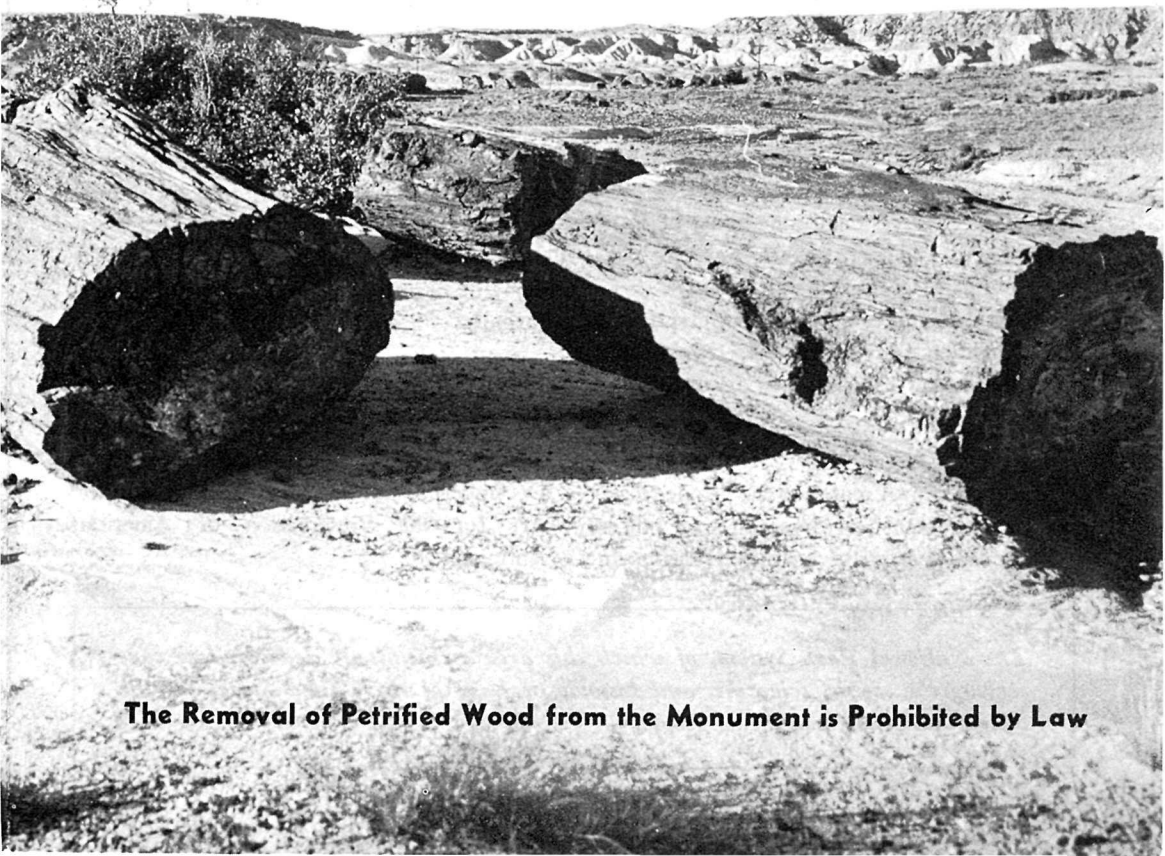


# Petrified Forest

NATIONAL MONUMENT • ARIZONA



**The Removal of Petrified Wood from the Monument is Prohibited by Law**

# Petrified Forest

## NATIONAL MONUMENT

The most spectacular display of petrified wood known in the world as well as some of the most colorful parts of the Painted Desert are included in Petrified Forest National Monument in northeastern Arizona. Unique in its vivid and varied colors, the petrified wood of this area has long attracted visitors from all parts of the world. Within the monument are six separate "forests" with giant logs of agate lying on the ground and numerous broken sections and smaller chips and fragments forming a colorful ground cover.

The area is part of the Painted Desert of northern Arizona, a region of banded rocks of many hues carved by wind and rain into a landscape of fantastic color and form. Here and there are beds of shale containing perfectly preserved fossil leaves of plants of a remote age. Occasionally the bones of giant amphibians and reptiles are washed from their burial places in the soft rock.

Many Indian ruins and petroglyphs are found, evidence of Indians who lived in this area long before America was discovered.

