



NARG NEWSLETTER

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Fossil Preparation Workshops

By Tara Baker

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Several folks took advantage of fossil preparation workshops given this month by Greg Carr, a long-time NARG member. Greg has been a life-long fossil and rock hound, but only began learning how to prepare fossils about 12 years ago. At that time, NARG members rescued a whale skull from beachside bedrock and brought it to Bill Sullivan's workshop. Greg learned how to clean and define some of these fossils using an air scribe. An air scribe is a pneumatic tool, like a miniature jackhammer, that can be used to break away rock (matrix) from around fossils. This is done to better expose the fossil, be it bone, shell, or even tissue.

But Greg got the most experience preparing fossils after 2011. At that time, Greg and his daughter, Gloria, discovered a new marine reptile a unique type of Thalattosaur, in Central Oregon. NARG performed another rescue, bringing more than 60 matrix-bound bone fossils back to Portland. Greg estimates that he has spent approximately 4000 hours prepping these bones using several different air scribes.

On February 14, several members met at Metzger Park Hall in Tigard. Some had concretions and fossils to work on. Some brought basic tools, like pin vises, while others came with air scribes and compressors. Greg assisted participants in setting up equipment, taught them how to use new tools, and gave advice on how to best expose fossils. Some folks had experience in prepping and just enjoyed the company as they worked on revealing crabs from concretions. As one of the NARG members there that night, I appreciated Greg's help. I had a new air scribe and compressor, with no experience on how to use it. I appreciated learning a new skill from someone with so much experience.

Greg Carr offered three other fossil preparation workshops on February 21, March 6, and March 20.



Figure 1: Greg Carr and Jerry Lukos discussing fossil preparation on February 14, 2018. Pat Jordan in the background



Figure 2: Jerry Lukos happily working away on a Wyoming fish fossil. She was very excited to tease out a single tooth.



Figure 3: A partially prepared “practice” (junk) fossil.



Figure 4: Some of the fossil preparation materials used: magnifying light, air scribe, and facemask to filter out rock particles.

It Happened Near Pahrump

By Robert Rosé

Where do you go to collect fossils in early January? Margaret Johnson and Robert Rosé found fossils in the Spring Mountains of southern Nevada. Margaret brought her Jeep and picked up Robert in a Pahrump RV park and drove nearby to an outlier of the Spring Mountains. This outlier is very near a gravel road leading to Wheeler Pass and is comprised of Late Carboniferous limestone and dolostone.

Since there are many beds exposed we stopped at several places along the gravel road and walked to the outcrop. The beds are tilted to that as you climb up the hill and head westward you encounter different beds over time. Some beds have solitary corals and some colonial corals. Many beds appear non-fossiliferous. The best strategy is to walk across as many beds as possible so you can find the right bed. Once you have found the bed with fossils follow it along its length to find the best specimens.

In one spot Robert found a fossil reef with many colonial corals. It appears that much of the limestone is comprised of small boulders of coral colonies. This probably represents the rubble pile found at the foot of a reef. Even though there are lots of fossils, trying to remove them from the outcrop is very difficult. Generally the best specimens are loose in the talus or in the washes.



Syringopora Colonial Coral (side view)

The last place we visited was at the end of a two-track which led to a large hillside of limestone beds dipping toward us. As we walked up hill we encountered new beds all the time. This is the location where Margaret found her special specimen of *Syringopora* colonial coral. Her specimen was a nice fan-shaped cross section of a coral head which was loose on the slope.



Top view

We explored a small percentage of the hills available in this easily accessible area near Pahrump Nevada. The good thing about this area is the lack of vegetation. Limestone beds are easily followed along the hillside and fossils are easily spotted. The large expanse of outcrop also means that we will not run out of fossils any time soon. Corals are the most abundant fossils but brachiopods, crinoid columnals and bryozoans are present. Many of the fossils are silicified, wholly or partially.

