



NARG NEWSLETTER

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Volume 7 Number 2

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NW FossilFest

By Dan O'Loughlin

This year's FossilFest was a colossal success! The sweltering weather we had been enduring all summer abated for one day. Once again my family joined us to help with our event. We had a record number of visitors, topping 700. This pushed the limit on our ability to park everyone at the museum. The food served by Sue's Steak Tacos was plentiful. They were asked to come back next year with a larger variety of culinary treats. Our t-shirt design, featuring ancient horse skeletons, by Lisa Schenk and Aaron Currier was our most popular design yet! There were many things to keep young budding paleontologists busy. Moroccan shark teeth, "Guess the number of dinosaurs", OMSI, a water feature, and air scribe instruction were all part of our entertainment. I was lucky enough to find an appropriate coloring book to give away titled "Evolution of the Horse". Joe Cantrell was busy showing off his talent with macro-photography. Joe is one of the guest speakers at the upcoming



Info Booth was manned by Anne Sivers, Debbie Shannon and Phil Knutson

Portland Regional Gem and Mineral Show in October. We are truly blessed to have such a talented artist in our group. Greg Carr kept guests occupied with his 3D printer. He demonstrated how the technology can be used to recreate fossils. It is important to remember that Greg built the printer himself! We continued our tradition of selling Metasequoia and ginkgo trees, much to the delight of everyone. Our air scribe demonstration featured Pat Jordan preparing a oreodont specimen. Attendees, under supervision, could try their hand at scribing on rocks. Our Fossil Identification area was constantly busy with Aaron Currier rarely getting a break. Robert Rose staffed a hands-on area and seemed to constantly be busy with identification.

NARG began the day with a brief ceremony for turning over a spike toothed salmon, *Oncorhynchus rastrosus*, to the Condon Museum. Dr. Ed Davis and Eric Gustafson were there to accept the specimen and elaborate on its importance to the scientific community. The entire story of how we obtained the specimen is worth an article by itself. The greatest aspect of this year's event was our two speakers. Dr. Nick Famoso of the John Day Fossil Beds National Monument started our talks with "Fossil Horses in Oregon and the John Day Fossil Beds National Monument" Dr. Bruce MacFadden, the leading horse evolution expert, flew in from Florida for the event. His talk "Fossil Horses and the Relationship to Changing Climates" ended the series. We again would like to thank both of our distinguished speakers for their time. The Fossil Fest was a huge success and I think NARG members enjoyed getting to hear from and socialize with our guest speakers. The participation by members made the event educational while ensuring our guests had a great experience. A special thanks goes to Bill and Linda Harvey for their event coordination, assistance with the trailers, and willingness to use their house for staging the event.



Oncorhynchus rastrosus
spike toothed salmon. The giant salmon was about 400lb and 10ft long. For now you can view it at OMSI in Portland, OR

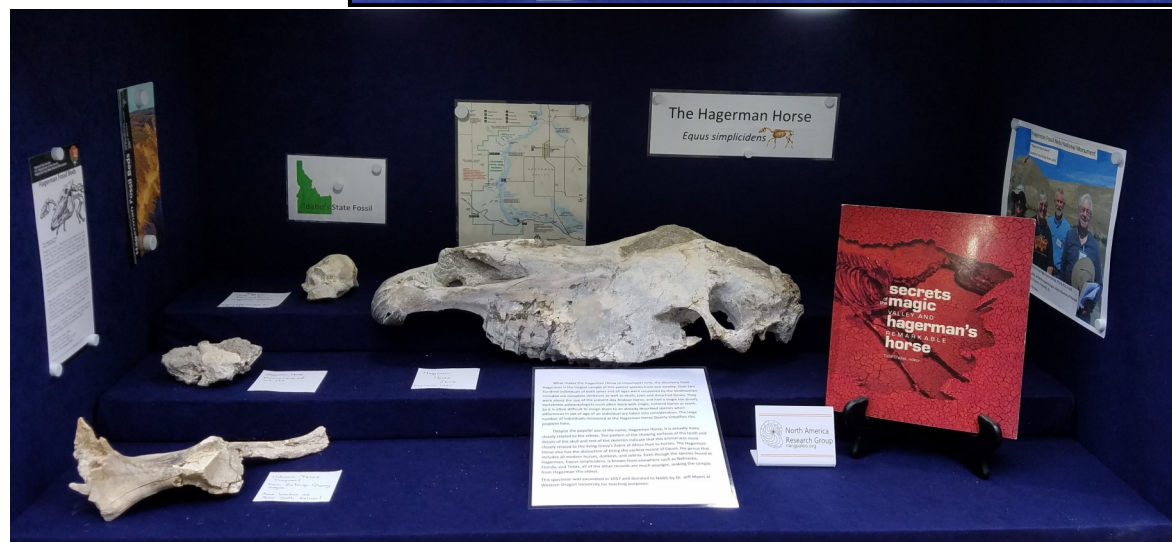


NARG Fossil Cases



Modern Horse presented
by Larry Purchase

John Day Formation
Vertebrates. Fossils
was donated by Rose-
mary Kenny and Larry
Purchase to the John
Day National Monu-
ment.