### History

The first known report of the "stone trees" was by Lieutenant Sitgreaves, an army officer who explored parts of northern Arizona in

*The National Park System, of which this area is a unit, is dedicated to conserving the scenic, scientific, and historic heritage of the United States for the benefit and enjoyment of its people.*



1851, soon after Arizona was acquired by the United States from Mexico.

The petrified forests remained almost unknown, however, until the settlement of northern Arizona began in 1878 and the Atlantic and Pacific (now the Santa Fe) Railway was completed across northern Arizona in 1883. During the following years, the existence of the petrified forests was threatened by souvenir hunters, gem collectors, commercial jewelers, and manufacturers of abrasives. Entire logs were blasted to obtain the quartz and amethyst crystals often found within the logs, and much agate was carried away for making jewelry. The erection of a stamp mill near the forests to crush the petrified logs into abrasives offered the most serious threat. Alarmed, the citizens of Arizona, through their territorial legislature, petitioned Congress to make the area a national reserve so "that future generations may enjoy its beauties, and study one of the most curious . . . effects of nature's forces."

Following an investigation by Lester F. Ward, of the United States Geological Survey, Petrified Forest National Monument was established by Presidential proclamation on December 8, 1906, under authority of the Act for the Preservation of American Antiquities.

## The Geologic Story

### THE FORESTS

About 160 million years ago, in the Triassic Period, northern Arizona was probably a lowland where shifting streams spread sand and mud over the plains. Scientists believe that the growing forests were upstream, possibly as much as a hundred miles west and southwest of the present petrified forests. The principal tree resembled our native pines, but was more closely related to the Araucarian pines of South America and Australia. Remains of two other kinds of primitive trees are also occasionally found.

### THE TREES WERE BURIED

Natural processes, sometimes hastened by destructive fires and ravages of insects, are believed to have killed the trees. Certainly, many of them decayed on the ground, but others fell into streams and came to rest in bays or on sand bars where rapid burial by mud and sand prevented their decay. The deposits in which these trees were buried eventually turned to the sandstones and shales now called the Chinle formation. These were buried at least 3,000 feet beneath later layers of sand and silt spread by shallow seas.

### THE LOGS PETRIFIED

The sediments in which the logs were buried contained a large amount of volcanic ash, rich in silica. This silica was picked up by ground water, carried into the wood, and deposited in the cell tissue. The mineral filled the wood solidly, forming the present petrified log. However, part of the original organic matter remains. The color patterns were caused by oxides of iron and manganese, the predominant type known as agate. Cavities in the logs were often filled or lined with quartz crystals.

### HOW THE FOREST WAS UNCOVERED

After the forest was buried, there were several periods of great mountain making. Forces from deep in the earth thrust the Rockies and Sierras upward several thousand feet, and the land between was lifted far above its former position near sea level. As a result of this great mountain growth, certain areas became arid and desert-like; soon wind and rain started wearing down the great deposits that covered this region. Large river systems carried away the loose mud, sand, and gravel which finally found its way to the sea. Thus the sediments that once covered the forest were removed. Finally the layers in which the logs were buried were cut by canyons and ravines, revealing the great petrified logs and the many bands of colored rock that make up the Painted Desert. As the logs wash from the hillsides, they break and accumulate in piles at the base of the cliffs. Only a small part of the petrified forest is now exposed, for logs are scattered below the surface of the ground to a depth of about 300 feet.