(We will be visiting this location on our May 19th field trip. Come to the April meeting to find out more about our trip)



Limestone coral reef with Robert R. in background.



Silicified solitary coral



Limestone beds with solitary corals



Robert R. sitting on limestone reef entering notes in his notebook.

Fossil Cyber Security

MacKenzie Smith

It can easily be said that technology has brought many joys and many pains. There is the joy of being able to IM (instant messaging) friends on the opposite side of the world and convenience of being able to look up almost anything (nearby restaurants, directions etc.). But with these benefits we also have to put up with updates that seem only slightly less short than a geologic epoch and remember about as many passwords as there are species of snails and clams.

Paleontology is no exception to today's technological splendors and frustrations. CT scans and 3D prints have enabled us to study, communicate and educate in unimaginable ways. One problem that we face in paleontology with modern technology though is a bit ironic: the combination of cameras and GPS on cell phones. Obviously, we need pictures of our field site or fossils in the field. A picture of the site might be useful to help record the geology of the area or serve as a reference to what the site looked like. We also like to take pictures during group digs in order to remember the shared fun and comradery. Pictures of the fossils are important too (with a scale or something to illustrate size). We like to show others what we find to just share our experiences or have help with identification. Taking a picture can also help with reconstruction of the fossil if it gets damaged or needs to be reconstructed. GPS on the phone also enables us to all have access to our coordinates at almost any time (provided we have enough battery). This in turn helps us be more scientific in our collecting by being able to record where the fossil was found. And herein lies our problem.

Today's cell phones have a feature that records your location when you take a picture called "Geo Tagging". Your GPS coordinates are embedded in the picture itself when this feature is turned on. So why is this a problem in paleontology (and conservation biology) if we need pictures and location data? The main problem is two-fold. These pictures are shared over social media on platforms such as Facebook, Twitter, Instagram, Pinterest, Snap Chat and Tumblr. This in and of itself is not a problem. The real problem is when there are pictures of a sensitive, working or undescribed site or fossil at said site online and on social media. When a Geo Tagged photo is posted anyone can access the GPS information meaning that you've potentially given away the location of the fossil site to poachers or to enough people where the site can be easily exhausted (all of the fossils removed).

We, down at Montbrook (operated by the University of Florida), and other dig sites across the globe have run into this problem. Our site has been pillaged a few times which we attribute to the "shared Geo Tag photo problem". This site is active and relatively new, we've only known about it for three years or so, therefore, there is not a lot of scientific literature on it and the animals that have come from it, some of which are new species. It is also the only known 5 million year old terrestrial deposit in Florida. Because this site is significant and active research is being done, we can't have people coming and taking fossils regardless of what their intent is. Furthermore, it is on private property. We at the Florida Museum have permission to dig on the property for the museum and have the responsibility of protecting their privacy by not accidentally encouraging unwanted guests.

Most of us have probably been to a site like this or a site that is unsustainable for a large group of people. As good stewards of paleontological resources, it is our duty to recognize sensitive sites and act accordingly. While it is important to protect sites and fossils we also need to show that paleontology is a science accessible to all and posting pictures of fossils that you've found and sharing them with your friends is one way of doing that. Here are some tips to keep locality data safe:

Turn off "Geo Tag" on your phone – This can usually be done in your phone's main settings or your phone's camera settings but varies by the type of phone you have. If you have any trouble doing that you can either Google how to or go and talk to your phone dealer.

Use a digital camera that does not have GPS – Arguably, this is the safest option. You can access data you've never recorded.

Nothing is private regarding social media – Even if you have a small group of friends or followers and never post publicly, nothing is preventing friends or followers from sharing your posts with other people. Your picture might even go sub-viral.

Be vague about (or don't mention) locations – I'm not saying you shouldn't share a photo of you finding an *Anadara* at Beverly Beach. It is well established that they are super common there. I'm referring to not sharing your location regarding sensitive sites and rare finds. You can use vague terms like Central Oregon or Northern Florida if necessary to talk about where it is from.