Hagerman Horse
Equus simplicidens
Presented by Greg
Carr



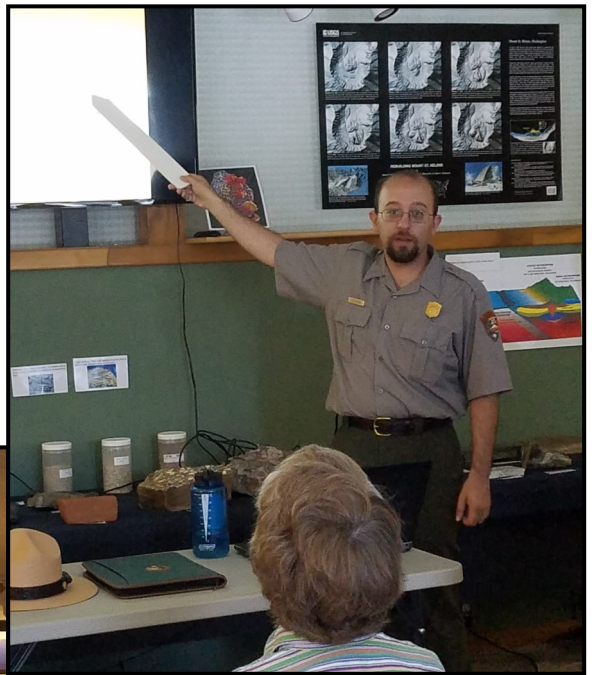
Pacific Northwest Fossil Crabs
Prepared by Bruce Thiel

**Woodburn High School
Large Mammal Leg Bones
(13,000 years old)**
Presented by Dave Ellingson



Trilobites
Presented by Pat Jordan

Dr. Nick Famoso of the John Day Fossil Beds National Monument gave a presentation on the latest understanding of fossil horses and their relationship to the paleoclimates of Oregon.



Dr. Bruce MacFadden (Fossil Horse Expert) of the University of Florida, gave a presentation about the latest discoveries of fossil horses and their relationship to changing climates from a global perspective.



Spike Tooth Salmon Ceremony

NARG presented to the University of Oregon and the Condon Collection with an exemplary and historical specimen of the "spike-tooth" salmon. Dr Ed Davis of the U of O accepted the specimen and made remarks about the salmon. (See picture of salmon on pg. 2) Dr. Davis is holding a 3D model of the salmon snout.





Petrified Wood cases presented by Robert Rosé



Equus in Oregon case presented by Rice NW Museum of Rocks and Minerals.



Kids activity



Pat Jordan demonstrating the preparation of an oreodont specimen from the Douglas formation in Wyoming



Joe Cantrell working magic with his camera, using a picture stacking method.



Aaron helping with fossil ID

NARG's FossilFest 2018 shirt on Fossil Horses. Designed by Lisa Schenk and Aaron Currier





ID table

Robert Rosé answering
visitor's questions.



Chimaeroid Egg Case Dis-
play presented by Dan
O'Loughlin

NARG Summer 2018 Field Trip – Mitchell Oregon Area

On July 20 – 23, 2018, the NARG group had a field trip to fossil sites around the small central Oregon town of Mitchell, which is located approximately 50 miles East of Prineville on highway 26. Some of us stayed at the Spoken Hostel, some in local hotels, and a local airBNB. We ate dinner in town, several times at the new ‘Tiger Town’ brewers and Pub.

We visited the ‘Suture Bed’ site in the Cretaceous Hudspeeth Formation, and two plant localities – Ochoco Pass is Clarno Formation and White Cliffs is John Day Formation, 33 million year Oligocene. NARG group members attending the trip on first two days were Greg and Gloria Carr, Doug and Robert Olson, Daniel Vossen, Kurt and Lorna Christensen and Gerri Lukas. The last two days were Anne Silvers, Guy DiTorrice and Scott Whitman.

