



NARG NEWSLETTER

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Holiday get-together Pg 1-2

Salmon field-trip Pg 3-4

South Dakota trip Pg 5-7

New York trilobites Pg 8-9

Post, OR field trip Pg 10-11

Woodburn dig 2023 Pg 12-13

Museo Geomineral Pg 14-15

Retirement trip of a lifetime Pg 16

On the Prowl book review Pg 17-18

NARG Holiday Deco Pg 18

Petrified Wood ID Pg 19

NARG Library Pg 20

NARG Membership Pg 20

NARG Calendar Pg 21

NARG Officers and Committees Pg 21

NARG Mission Statement Pg 21

NARG Celebrates the Holidays with Annual Get-together

On November 11, around 20 NARG members attended the annual get-together at the Tualatin Heritage Center. In previous years, the celebration included a potluck dinner and auction, but this year, we tried something new. Debbie Shannon and Gerry Lukos organized this year's event. It included potluck snacks tables and a fossil swap. While eating BBQ sliders, fruits, veggies, snacks, and cookies, the group caught up and shared wonderful fossils. Robert Rosé brought pieces of petrified wood to share, while Tim Fisher had crab concretions and more. Greg Carr brought buckets of fossils. Many folks swapped stories and fossils. Another fun activity was the raffle. Tara Baker took home a dinosaur PlayDoh set for her godson, while others won books and prepared fossils. It was a great way to start off the holiday season and say good-bye to 2023!



Holiday snacks and chats



Looking through one of eight tables full of fossils for sharing and swapping.

Holidays, Continued from previous page



Debbie Shannon and Gerry Luko were the event organizers.



Aaron Currier and Larry Purchase chat over fossils for swapping.



Greg, Gloria, and Peggy Carr made it a family affair.



Thomas Stevens, Bruce Thiel, and Greg Gentry talk fossil adventures, most likely about crab concretions.



A full snack table



Larry Purchase peruses the raffle table.



David Klubert and Gloria Carr, with Cindy Yablok and Linda Frenette chatting in the background

Salmon Fossil Recovery Field Trip

Vibbert's Gravel Quarry, Gateway, Oregon

May 13 & 14, 2023

Greg Carr

This field trip was organized to recover two salmon fish skulls left behind from the 2022 Field Trip, a third skull identified later in 2022, and some matrix where loose bones had been found.

Although the dig was scheduled for Saturday May 13 and Sunday May 14, some of us went out on Friday May 12 to get an early start. We started digging out the large hole where the twin skulls from last year were located. In all, over the three days, we had to excavate about one cubic yard of cemented gravel to get around a block that hopefully will contain the skulls.

Over the three days we had 18 people participate, including several first-timers. We recovered all our target blocks. The main target was a large block that may contain two skulls. This block had two backbones leading into it which we recovered last year. The block does contain at least one skull. We'll have to wait until it's prepared to see if there is the second! The block is all gravel, no sand lens, and weighs about 400 pounds.

A second smaller block may contain a third skull. It came from the edge of a sand lens that yielded two skulls with backbones, recovered in 2011 and 2014. Again, we'll have to wait until it's prepared to see if there is a skull or not.

A set of smaller blocks were collected from an area of disarticulated bones. Most of these have been partially prepared. A lot of bones have already been recovered – one partial lower jaw, five head bones like gill plates, five spines from fins, six centrums, and two bones that may actually be from a bird. Good work, Debbie Shannon, on getting these smaller blocks!

The most unusual find was made by Isaac Gagner. He was looking at one of the blocks left over from last year's excavation (2022) and noticed that there were bones in it. In fact, there was a whole set of articulated bones, possibly leading to skull pieces, through the entire length of the 16-inch block. He'll be preparing it as a reward!

Attached are some of my pictures from the dig.



Isaac with rotary hammer at the large block excavation.



Isaac with his articulated bones from last year

Salmon dig, Continued from previous page



Potluck lunch on Saturday



Happy folks digging ugly pits in to the cliff face



Debbie and Tom digging the disarticulated bone area.