Don't have to show a picture of the outcrop – Sometimes it can be easy to find a spot if you have a picture of it. It is best not to share with everyone what the area looks like.

Respect the rules of the site – If you are at a managed site and they do not want pictures of any type taken please follow their rules. They are there to ensure that people can return to dig at the site and not to dictate your every move. Different sites have different photo policies so ask your site leader for the day what their photo policy is. This is new territory for everyone and people's comfort levels differ so policies may vary from place to place or time to time.

Once again these tips are mainly for sensitive sites and/or fossils. This is by no means a safeguard that will prevent all looting, research disruption or over collecting. People still look in publications and on museum specimens. Data mined from publications and museums can be from sites that are exhausted or no longer accessible. But photos from social media show that a site is active making them a more likely target. By following the six points above we can reduce the potential of these problems. It is still important to communicate with our friends, family and the public about fossils and how they are found and social media is still a good way of doing that. We just need to be aware of how technology has changed and potential consequences of our actions.



This crab got a new home at the Rice NW Museum of Rocks & Minerals, in Hillsboro, Oregon - now a Smithsonian affiliate. It is on display in the Fossil gallery on the shelf above the trilobites. Because a photo illustration is going in the Online Treatise of Invertebrate Paleontology, the Treatise people want it housed in a public collection.

narg_paleolist@orerockon.com

NARG would like to take a moment to thank Tim Fisher for keeping our group communicating. NARG members have been sharing information, including this Newsletter, through a host site set up and maintained by Tim. Over the past few months we have been having problems with many of our members not able to receive information through this channel. Our listserv would kick out any email address it found suspicious. Tim, with the help of Peg Johnson, has worked hard to reestablish our group's main form of communication. Thank you, Tim, for all your effort. Visit his website at <https://orerockon.com/>



Tim and Tonya Fisher collecting at Hollywood Ranch



Tim answering questions at Newport Fossil Fest



Rick Johnson, Bill Sullivan, and Tim Fisher prepping Wally



Tim and Tonya at Newport Fossil Fest

Fossil Stromatolites Found Near Las Vegas



Robert R and Peg J went on an exploration trip at the end of December 2017. The dark layers of rock are reefs made out of stromatolites. In picture below is a side view of an extremely large buildup (about 20 feet long).



Living stromatolites in Hamelin Pool of Shark Bay, Western Australia.

www.britannica.com



Looking down on head of stromatolite

Side view of stromatolite showing stalk and head.



Head

Bottom where stalk was attached.



North West FossilFest 2018

By Linda Harvey

It's 2018 and already time to start thinking about this year's North West Fossil Fest held at the Rice Northwest Museum of Rocks and Minerals. The date is set for August 11 and the theme this year is "Prehistoric Horse". Dr. Bruce McFadden, Distinguished Curator of Vertebrate Paleontology at Florida Museum of Natural History and Professor of Biology, Geological Sciences, and Latin American Studies at the University of Florida will be one of our event speakers. We are also hoping the new Director of the John Day Fossil Beds will be a speaker. Stay tuned for updates on the event. If you have any horse fossils in your collection that you would like to share in a display, please be sure to let Dan O'Loughlin or Linda Harvey know to save a display case for you. Be prepared as we get closer to the event - show cases, in addition to all things "horse" and volunteers will be solicited.

Evolution

by **Bob Strauss**

Updated March 06, 2017

Name: Miohippus (Greek for "Miocene horse"); pronounced MY-oh-HIP-us

Habitat: Plains of North America

Historical Epoch: Late Eocene-Early Oligocene (35-25 million years ago)

Size and Weight: About four feet long and 50-75 pounds

Diet: Plants

Distinguishing Characteristics: Small size; relatively long skull; three-toed feet

About Miohippus

Miohippus was one of the most successful [prehistoric horses](#) of the Tertiary period; this three-toed genus (which was closely related to the similarly named [Mesohippus](#)) was represented by about a dozen different species, all of them indigenous to North America from about 35 to 25 million years ago.

