Petrified Forest

National Park Service
U.S. Department of the Interior

Petrified Forest National Park
Arizona

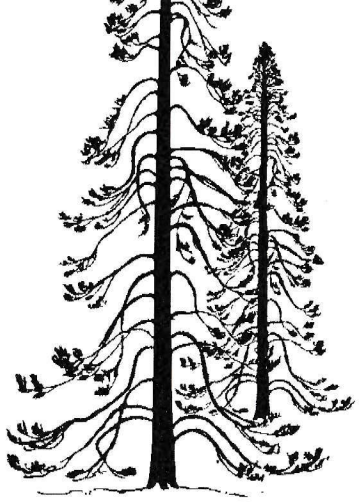
Trees to Stone

An enchanted spot. . .to stand on the glass of a gigantic kaleidoscope, over whose sparkling surface the sun breaks in infinite rainbows. Charles F. Lummis, 1891

Triassic Environment

During the Late Triassic Epoch, over 200 million years ago, northeastern Arizona was located near the equator. This region was near the southwestern edge of the earth's largest existing landmass, Pangaea. The tropical location resulted in a climate and environment very different from today. Eventually the super-continent broke apart into the modern continents. Fossil evidence of this ancient land lies in the sediments called the Chinle Formation now so widely

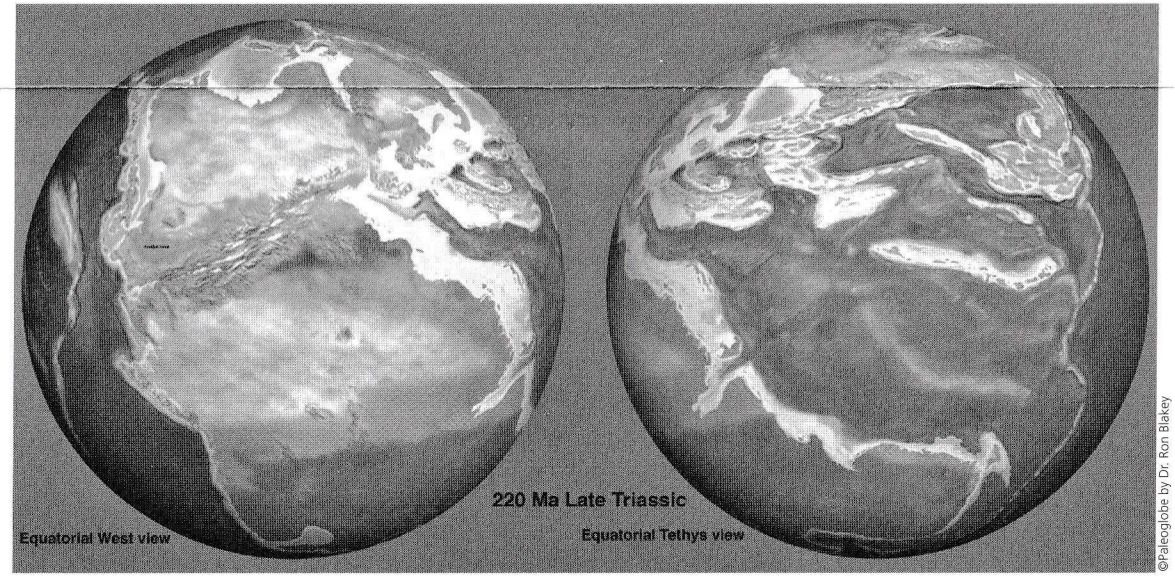
Over time, trees died or were knocked down by wind or the action of water. Rivers and streams carried the trees downstream, breaking off branches and roots along the way. Many tree trunks came to rest on the banks of the rivers while others were buried in the stream channels. Most of the trees decomposed and disappeared, but some of the trees were petrified, becoming the beautiful fossilized logs we see today. Some of the fossilized logs are from a



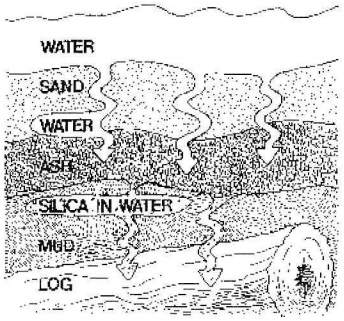
exposed in Petrified Forest National Park.