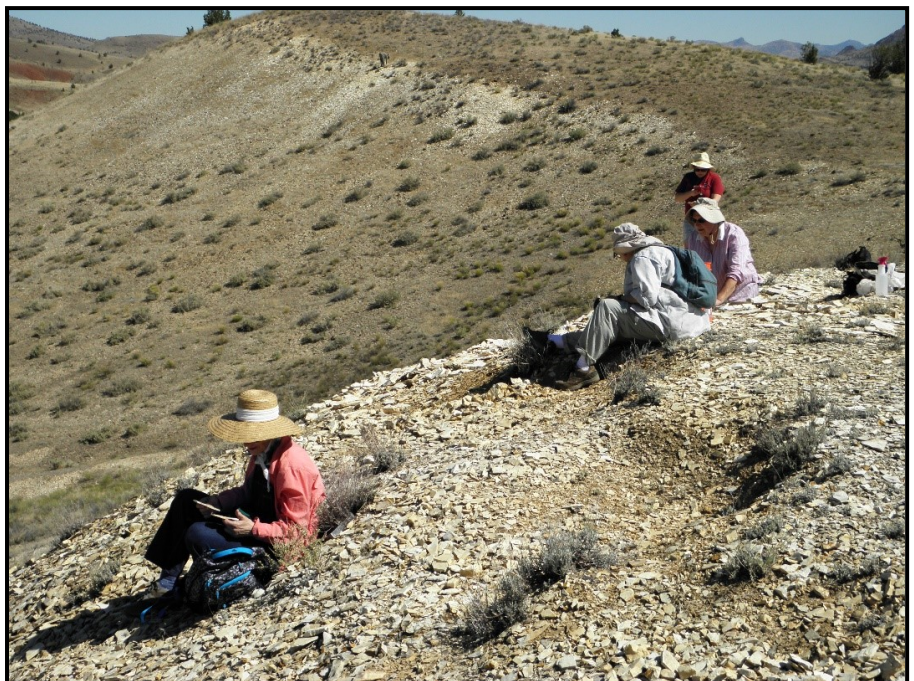
Each group followed the same itinerary – first morning at the Ammonite beds, first afternoon at Ochoco pass, second morning at White cliffs, and second afternoon free. Several of us also visited the local county road quarry and collected vein agate and calcite as well as faint lavender Amethyst quartz crystals. By poundage, the road quarry was most productive!

At the ammonite beds, several of the group continued digging in a deep trench previously excavated by a previous unknown group. Whole ammonites 6-8 inches were collected, although broken and flattened, with suitable preparation they should be great! Others worked where they wanted, and Doug Olsen got a nice hard complete ammonite.

Also, unexpectedly, a fossil bone was found in a concretion – the bone was hidden inside and was not apparent until the concretion was broken. The bone was re-assembled, wrapped in foil, re-buried in the hole and covered with rocks and left there as per BLM rules. The GPS reading and pictures were taken, Ed Davis from the University of Oregon will be collecting it later this summer.

leaf collecting area in Ochoco pass is Clarno Formation

Collecting at White Cliffs – Second Day



Gathering at the parking area, White Cliffs.



The beautiful Painted Hills at Sunset

Interesting murals on the side of the store in Mitchell, celebrating the plesiosaur found in the Cretaceous Hudspeth Formation and early 'First Peoples' hunters.



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Digging at the White cliffs – fourth day.



One Way to Build a Light Assembly for Display Cabinets

by Debbie Shannon

The following describes how to build a light cable assembly for a display cabinet that is 4'x2'x2' in size. Our cabinets have a 16" spacing between the holes for the lights. This is what the final light assembly looks like:



Tools list:

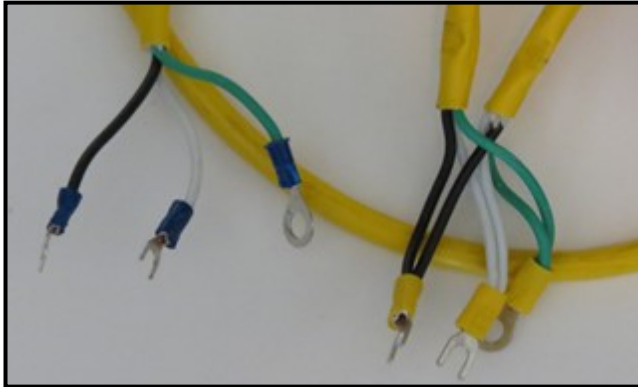
Measuring tape
Diagonal cutters
Wire strippers
Wire crimper
Screw driver (philips head)
Socket wrench
Multimeter (need to be able to do a continuity test)
Safety glasses
Electric drill (also bits to put in screw holes and a hole for the box lid-I used 1 3/4" for this)
Hammer
Tin snips
Metal file
Small needle nose pliers
Soldering iron, and solder (I used 60%tin, 40%lead with rosin core)
Electrical tape

Parts list (most of these items can be found at any hardware store, exceptions are noted):

