Valley of Fires

The black, fissured lava of the Carrizo- 
ozo Malpais on US-380, west of Carrizozo, 
has fascinated travelers for many years. 
Because of its unusual scenic and scientif-
ical 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 Carri-
ozzo at an elevation of 5,250 ft, park 
facilities include campites with shelters, 
tables, barbecue grills, playground equip-
ment, 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 
neat the northern end of the Tularosa 
Valley. The glowing, molten lava flowed 
southwestward 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 the 
ropy 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 increas-
ingly 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pressure domes was withdrawn.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 pro-
cess. 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 
shelter and sustenance here among the 
mammals, reptiles, and birds soon found 
sustenance here among the 
protection crevices and ledges.

Beneath the glassy to very fine grained 
crust, close examination reveals the min-
ersal of olivine basalts. Visible to 
the naked eye are scattered, glassy green 
crystals (phenocrysts) of olivine set in an 
interlocking network of smaller crystals 
of plagioclase feldspar and minor 
amounts of augite too small to be recog-
nized without a microscope.

When these volcanic eruptions took 
place cannot be precisely determined as 
yet. A search for charcoal in trees inun-
dated by the lava flows, that would permit 
dating by the carbon-14 method, has been 
unsuccessful. Geological and archeolog-
ic 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, sur-
rounded by a "sea" of lava. The kipuka 
consists of a hill of Dakota Sandstone 
deposited along the shores of a Creta-
ceous sea roughly 100 m.y. ago. Weather-
er surfaces are stained brown by iron oxides; some of the more resistant sur-
faces bear a black coating of desert 
varnish—a mixture of iron and mangan-
eses that accumulate during pro-
developing 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 sand-
stone also of Cretaceous age, but overlying 
the Dakota Sandstone (hence some-
what younger), are exposed along the 
eastern margin of the malpais and east-
ward toward the base of the mountains.

Fossil shells of sea animals and beds of 
biterminous 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 men-
tion. Many plants flourish here in greater 
abundance and luxuriance than on the ad-
jacent valley slopes. Because rain pene-
trates the porous basalt readily, there are 
fertile patches of soil in crevices and 
depressions. In addition, the black lava 

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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, and lizards have developed dark-hued colorations that protect them from predators among the dark rocks. At the White Sands gypsum dunes, within a few miles of the southern tip of the lava field, these same species have adapted to the glaring whiteness of the sands by acquiring very pallid colorations.

History

Prehistoric man also found shelter here, undoubtedly collected plant foods and fiber, and hunted and trapped animals. Petroglyphs pecked and scribed into the rock surfaces along the edges of the flows, and occasional bits of pottery and spalls of stone testify to visits by Indians of the Jornada Branch of the Mogollon Culture during the period prior to 1400 A.D. The region subsequently was to become the domain of the Mescalero Apache, whose resistance to intrusions of white settlers led to establishment of nearby Fort Stanton in 1855. The vast open rangelands extending eastward across the Pecos into Texas attracted cattlemen such as John Chisum, whose brand was registered in Lincoln (then the county seat) in 1869. Amicable relationships among the ranchers were shattered in the interval from 1878 to 1881 by the Lincoln County range wars; and an early-day delinquent, William "Billy the Kid" Bonney, left his mark in the register of infamy. In the more peaceful years that followed, ranching, mining, farming, and railroading became the principal activities in the development of the area.

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. Cub 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 antclinal upfold), 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.