of the igneous and metamorphic rocks within the complex are of Precambrian age, predating the development of significant life on the earth and encompassing perhaps 85% of the time following the origin of the earth. The lack of fossils in Precambrian rocks precluded accurate dating for many years; however, recent scientific techniques have permitted more accurate dating of geologic units by the analyses of radioactive isotopes. Although radiometric dates are not available for rocks in the park, an age of 1.7 billion yrs has been determined for a similar rock collected near Las Vegas, New Mexico, within the eastern limits of the complex.



Two types of rock have been identified within Hyde Memorial Park. The more abundant is a brownish-pink granitic gneiss. This rock is granular and is characterized by a crude, but prominent, banding resulting from the parallel alignment of mineral grains. Mineralogically, this particular gneiss is very similar to granite. Under a magnifying glass, individual grains of pink orthoclase, milky-white quartz, and buff plagioclase can be seen. Flat, shiny grains of mica are abundant in the rock, and they account for a major part of the banded appearance. Because of their near-metallic luster, mica grains occasionally are mistaken for gold by the inexperienced.

For many years all gneisses were classed as metamorphic rocks. However, within the past few years several geologists have suggested that granitic gneisses belong in the igneous classification. Most geologists agree, however, that granitic gneisses commonly form in the marginal parts of large bodies of magma (molten rock) and that the banding results from flowage and crystal alignment during cooling.

At several locations small veins of coarse-grained feldspar and quartz crystals are visible within the gneiss. These veins range in width from several inches to several feet and are the source of innumerable large quartz grains found in the park.

The most striking exposures of gneiss within the park can be seen along the "water fall" trail, which starts behind Shelter No. 2 and follows a narrow, rock-strewn canyon for a distance of about ½ mi. The graded and marked portion of the trail terminates at the foot of a steep, semicircular rock wall, down which a stream cascades or trickles, depending upon the season.

Numerous veins of coarse-grained quartz and feldspar crystals are visible in the walls of the canyon. Other parts of the canyon walls exhibit closely spaced parallel fractures. These fractures are called joints and are thought to have resulted from contraction during cooling of the magma.

The other rock type seen in the park is a layered, dark-brown mica schist. Schists are classified as metamorphic rocks, although remnants of sedimentary bedding surfaces still are recognizable within this particular unit.

The schist is older than the gneiss and originally was deposited as a sandstone. During the intrusion and cooling of the igneous rocks, the sandstone was altered, or metamorphosed, to

(continued on p. 63)

mainly in the form of petrified stumps and less commonly logs of coniferous trees. Stumps often occur in groups. Logs are sometimes found in channel-form sandstones, but stumps are usually restricted to overbank deposits. Dinosaur remains are more common in overbank than channel deposits but are most often isolated in the former. Subcomplete skeletons are and usually occur in channel-form sandstones. Of other vertebrates, turtles are by far the most abundant, usually occurring in overbank mudstones. Crocodile remains are far less common. Predator damage on vertebrate fossils is rare. Invertebrate remains high in the Fruitland are rarely preserved in situ and usually occur in clay-pebble conglomerates with plant and vertebrate remains, often associated with sideritic concretions. Clay-pebble conglomerates also yield the vast majority of the mammal, lizard, and amphibian remains and most of the fish scales and vertebrae. Lower in the Fruitland are coquinas of brackish invertebrates. Some clay-pebble conglomerates yield many calcitic snail opercula but very little body shell material.

THE PALEOENVIRONMENTS OF THE PENNSYLVANIAN SYSTEM ALONG THE EASTERN MARGIN OF THE RIO GRANDE RIFT, CENTRAL NEW MEXICO, by *J. H. Bauch*, NMIMT.

Surface exposures east of Socorro, New Mexico, contain a complete stratigraphic section of the Pennsylvanian System. These sediments were deposited on a northwest trending shelf, connecting the larger and deeper Paradox and Delaware Basins. The Sandia Formation (Atokan) lies unconformably on Precambrian quartz monzonite. It largely consists of quartz arenites occasionally interbedded with wackestones and is interpreted to represent the transgression of the Pennsylvanian sea. The Madera Limestone conformably overlies the Sandia and is divided into a lower gray limestone member (Desmoinesian) and an upper arkosic limestone member (Missourian–Virgilian). The lower gray limestone consists of cherty mudstones and wackestones with a diverse fauna. These sediments probably accumulated in very shallow water with normal marine salinities. The upper arkosic limestone consists of interbedded gray shales, brown fossiliferous sandstones, and wackestones. The shales are barren of plant and animal debris. They are interpreted to have been deposited in shallow, quiet water under anoxic conditions. There is no evidence of a transgression between the Desmoinesian and Missourian rocks. Storms periodically interrupted mud sedimentation by rapidly depositing shallow-water carbonate grains (oncolites and oolites) with quartz. Carbonate sedimentation resumed whenever clastic influx decreased, resulting in wackestones.

LATE CENOZOIC GEOLOGY OF THE LOWER RIO PUERCO, SOCORRO AND VALENCIA COUNTIES, NEW MEXICO, by *J. D. Young*, NMIMT.