Power cord (need at least 15' long, 3A, 125V cord)
12-10g spade connectors (yellow) (2 for each assembly)
12-10g ring connectors (yellow) (1 for each assembly)
16-14g spade connectors (blue) (2 for each assembly)
16-14g ring connectors (blue) (1 for each assembly)
4" metal electrical box (2 for each assembly)
4" metal box lid (2 for each assembly)
3/8" snap in clamp connector, non-metallic (2 for each assembly)
Ceramic socket (Ace Hardware part number 30888 also listed as POR660W) (2 for each assembly)
Machine screw 8/32X1/2 (2 for each assembly)
Machine screw 8/32X1 (2 for each assembly)
Machine screw nut 8/32 (4 for each assembly)
External tooth washers #8 (4 for each assembly)
Metal strap 1" wide X 16 1/2" long X 1/16" thick (edges rounded and smoothed off)
Pushbutton switch (Parkrose Hardware part number SS103-BG, On-Off 3A switch) (1 for each assembly)
Plastic thread protectors #6 (orange) (12 for each assembly)

Assembly

Step 1 Build power cord assembly



1 . First, cut off the female end of the power cord. Then measure 27" and cut the cord . On the 27" piece of cord, strip about 2 ½" of the outer plastic jacket on each side of the cord section being careful not to cut or nick the wires inside. Then, strip each individual wire about ¼" being careful not to cut any of the wire strands. Also strip the outer jacket about 2 ½" off the end of the longer length of cord (the end that you just cut off the female connector).

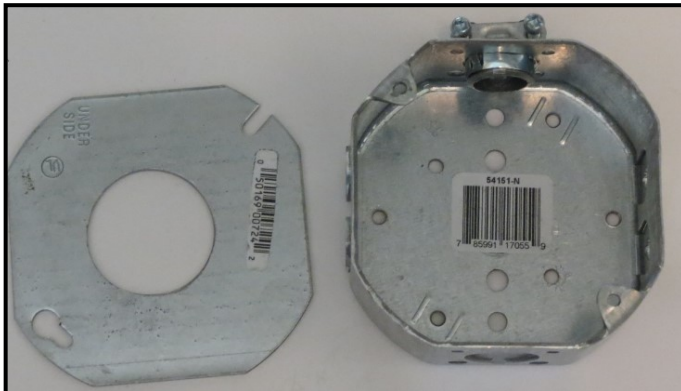
2 . Crimp the blue 16-14g spade connectors onto the white and black wires of one end of the 27" cord. Crimp a blue ring connector to the green wire of the same end of the 27" cord . Ensure

that the crimps are snug and will not come loose. Note that when crimping the wire, the copper wire should be just visible near the end of the connector with the spade or ring. Only the copper wire should go through the final part of the hole in the connector, the jacket on that copper wire should bump up to that hole. This will give you a correct crimp on the jacket+wire.

3. Crimp the 12-10 spade connectors onto the white and black wires of the longer length cord and the other end of the 27" cord (ie they will be tied together into one connector-both black wires, then both white wires). Crimp a yellow ring connector to the green wire of the same end that longer cord and 27" cord (one connector ties both of these green wires together). Ensure that the crimps are snug and will not come loose.

4. The black wire is Line, the white wire is Neutral and the green wire is Ground. This will be important later.

Step 2 Prepare metal boxes and lids



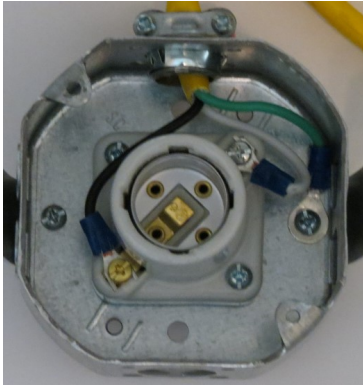
1. Note where the predrilled holes are in the box. You will need 4 holes to install the socket and the metal bracket, 2 holes for each of these parts. I used 2 of the predrilled holes for the brackets and drilled out 2 separate holes to install the socket. You are going to want to tie the ground wire into one of these holes.
2. If needed, drill holes in the box for screws for the connector or metal bracket.
3. Drill the hole for the socket in the lid. I used a 1 ¾" metal circular saw blade with a drill to do this. (We used a drill press at my husbands work place-it was a time saver!)
4. Determine which of the removable holes you will use for the cord entry to the box, then remove the metal "hole". Install a 3/8" nonmetallic snap in clamp connector into that hole in the box using a hammer. Ensure that its well seated.
5. Do this for 2 metal boxes



Step 3 Prepare metal brackets

This bracket has already been bent to fit around box)

1. Determine where screw holes are needed in the metal bracket, drill them out.
2. Make sure the ends of the metal bracket are rounded and smooth, if not completed previously.
3. Do this for 2 metal brackets.



