



Education

TRI-CLUB EDUCATION COMMITTEE OF THE VENTURA COUNTY GEM & MINERAL SOCIETIES

Petrified Wood Explained

Larry and I have been very lucky in that since his retirement in 2003, we have been able to take the whole month of October to travel across the United States. We visit family, rock hunt and mostly indulge in my other passion — genealogy. This year one of our stops was in Wise Co. Texas where my great-grandfather is buried. When we entered the beautifully kept pioneer cemetery to take a picture of his headstone, the rockhound side of me popped to the foreground immediately. It seems that about half of the markers in the cemetery were petrified wood. Some were upright, up to four feet sticking out of the ground, some were surrounding the graves and others simply marking the head and foot of the grave.



Wise Co. Texas petrified wood headstones

Clearly, in Wise Co. Texas in the mid 1800s petrified wood was a plentiful commodity! That is great for the rockhound of today—horrible for the genealogist—no dates, no names. Luckily for me Great-Grandpa John had one of the oldest headstones in the cemetery!

It brought home to me the fact that petrified wood is everywhere. It's found in all 50 of the United States as well as

all over the world— notably in Argentina, Denmark, Mexico, China, Japan, New Zealand and Indonesia.

When we first moved to Ventura, there was a rock shop in Oxnard, Geffre's, which had a 3 or 4 foot tall and 2 ½ foot wide section of colorful wood outside its front door from a petrified forest near Red Rock Canyon here in California. It is the state gem of Washington. There are a bunch of petrified forests in several different parts of that state. Petrified palm wood is the state fossil of Louisiana.

It is, also, one of the rocks that kids know and ask about. Therefore it is our subject for our newsletter this month.

How did wood get hard like that?

Our most common

question! Petro is the Greek word for rock or stone. Petrify means literally “turn to rock”. For wood to “petrify” you need only 3 things— wood, water and sediments. Some say the process takes about 100 years, others say it takes thousands and it may be that both are true. The process has been duplicated (with a few laboratory processing “helpers”) in less than a week in England.

The process of turning wood into a fossil (the preserved remains or traces of a living thing) generally involves the wood's interaction with water, being moved by a stream, flood or living and dying in a swampy environment. The wood must be quickly buried in sediments in a watery environment, so that it is not exposed to

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39th Annual Show in Oxnard

November 22nd and 23rd will see the opening of the 39th Gem and Mineral Show at the Oxnard Performing Arts Center at 800 Hobson Way in Oxnard. As it always has been, the show has free admission and free parking, along with many other freebies for

both children and the educational community. For teachers, there are many no cost teaching aids—books, posters, cd's and activities as well as samples of packets from some of the geology educational organizations. There are a limited number of books available. (See a

list on page 4). These are bought in quantity at very good prices—all below retail—some 60 % or more below cost at a dealer. Bring your ID.

There are lots of free and low cost activities for the kids. There is a free door prize drawing

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Petrified Wood continued

oxygen, where it could rot, as happens to the vast majority of fallen trees. The wood then decomposes very slowly as the mineral-rich water circulates into the tiny cavities and leave behind silica leached from the surrounding sediments. This process sometimes happens cell by cell so that if you look at the petrified remains with a microscope you can tell exactly what kind of tree it was by the identifying cell structure. That, also, enables you to see features such as tree rings, knots and bark in the fully formed fossil.

Petrified materials of more than 80 tree species have been found, the most common being walnut, sycamore, oak, magnolia, chestnut, redwood, maple, persimmon, dogwood and palm

Occasionally, wood will rot away after the surrounding sediments harden into rock, then at a later date this "mold" is filled with another mineral. The new "cast" may or may not have the outside look of the original piece of wood but none of the internal features since they were already gone.

The petrified wood takes on the characteristics, like hardness and weight of the new mineral replacement — generally quartz, sometimes calcite, opal or rarely other minerals. That means that though it has quartz's hardness (6 on the Moh's Scale,) it also has its brittleness and can shatter when under stress. That explains why fossil logs are often found in what looks like sawed sections, when they have broken as the layers surrounding them are deformed by pressures and shaken by earthquakes. Sometimes, the wood will have internal cracks caused by the crushing weight of sediments or decay. These are often filled in with crystals of the invading mineral providing beautiful displays, occasionally in amethyst or citrine (purple or yellow quartz).

How does it get to be that color?