Miohippus was a bit larger than Mesohippus (about 100 pounds for a full-grown adult, compared to 50 or 75 pounds); however, despite its name, it lived not in the [Miocene](#) but the earlier [Eocene](#) and [Oligocene](#) epochs, a mistake for which you can thank the famous American paleontologist [Othniel C. Marsh](#).

Like its similarly named relatives, Miohippus lay on the direct evolutionary line that led to the modern horse, genus *Equus*. Somewhat confusingly, although Miohippus is known by over a dozen named species, ranging from *M. acutidens* to *M. quartus*, the genus itself consisted of two basic types, one adapted for life on prairies and the other best suited to forests and woodlands. It was the prairie variety that led to *Equus*; the woodland version, with its elongated second and fourth toes, spawned small descendants that went extinct in Eurasia at the cusp of the [Pliocene](#) epoch, about five million years ago.



Miohippus sp.
Oligocene (30-35 myo)
Brule Formation
South Dakota



Mesohippus (Heinrich Harder).

Evolution

by Bob Strauss

Updated March 06, 2017

Name: Mesohippus (Greek for "middle horse"); pronounced MAY-so-HIP-us

Habitat: Woodlands of North America

Historical Epoch: Late Eocene-Middle Oligocene (40-30 million years ago)

Size and Weight: About four feet long and 75 pounds

Diet: Twigs and fruit

Distinguishing Characteristics: Small size; three-toed front feet; large brain relative to its size

About Mesohippus

You can think of Mesohippus as [Hyracotherium](#) (the ancestral horse previously known as Eohippus) advanced a few million years: this [prehistoric horse](#) represented an intermediate stage between the smallish hooved mammals of the early [Eocene](#) epoch, about 50 million years ago, and the large plains grazers (like [Hipparion](#) and [Hippidion](#)) that dominated the [Pliocene](#) and [Pleistocene](#) epochs over 45 million years later.

This horse is known by no less than twelve separate species, ranging from *M. bairdi* to *M. westoni*, which roamed the expanse of North America from the late Eocene to the middle [Oligocene](#) epochs.

About the size of a deer, Mesohippus was distinguished by its three-toed front feet (earlier horses sported four toes on their front limbs) and the wide-set eyes set high atop its long, horse-like skull. Mesohippus was also equipped with slightly longer legs than its predecessors, and was endowed with what, for its time, was a relatively large brain, about the same size, proportionate to its bulk, as that of modern horses. Unlike later horses, however, Mesohippus fed not on grass, but on twigs and fruit, as can be inferred by the shape and arrangement of its teeth.



Mesohippus bairdi (horse)
Oligocene (30-35 myo)
White River Formation
Pennington Co., SD

Florida Fossil Horse Teeth



Nannippus Cf. *N. aztecus*
m1 or m2
Early Pliocene
Palmetto Fauna
Bone Valley District
De Soto County, Florida



I want to thank Harry Pristis for the use of these wonderful fossil horse teeth pictures. Please contact Harry for permission to use them. pristis@aol.com

Joe Test Out New Camera

Joe Cantrell sent these pictures in January. He said: *In the last month, I've been testing an unprecedented new camera with dedicated and buggy software, along with the best methods from previous work. This evening, it came together.*

*These are the first images from it, three of ostracods in **Elimia tenera**. There is far more detail than ever before, even using my old lenses dating back 35 years or so.*

I do not often talk aloud to myself, but these have generated a real conversation with a lot of delighted laughs. Look at that, crystals forming inside the fossil snail shells and who knows what inside the ostracods and their shed shells!