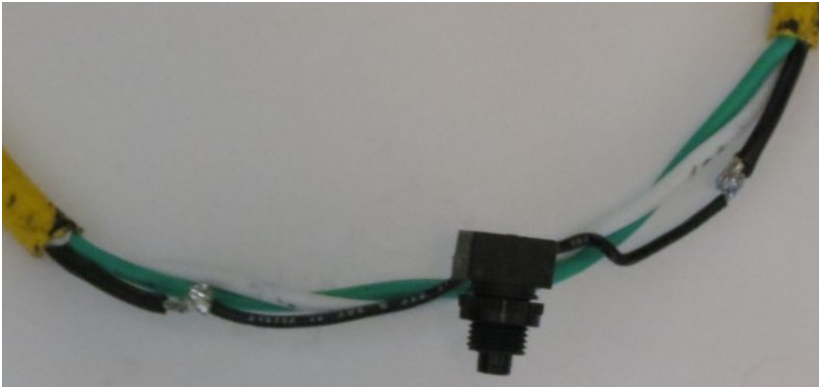
Blue connectors



Yellow connectors

Step 4 Install cable assembly and metal bracket to metal box

1. Install socket into the metal box using the 1" screws+tooth washers+nuts. Do this to both boxes. (one assembly) Ensure the screws+nuts are tight.
2. Install the end of the 27" cord with the blue connectors into the box through the clamp connector. The black wire should be routed and screwed down onto the gold screw (Line) on the socket, the white wire should be routed and screwed down onto the silver screw (neutral) on the socket. Ensure screws on the socket are snug. Route the green wire to one of the 2 holes you are using for the metal bracket. Use the 1/2" machine screws+tooth washers+nuts for this ensuring that the ground wire is part of one of these. Ensure the screws+nuts are tight. The bracket will be sticking out straight from the box. We will bend the bracket below so that it can be used to connect to the display case.
3. Install the end of the cord with the yellow connectors into the other prepared box through the clamp connector. The black wire should be routed and screwed down onto the gold screw (Line) on the socket, the white wire should be routed and screwed down onto the silver screw (neutral) on the socket. Ensure screws on the socket are snug. Route the green wire to one of the 2 holes you are using for the metal bracket. Use the 1/2" machine screws+tooth washers+nuts for this ensuring that the ground wire is part of one of these. Ensure the screws+nuts are tight. The bracket will be sticking out straight from the box.
4. Tighten the screws on the nonmetallic snap in clamp connector until the screws are snug and the cord does not move. You do not have to tighten them all the way down but it does need to be snug.
5. Using the continuity feature of a multimeter, test that the ground (green wire) is only connected to ground (cases, green wires in both boxes) and that the line (black wire) is only connected to line, and that the neutral (white wire) is only connected to neutral.
6. Install the metal lid to the box and tighten the screws.
7. Bend the bracket so that it fits around both sides of the box, then bend out it at the ends to create a tab to slide into the slot in the display case. At this point you want to make sure you are doing the bending so that the bracket sits at a height above the display case just high enough for the lightbulb to barely poke through the hole in the display case. For our cases this height was 8.5 cm. The reason for this is that you want light in the display case, but you do not want to look directly at a light bulb when looking into the case from the front.
8. Put thread protectors on each of the screws sticking out of the boxes (there are 12). You may need to cut some of the thread protectors so that they fit snugly onto the screws.

Step 5 Build switch (lengths can be different, this is what I did)

1. Measure 6" along the cord jacket from the box with the double cords in it. Make sure you are measuring the cord that goes to the wall plug and not the cord that goes to the other metal box. Then measure about 5" from this measurement toward the plug end of the cord. Strip the outer plastic jacket off between these 2 marks making sure you do not nick or cut the underlying wire jackets.

2. Cut the exposed black wire in half, then cut off about 1" on each end. Then strip back about 5/16" on each end of the black wire. You will be attaching the switch to this wire which is line (ie power).

3. Cut each wire on the switch back about 1/2",

then strip back about 5/16" on each end.

4. Prepare the soldering iron, ie heat it up until it starts to melt the solder. Tin each end of the switch wires and the exposed black wires on the cable assembly. Then, put hooks into the ends of the all of these wires and hook one black wire from the cable assembly to one end of the switch, solder them together. Do the same with the other black wire from the cable assembly and the other end of the switch.
5. Wrap a strip of electrical tape around each of the solder joints on the black wire/switch. Then using the discarded jacket from step 1, wrap electrical tape around the rest of the exposed wiring. The discarded jacket can be used to add strength to the tape. I used it to cover the wire on each side of the switch then wrapped the tape around the wire+ jacket. (see photo at top of article)

Step 6 Test the assembly

Install lightbulbs into the sockets, plug the cord plug into a wall outlet and test that the switch works.

That's it, congratulations you are done with one assembly!



Fossilized Turitella in agate containing *Elimia tenera* (freshwater snails) and ostracods (seed shrimp).

