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SECOND GEOLOGICAL REPORT
ON PETRIFIED FOREST NATIONAL MONUMENT

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ON MICROFILM

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Submitted July 2, 1937

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By: Dr. Charles N. Gould

Accompanied by Earl A. Trager, Chief of the Naturalist Division, and by Vincent W. Vandiver, Associate Geologist, I made an inspection of Petrified Forest National Monument on June 14, 15 and 16, 1937. My first inspection of this monument was made on July 19, 1936 and embodied in my report No. 64. A much more comprehensive report on the geology of the monument was submitted by Associate Geologist Vandiver on January 12, 1936. To these two reports reference is made for details of geology.

Since my last visit much good work has been accomplished on the geology and paleontology of the forest by Park Naturalist M. V. Walker: particularly along the line of determining the place of origin of the petrified logs. There have been two schools of thought on this subject. Some investigators have believed that the trees which went to form the logs grew near the point where they are now lying prone. Others have contended that these logs represent driftwood derived from some unknown area which was washed or floated in.

The difficulty has been that while petrified logs and limbs are very abundant in the area, very few stumps had been found. It is for this reason that other localities for the origin of the logs have been sought. It has even been suggested that another fossil forest,

located near Cameron, Arizona, about 100 miles northwest, where many fossil stumps occur, might be the source of at least part of the logs now found in Petrified Forest.

Fortunately, during the past year Mr. Walker has been able to discover more than 50 fossil stumps in place. The greater number of these are as yet undisturbed, with only the top of the trunk projecting above the ground, but five specimens, showing branching roots, have been excavated. One of the largest of these, which is 12 feet in length and 3 feet in diameter, is shown in figure 1. Others are believed to be larger.

One rather peculiar fact is that when the clay has been removed, the roots of these stumps are found to be largely carbonized, and not silicified as is usually the case of the logs lying on the surface.

After studying the evidence in the field there is little doubt in my mind that these stumps grew at the spot where they are now found. They stand upright, or practically so, and show no evidence of having been transported. Some of the logs may have floated in, it is true, but it is my judgment that the stumps and probably the greater number of the logs, grew on the spot where we now find them.

Substantial progress has been made by Mr. Walker in the matter of the identification of the various forms of trees and plants that grew in the forest. Studies made by him and by Professor

Lyman H. Dougherty of San Jose State College, San Jose, California, indicate that there are 8 or 10, possibly more, genera of trees besides many other forms of plant life that may be identified. Figures 2 and 3 show logs on the surface in Black Forest.

The three most common forms of the larger trees, known by their scientific names, are: Arancarioxylon Arizonicum, Woodworthia Arizonicum, and Schilderia Adamanica. Other forms include neo calamites, cordaites cycade, horsetails and many species of ferns. No dicotyledons, or broadleaved trees like our modern oaks, willows or cottonwoods were in existence during the Triassic Period when these trees grew.

During the past year ten wells were drilled along Lithodendron (Carrizzo) Wash west of the Painted Desert Rim building site north of Highway 66. (This wash was named Lithodendron by Whipple in 1853, because of the petrified trees which he found there.)

All of these wells produced water and four of them were capped, awaiting development. The average depth of these wells is 40 feet. They are said to produce 12 to 30 gallons each per minute on the pump.

The water in these wells is probably secured from sands in Lithodendron Wash.

I understand that arrangements are being made to use water from but one of the four wells. This water is to be raised approximately 300 feet and carried a distance of more than one mile, to a reservoir now being built on the highest point of the hill. From this reservoir the water is to be distributed by gravity to the utility area.

From the standpoint of geology, it would perhaps be better to pump water from all four wells rather than from a single well. If our deductions are correct, and the water comes from surface sands, it is possible that it may be easily exhausted. I would therefore recommend that more than one well be used.

If it is found necessary to drill additional shallow wells, care should be taken that the wells be spaced sufficiently far apart that one well does not steal water from another.

A topographic map of the Petrified Forest has been prepared and copies will soon be available.

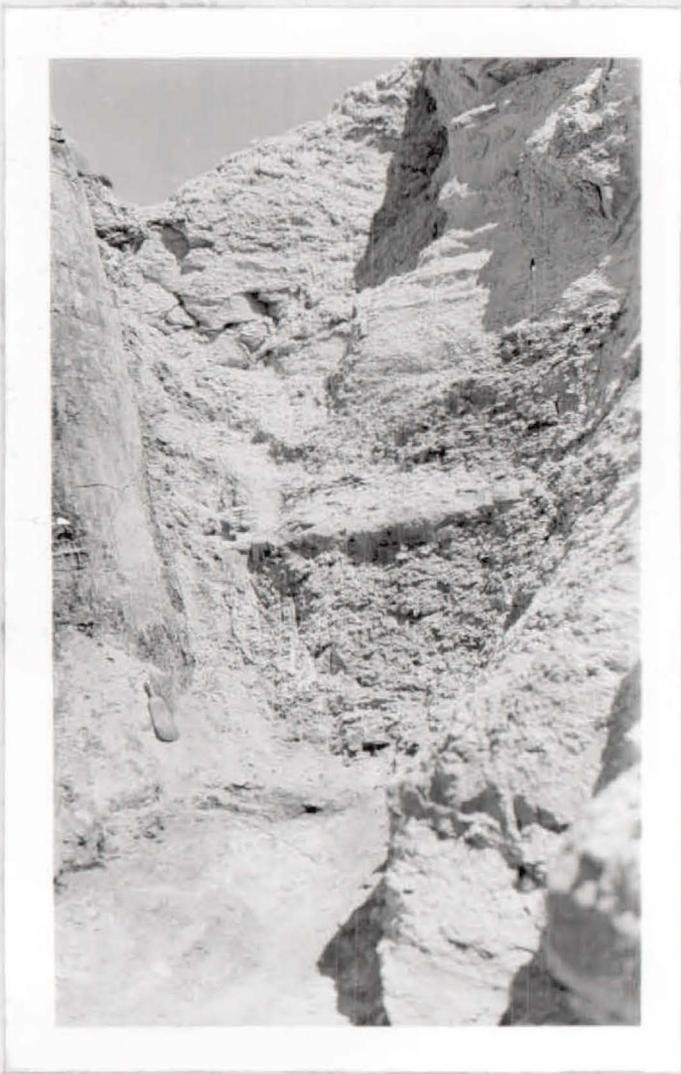


Figure 1.

Stump 3 feet in diameter and 12 feet long, with branching roots.



Figure 2.
Petrified logs in Black Forest North of
the Painted Desert Rim.



Figure 3.

Petrified logs in Black Forest. The hill in the distance is Pilot Rock, composed of black volcanic basalt.