

Petrified Forest

National Park Service
U.S. Department of the Interior



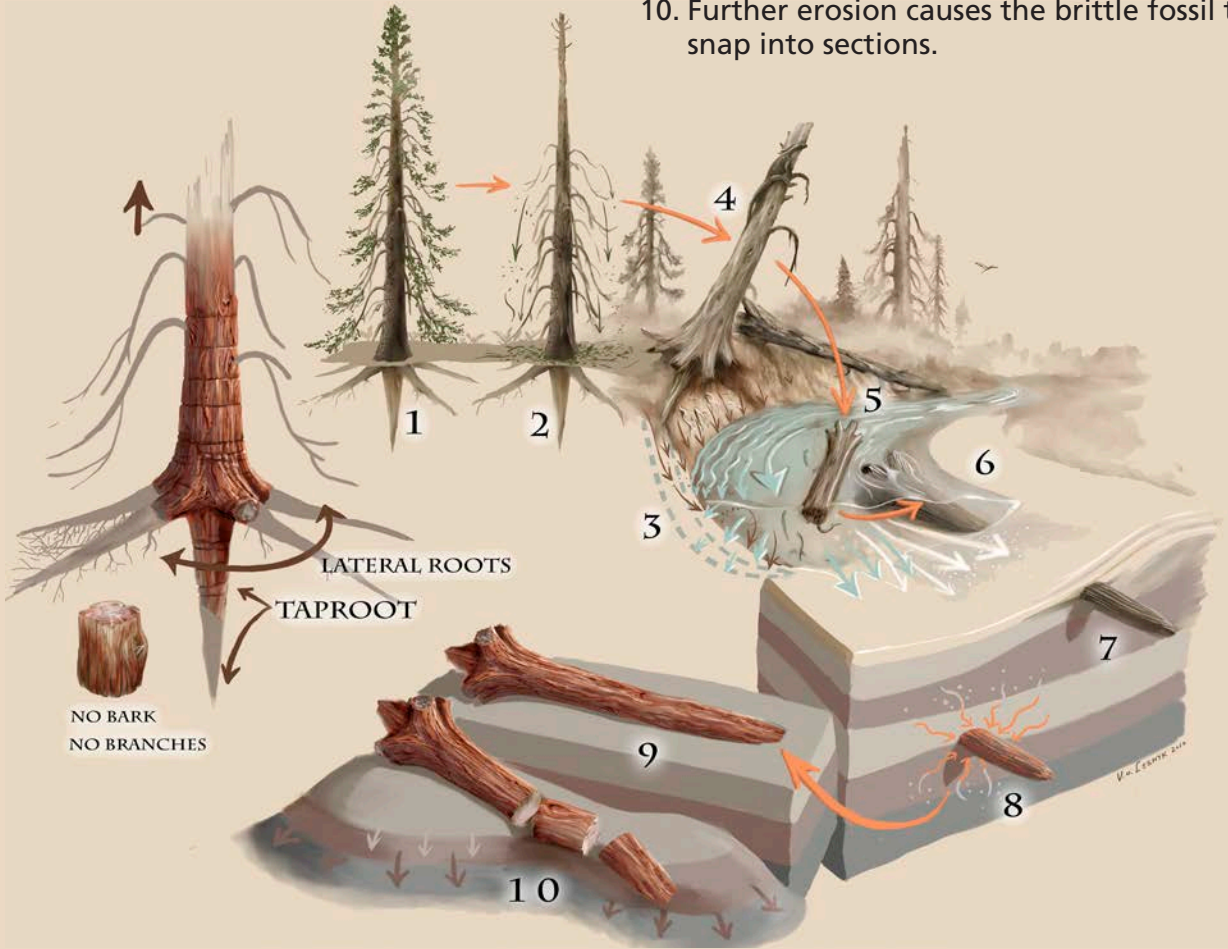
Trees to Stone

How Wood Becomes Petrified



The process of petrification

1. A tree dies.
2. The dead tree loses its branches and bark.
3. The river undercuts the dead tree.
4. The tree topples into the water.
5. The log may be transported.
6. Sediment starts to cover the log.
7. Rapid burial seals the tree away from bacteria and oxygen, inhibiting decay.
8. Mineral-rich groundwater percolates through the logs, depositing minerals.
9. The fossilized log weathers out of the surrounding rocks.
10. Further erosion causes the brittle fossil to snap into sections.