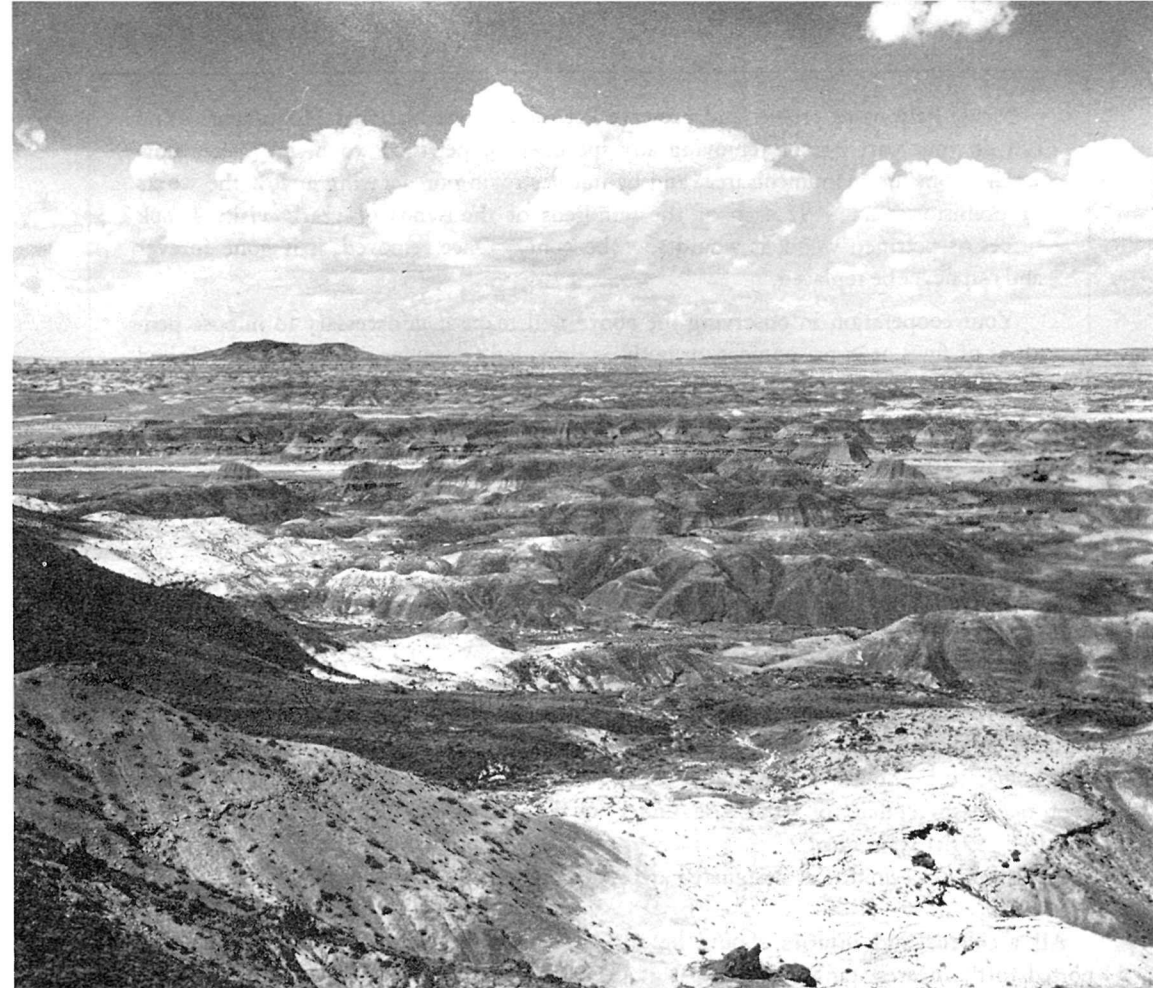
### BROKEN LOG SECTIONS

Rhythmic vibrations of earthquakes during the period of uplift of the land are believed to have produced fine cracks at more or less regular intervals across the petrified logs. As erosion of the softer material around the logs took place at the surface of the land, the exposed cracks widened, separating the logs into sections.

### THE PAINTED DESERT

The part included in the monument exhibits practically all of the typical forms of desert erosion.

The badlands of the Painted Desert are of the same age (Triassic) as those of the Rainbow Forest to the south. They are composed of water-deposited layers of volcanic ash,



Painted Desert from Inn Lookout.—Courtesy, Joseph Muench.

interbedded with thin lenses of shale, sandstone, and river gravel. The alteration of the ash has converted it into a claylike rock called bentonite.

Bentonite when dry is hard and strong, but when wet, it absorbs water like a sponge until it finally disintegrates into a fine flowing mud. In this semiarid region with its long dry season and its torrential summer rains, the bentonitic beds are rapidly cut into conical hills, turreted ridges, and small steep-walled canyons and ravines.

In places, a hard covering or caprock of sandstone or lava may serve to protect the

soft bentonite beneath, thus forming abrupt-sided buttes and mesas.

The most amazing property of the Painted Desert is the ever-changing quality of its colors. Pure bentonite is nearly white, but here, minute quantities of iron oxides in the volcanic ash have stained the layers to many shades of red, blue, brown, and yellow. These colors are most vivid immediately after a rain in the early morning or late evening, and cloud shadows create a wonderful kaleidoscope of moving colors.