Photography by Joe Cantrell



Digging Woodburn 2018

by Dave Ellingson

This summer the Woodburn digs have had the highest number of participants since digging began in 1996. Over 150 people came by to try and find the bones of 13,000 year old animals that lived in a pond ecosystem as the Ice Age was ending. A majority of the bones found belonged to frogs and muskrats. However, small fish, ducks, water shrew, cotton-tails, voles, and snakes were also found. The largest find was a bison lumbar vertebrae as well as an eye socket likely from another bison. Overall, nearly 400 bones have been found and there is still the September dig with the High School students to come. The most impressive find of the summer was not a bone, but a large piece of pacific willow that was cut down by a beaver. The chew marks from the beaver's teeth are perfectly preserved and look as if it were cut down recently.

Another highlight of the summer was that PBS Kids came to film for an upcoming episode of the nationally acclaimed children's paleontology show Dinosaur Train. The film crew got footage of kids finding bones in the sediments and water screening. Even the camera operator Rob found a muskrat pelvis. The local radio OPB was also on the scene to interview participants of the dig.



Sisters who each found a muskrats tibia.



PBS kids with the recent finder of a frog tibiofibula.

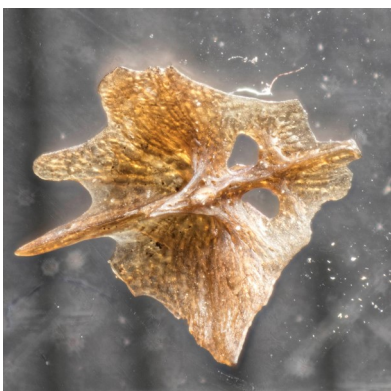


Bison lumbar vertebrae found at Legion Park.



Richard Ilg with a portion of an eye socket of a bison skull.

Debbie Jackson found these fossils at the Woodburn dig this summer. Joe Cantrell took pictures of them. He is working on taking pictures of some of the other fossils from the dig.



Vertebra, not sure of what animal.



Could be part of fish skull, but they are not sure which bone it might be.



More research is being done on these bones. They are sitting on millimeter marks for scale.

A Handy Guide to Remembering the Five Major Extinction Events

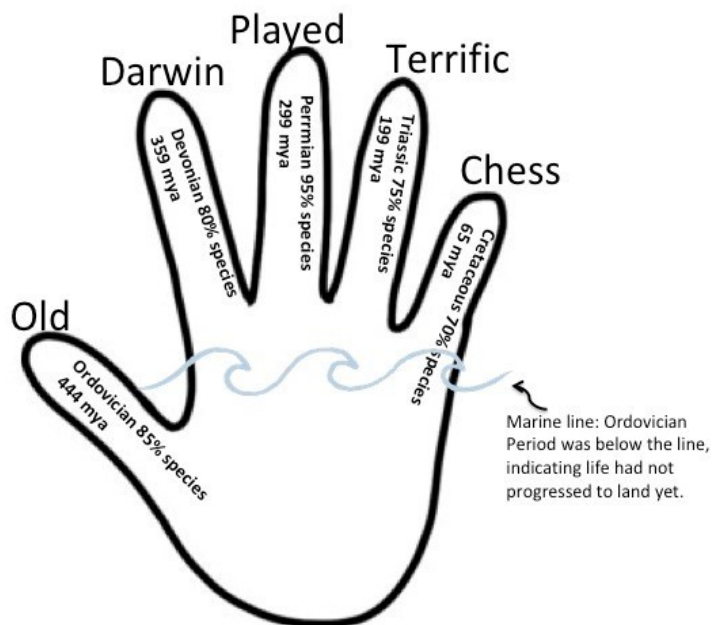
by Tara L. Baker

The fossil record and current evidence shows that species extinctions occur naturally continuously, though at a low rate. For many reasons, a species fails to thrive and dies out as it experiences changes to its environment. The fossil record shows that there have been at least five times of very high loss of species, in the range of 70-90% species' extinctions. These periods of time are called **mass extinctions** and have been one tool used to separate Periods in geological time. Mass extinctions were not caused by a single event or in an immediate loss of life. In fact, all of mass extinction "events" occurred over long periods of time, 500 thousand-10 million years. The causes of mass extinctions are probably varied, but all include geologically rapid climate and environmental changes. Species were not able to adapt quickly enough to the changes happening in their environments, so died out. While extinctions are an immediate loss in biodiversity, they do lead to many positive changes in the biological ecosystem. For instance, the Cretaceous mass extinction event 65 million years ago led to the extinction of dinosaur species. This enabled mammal and bird species to thrive and diversify as predators were no longer present.

A useful way to memorize the five mass extinction events is using the mnemonic: **Old Darwin Played Terrific Chess** (Ordovician, Devonian, Permian, Triassic, and Cretaceous). Additionally, by using the fingers of the left hand, other useful information about these events can be easily remembered.

Old (the thumb): The Ordovician Period, between approximately 488-444 million years ago, was a time of marine organisms, including many marine invertebrates and fish. Organisms had not adapted to terrestrial habitats yet. The mass extinction event was long, about 10 million years in length, and wiped out 85% of species.