Sediments of the lower Rio Puerco study area may be divided into two broad categories: 1) the Santa Fe Group which represents a rapidly aggrading fluvial system filling the Albuquerque Basin and 2) post-Santa Fe valley-fill sediments which include valley-margin deposits and valley-floor deposits. The latter group represents processes of erosion and deposition that have prevailed since the entrenchment of the Santa Fe basin fill. Both groups contain many of the same types of sediments. The Santa Fe Group is divided into two formations: 1) the Miocene–Pliocene Popotosa Formation which consists of piedmont and playa facies deposited in a closed basin and 2) the late-Pliocene (?) to mid-Pleistocene Sierra Ladrones Formation which represents deposition by a through-flowing river or rivers. Paleocurrent indicators and the presence of Grants obsidian in the Sierra Ladrones indicates a source area to the northwest. Two facies are suggested for the Sierra Ladrones based on composition and texture of gravels: 1) a through-flowing fluvial facies and 2) through-flowing fluvial facies associated with marginal slopes (this is more of an interfingering zone between distal piedmont material and through-flowing fluvial facies). The through-flowing fluvial system that deposited the Sierra Ladrones was primarily a high-gradient, low-sinuosity, flat-bottomed braided system. The Llano de Albuquerque landform and associated soil capping the Sierra Ladrones Formation represents a period of surface stability and soil formation on the Albuquerque Basin floor during mid-Pleistocene time.

MINERALIZATION TEMPERATURES AND SOURCES OF HYDROTHERMAL FLUIDS AT THE QUESTA, NEW MEXICO, MOLYBDENITE DEPOSIT, by *R. W. Smith*, NMIMT.

Mineralization of the granite-type porphyry molybdenite deposit at Questa, New Mexico, consists of quartz-biotite-feldspar-molybdenite and quartz-molybdenite veins associated with potassic alteration. Also present are later quartz-pyrite-molybdenite and quartz-base metal sulfide veins associated with phyllic alteration. Studies of fluid inclusions of vein quartz associated with molybdenite mineralization indicate a wide dispersion of temperatures (300–500°C) with a mode of 400°C for mineralization associated with potassic alteration and slightly lower temperatures for mineralization associated with phyllic alteration. Halite-trend fluids characterized the potassic alteration zone, with more dilute fluids common in veins associated with phyllic alteration. Oxygen isotopic data suggest high temperature (550°C) magmatic fluids ($\delta^{18}O = +7.6$ ‰) were responsible for early mineralization. Later mineralization was from fluids of a mixed meteoric and magmatic water. Fluid inclusion, oxygen isotope, and published sulfur and strontium isotope data are consistent with early mineralizing fluids exsolving directly from a "granite-minimum" intrusive, with later mineralization resulting from mixing of magmatic and meteoric water, or remobilization of earlier mineralization by meteoric water.

VOLATILES IN PHYLLOSILICATES FROM THE BINGHAM, UTAH, AND COPPER FLAT, NEW MEXICO, PORPHYRY COPPER DEPOSITS, by *J. M. Palin*, NMIMT.

Whole-rock samples, containing phyllosilicate minerals, have been collected from the porphyry copper deposits at Bingham, Utah, and Copper Flat, New Mexico. Upon heating, these phyllosilicates release H_2O and other volatiles. Measurements of these volatiles, using a quadrapole mass spectrometer, have been done in an attempt to develop an exploration tool. The H_2S/H_2O ratios for the samples from Bingham show patterns similar to those for hydrothermal alteration and Mg/ (Mg + Fe) ratios in biotite. Surface samples from Copper Flat also show a spatial distribution of thermally evolved volatiles about the orebody, which does not crop out at the surface and has no well developed alteration pattern. The results indicate that thermally evolved volatiles from phyllosilicates may serve as an exploration tool for hidden hydrothermal mineral deposits. □

Hyde Memorial *(continued from p. 59)*

schist. The original internal structure of the sandstone has not been changed greatly. The metamorphic effects are mainly confined to concentrations of brown and gold mica along the bedding planes of schistosity (planes of weakness).

Exposures of schist occur at higher elevations, near the crests of the ridges bordering the central valley, and are easily identified by their color and the presence of bedding.

Sedimentary rocks of Pennsylvanian age have been recognized lying directly on top of the Precambrian in several areas of the complex, but not within the park. Sedimentary rocks are formed from water-transported sediments and comprise the third major rock type. The presence of these rocks indicates that north-central New Mexico was occupied by an ocean during Pennsylvanian time, between 320–270 m.y. ago. No evidence remains to indicate what occurred in this area during the millions of years that elapsed between the Precambrian and the Pennsylvanian.

In some areas of the complex, Pennsylvanian rocks are overlain by remnants of younger formations. Field evidence indicates that at least several hundred feet of post-Pennsylvanian rocks formerly existed in this area. Undoubtedly Pennsylvanian and younger rocks partially covered Hyde Memorial Park sometime in the past. However, these rocks, as well as part of the Precambrian have been eroded by streams and glaciers, shaping the landscape as we see it today. □

Index to New Mexico Geology, volume 4

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