A 4-mile drive along the rim of the Painted Desert provides 8 overlooks from which

superb views may be obtained. Rapid erosion of the desert soils makes it impossible to maintain either roads or trails into the desert below the rim. Consequently, the Black Forest, a concentration of dark-colored petrified wood, is virtually inaccessible. While you are not prohibited from entering the desert, only those conditioned to desert hiking should consider doing so.

## Other Points of Interest

### PUERCO RUIN

This ancient Pueblo village site is located near the Puerco River Entrance Station. Outlines of the walls of the village indicate that the structure originally contained 150, or more, rooms. The village was abandoned about 600 years ago.

### NEWSPAPER ROCK

A short trail from the parking area leads to a remarkable display of prehistoric petroglyphs. Some of these carvings probably record ancient events, but they are not "writing" in our modern sense, and they cannot be interpreted.

### AGATE BRIDGE

Here, one of the most noted petrified logs forms a natural bridge spanning a ravine about 40 feet wide. The log, 111 feet of which is exposed, has never fallen. The support beam beneath it was constructed in 1917 to protect it from possible collapse.

## Plant and Animal Life

Lands within the monument range in altitude from 5,300 to 6,200 feet above sea level, and receive less than 10 inches of moisture in an average year.

The plants which have become adapted to this semi-arid situation are mostly small and

inconspicuous, yet many have tiny but beautiful flowers. The showy blossoms of the yuccas, Mariposa lily, and cactuses are to be seen only in the spring, while such common plants as the asters, paintbrush, rabbitbrush, and sunflowers bloom throughout a good part of the summer.

Birds, animals, and reptiles are far more common than one is likely to suppose. Common mammals of the area include the jack rabbit, cottontail, antelope ground squirrel, skunk, coyote, bobcat, porcupine, and American pronghorn (antelope). The most noticeable resident song birds are the desert horned-lark, rock wren, pheobe, and several species of sparrows. Of the more than a dozen species of snakes and lizards, all are harmless and beneficial except the rattlesnake.

## Interpretive Service

You are invited to see the Rainbow Forest Museum, which includes a diorama, outstanding specimens of polished petrified wood, fossils, minerals, and charts which explain the formation of petrified wood and the badlands. In the basement of the Painted Desert Inn there is an exhibit of ancient and modern Indian arts and artifacts. There are wayside exhibits at the major points of interest en route through the area.

## Travel Information

Petrified Forest National Monument is open during daylight hours every day of the year.

Excellent paved highways make the area easily accessible by car. U. S. 66 crossing the area near the Painted Desert is the approach from the east. Travelers from the southeast, south, and west enter by way of U. S. 260. The monument road connects these two main highways and leads through the more interesting parts of the area.



Agate Bridge.

Travelers by rail, air, or bus can get privately operated cars at terminals in Gallup, N. Mex., or Holbrook and Winslow, Ariz.

### Accommodations and Supplies

Refreshments, lunches, souvenirs, and gasoline may be obtained at the Painted Desert Inn and Rainbow Forest Lodge. These establishments are about 25 miles apart, and are located near the entrances to the monument. Both are open daily throughout the year.

A small picnic ground with tables and water is maintained at the Rainbow Forest. There are no overnight facilities within the monument, and camping is not allowed. The nearest campgrounds are in national forests

to the south and west, nearly 100 miles distant.

Excellent motels and restaurants are to be found along the highways crossing the area, and in the surrounding communities of Gallup, N. Mex., and St. Johns, Springerville, Showlow, Holbrook, and Winslow, Ariz.

### Administration

Petrified Forest National Monument is administered by the National Park Service of the United States Department of the Interior.

The office of the Superintendent in immediate charge is in the Rainbow Forest Museum. Address mail to the Superintendent, Petrified Forest National Monument, Holbrook, Ariz.

Please help us to protect and preserve Petrified Forest National Monument. You can do your part by not removing any specimen of petrified wood, no matter how small, from the monument area, and by not destroying or defacing any of the works of prehistoric man. If each of the hundreds of thousands of yearly visitors took pieces of petrified wood, it would soon be gone. Once removed, it is gone forever and can never be replaced.