Loose bones discovered from the disarticulated bone area

Field Trip Report: South Dakota June 2023

Isaac Gagner

On June 17th my mother, grandmother, and I departed from Oregon to travel out to South Dakota for the pay dig with the folks at "Naughty Nautilus". I arrived back home on July 1st. We made numerous stops along the way, collected hundreds of fossils, and visited several museums.

The first fossil stop was in Washington State where we surface collected at a Cambrian roadcut. This produced two cephalons of Redlichiida trilobites, I believe, belonging to *Nevadia addyensis* (pictured below). The fossils from this roadcut are not particularly well preserved and appear to be exclusively fragments from molted exoskeletons. Nonetheless, I was very pleased to have found trilobites from WA.



Our next fossil related stop would be a few days later in Bozeman, Montana at the Museum of the Rockies. The museum has a fantastic array of dinosaur fossils and I highly recommend visiting if you get the chance. This display on Triceratops ontogeny was especially impressive.

From Bozeman we found our way further East to the Glendive area. We camped at Makoshika State Park, with a beautiful view at our campsite.

We met Greg and Peggy Carr at the park and collected some fossils in the Pierre Shale on BLM land south of the park. The most common fossils by far were the shells of the clam *Inoceramus*. We also found several ammonites of the genus

Hoploscapites, and nautilus of the genus *Eutrephoceras*.



Inoceramus



Hoploscapites



Eutrephoceras

South Dakota, Continued from previous page

From Glendive, we made our way to the ranch where we would collect with Don and Karly Litchfield of “Naughty Nautilus” and other NARG members, Tom Stevens and Doug Olson. Right away we started finding fossils on gravel bars along the creek, including this impressive *Placenticerias ammonite* found by Greg.

Extensive rain covered the gravel bars after the first day but hunting continued. Large concretions were found eroding out of the softer shale in numerous places along the creek. These concretions were split primarily using chisels and hammers. Inside, we found cephalopods including *Baculites*, *Hoploscaphites*, *Placenticerias*, and *Eutrephoceras*. Some concretions contained a thick hash of dozens of examples, others contained only a single large ammonite.



Greg Carr opens a large concretion



Tom Stevens holding a pristine *Eutrephoceras*



Karly Litchfield discovers an extant amphibian



Arguably the most impressive find during our time on the ranch was this massive *Placenticerias ammonite* found by Tom Stevens. If memory serves, the ammonite measures 19 inches in diameter. To transport the large concretion, it was carried on a stretcher by two people.



After our time on the ranch, our respective family members were anxious to go home, so Greg and I traveled together from this point, allowing Peggy, my mother, and my grandmother to return home sooner. Greg and I visited several museums. First, The Mammoth Site in Hot Springs, then The Black Hills Institute. We traveled to Casper, Wyoming to see the Tate Geological Museum and speak with JP Cavigelli. JP was kind enough to show us around behind the scenes.

Lee rex in the Lee-Tate Prep lab

South Dakota, Continued from previous page

We drove through the Grand Tetons and Yellowstone National parks, then down to the Spence Gulch locality in Idaho. This is the type locality for the Spence Shale, a Cambrian lagerstatte similar to the Wheeler Shale and Burgess Shale. We collected many trilobites in this area. The taxonomy of these trilobites has changed significantly since the locality and its fauna were originally described, so I do not yet have accurate IDs on many of the trilobites we found. We found dozens of beautiful hyoliths as well as numerous complete and exceptionally well-preserved trilobites representing several species and a wide range of stages of life.



An adult *Ptychopariida* trilobite, originally described as *Alokistocare*



A molted exoskeleton of the coveted trilobite *Amecephalus*



An adult *Zacanthoides*, found by Greg



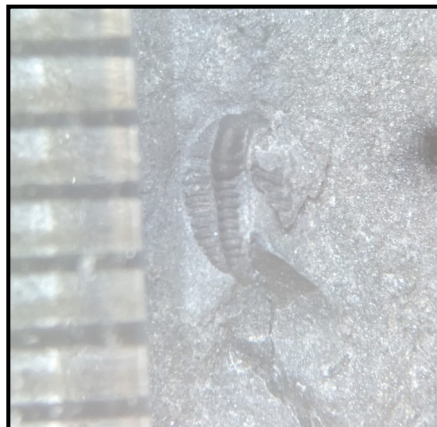
A juvenile *Zacanthoides*, next to a well-preserved hyolith



A smaller species of *Ptychopariida*. I am uncertain of the genus.