Imagine a large basin with numerous rivers and streams flowing through the lowland. A lush landscape with coniferous trees up to ten feet in diameter and towering almost two-hundred feet into the sky surround you. Galleries of trees, ferns, and giant horsetails grow abundantly along the waterway, providing food and shelter for many insects, reptiles, amphibians, and other creatures. In the slightly dryer areas a short distance from the water there are cycads, bennettitaleans, ginkgoes, and coniferous trees.

tree called *Araucarioxylon arizonicum*. Two others, *Woodworthia arizonica* and *Schilderia adamanica*, mostly occur in the northern part of the park. Overall at least nine species of fossil trees have been identified from the park; all are now extinct.



Petrification



Some logs were buried by sediment before they could decompose while volcanoes far to the west spewed tons of ash into the atmosphere. Winds carried ash into the area where it was incorporated into the thickening layers of sediment. Ground water dissolved silica from the volcanic ash and carried it through the logs. This solution filled the cells, eventually replaced the cell walls in some cases, crystallizing as the mineral quartz after a very long time. The process was sometimes so exact the resulting fossils show many details of the logs' original surfaces and, occasionally, the internal cell structures. Iron and other minerals combined with quartz during the petrification process, creating the brilliant rainbow of colors. Iron minerals provide bright mustard, orange, rich reds, ochre, and black. Blue, purple, brown, and black, including graceful fern-like patterns, are caused by manganese minerals. Sometimes crushing or decay left cracks in the logs. Here the growth of quartz crystals was not limited and larger crystals of clear quartz, purple amethyst, yellow citrine, and smoky quartz formed.

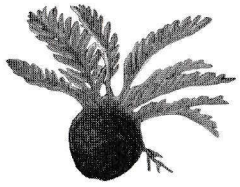
Uplift and Erosion

This area has endured many changes. As time passed, the Chinle Formation was buried by a thick sequence of younger rock. About 60 million years ago the region was uplifted as part of the massive Colorado Plateau. Over time, many rivers and storms eroded the land, removing the younger layers of rock until parts of the Chinle Formation were exposed. Now fossilized logs that were once embedded in the Chinle Formation lie strewn across the badland hills and are exposed in cliff faces. You might notice that most of the logs are broken into segments. Who cut the logs? This is one of the park's most common questions! People did not cut the logs. Because the sections are still in order, we know that the logs fractured after they were buried and the petrification process softer sedimentary layers. As the sediments shifted and settled, as well as tectonic movement, stress on the rigid logs caused fractures. Some researchers believe that such stress may have been produced by earthquakes or the gradual uplifting of the Colorado Plateau.

Erosion continues today. Rain and wind wear away the land, uncovering additional logs, while freezing and thawing break down the logs exposed on the surface. With the infinite patience of time, the layers of sediment will continue to erode, exposing more pages of this ancient history book.

was complete. Since petrified logs are composed of quartz, they are hard and brittle, breaking easily when subjected to stress. The hard logs are surrounded by

More than Trees



While the park is best known for its petrified trees, the Chinle Formation is full of different kinds of fossils and is considered one of the richest Upper Triassic fossil plant deposits in the world. Over 200 fossil plant taxam including more trees, are known from the Chinle Formation, including silicified wood, compressed leaves, stems, cones, pollen, spores, and amber. Plant groups represented in the park include lycopods, ferns, cycads, conifers, ginkgoes, bennettitaleans, and several forms that are currently unclassified.

Your National Park

Petrified wood is found in every state and in many countries, so why was this place made into a national park? It was originally established to protect some of the largest and most beautifully preserved concentrations of petrified wood in United States. We now know, however, that few places in the world have a fossil record of the Triassic Period that is so diverse and complete. These things make this park special.

All natural and cultural resources such as petrified wood, rocks, fossils, artifacts and plants must not be removed from the park. Petrified wood sold in local shops does not come from the park. It is obtained from private lands outside the park boundaries.