



Wickenburg Gem & Mineral Society, Inc.

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The purpose of this organization shall be to educate and to provide fellowship for people interested in rocks and minerals; to foster love and appreciation of minerals, rocks, gems, and the Earth.

Membership shall be open to all interested people.

PETRIFIED WOOD ARIZONA'S STATE FOSSIL

By Susan Celestian

Modified from an article originally written while curator of The Arizona Mining and Mineral Museum, Phoenix, Arizona

The weather will be cooling off soon, especially 'up north', and it could be a good time to wander about the Petrified Forest, and perhaps fossick on BLM land or at a commercial property, such as Dobell Ranch. Maybe that would be a good field trip?

Petrified wood is found in nearly every state in the United States, and in many other countries -- notably (but no where near exclusively) Indonesia, China, and Argentina. In Arizona, it is found in nearly every county. However, it is the fossil wood in the Petrified Forest National Park and adjacent areas that is most famous, for its size, color, and beauty.

Arizona's story begins in the late Triassic Period, roughly 225 million years ago, when the area of the Petrified Forest was a broad, tropical coastal plain, occupying a near-equatorial position. About 100 miles to the south, rising mountains (the Mogollon Highlands) were the source of northward-flowing streams. Rivers carried trees into this lowland, which supported marshy areas lush with primitive plants, reptiles, amphibians, mollusks, and insects. Mountain forests of coniferous (cone-bearing) trees, 80-200 feet tall and 3-9 feet in diameter, thrived in the tropical environment. Through normal erosion and flash flooding, the rivers brought in sediments (sand, silt, clay) and logs of trees (a small percentage of the trees grew in the immediate area). That long journey removed most of the bark, limbs, and roots of the trees. See Figure 1. In all, over 900 feet of sediment buried the trees and other organisms, and became the Chinle Formation.

Summer is Over
(at least by the calendar)

NEXT MEETING:

Friday, October 12, 2018 7:00pm
Potluck starts at 6:00 pm



FIGURE 1 These two tall petrified trees in the Petrified Forest travelled many miles, getting stripped of roots, branches, and bark along the way.

Photos by Stan Celestian

Petrified Forest continued on page 2.....

INSIDE THIS ISSUE

Petrified Forest and Petrified Wood	1-5
Minutes	2
Lapidary Resources on the Internet	5
Field Trips Upcoming, Show List, Club Information	6

Meeting Minutes — May 11, 2018

The meeting was called to order by Vice president Mel C, after a potluck dinner with 15 people in attendance. The pledge of allegiance was said. A new youth member, Bohdy, was introduced.

The minutes for the April meeting were approved as presented in the newsletter. The treasurer’s report was approved as presented by Debbie.

New Business: The Rocky Mountain Federation show will be held in Rapid City South Dakota July 20-22.

Scholarship: Five Scholarship applications were presented to the board members. None of the students fit the stipulations of the application, so no earth science scholarship will be given this year.

Club Show Saturday November 24th 9AM-5PM and Sunday the 25th 10AM-4PM: Debbie C and Robbie B will be helping Beth with the show this year.

Next Field trip will be in October. It was suggested that two vehicles scout the proposed trip area prior to taking a big group out. They will determine the difficulty and what rocks will be available for collecting.

Show and tell prize was won by Bohdy and the first door prize winner was also Bohdy. Followed by Debbie C, Beth and Allice.

Mel C gave a presentation on collecting minerals specimens. With his microscope and computer set up we were able to identify tiny mineral crystal formations.

Next meeting will be October 12 with a potluck dinner starting at 6PM.

Respectfully Submitted,
Debbie K.



This orange-ish agate took on a highly lustrous shine. It was collected by club member George S., on a club field trip, earlier this year. Photo by George S.

...Petrified Forest continued from page 1

Volcanoes to the west and southwest contributed siliceous volcanic ash to the Chinle sediments. The water-logged trees were buried in this silica-rich sediment. Rapid burial and low oxygen levels prevented rotting of many of the trees. As some of the ash dissolved, silica-rich water filled the pores of the saturated wood (leaving the original cell walls intact) and was deposited as the mineral *Quartz*. This process of petrification is called **permineralization**. As pore spaces were filled, the cellular structure was sometimes precisely preserved, making species identification possible. See Figure 2. Other times, this exact preservation may be a result of atom-for-atom **replacement** of the wood. The varied and beautiful colors, that make Arizona’s petrified wood so valuable, are due to trace amounts of various minerals. See Figure 3.