Your cooperation in observing the above will make it unnecessary to impose penalties of fines or imprisonment, or both, as provided for under the laws of the United States Government for the protection of Petrified Forest National Monument.

You may purchase petrified wood from the monument concessioners who get their supplies from private lands outside of the monument.

The following items, which through their observance will tend to make your trip and that of your neighbors more enjoyable, are listed for your guidance:

The monument is a sanctuary for all living things. Please do not molest the birds or animals or pick wildflowers.

Pets may be brought into the monument if kept on leash, crated, or otherwise under physical restrictive control.

Picnicking is permitted at designated areas only.

All accidents and injuries should be reported to the nearest ranger station.

Please observe posted speed limits, drive with caution, and heed all traffic signs.

Lost and found articles should be reported to the nearest ranger station.

Park rangers are here to assist you as well as to protect the monument area. If you need information or assistance, see a park ranger.

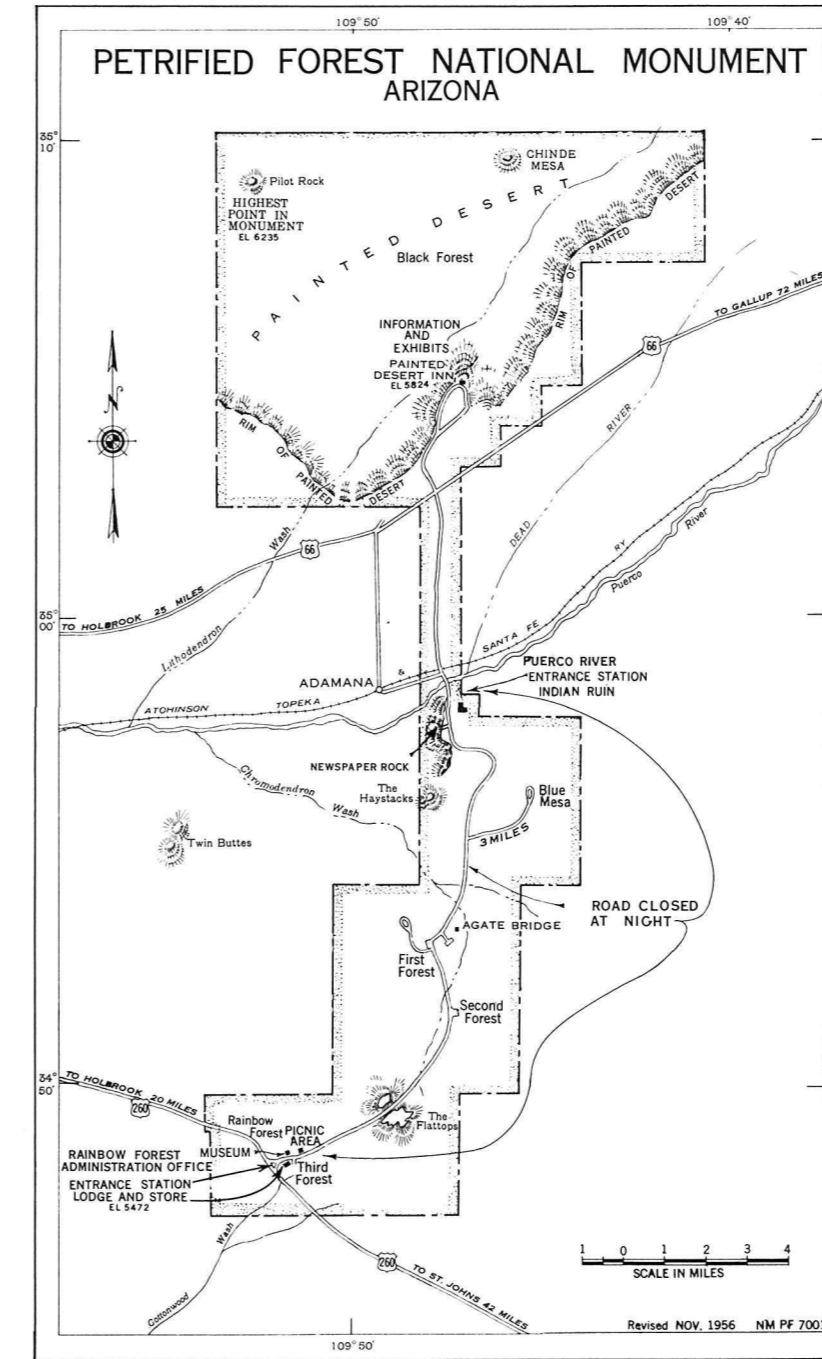
There are trash receptacles conveniently located throughout the area. Please use them and help keep the monument clean.