Darwin (the index finger): The Devonian Period, between approximately 416-359 million years ago, ended with a mass extinction that lasted around 3 million years and included a series of smaller extinction events. The Devonian mass extinction event led to the loss of 80% of species. The organisms living during the Devonian Period included mostly marine organisms, but also included early partially terrestrial animals like frogs and semi-terrestrial plants, such as mosses and liverwort.



Played (the middle finger): The Permian mass extinction was the most devastating extinction event with the loss of 95% of all species. Because of the major loss of species, it has been called "The Great Dying." It most likely occurred very quickly (500 thousand years or less). A recent paper in Nature Geoscience describes major volcanic eruptions in Siberian leading to destruction of the ozone layer as causes of the Permian mass extinction. Organisms in the Permian Period

od (251-299 mya) would have included large marine animals, diverse reptiles and many plants.

Terrific (the ring finger): The Triassic Period (251-199 mya) ended with a mass extinction of 75% of species. Most of the species lost were animals while plants seemed less affected. It lasted about as long as the Devonian extinction event, about 3 million years. Dinosaur and mammal species show-up in the fossil record during the Triassic Period.

Chess (the pinky finger): The Cretaceous Period (145-65 mya) was a time of dinosaurs and large marine reptiles, and first seed-bearing plants. It ended with a mass extinction lasting approximately 1 million years. 70% of species went extinct, including all dinosaurs.

You can use this model to remember the Periods of the five mass extinctions. Additionally, you can use the sizes of the fingers to memorize the relative loss of species that occurred. The third finger is probably the largest digit, and represents the Permian extinction which resulted in the largest loss of species (95%). The thumb is another large digit and corresponds to the Ordovician mass extinction that resulted in 85% species extinction. The index and ring fingers are just about the same size and the mass extinctions they represent (Devonian and Triassic) both resulted in 75-80% species extinction and lasted

about the same length of time. The pinky, the smallest digit, represents the smallest mass extinction event, the Cretaceous.

The evolution of life on Earth is spurred on by environmental changes. Species must adapt or die. The Earth has experienced at least five major mass extinction events caused by immense global climate change. These represent times of loss, but also times of opportunity for highly adaptable species. As we study the fossil record, we can observe the results of these times of extinctions and, possibly, predict effects of the current global climate change we are experiencing. Hopefully this handy guide to memorizing the 5 mass extinction events helps as you continue your own study into the fossil record.

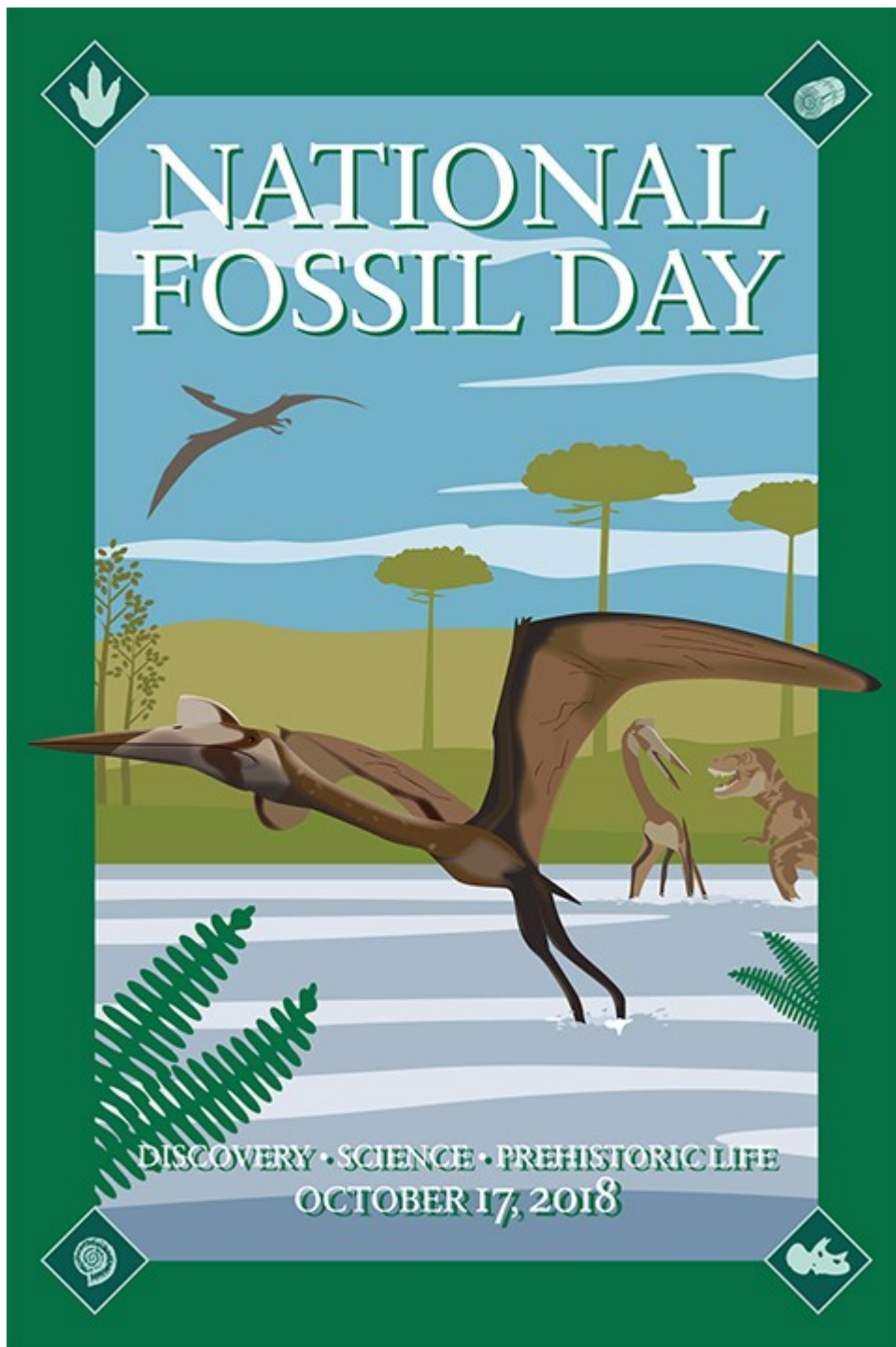
Much of this memorization tool was taken from Linden Pike's YouTube video entitled "How to Remember 5 Major Mass Extinction Events - Hand of Apathy" (https://www.youtube.com/watch?v=q6N_8rwKK2q&t=44s). The citation for the Nature Geoscience article mentioned above: Broadley, Michael W., et al. "End-Permian extinction amplified by plume-induced release of recycled lithospheric volatiles." *Nature Geoscience* 11.9 (2018): 682.