Actually, according to www.intersurf.com/~chalcedony/Petwood.html, the chemistry of wood petrification is as follows: The dissolved silica is a form of monomeric silicic acid. It attaches to the wood’s lignin and cellulose, eventually forming a layer, which later dehydrates into silica gel. The pores fill with this silica gel, which is converted into opal after rapid water loss. After 10-40 million years, the opal dehydrates and crystallizes into chert or microcrystalline quartz.

COLORS IN FOSSIL WOOD

- White/Gray - No Impurities
- Red/Pink - Hematite
- Yellow/Brown/Orange - Goethite
- Green - Iron, Chromium Copper
- Black - Carbon, Pyrite, Manganese Oxide
- Purple/Blue - Manganese Oxide



FIGURE 2 Fossil wood from Oregon, identified as Red Oak. The fossilization process of permineralization resulted in the preservation of the cellular structure of the original wood.

This structure matches that of an extant species of Red Oak. Many species of wood have been found and identified in Oregon and Nevada.

Photo by Stan Celestian

.Petrified Forest continued on page 3....

...Petrified Forest continued from page 2



FIGURE 3 Colors in Petrified Wood Arizona fossil wood is among the most colorful in the world. During the fossilization process, trace amounts of soluble elements in the water-saturated sediments become incorporated within the fossilizing silica, turning the wood a rainbow of colors. Since these elements are fairly ubiquitous in the environment, it seems strange that other woods in the western U.S. are not similarly colored, but tend to be shades of gray, brown and black. *Photos by Stan Celestian*

About 90% of the fossil wood of the Petrified Forest is *Araucarioxylon arizonicum*, Arizona's state fossil. Two other dominant species of trees are: *Woodworthia arizonica* and *Schilderia adamanica*.

As subsequent seas covered the area during the Jurassic and Cretaceous Periods, more than 3000 feet of additional sediment was deposited on top of the Chinle Formation. Then about 60 million years ago, as a result of the uplift of northern Arizona (as part of the Colorado Plateau) erosion, and the removal of over half a mile of rock, exposed the petrified-wood-bearing strata.

Most Western U.S. fossil wood was preserved in similar fashion, although most is generally much younger (less than 144 million years old) than Arizona's. A third form of preservation is a **cast (limb cast)**. A cavity in the shape of a piece of wood is filled in with quartz, replicating the external form of the wood.

Fossil wood of Eastern states tends to be older (greater than 250 million years old) and is usually preserved as a natural cast or by **carbonization** (organic remains reduced to essential carbon), often associated with coal deposits. See Figures 4-9.



FIGURE 4 Arizona Petrified Forest Fossil wood in northern Arizona is replaced with chert, a dense, opaque form of cryptocrystalline quartz (refer to newsletter Nov 2017). *Photo by Stan Celestian*



FIGURE 5 Fossil Wood of Southern Arizona These two specimens are from somewhere in southwestern Arizona. I'm not sure the exact age, but they are much younger than the wood in the Petrified Forest. They are replaced by quartz, but more delicately than that 'up north'. The fossils are porous, the wood grain is preserved, and even borings are obvious. Between the tan color, and the visual woodiness, they are hard to distinguish from real wood, at first sight. *Photos by Stan Celestian*

.Petrified Forest continued on page 4....

....Petrified Forest continued from page 3



FIGURE 6 This twig of petrified wood, from an unknown locality, is interesting in that the bark is agatized, while the core is silicified (non-agate).
Photo by Stan Celestian



FIGURE 7 Fossil Wood of Indiana This fossil of *Lepidodendron* sp. was found in a carbonaceous shale in a roadcut in Indiana. It is Carboniferous in age, which is much older than that of Arizona -- around 350 million years. Rather than being replaced by quartz, it is a cast. The wood was buried, rotted away, and then silt/fine sand filled in the space, thus replicating the original wood.
Photo by Stan Celestian

Collecting the West's petrified wood is sanctioned on private land (with landowner's permission).

On BLM land, one may collect 25 pounds, plus one piece, per day for a total of 250 pounds/year -- for private use.

On Forest Service Land, the rules are a bit less formal. Generally, a "reasonable" amount (estimated at about 10 pounds) may be collected for personal use.

.Petrified Forest continued on page 5....