There is an annual fee of \$1, and a 15-day fee of 50 cents, for each automobile and motorcycle. These fees are subject to change. Permits must be shown to leave or reenter the monument. During the valid period of all 15-day permits, the cost thereof may be applied toward the purchase of a similar annual permit. All fees are deposited in the United States Treasury and offset, in part, appropriations made for operating the monument.

The monument road between the Rainbow Forest and the Painted Desert is closed at night.



UNITED STATES DEPARTMENT OF THE INTERIOR  
Fred A. Seaton, *Secretary*  
NATIONAL PARK SERVICE, Conrad L. Wirth, *Director*



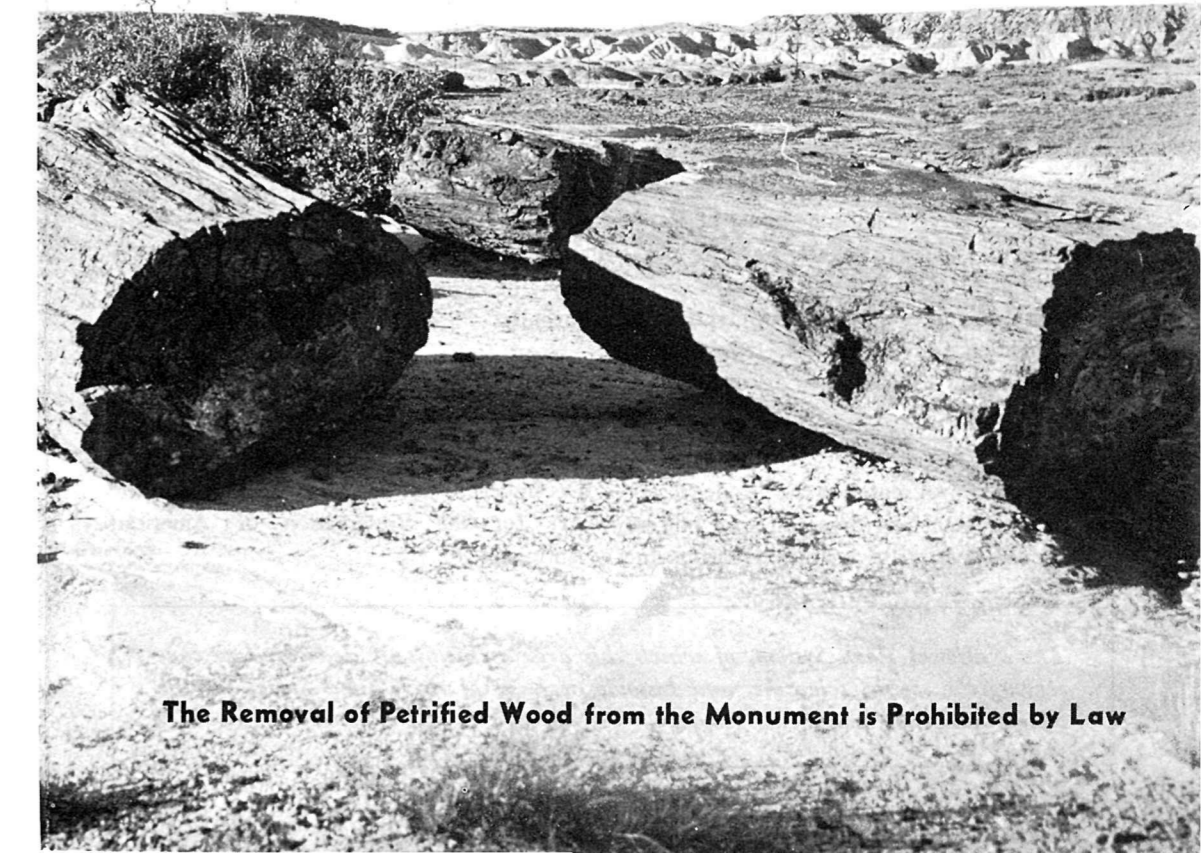
COVER: Petrified logs in Rainbow Forest.

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