Our second most common question! If wood, or anything else, is replaced with pure quartz, it will appear to be clear to white or gray. So how is the wood in the Petrified Forest National Forest red, blue, black, pink, yellow, gray, purple and all those other colors when it is quartz? The answer is that the volcanoes near what is now the park were contributing a great amount of mineral-rich ash to the sediments in which the trees were buried. The crystal structure of quartz allows the inclusion of tiny amounts of these dissolved minerals to tuck away in its structure which changes its appearance.

Petrified wood is found in the colors available in the water and sediments surrounding it when it was petrified. If the sediments have only white and black minerals, the wood will be white and black. If there is only chromium it will be green. Multiple and bright colors are generally desirable in collecting samples. Here is a list of minerals that cause colors in the woods:

Copper - green/blue
 Cobalt - green/blue
 Chromium - green/blue
 Manganese - pink/orange/black
 Carbon - black
 Iron Oxides -
 red/brown/yellow/orange/black/green
 Manganese Oxides - black/yellow
 Silica - white, grey
 Uranium - brown/green/yellow



Petrified National Forest and the Holbrook, Arizona area

When you think of petrified wood this is the area most people think about. One of the greatest concentrations of petrified wood in the world is found in the Petrified Forest National Park in northeast Arizona. It was set aside in 1906 but didn't become a park until 1962. Logs, as long as 200 feet long and 10 feet in diameter, have been found in the park.

About 220 million years ago, four hundred feet of sediment was deposited on this (then) plain by the rivers that originated from the Mogollon Highland volcanic mountain range. About 60 million years ago it started to erode. At this time, only about 125 feet of this Chinle formation has come to the surface. So there are still 275 feet of discoveries awaiting us!

By far the most common tree is *Araucarioxylon arizonicum*, similar to a redwood, with small amounts of two other species, though only nine species in all have been found in the park. To encourage the belief that the trees were washed in from afar is the fact that there are no tree limbs, roots, leaves etc. are preserved in the park. There are however over 200 species of plants identified from other Triassic fossils, such as leaves, pollen, and spores. In fact the value of the park is not measured in the "stars" of this show, the colorful fossil trees. Petrified Forest National Park has one of the best geologic and fossil records of the rare Late Triassic in the world. The plants, the dinosaurs and other animals--the unique ability to reconstruct a near complete record from the rare upper Triassic when the supercontinent of Pangaea was breaking up—that is the greatest value of this national park.

Colors from the Chinle Formation (left) in Arizona are dazzling. Fieldtrip 2005

Petrified Wood Continued

I started this article with a personal story of petrified wood and I will end it the same way. In 2005, one of our members reported to the club that there was going to be a rare chance to get petrified wood from a ranch that bounded the national park near Holbrook, Az. It seems that the government was condemning the ranch and some smaller properties in order to buy it to add to the park and the rancher wanted to make up for some of the revenue he would lose from the government taking the property, Sounded "fishy" but checked out

with the rangers. The park service was more interested in the fossils of the much more rare creatures and plants than it the petrified wood found the ranch. So I present to you pictures of some of the wood from that trip. Please come to our show and see it in person! Maybe you can pick out some cells and tree rings! As a footnote while I was researching this article, I found a comment from the park service about a new dinosaur that was found on newly purchased land adjacent to the Park in 2006.

Fieldtrip in 2005 to the Sell Ranch just outside Holbrook, Arizona



World Championship Crystal Dig



Stephanie Hagiwara with some prize quartz crystals

Ventura County was well represented at the World Championship Crystal Dig this

year. There were 7 participants from our county to the Mt. Ida, Arkansas area that is world famous for its abundant clear quartz crystals. Ventura, Oxnard, Port Hueneme and the Conejo Valley all had residents among the 112 contest entrants. Attendance was down about 15% from last year because of the gasoline costs.

A fabulous pocket was opened on the first day at the Arrowhead mine, one of the three mines participating in the contest this year. This pocket yielded most of the winners, both in the single

crystal and group categories. Several of the exquisite specimens were in the \$200 to \$450 value range even though there is a 10 pound size limit for each of the two classes. They were among the most valuable ever submitted in this event in its 22 year history.

Only one of our group got "on the board" with a 4th place 4" by 4" "golden healer" crystal, due to the pronominal find. We all did come home with boxes of the beautiful, clear quartz points and clusters.