FIGURE 7 With obvious wood grain, this Montana wood has been replaced by agate. Note the shiny, somewhat waxy appearance.
Photos by Stan Celestian



FIGURE 8 From an unknown locality, this piece of petrified has beautiful wood grain. Looks just like a fresh piece of wood!
Photos by Stan Celestian

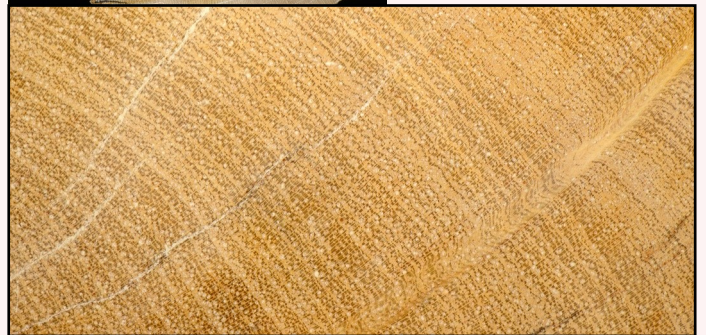


FIGURE 9 These limb casts of pink quartz were collected at Texas Springs,

near Jackpot, Nevada, and out of the Miocene-age Rhyolite Volcanics. This spot would make a great field trip!
Photo by Stan Celestian

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While not exactly petrified wood, there is an additional way in which trees (or the evidence of trees) is preserved. This occurs during volcanic eruptions, where trees are wrapped in lava. See Figures 10-12.

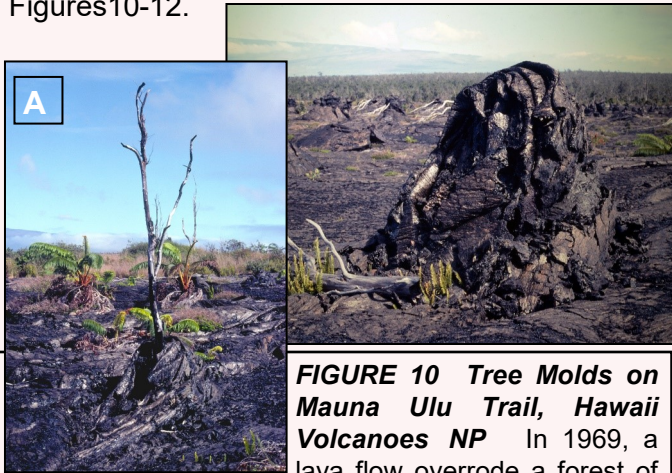


FIGURE 10 *Tree Molds on Mauna Ulu Trail, Hawaii Volcanoes NP* In 1969, a lava flow overrode a forest of

Ohia trees. The lava wrapped around the trunks, and the wood burned. Due to the water in the wood, some trees were not totally destroyed, at first, and trunks still remained in 1986, when photos A and B were taken. C and D were taken in 2015, the wood is long gone, and the external molds of tree trunks are revealed.

Photos by Stan and Sue Celestian



FIGURE 11 (left)

This hollow tree mold can be seen on Devastation Trail. It stands as evidence of a tree overcome by a 1959 lava flow.



FIGURE 12 (right) This lava mold of a tree trunk stands as sentinel in Lava Tree State Park, Hawaii. It is from a 1790 lava flow.

Photos by Stan and Sue Celestian



LAPIDARY & RELATED RESOURCES:

There are lots of websites out there with hints, tips, tutorials, and ideas about lapidary processes, silversmithing, wire-wrapping and other related crafts.

FACEBOOK: There are many groups on Facebook, there to join and reap the benefits of others' expertise. For example:

Lapidary Tips and Tricks:

<https://www.facebook.com/groups/774419732663040/about/>

Silversmithing and Jewelry:

<https://www.facebook.com/groups/Silversmithing.Jewellery/>

PINTEREST: Pinterest is a bottomless searchable font of ideas, on any imaginable subject. Members save ideas, tutorials, and images within many, many categories. Join and you can create your own categorized bank of information -- either by choosing ones already "pinned" by other members, or ones you find while browsing the web. Pinterest will suggest links related to your interests. For example:

Cutting Ethiopian Opal:

<https://www.pinterest.com/pin/AWslrOwQVQXqI71ZBUljVmLJCg7W0OywLq2bhZcxyycQ34xwg0eNswM/>

Wire Wrapping

<https://www.pinterest.com/pin/452471093807120520/>

Viking Weave:

<https://www.pinterest.com/pin/421438477603181989/>

YOUTUBE: Here you can find videos of instruction on many, many subjects. Sometimes it is very helpful to see a technique being done, and orally described. For example:

Soldering a silver ring:

<https://www.youtube.com/watch?v=AiT Xgm5G23s>

UPCOMING AZ MINERAL SHOWS

October 12-14 - Buckeye, AZ West Valley Rock and Mineral Club (HelzaRockin' Gem and Mineral Show); Buckeye Arena, 802 N 1st St (Miller Rd); Fri-Sat 9-5, Sun 9-2; Admission: Adults \$3, children under 13 free, with adult.