3D Printing From CT Scans

By Greg Carr

3D printing is a method of creating objects by adding materials to a base. Materials can be liquids that polymerize when exposed to light, plastic filaments that can be heated and fused together, powders of many kinds that are glued together with accurate adhesive application, and even paper sheets cut and glued together.

Fossil scanning, image manipulation and 3D printing are revolutionizing paleontology. Many fossils can be scanned and then reproduced in ways that literally cannot be done with conventional fossil preparation techniques. One such technique is CT (Computerized Tomography) which uses X-Rays to measure and map the insides of fossils.

The Oregon Museum of Science and Industry (OMSI) has recently begun a collaborative project with Oregon Health Sciences University (OHSU) to scan and print some of the fossils in OMSI's collection. We chose to begin with a 17 million dolphin skull from the Astoria formation, found at Newport Oregon about 20 years ago. The exterior of the skull had been prepared by one of OMSI's Paleo lab volunteers, but the internals of the skull (braincase, sinus) remained unknown and inaccessible. The skull was scanned by OHSU in February 2018. 3D files of the exterior of the skull and the bone structures of the file were extracted from the CT scan data by one of the OHSU researchers.

The first 3D print is of the exterior of the skull. It is an accurate copy and shows some details not visible on the actual skull. In particular, some of the small cracks and holes show up in the CT-based print because the glue filling them is transparent to X-rays, whereas on the real skull they are filled and covered with glue.

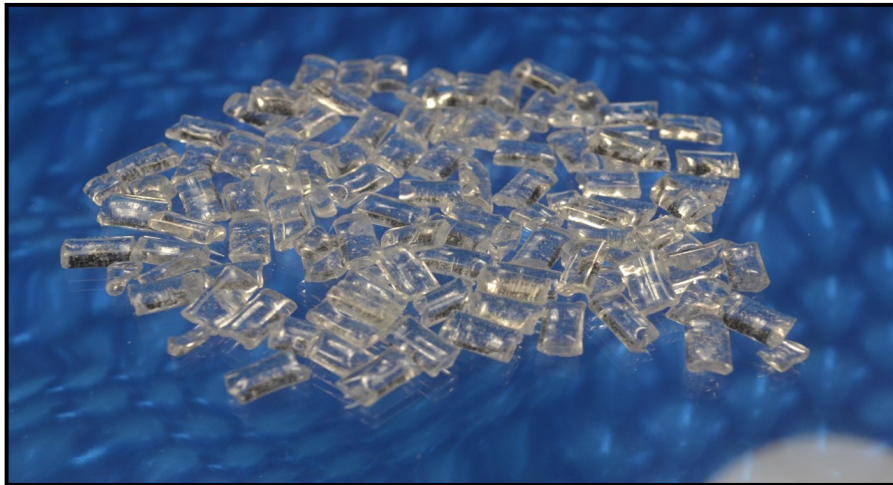


However, the real fun begins when the bone print is examined. This print removes the internal bone from the skull which cannot be done in real life. Most prominently, the brain case (the hole where the brain was) and nasal passages from the blow-hole to the mouth are revealed. Parts of the skull are not present in the model, leaving large access holes into the brain case. The bone is so thin in these areas that it does not show up in the X-ray, even though they are present in the actual skull.

In short, new scanning techniques have the ability to reveal lots of cool stuff that can't be seen by normal fossil preparation techniques. The OMSI-OHSU collaboration has already given us wonderful information about this one specimen and will yield more information in the future.



Paraloid B-72



Fossil collectors/preparers have utilized various adhesives over time. Many of these adhesives, later on, have caused problems for museums or researchers. A North American based organization, the Association of Methods & Materials in Paleontology, continues to research the most appropriate adhesives available. Their members include professional preparers from top museums throughout the world. Currently, the most accepted consolidant/adhesive used at museums today is Paraloid B-72. This thermoplastic is stable over a long period of time and can be reversed if you change your mind later.