After this we visited the Idaho Natural History Museum. Then, we made our way back to Oregon and the long process of unpacking, sorting, and preparing our finds could begin.

In the time since this trip, I have begun preparing some of the smaller trilobites I found at the Spence Gulch. The shell on these trilobites is a gorgeous jet black and makes for a striking appearance. It is however very fragile. Preparation must be done carefully under magnification using air abrasion at low PSI with sodium bicarbonate as media.



Prepared trilobites from the Spence Shale. Scale in mm

Collecting the Devonian Trilobites of New York

Isaac Gagner

New York is world famous for its Ordovician, Silurian, and Devonian trilobites. In late July, I had the great pleasure of visiting New York to collect some of these trilobites with several of my friends who routinely collect in these areas. We focused on the Devonian trilobites (we did visit one Ordovician locale but did not find any trilobites worth noting). I flew out to Buffalo on the 24th of July and met up with the crew. We stayed the night in Buffalo and the following morning went straight to Penn Dixie Fossil Park.

We went back to where we could start a bench in the productive layer and met up with Penn Dixie employee James Hanna.



Penn Dixie Front Gate



The location of our bench when we arrived

Working together, we removed overburden with bars and shovels, and then using a wedge and 12 lb. sledge we removed blocks of the productive layer. These blocks were pulled out and then split down into small pieces in search of *Eldredgeops rana*, and *Greenops barberi*.



Me holding up a freshly removed block of material



An *Eldredgeops rana* as found



Our bench after two and a half hours of digging.
From left to right: myself, Owen Yonkin, Chris Komp, Dean Ruocco, Zachary Fink

New York, Continued from previous page

After a couple hours, we packed our things to go to another nearby locality. We stopped at the “Past and Present” fossil store and museum close by.

Then James Hanna took us to a nearby locality similar to Penn Dixie. This locality is one of a few which preserve “camo” trilobites: trilobites bearing a speckled pattern similar to camouflage. This pattern is believed to be representative of the distribution of pigments in the shell in life and is the best glimpse we have of how these organisms appeared back when they crawled the ocean floors.



Chris, Owen, and myself at “Past and Present” museum



Me pulling up material at “camo” trilobite locality



Trilobite I found exhibiting camouflage pattern

The next day we went to a locality in the Onondaga limestone in search of much rarer trilobites. Specifically, we were after *Odontocephalus*, prized for its rarity, and the unique fringe along the front of its cephalon, and *Kettneraspis*, a truly iconic spiny trilobite. We were in great luck as we found several specimens of both.

The material at this locality is more prone to unfavorable splits, so many trilobites are found in cross-section and require extensive painstaking preparation.



An enrolled *Odontocephalus* found by Owen Yonkin



A perfect *Kettneraspis* found by Chris Komp



Odontocephalus and *Viaphacos* I found split in cross-section

The next day we went to the famous Deep Springs Road locality. After a few hours of digging, we found several examples of the classic New York trilobite *Greenops barberi*.



Greenops from DSR, before and after preparation

We visited 3 other localities after this, but we had much less luck and did not find anything noteworthy at those locations. From there I packed my suitcase and backpack full of my finds and boarded a flight back to Oregon. It will be some time before I am able to prepare most of the fossils I found. The Onondaga trilobites should be especially spectacular once prepped. If you want to see what my East Coast friends are up to, check out their website: familiafossils.net or you can find them on Instagram and Facebook.

Field Trip Report: Near Post, Oregon August 2023

Greg Carr

This field trip was held in August 12 & 13, 2023. It was warm, but not too hot. The main collecting location is just east of the store that is Post, Oregon. Approximate GPS is 44.156N, 120.452 West.



