

THE PETRIFIED FOREST OF ARIZONA.

BY D. ALLEN WILLEY.

In the northwestern part of Apache County, Arizona, is located the most remarkable petrified forest yet discovered on the American continent, and what geologists believe to be the most wonderful specimens of silicified trees in the world. The forest is about 8 miles square and was originally composed principally of firs. It is located upon a plateau which is 5,500 feet above tide water, although the theory of geologists is that the woodland in its natural state originally existed at a much higher altitude. It is in the center of one of the most desolate parts of the West, surrounded for many miles by a country which yields principally sage brush and soapweed. The nearest stream, which is about 20 miles distant from the forest, is lined with a stunted growth of cottonwood trees and is called the Dirty River from the quality of the liquid, which can hardly be called water, flowing through it. The cottonwood trees and a small clearing at the nearest railroad station include the only living vegetation in the vicinity of the forest, with the exception of a few small cedar trees and bushes near what is termed the "Natural Bridge."

The plateau on which the forest exists is divided into many small gorges and gulches, and the strata of which it is composed consists principally of beds of clay, sandstone and sandstone shale. Under a portion of the strata water can be found at a depth of but a few feet, and it is believed that below it are several subterranean water courses. The trees in various forms are scattered throughout the region, the majority consisting of fragments of trunks, although quite a number are in a vertical position. The great majority are completely petrified, as far as the wood is concerned, and have an outer coating of what seems to have once been sand and gravel. This coating, it is believed, was formed by the action of the elements and by the movement of the trees at different periods in the world's history. Geologists have divided the forest into what

are generally found near the center of the tree. There is every evidence that a century or more ago the Indians in this part of the United States, and possibly prehistoric inhabitants, visited the forest to obtain material for hatchets, arrow heads and knives, as the same material has been found in such implements among the cliff dwellers of Arizona and the Southwest.

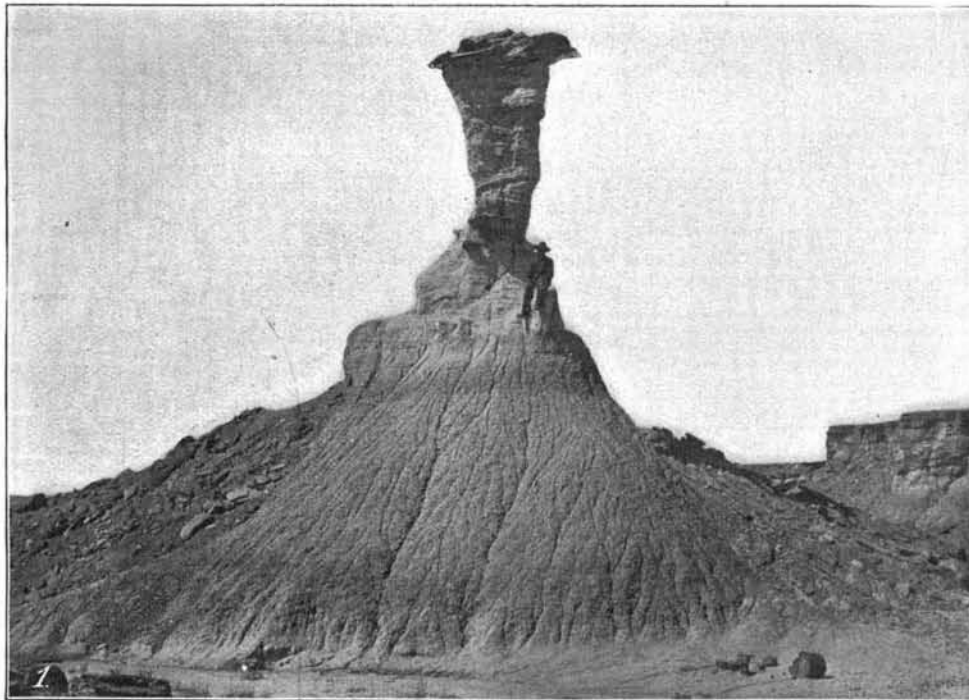
The beauty of the silicified wood and its hardness has attracted attention to the petrified forest by manufacturers, who have used it as a substitute for onyx and other material for the manufacture of table tops, clock cases, tiling for floors, and even curious jewelry. At the Chicago Exposition an assortment of articles manufactured in material obtained in the Arizona forest was shown, which attracted much attention. Another collection is now on exhibition in Paris. The material also forms an excellent substitute for emery for milling purposes, and several years ago a company was organized which located a mill for reducing it to a powder on the edge of the forest. Owing to competition from Canadian manufacturers, this plant was never placed in operation, and consequently a large portion of the forest was saved from destruction.