Galaxy of Gems Show continued

that takes place every hour especially for the kids--aside from the regular adults drawing. We have the popular "make your own fossil" again as well as the Pebble Pup Challenge (see on page 4). This year we have a different Volcanic Rock set based on the old egg carton sets. There are always the "Touch Rocks" that the kids are encouraged to feel and lift and the "Ugly Rocks" that are ugly on the outside and pretty on the inside. We have interesting guests this year: from **Bureau of Land Management** - Chief Geologist Dr. Gregg Wilkerson--from **Women in Mining**—Betty J. Peters--from our

own **Ventura County Library**—Lori Karnes and Mary Stewart

Gregg can answer rock and location questions. Every girl should be encouraged to come and talk to the Women in Mining if just for the encouragement of women doing non--traditional jobs and teachers because they have great handouts for the you! Lori and Mary are a great source for you and will have information on library resources, getting rock boxes and the brand new fossil box that is now available for loan at the library.

There will be about 70 display cases of minerals, handmade

jewelry and rocks. There are booths for games with gemstone, arrowhead and sharks teeth prizes, grab bags, a special Scout program to get their geology badge in one day. We have a silent auction for inexpensive rocks. There are hands on demonstrations of lapidary, art clay, beading and wire wrapping and etc. and dealers to start your Christmas shopping early.

Our FREE teacher rock samples this year are on page 4. Bring your teachers ID with you!!

Pebble Pup Challenge

- What is the State Fossil of California?
Smilodon (saber- tooth tiger)
- What gemstone comes in the most colors?
Garnet
- What makes a gold nugget a nugget?
A nugget has been rounded by water.
- How much of this petrified wood is wood?
None, the wood has been replaced by quartz.
- What mineral is in cement and in animal crackers?
Calcium carbonate or limestone
- Why is the colorful fluorite not used in jewelry?
At 4 on the hardness scale, it's too soft.
- How does limestone turn to marble?
Pressure, heat and often hot liquids are forced through deposits of limestone.
- How did sharks teeth get to Bakersfield?
It was an ocean until the Coast Range was pushed up.
- What is the difference between a rock and a mineral?
A mineral is composed of one type of atom---a rock can be made of many minerals.
- What do coal and diamonds have in common?
Both are composed of the same mineral -- carbon

We're on the Web!

oxnardgem.com

Books available for teachers at the show (be sure to bring your teacher I.D.)

5 Copies	<i>A Pocket Guide to Rocks and Minerals</i>	\$5.
3 Copies	The Complete Guide to Fossils & Fossil Collecting	\$7.
6 Copies	The Complete Guide to Rocks & Minerals	\$7.
“ Learning About “ series from Dover		
25 Copies	Learning About Minerals	\$1.25
15 Copies	Learning About Rocks	\$1.25
2 Copies	Learning About Prehistoric Animals	\$1.25
Diamond Dan books		
4 Copies	Corundum Carl	\$1.25
15 Copies	Gold	\$1.25
14 Copies	The World of Minerals & Crystals	\$1.25

Free Teacher Rock Samples For 2008

- 10 Volcanic Bombs – These are large size bombs from Owens Valley
- Pumice -- the floating rock for your classroom
- Feldspar – The most common mineral
- Ventura County Coquina – From Point Mugu
- Rose quartz – Pink tinted quartz from Greenhorn Mountain California
- Granite – A “salt and pepper” with easy to recognize components
- Gypsum – common sedimentary rock – often the “glue” in other rocks

New Fossil Boxes Now Available at Library

These two newest additions to the educational aids sponsored by the County's Tri-Club Education Committee for use by teachers is now ready and waiting to be checked out through your nearest branch of the Ventura County Library. The two General Fossil Kits were developed, documented and assembled by Jim Brace-Thompson, acclaimed fossil collector from Ventura and the author of the instruction manual for the Earth Science Kit that is being distributed to the county's schools now. Brace-Thompson, who has won many awards in this field, donated many of the fossils from his own collection.

The collection comes in a 15" X 8 ½" X 2", easy to handle metal case that is lockable. It has 18

compartments with a fossil from each of the 18 Eras. The kits include samples from all 5 kingdoms that include such diverse samples as algae and trilobites to dinosaur bone and a marine mammal tooth.

Each sample has the time period and location where it was found and some interesting information about the specimen. Included is a card containing information on what a fossil is and the different forms of fossilization. There is a chart with information on the “Tree of Life” and the “5 Kingdoms” are defined.

Two classroom activities, “Making a Fossil” and instructions on creating a time line are also in the box along

with a pocket guide for fossils.

You can reserve the box for whenever you need it by calling E.P. Foster Library at 805-648-2715 and requesting the date you want. The Library will send the kit to your nearest county library for pick-up before that date.