The base camp was at Elkhorn campground, just south of highway 26 and a few miles East of Post. It is infamous for its mosquitoes, but thankfully it was not bad this summer.



There is a very nice meadow a few hundred feet from the campground, where we watched the main Meteor shower of the year, the Perseids. I didn't get any real pictures with my camera, so the picture on the right below is from the [web](#).



Meadow at campground for star-viewing.



Post field tip, Continued from previous page

The main finds from that area are petrified wood, agates and calcite crystals. The calcite crystals formed inside petrified tree trunks that were hollow when they were buried by ashfalls. This hollow space gave room for crystals with euhedral surfaces to grow. The crystals glow faint bubble-gum pink under ultraviolet light:



Here is our famous (at least in his own mind) President Aaron (with his trusty dog Dexter) digging at a petrified tree sticking out of the side of a hill.



Here is the best find of the trip (made by one of the first-timers, of course) – **PETRIFIED ANT EGGS!!!**



Here we are getting ice cream floats at the world-famous store at Post, Oregon.

Woodburn Update for 2023

Dave Ellingson

In 2008, the high school biology class I was using to do the yearly paleontology digs uncovered a mostly complete bison skeleton. After cleaning and putting the skeleton together as best we could, it was evident that there were missing bones. I placed a metal post in the southwest corner of the site so we would know where to dig next year. Unfortunately, the landscape workers for the school removed the post when they mowed the area. I couldn't identify the exact site.

This spring I was approached by George Freitag of GRI (<https://gri.com/team/george-freitag/>). He offered the services of the firm's Ground Penetrating Radar equipment for use at the high school. Thanks to George and Todd Scholtz, we were able to identify what we hoped was the site of the 2008 bison.

This August, the excavation crew dug a trench right next to the southwest corner of the site we identified in the Spring. We were right. This was the spot. During the soil sifting we found two ribs and the radius of a bison. When we cleaned the bones, we were able to connect them to the broken pieces found in 2008. It was incredible how well they fit together.



Woodburn, Continued from previous page

Currently the bison skeleton is on display at the Woodburn City Berry Museum (<https://www.woodburn-or.gov/museum>). We were able to add more bones than were on display when the skeleton was at the high school. The skull is a cast of the real skull as it is too fragile to mount. Now, since we have found more of the skeleton, we will be adding those to the new mount soon.



This September we will be excavating for the high school students, and we plan to dig next to the southeast corner of the 2008 site. Hopefully more bones are waiting for us to find.

Update: Student dig at Woodburn High School

The end of September student dig was a success this year. We dug in two places. One was more productive, and we came up with over 50 bones of the usual critters. In the first day we found a transverse process of a lumbar vertebrae of a large mammal, probably bison, but maybe horse. It showed a new break, and I was sure the rest of the vertebrae was somewhere in the pile. However, with over 100 students looking for five days, we didn't find anymore of it.

In the spring after the rains, we will go out to the site and with some of the top layer of sediment washed away if there are any newly exposed bones that we missed.



Transverse process of a lumbar vertebra from bison or horse



Modern bison lumbar vertebra for comparison to picture at the left.

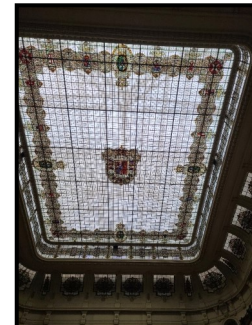
Trip Report Museo Geomineral, Madrid, Spain

Greg Carr

On our trip to Spain in October 2023, we visited to Museo GeoMineral in Madrid. According to Wikipedia, "The museum is located in the headquarters of the Geological and Mining Institute of Spain. The building was designed by Spanish architect Francisco Javier de Luque, and built between 1921 and 1925. The contents of the museum are displayed in 250 showcases on the ground floor of the building and three perimeter balconies." A panoramic view of the room, from the center, gives us this interesting picture:



The museum focuses on minerals and fossils found in Spain and Spanish-American locations, mostly minerals. It is housed in one large, square room. The entire floor of the room is filled with display cases, with additional cases lining the walls along the upper mezzanines. The entire building is not built to be handicapped accessible – you even have to climb narrow spiral staircases to access the mezzanines. The ceiling is a wonderful "Belle Epoch" style-stained glass creation.