Probably the most remarkable feature of the forest is the Natural Bridge already referred to. This forms a thoroughfare across one of the gulches or canyons upon which a man can safely travel and which has been crossed by a sure-footed mule. The bridge consists merely of a huge tree trunk, which, it is believed, has never moved from the original section in which it fell. The center of the trunk shows that it is completely silicified. The exterior is coated with a sort of cement made of sand-rock, in which geologists believe it was originally imbedded. At the middle it measures 10 feet in circumference and at the base 4 feet in diameter. No branches, however, of any kind can be found upon it, nor are there any indications that branches have ever grown from the trunk. The supposition is that the gulley has been formed by the action of the elements washing away the formation from beneath the trunk as it lay where it originally fell and that its first bed was upon solid ground.

Several theories of the petrification of these trees have been advanced. One is that ages ago a volcanic shower buried a number of forests in the Southwest and that the action of water in later periods produced

the necessary chemical action to change the woody matter into the present material. In the case of the Arizona forest, however, there is little evidence of volcanic action, except in one or two portions. Many of the trees are found in the sandstone formation, and this has caused much discussion among geologists. It is admitted that the trunks and other fragments must have become petrified in the locality where they were found, as their weight would render it impossible for them to have become moved to the place by floods or by any convulsion of nature, owing to their size and the form in which they have been discovered.

At the last session of Congress the question of preserving the petrified forest in its present condition was brought up by a memorial from the Arizona Legislature that it be made into a national park like the Yellowstone. The Government has



The Twin Sisters.



An Agatized Log Bridge.

Eagle Rock Monument.

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are termed three centers of accumulation, on the theory that much of the wood has been carried from one point to another by natural phenomena. In each of these centers of accumulation can be found logs and blocks from a few inches in diameter to 5 feet, while trunks in length range up to 50 feet, although the tree forming the Natural Bridge has been measured a distance of 111 feet to a point where it meets the sandstone formation. Its length in the formation has not, as yet, been estimated.

Throughout the forests are scattered mesas upon which are many of the larger fragments. They are of brilliant tints in red, yellow, blue, and combinations of these colors, and sections cut through the center show that the interior of the logs have completely changed into the forms of agate, jasper and chalcedony. Judging from portions of the larger pieces which have been found, some of the original trees must have been from 150 to 200 feet in length. Owing to the fact that quartz crystals are abundant in the forest, many of the best specimens have been cut, also blown up with explosives by persons who wish to get solid crystals, which

The position of the various trees in the forest makes it exceedingly picturesque, but since 1853, when it was first discovered, but comparatively few tourists have explored it, owing to the difficulty in crossing the gorges and in climbing the mesas and other forms. Some of the trees have been found projecting from deposits of what were evidently at one time volcanic lava and ashes, as high as 25 feet above the volcanic foundation. Others are on the edges of the gulches lying like gigantic cannon, as if protecting the locality from the intruder. In some portions of the forest trunks are piled as neatly as if they had been arranged for the sawmill, ten to fifteen being counted in one lot. As will be noted by the accompanying illustrations, a large number of them are in lengths of but a few feet and at a distance looked like great cart wheels. As their centers are beautifully tinted with the colors referred to, the scene in the sunlight is so brilliantly dazzling that the visitor could imagine himself in a sort of earthly paradise were it not for the desolate surroundings formed by the clay, sandstone, and volcanic formations.

had examinations made of the tract, and it is probable that some action will be taken at the next session.

A Prize for Insulating Gloves.

A competition for insulating gloves to protect electricians is being held by the Association des Industriels de France Contre les Accidents du Travail, 3 Rue de Lutèce, Paris. A prize of 1,000 francs will be given for the best glove. Two pairs must be sent before December 1, 1900. The gloves must afford sufficient protection to the hand and forearm and must not only resist the current, but also any accidental perforation. Free play must be allowed to the fingers and the gloves must be easy to put on.

GREAT BRITAIN'S contribution to the immense photograph of the heavens, which is being prepared by all the leading observatories throughout the world, is making rapid progress at Greenwich Observatory, according to the report of the Astronomer Royal. The catalogue of star places resulting from this observation is also being printed.