For those of you that are new to prepping, you may be hesitant to make up large quantities of adhesives. Bruce Thiel gave me the idea of using empty fingernail bottles to make up small quantities. Here is his description of his technique:

"The number of beads and percentage are based on approximations made after measuring quantities on a 5,000 capacity gram scale purchased from Harbor Freight for \$20. Weigh the nail polish bottle empty and full, which gives you the weight of the acetone. Then you weigh the Paraloid beads to calculate an exact percentage in solution (weight of Paraloid/Weight of acetone x 100 = %). Keep in mind that the acetone evaporates during the time you have the bottle open while applying. Once you cap it and store it awhile, more acetone dissipates and it becomes more concentrated, so I end up adding a little acetone later if I notice that it is starting to get thicker or shinier upon application.

When I first started preparing fossils, I slopped it on heavily and made everything shiny and glossy. In some cases it hid the mistakes if I had gouged out a hole. Sometimes these were filled and tinted to match with watercolor. The Paraloid solution protected it. After the first couple of crabs, I decided it was an artificial restoration and unethical. Now, if any restoration is needed for esthetic display, the restored material is tinted to a close match but off enough to be detectable upon close examination.

When I have had crabs photographed for scientific papers, I was asked to remove all surface applications of Paraloid. This was so they could be photographed in black and white after an application of ammonium chloride smoke, which temporarily whitens the surface and makes the features stand out. This has caused me to be more conservative in my use of Paraloid applications, and to avoid any heavy application for cosmetic reasons. If there are pieces of crab shell or legs that are loose or need stabilization, then Paraloid is used, but only in heavily diluted solutions, which are sometimes applied over each other."

Concentrations of 2.5-5% are stated in the literature. You can see by Bruce's technique that the least amount used is always better. Thanks, Bruce, for sharing your technique with us. This should allow even the most hesitant of us to get started preparing fossils. NARG sells small quantities of Paraloid for \$2.50.

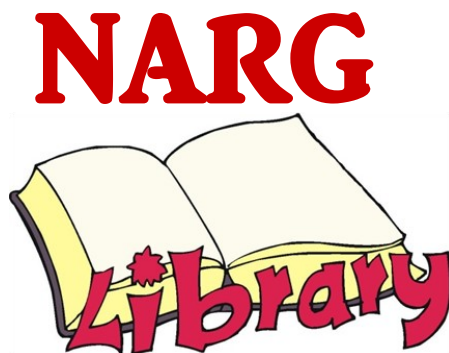


Horse Evolution

M B G L R G P L E I S T O C E N E W
 E T D M U I R E H T O C A R Y H J F
 R G S B L C Z K P P Z M H E K M W L
 Y R U X M L D L F L L L N T E B A C
 C Q P T D J W L A X I I L T T N C Q
 H B P E F R B S R P U O A T U V M M
 I M I E R K L M U Q R L H A N E G L
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DINOHIPPUS	MERYCHIPPUS	PALEOCENE
ENAMEL	MESOHIPPUS	PERISSODACTYLA
EOCENE	METACARPAL	PLEISTOCENE
EOHIPPUS	METATARSUS	PLIOHIPPUS
EQUINE	MIOCENE	UNGULATE
EQUUS	MIOHIPPUS	
HYRACOTHERIUM	OLIGOCENE	



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 membership dues for 2018 are due January 1, 2018

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.

Fossil Calendar

WAMS Show	Rickreall, Oregon	April 13-15
Newport Fossil Fest	Newport, Oregon	April 21
Stonerose member's dig	Republic, Washington	April 27-29
Association for Materials & Methods in Paleontology	Lincoln, Nebraska	April 24-28
Northwest Federation of Mineralogical Societies Show	Yakima, Washington	April 27-29

For a listing of local gem and mineral shows check out: <http://www.mineralcouncil.org/shows.pdf>

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

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

NORTHWEST FOSSIL FEST

August 11, 2018

*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