The collections are well cataloged, grouped by type of minerals or the age of fossils. The entrance hall has this nice Chronostratigraphic Window set:

Here is my wife Peggy admiring the skull of a large proboscian, probably a gonothere.



Spain, Continued from previous page



A club favorite: large Miocene crab from Patagonia



Pyrite cubes from Northern Spain

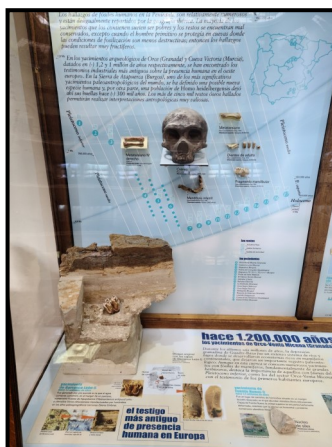


Skeleton of an ice-age ibex found in a cave north of Madrid



View from the upper balcony, overlooking the opposing balconies and the main floor. In this center is the ice-age mammoth display.

They also had a lot of information about Homo Neanderthals, found in Spain, as well as other related hominids. Here's a modernized display about hominids of the African Savanna.



And here's my wife Peggy next to a display of faceted gemstones.

Overall, it's a great place to visit if you are somewhat able-bodied and are not afraid of heights. Oh, by the way, it's only open on weekends.

Retirement Trip of a Lifetime

Kent Gibson

After a long time planning, I was able to make a solo trip of a lifetime around the Western and Central United States exploring geological sites. Here are the statistics:

22 days

19 different states

9028.6 miles in my truck

Visited one sapphire mine, 1 aquarium, and 26 different museums.

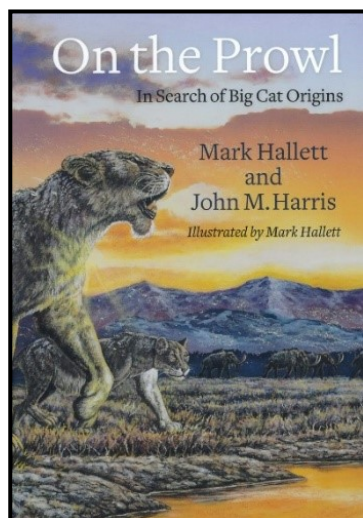
Here's the itinerary:

1. Spokane Bar Sapphire Mine, Helena Montana
2. Museum of the Rockies, Bozeman, Montana
3. Glendive Dinosaur and Fossil Museum, Glendive, Montana
4. Dakota Dinosaur Museum, Dickinson, North Dakota
5. Pioneer Trails Dinosaur Museum, Bowman, North Dakota
6. The Mammoth Site, Hot Springs, South Dakota
7. Badlands National Park, South Dakota
8. The Field Museum, Chicago, Illinois
9. Museum of World Treasures, Wichita, Kansas
10. Sternberg Museum, Hays, Kansas
11. Morrill Hall, University of Nebraska, Lincoln, Nebraska
12. Denver Museum of Science and Nature, Denver, Colorado
13. University of Colorado Museum of Natural History, Boulder, Colorado
14. Rocky Mountain Dinosaur Research Center, Woodland Park, Colorado
15. Morrison Natural History Museum, Morrison, Colorado
16. Florissant Fossil Beds, Florissant, Colorado
17. The Dinosaur Museum, Blanding, Utah
18. Moab Giant Dinosaur Tracks, Moab, Utah
19. Cleveland Lloyd Dinosaur Quarry, Cleveland, Utah
20. Price Prehistoric Museum, Price, Utah
21. Utah Field House of Natural History, Vernal, Utah
22. Dinosaur National Monument, Jensen, Utah
23. Fossil Butte National Park, Kemmerer, Utah
24. Idaho Museum of Natural History, Pocatello, Idaho
25. Wyoming Dinosaur Center, Thermopolis, Wyoming
26. Montana Dinosaur Center, Bynum, Montana
27. Burke Museum, Seattle, Washington
28. Westport Aquarium, Westport, Washington

I was able to present a report on my visits to these places during a recent NARG meeting. Hopefully you can check out the recording on YouTube once it is uploaded!