Who cut the wood?

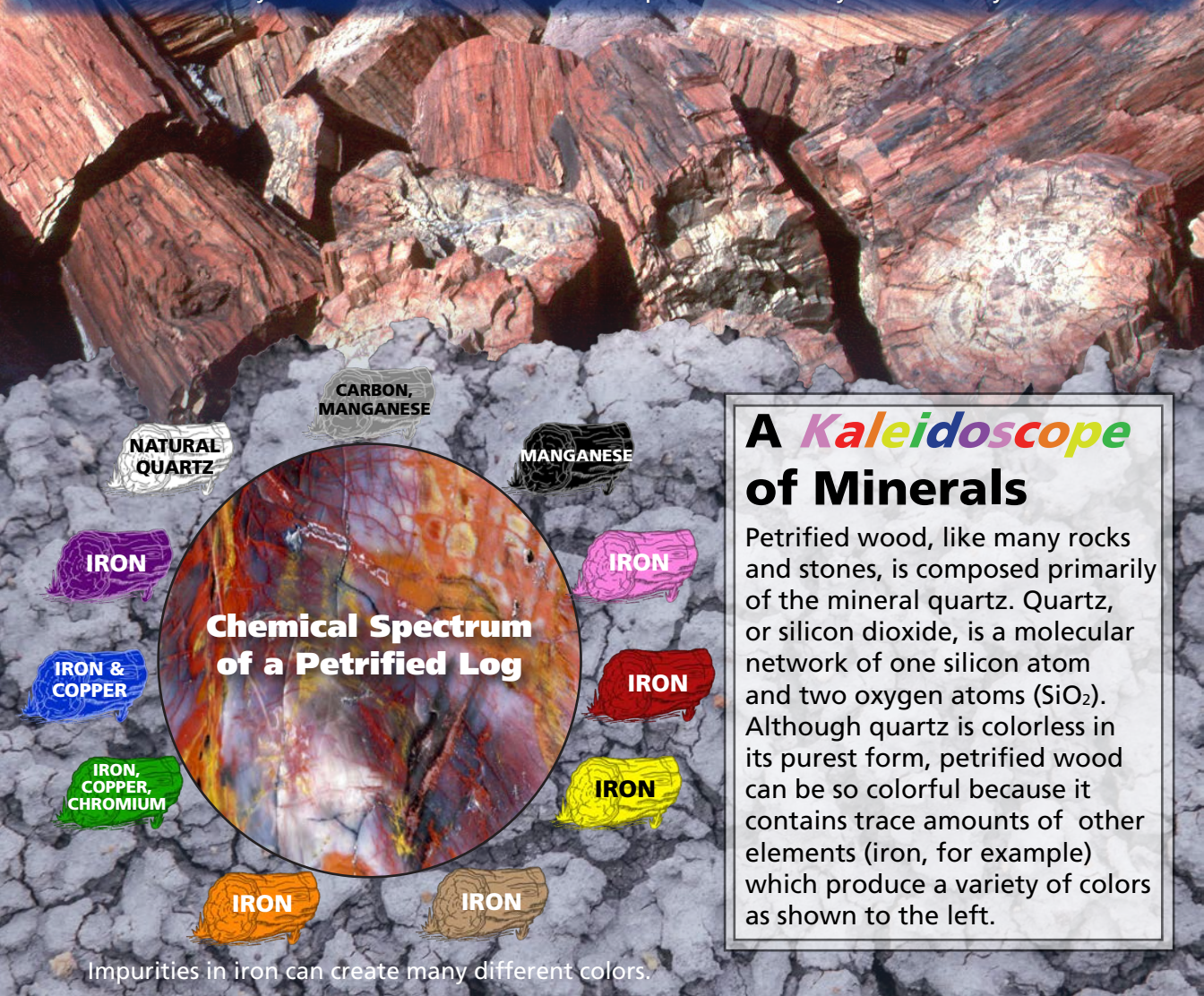
Petrified trees today lie strewn across clay hills and within cliff faces; each log broken into large segments. The quartz within the petrified wood is hard and brittle, fracturing easily when subjected to stress. It is thought that during the gradual uplifting of the Colorado Plateau, starting 60 million years ago, the still buried petrified trees were under so much stress they broke like glass rods. The crystal nature of the quartz created clean fractures, evenly spaced along the tree trunk, giving the appearance today of logs cut with a chainsaw.

