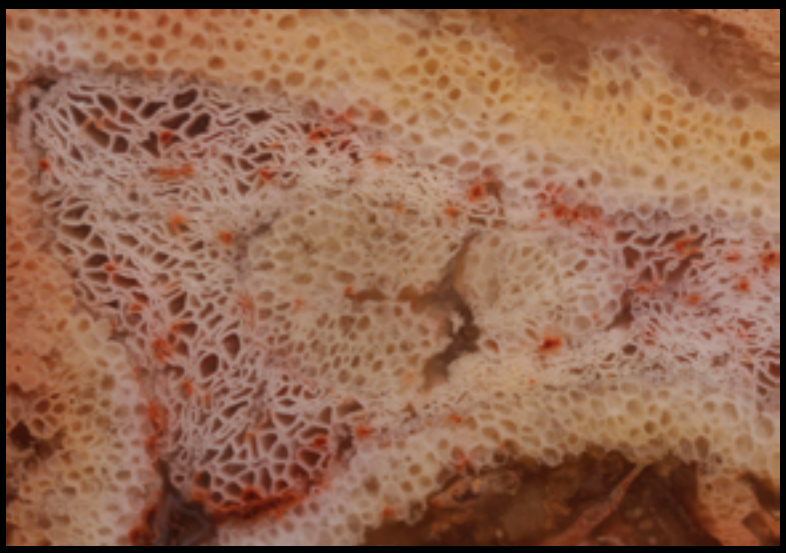
Petrified Wood



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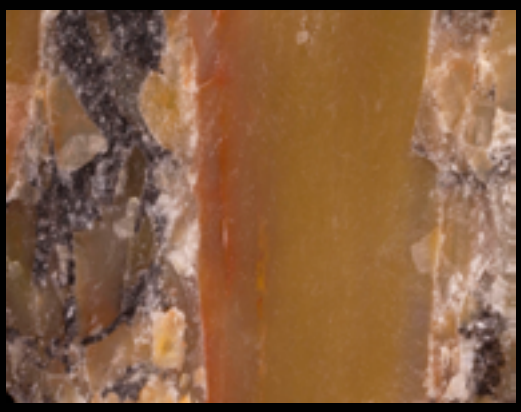
What is Petrified Wood?

Is it wood or stone?

Petrified wood is literally wood that has turned into stone. The name is derived from the Greek root *"petro"* which translates to rock or stone. This special fossil wood is turned into stone through the processes of permineralization and petrification. As a result of these processess, minerals replace the organic matter of the wood and harden, giving the wood its characteristic stone appearance.



How does it become petrified?

To become petrified, wood must be preserved. Trees can become buried beneath sediment following natural disasters like floods, mudslides, and volcanic eruptions. Once the wood is buried in sediment such as volcanic ash, mud or water, the wood becomes deprived of oxygen; which impedes decay.

Beneath the sediment, a mineral rich solution like ground water flows throughout, seeping into the wood. As the lignin and cellulose begin to deteriorate within the wood,minerals infiltrate the pores, crystallize and form a cast. This part of the process is referred to as permineralization. This is the first step in forming petrified wood. The next step is petrification; during which, minerals continue to crystallize and replace the organic material within the wood.

Note:

During the process of ***permineralization***, the organic composition and cellular structure of the wood is *preserved*. The cells are only filled with deposited minerals. Petrification is similar to permineralization, in the sense that the wood cavity is filled with minerals. However, the difference is that during ***petrification*** the minerals completely *replace* the original cellular composition and organic matter.

Why does this matter?

Petrified wood is our key to the past.

Because the permineralization process can preserve the original structure of the wood, this fossil wood can provide valuable information about the environment; the past and future,climate,aging and even evolution.

The organic material of the wood is most commonly replaced with quartz and silica minerals. When different elements mix with these minerals, the hardened crystals yield a variety of colors.

Listed below are a few common elements and their corresponding colors:

Carbon - black
Cobalt - green or blue
Manganese - pink or orange
Copper - green or blue
Iron oxides - red, brown, or yellow
Chromium - green or blue

The photographic process:

Equipment:

Canon 5D Mark II, a copy stand, fiber optic lights, bellows, 20mm and 30mm thimble lenses bellows,65mm canon 1-5x macro lens, black cloth, white paper and a motorized stage.

Camera Setup

File Format: RAW
ISO: 400
Fstop: f/11, f/16
Shutter Speed: 0.6 - 1/13 seconds
The camera was mounted on a copy stand and tethered through Adobe Lightroom to minimize vibration.

Magnification

For magnifications 1-5x I used the Canon 65mm macro lens. I found that this lens provides more desirable focus. For higher magnifications I used the 20 and 38mm thimble lenses attached to bellows.

Lighting

I used fiber optic lights positioned on each side of the wood samples bouncing off of white paper to provide diffuse lighting.

Stacking

Because each piece of wood had a unique texture and shape, I used a stacking technique to achieve optimal focus. To accomplish this, I photographed each piece of wood at different focal depths, and assembled them in post production using Zerene Stacker focus stacking program.

Zerene Stacker software offers three stacking methods. PMax, DMap and the option to use both PMax and DMap. I used the the DMap stacking method rather than the PMax method. I found that the PMax method altered the color and contrast of the image. The DMap method provided a slightly softer overall focus, but preserved the original integrity of the image.

Sources:
http://en.wikipedia.org/wiki/Petrified_wood
http://www.nps.gov/pefo/naturescience/petrified-wood.htm
http://www.ncsec.org/cadre2/team2_2/Lessons/questionsAnswers.htm

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