Tracing the family tree of the Genus *Panthera*



Review by Harold E. Hinds, Jr.

Mark Hallett and John M. Harris, *On the Prowl: In Search of Big Cat Origins*. New York: Columbia University Press. 2020.

On the Prowl focuses on cats, specifically the genus *Panthera*, and their origins, evolution, dispersion, and finally, their fate when encountering humans. *Panthera* cats include tigers, jaguars, leopards, and lions.

Although Hallett and Harris' monograph is quite technical at times, the main lines of reasoning and analysis are easy to follow; and they are brilliantly illustrated with charts, graphs, sketches of skulls and skeletal structures, and conjectural restorations of what a big cat (known only from fossils) may have looked like. These remarkable illustrations, according to the book jacket, are the work of Hallett, who is "a naturalist, scientific artist,

and author who specializes in prehistoric animals and their environments." Presumably, the illustrations' captions and the book's text are largely the work of John M. Harris, Chief Curator Emeritus at the Natural History Museum of Los Angeles County. The volume's "Sources" cites no publications by Hallett or Harris, and there are no footnotes. So evidently this highly recommended study ably summarizes the work of the experts listed in "Sources."

The early evolution of felids, or "true cats," is not well known. However, they have been defined as possessing several key traits: "an enlarged first premolar of the upper jaw and the first molar of the lower jaw" (p. 8); "a shorter face that resulted in a more powerful bite" (p. 8); binocular vision (p. 11); highly mobile forelimbs (p. 11); and a bony auditory bullae "which encapsulate and protect the middle ear bones" and "are divided into an inner and outer chamber" (p. 13). In addition, they generally were "committed to an ambush-moded predation rather than to cursorial (running) predation" (p. 11). The pantherines are further differentiated from other felines in Chapter 2, "Anatomy of a Hunter."

The big cats probably split from other felines in the late Miocene (ca. 7 Ma-5.93 Ma; p. 17). Pantherines have been distinguished from the late Oligocene "false saber-tooth" *Nimravid* discovered in the John Day Formation of Eastern Oregon. (p. 14). *Nimravids* survived into the mid-Miocene. In 1959, I traveled to New York City to visit museums, in particular the American Museum of Natural History, and to view its collection of John Day Fossils, both on display and in its archive. A highlight was the famous skull of the *Nimravid Pogonodon platycopis*, collected at considerable risk, and initially described by Cope in 1879. At that time, I did not realize that the *nimravids* were not true cats. *Nimravids* are a separate line of evolution from felids: "nimravids are considered to be evolutionary convergents or look-alikes with respect to felids" (p. 13); and "were amazingly similar to...the felid sub-family of 'true' saber-tooth cats" (p. 15); which split off from the ancestors of the pantherines in the early Miocene (p. 205).

A major contribution of *On the Prowl* is that the pantherine origins were in Northern Asia, especially the Tibetan Plateau, in the late Miocene. And then "From this location the snow leopard-tiger lineage dispersed into Northern, Eastern, and Southeastern Asia, while the jaguar-lion-leopard lineage migrated to Africa and then radiated out into Eurasia and the New World" (p. 107 for quote and chapters 3 and 4).

The authors note in their Preface that "Our emphasis on Asia, a crucial region for the origin of big cats, reflects the extensive but generally less well-known discoveries and academic studies over the last fifteen to twenty years in Asian paleontology by Chinese and other workers" (p. xvii).