October 13-14 - Sierra Vista, AZ Huachuca Mineral and Gem Club; Cochise College, 901 N Colombo Av; Sat 9-5, Sun 10-4; Admission: Free.

October 20-21 - Sedona, AZ Sedona Gem and Mineral Club; Sedona Red Rock High School, 995 Upper Red Rock Loop Rd; Sat 10-5, Sun 10-4; Admission: Adults \$3, children free.

November 2-4 - Black Canyon City, AZ High Desert Helpers; High Desert Park, 19001 E. Jacie Ln.; Fri-Sun 9-4; Admission: Free.

November 17-18 - Payson, AZ Payson Rimstones Rock Club; Payson H.S., Longhorn Gym, W. Longhorn Rd & N. McLane Rd.; Sat 9-5, Sun 10-4; Admission: Adults \$2, children under 12 free.

November 24-25 - Wickenburg, AZ Wickenburg Gem and Mineral Club; Wrangler Event Center, 251 S. Tegner St.; Sat 9-5, Sun 10-4; Admission: free.



If you are travelling, a good source of shows AND clubs is <http://www.the-vug.com/vug/vugshows.html> or <http://www.rockngem.com/ShowDatesFiles/ShowDatesDisplayAll.php?ShowState=AZ> For out-of-the-country shows: <http://www.mindat.org/shows.php?current=1>

A good source for a list of Arizona Mineral Clubs and contact information is http://whitemountain-azrockclub.org/Public_AZ_Clubs_Links.html

UPCOMING WGMS FIELD TRIPS

No Upcoming Field Trips Planned at this Time

DATES & PLACES SUBJECT TO CHANGE

CONSIDER VOLUNTEERING TO PLAN OR HELP PLAN TRIPS. YOU WOULD NOT NEED TO LEAD EVERY TRIP, BUT KEEP THINGS ON TRACK

If you all have some place that you would like to go, let Schneiders or Craig J. 208-523-9355 or 208-681-4770. This is your club. Let's go out and have some fun.

Officers and Chairperson

President: Craig Jones..... 208-523-9355
Vice President: Mel Canter 502-641-3118
Secretary: Alyson Arnold 517-652-1355
Treasurer: Debra Keiser..... 928-684-1013
Program Director: Dale Keiser..... 928-684-1013
Publicity: currently open position
Membership: Roma Hagan 602-469-7662
Editor: Susan Celestian 602-361-0739
Field Trip: Craig J, Alice & Jim S.
Show Chair: Beth Myerson..... 480-540-2318
Scholarship Chair: Steve Hill..... 928-533-3825
Historian: Jeanine Brown..... 928-684-0489

Meetings are held the **2nd Friday most months** at **Coffinger Park banquet room**. Potluck dessert at 6:30 pm. Business meeting at 7:00 pm. **Exceptions: February and December** meetings are held on the **first Friday of the month**. We do not meet in the summer — **no meetings in June, July or August**.

**Membership Dues: \$15.00 Adults per Person
 \$ 5.00 Juniors and Students**

Meeting Dates for 2018

Wickenburg: Jan 12, Feb 2, Mar 9, Apr 13, May 11, Oct 12, Nov 9, Dec 7

Stanton meets Thursday after the Wickenburg meetings. Jan 18, Feb 8, Mar 15, Apr 19, May 17, Sept 20, Oct 18, Nov 15, Dec 13 (subject to change)

<http://www.wickenburggms.org/>

If you ever have photos from a club field trip, send a couple to Dale, for posting on the website.

NOTES FROM THE EDITOR

Have a geological interest? Been somewhere interesting? Have pictures from a club trip? Collected some great material? Write a short story (pictures would be great). I'd like topic suggestions also.

I would love to have some pictures from field trips! Snap a couple and send them -- or a link -- to me.

Deadline for the newsletter is the 27th of the month.

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