How old is our petrified wood?

Quartz minerals within the logs cannot be used to date the logs themselves. We can date the rocks that contain the wood by using zircon, a radioactive mineral found in those rocks. The zircon crystals came from volcanic ash deposited during the Triassic Period. Zircon incorporates uranium into its structure but strongly rejects lead. Since uranium is unstable and decays to lead, by determining the ratio of radiogenic lead to radioactive uranium, we know that our fossil forests were alive from 210-227 million years ago.

How long does wood petrification take?

As shown in step 8, silicic acid enters the waterlogged tree and chemically alters the wood into opal that replicates the features of the wood. This stage is fairly quick and only takes thousands of years. As the log gets buried deeper it enters a 'dewatering' and recrystallization stage, transforming the opal to solid crystalline quartz. This process can take millions of years but the result is beautiful petrified wood you see today.



CARBON,
MANGANESE

NATURAL
QUARTZ

MANGANESE

IRON

IRON

**Chemical Spectrum
of a Petrified Log**

IRON &
COPPER

IRON

IRON,
COPPER,
CHROMIUM

IRON

IRON

IRON

A *Kaleidoscope* of Minerals

Petrified wood, like many rocks and stones, is composed primarily of the mineral quartz. Quartz, or silicon dioxide, is a molecular network of one silicon atom and two oxygen atoms (SiO_2). Although quartz is colorless in its purest form, petrified wood can be so colorful because it contains trace amounts of other elements (iron, for example) which produce a variety of colors as shown to the left.

Impurities in iron can create many different colors.

Questions & Answers

Q: *What kind of trees were they?*

A: Conifer trees, tree ferns, and some gingkoes.

Q: *How tall were these trees?*

A: Two trees in the Long Logs area of the Rainbow Forest measure 137 - 141 ft long (41 - 42 m). Some trees may have approached 200 ft (61 m)!

Q: *How heavy is the wood?*

A: About 160-200 pounds per cubic foot. (2,563 - 3,203 kilograms per cubic meter)

Q: *Does the petrified wood resemble any of the tropical conifers growing around the world today?*

A: Some may be distantly related to the Araucaria, Bunya Pine, Monkey Puzzle Tree, and the Norfolk Island Pine.

Myths & Misconceptions

The lost logs

It has often been said that large amounts of wood have been removed from the park. Comparing new and old photos shows that the wood deposits are still intact and nearly identical to landscapes as far back as the late 1800's.

It's all in the name

A common misconception is that Crystal Forest is named because of a large concentration of crystals in the wood. The truth is, the logs at Crystal Forest are no different in their content than those at any other sites in the park. The same could be said of the Black Forest where most of logs found there are, in fact, brown.

Petrified wood only occurs at Petrified Forest National Park

Petrified wood is found in every state and in many other countries. Petrified Forest National Park, however, has the largest concentration of petrified wood in the world, hence the National Park designation.

The park sells petrified wood

Petrified wood for sale at local shops has all been collected from private lands outside the park. All petrified wood within park boundaries is protected forever under federal law.

Please join the millions of visitors since this area was first protected in 1906 who have enjoyed the petrified wood here and left it undisturbed for others to enjoy, too.

Removal of petrified wood from the park is illegal under federal law.