Panthera, Continued from previous page

Another significant contribution of On the Prowl is how and why the pantherin cats “compete[d] [and] prevail[ed] in the role of large-bodied feline hunters when the saber-tooths [were] the master predators of large game, [and] already monopolized this predatory niche” (p.33). That is, after coexisting with saber-tooths for 200,000 years, why did the pantherin cats win out? Was it changes in climate and prey? No. One saber-tooth genus, the “scimitar-toothed” saber cat, Homotherium, developed “long forelimbs and modification of claws for running and grappling,” hunted in social groups, and possessed a “large dewclaw and massive, projecting incisors [that] helped to subdue an animal so that the upper canines could do their fast, effective killing” (p. 103, 105). It was an effective competitor to pantherins on the open plains and its multitude of grazers. Rather, in the late Paleolithic, it was “modern hunters’ entrance into the ecosystem [that] pushed Homotherium over the brink” (p.144).

The balance of On the Prowl is devoted to “Man the Destroyer” of the pantherins. Initially, decline of the pantherins was due to competition with human hunters, then a combination of habitat destruction, decline of preferred prey, the slaughter for sport and spectacle, extensive killing for bush meat, harvesting for medicinal purposes and fashion, and exotic pet trade. All combined to drastically reduce, or even to drive some species to extinction. The efforts to protect remaining pockets of big cats in the wild have either been ineffective or are stop-gap measures. Yet there may be a future for big cats if “a spirit of wild conservation in which the worlds of legitimate human need and nature are not seen as separate, competing entities but instead will coexist” (p. 192); and if governments take effective actions, if people support environmental activism, and if “effective” conservation organizations, such as “Wildlife Conservation Society” are generously supported.

On the Prowl is a splendid, scholarly but accessible overview of the big cats, their past and possible future. Highly recommended and available in our library.

NARG Member Holiday Decorations



Have a crabby Christmas from Bruce Thiel



Deck the Halls with Ammonites by Than Woodward

Petrified Wood Identification

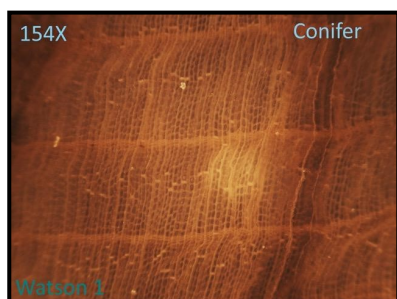
Robert Rosé

This article is meant to give you enough information to differentiate softwood from hardwood petrified wood. Softwood being conifer or Gymnosperm and hardwood being Angiosperm. The first thing you need is a loupe (hand lens) and a piece of petrified wood that has good preservation of internal structure.

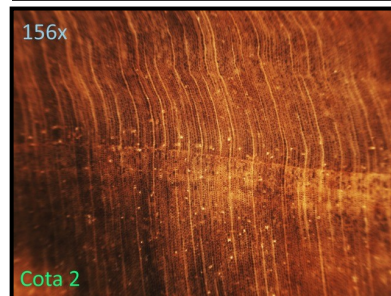
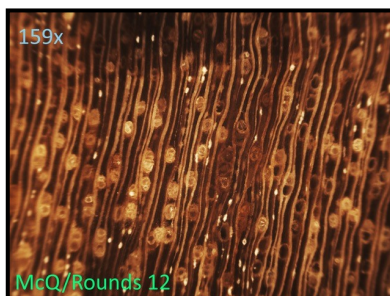
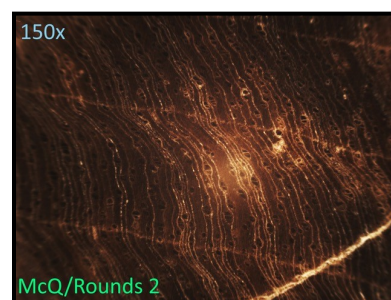
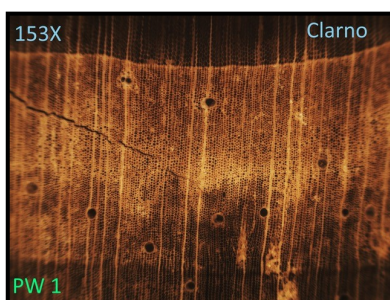
This structure includes growth ring, ray, and cell structure between the growth rings. Rays are the elements running from the center of the wood to the bark. Wood tissue is made of cells called tracheids. To see these elements, find a piece of wood that shows the cross sectional (transverse) view. Using petrified wood, the transverse surface needs to be polished.