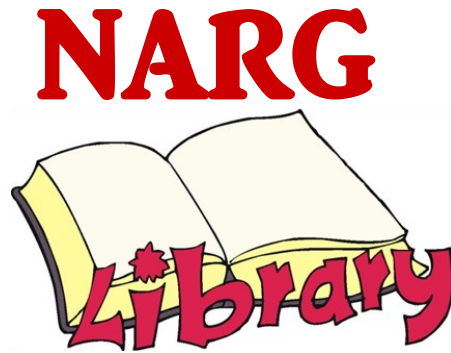


Picture of a palm leaf found on the NARG trip to Arbuckle Mountain, October 2008.



Chesapecten (scallop)
Miocene, 15 million years old
Calvert Cliffs, Calvert County, Mary-





- The NARG library has just become easier for members to use. The 532 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 membership dues for 2019 are due January 1, 2019

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

You may pay for your membership by:

- * Bring your money to our next NARG meeting..
- * You can mail your payment to:

NARG
Margaret Johnson
2220 179th Ave E
Lake Tapps, WA 98391

* You can pay your dues thru Pay Pal. You don't need a Pay Pal account to pay this way. You can pay using a credit Card.

Use the following links:

Family Membership \$40 https://www.paypal.com/cgi-bin/webscr?cmd=_s-xclick&hosted_button_id=AXASMFKA8MZU4

Single Membership \$25 https://www.paypal.com/cgi-bin/webscr?cmd=_s-xclick&hosted_button_id=438FVX4E6CTQY

Student Membership \$10 https://www.paypal.com/cgi-bin/webscr?cmd=_s-xclick&hosted_button_id=438FVX4E6CTQY

Fossil Calendar

SVP meeting	Oct 17-20	Albuquerque, New Mexico
National Fossil Day	October 17	
Paleontological Society meeting	Nov 4-7	Indianapolis, Indiana
NARG Members Only Auction	November 17	Hillsboro, Oregon

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:

President: Aaron Currier (503) 364-2979
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 Secretary: Tami Smith (503) 620-5317
 Treasurer: Peg Johnson (253) 370-8892

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 Robert Rosé (541) 367-2052
 Linda Harvey (503) 310-3036
 Debbie Shannon (503) 887-7423

Honorary Directors:

Michael Santino (503) 981-8902
 Larry Purchase (360) 254-5635

Committees:

Newsletter: Peg Johnson
 Aaron Currier
 Dan O'Loughlin
 FossilFest: Linda Harvey
 Dan O'Loughlin

NORTHWEST FOSSIL FEST

August 10, 2019

*A Celebration
of Paleontology in
the Pacific Northwest*

at the Rice Museum
in Hillsboro, Oregon



presented by the
North America
Research Group

FREE ADMISSION
nargpaleo.org