Valley of Fires

The black, fissured lava of the Carrizozo Malpais on US-380, west of Carrizozo, has fascinated travelers for many years. Because of its unusual scenic and scientific features, a 463-acre tract adjoining the highway was dedicated as the Valley of Fires State Park on May 6, 1966.

Located about 3 mi northwest of Carrizozo at an elevation of 5,250 ft, park facilities include campites with shelters, tables, barbecue grills, playground equipment, rest rooms, and electrical hookup for trailers. Motels and restaurants are available in Carrizozo (population 1,546), the county seat of Lincoln County.

Geology

The Carrizozo Malpais is one of the youngest and best preserved lava fields in the United States. The term malpais (meaning “badlands”), was used by Spanish explorers and travelers in the Southwest to designate rough-surfaced lava flows that seriously obstructed travel. Even today, 4-wheel drive vehicles are no match for this terrain.

The two principal olivine basalt flows comprising the Carrizozo Malpais issued from a volcanic vent at Little Black Peak near the northern end of the Tularosa Valley. The glowing, molten lava flowed southward 44 mi, blanketing an area of 127 sq. mi of valley floor. In narrow segments of the valley the flows were constricted to a ribbon one-half mile wide, whereas in wider parts of the valley they spread out to a width of over 5 mi. A thickness of 162 ft was measured at one point 2 mi south of the highway. As the lava flowed down the valley, the surface crust cooled and solidified, preserving theropy surface corrugations characteristic of pahoehoe (a Hawaiian term for very fluid basalt flows). Molten lava continued to flow down the valley and laterally toward the margins beneath the increasingly rigid crust that bulged locally into domelike mounds, buckled and cracked along pressure ridges, and collapsed into subcircular pits where fluid lava beneath pressure domes was withdrawn.

Eruptions of fluid lava were interrupted at least three times by explosive episodes that built conical mounds of cinders, bombs, and ash about the mouth of the volcano. The last of these explosive events created the small cinder cone composing Little Black Peak, which rises to a height of 85 ft and contains an intact crater 32 ft deep.

In time, the entire lava mass cooled and crystallized to solid rock, exhaling steam and other gases during the cooling process. These gaseous substances released during cooling left vesicles (bubble cavities) in the upper crust. Strong winds blew sand and silt into pits and crevices in the malpais surface, providing a fertile ground for vegetation to grow. Many plants flourish here in greater abundance and luxuriance than on the adjacent valley slopes. Because rain penetrates the porous basalt readily, there are fertile patches of soil in crevices and depressions. In addition, the black lava

unsuccessful. Geological and archeological evidence, however, suggests an age of approximately 1,500 to 2,000 years.

Access roads and facilities at the park are situated on an “island” of older rock, a kipuka in Hawaiian terminology, surrounded by a “sea” of lava. The kipuka consists of a hill of Dakota Sandstone deposited along the shores of a Cretaceous sea roughly 100 m.y. ago. Weathered surfaces are stained brown by iron oxides; some of the more resistant surfaces bear a black coating of desert varnish—a mixture of iron and manganese oxides that accumulate during prolonged exposure to the weather in dry climates. Red clays of still older rocks in the Chinle Formation (Triassic age, about 200 m.y. old) are poorly exposed below the Dakota Sandstone on the western slope of the kipuka. These beds were deposited by streams on the continental land surface prior to encroachment of the Cretaceous sea. Beds of shale and sandstone also of Cretaceous age, but overlying the Dakota Sandstone (hence somewhat younger), are exposed along the eastern margin of the malpais and eastward toward the base of the mountains. Fossil shells of sea animals and beds of bituminous coal in these rocks attest to shallow seas and swampy coastal forests during the Cretaceous Period.

Plants and animals

Although geologic features are the park’s chief attraction, various plants and animals native to the area also merit mention. Many plants flourish here in greater abundance and luxuriance than on the adjacent valley slopes. Because rain penetrates the porous basalt readily, there are fertile patches of soil in crevices and depressions. In addition, the black lava
surfaces absorb heat from the midday sunshine and reradiate it at night. Among the more conspicuous plants of the malpais are juniper, hackberry, algerita (hollygrape), squawbush, saltbush (chamiso), sparse clumps of desert olive and Apache plume, sotol, yuccas (2 species), beargrass, chollas (2 species), prickly pear, claret cup cactus, and various grasses. The dry, rocky soil of the kipuka supports a less luxuriant assemblage that includes juniper, algerita, and mesquite; beargrass, yuccas (2 species), chollas (3 species), prickly pear, saltbush, creosote bush, Mormon tea, snakeweed, and grasses.

Among the smaller mammals are numerous rodents—mice, rats, squirrels, and rabbits. Larger mammals include the skunk, bobcat, fox, coyote, mule deer, and an occasional black bear. Mice, snakes, lizards have developed dark-hued colorations that protect them from the glaring whiteness of the sands by acquiring very pallid colorations.

Panoramic view

An excellent panorama of the surrounding countryside may be seen from the rocky Dakota Sandstone hillock, where the flagpole is located (see accompanying diagram). Viewed in clockwise sequence, the following features may be seen. Slightly west of north is the cinder cone of Little Black Peak. The Gallinas Mountains are on the distant horizon slightly east of north. To the northeast are Lone Mountain, a stock or laccolith of intrusive igneous rock of Tertiary age (about 30 m.y. old), and Baxter Mountain, where rocks of Cretaceous age are cut by gold-bearing veins. Hidden in the adjacent canyon is the town site of White Oaks, now faded from its boom days of gold mining in the period from 1879 into the early 1900's, and memorialized as the setting of Emerson Hough's novel, Hearts Desire. South of White Oaks, the Tertiary intrusive mass of Carrizo Peak juts up abruptly. Farther south are the Vera Cruz Mountains. To the southeast is Carrizo (Spanish for "abundance of reed grass"), founded in 1905 on the El Paso & Northeastern Railroad. The high, forested mountain range south of Carrizo is the Sierra Blanca (White Mountains), a thick pile of volcanic rocks (andesites) of Tertiary age (35-40 m.y. old), surmounted by Nogal Peak on the north (9,550 ft) and by Sierra Blanca Peak on the south. The Mescalero Apache Indian Reservation encircles Sierra Blanca Peak. Cab Mountain is the prominent peak at the western foot of the Sierra Blanca. Slightly west of south are the Godfrey Hills, also composed of Tertiary volcanic rocks.

Although not visible from this point, White Sands National Monument is located on the floor of the Tularosa Valley 65 mi to the south-southwest. The Phillips Hills are a tilted block of marine limestones and associated sedimentary rocks of Permian age (about 250 m.y. old). The San Andres Mountains, a tilted fault-block range, form the western border of the valley to the southwest. At the northern end of that range is Mockingbird Gap, famous as the test site of the first atomic bomb in 1945. The Sierra Oscura are the tilted fault-block range north of the gap. Eastern slopes of Chupadera Mesa to the northwest are obscured by the hill in the foreground on the Carrizo dome (an anticlinal uplift), composed of limestone, dolomite, and gypsum of Permian age.

The Valley of Fires is a vivid example of some of the dynamic processes that have shaped the face of the earth. This is a region of many contrasts, ranging from cactus-studded plains to mountains verdant with pine and fir; dry arroyo beds, clear mountain brooks with trout to lure the angler; snow-covered slopes for skiing, and warm winter sun for basking. All are close at hand or within little more than an hour’s drive from each other, beckoning the visitor to seek them out.

—Robert H. Weber (1971)

NM Bureau of Mines and Mineral Resources

Editor's note—A nature trail through the malpais has recently been added to the park.