Starting with the more complex wood: the hardwoods. The most conspicuous elements are the vessels (pores) and rays. Vessels can be large or small dark openings with the largest located in the early wood location in the growth ring. It is easiest to orient the wood so that the early wood part is nearest to you. Rays can be narrow (uniseriate or one cell wide) or many cells wide (ten or more). Also note the distribution of the vessels as they can be densely packed or widely distributed. See picture on the left below.

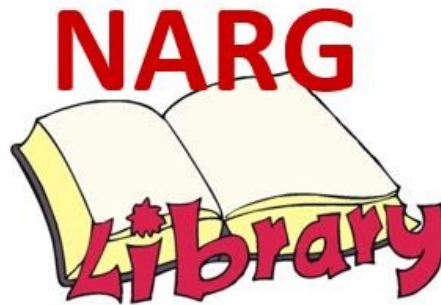
In contrast to hardwoods are softwoods, the Gymnosperms, which I normally call conifers. All conifers have univariate rays and no vessels. Also, there are some conifers that have resin canals which is one way to divide the conifers into two groupings. These resin canals appear as dark openings, normally in the late wood part of the growth ring. See picture on the right below.



Using the two images above try and identify the four images below as Angiosperm or Gymnosperm. If this exercise spurs you on for further investigation look up a book called [Identifying Wood](#) by R. Bruce Hoadley. Lots of good basic info and micro images of wood.



(Answers) Upper left: softwood; Upper right: hardwood; Lower left: hardwood; Lower right: softwood



The NARG library has just become easier for members to use. The 430 books can be viewed by using the link below. Once you find a book you want, click on it and find its 'index' number. Requests for books using the index number are made to danolough@aol.com. He will notify you if the book is already checked out. If it is not, he will bring it to the next NARG meeting. Members can check out 2 books at a time and should return them at one of the following 2 meetings.

<http://cloud.collectorz.com/danolough/books>

NARG Membership

NARG's annual membership dues are due January 1, 2024.

Individual Membership	\$25
Family Membership	\$40
Student Membership	\$10

Pay your membership by:

***Mail a check and [application](#) to:**

NARG (North America Research Group)
Membership
PO Box 233
Tualatin, OR 97062

***Renew membership and pay via credit card with PayPal (No account necessary):**

Use the following links:

Family membership: \$40, click [here](#).

Individual membership, \$25, click [here](#).

Student membership, \$10, click [here](#).

Fossil Calendar

Feb. 7 NARG Monthly Meeting, Tualatin Heritage Center, Tualatin @ 7PM
 Feb. 10 Fossil Fest at Hatfield Marine Science Center, Newport, OR 10AM-4PM
 Mar. 6 NARG Monthly Meeting, Tualatin Heritage Center, Tualatin @ 7PM
 Apr. 3 NARG Monthly Meeting, Tualatin Heritage Center, Tualatin @ 7PM

Check the [website](#), emails, and [Facebook](#) for any updates.

For a listing of local gem and mineral shows, check out:

<http://www.mineralcouncil.org/shows.pdf>

<http://orerocon.com/> Click on Portland Area Rock Clubs (includes PNW Clubs)

NARG Officers:

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 Secretary: Tami Smith dtm.smith3@frontier.com
 Treasurer: Megan Gagner meganmonagagner@gmail.com

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MacKenzie Smith
 Michael Santino
 Larry Purchase

Committees:

Newsletter: Tara Baker (organizer)
 Dan O'Loughlin, Peg Johnson,
 Bruce Thiel, Robert Rosé (proof-readers)
 FossilFest: Tara Baker
 Debbie Shannon
 NARG Fossil Swap: Debbie Shannon
 Gerry Lukos
 Portland Regional: Debbie Shannon



NARG's Mission Statement

To encourage responsible stewardship of earth's paleontological resources; to promote scientific research, communication, and public education.