



NARG NEWSLETTER

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Newport Fossil Fest 2019

By Dan O'Loughlin

Once again this year's Newport Fossil Fest was threatened by snow. Many NARG members and attendees decided to not risk the weather. As predicted, we did start the day off with mild snow in Newport, Oregon. It quickly went away but the weather remained chilly. For those "diehards" that did attend, they were treated to two fabulous lectures. Our own Aaron Currier gave an enlightening lecture titled "What is a Desmostylus?" Parts of this hippo-like mammal have been found on the central Oregon coast. His lecture was well received. After Aaron's lecture, Dr Bill Orr gave a talk titled "Super Predators: The Biggest and the Best". He plans to give a similar lecture at one of our upcoming meetings for those of you that missed it.



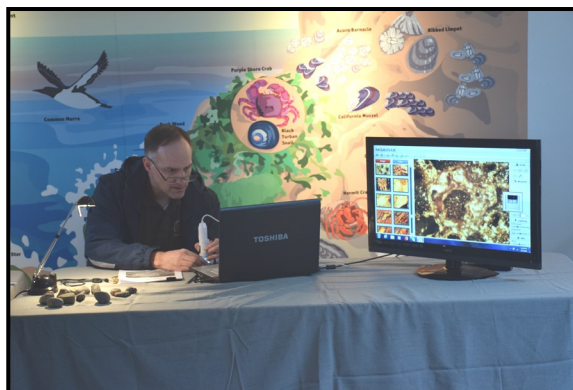
A fabulous display of local fossils was presented by local, Kent Gibson. As many of you remember, Kent donated a large quantity of his coastal finds to the Smithsonian.

Mike Full with the Yamhill River Pleistocene Project brought quite an array of fossils from the Willamette Valley.





Dr. Orr and Aaron worked the fossil identification table.



NARG covered 5 tables with free shark teeth, T shirts, and some local finds. In addition, Greg Carr had a great display of "Bernie" the thalattosaur with the most recent presentation on the brain case. There were plenty of 3-D printed models for guests to explore and ask questions about. We set up one table dedicated just to fossil wood and such.





There was lots of variety to draw a crowd. I would like to thank the dedicated NARG members that braved the weather to staff the tables and answer questions. Deb Shannon, Gerry Lukos, Greg Carr, and Aaron Currier worked all day. We also spotted Nick Oberzil and Lisa Schenk who worked the beaches all weekend. It will be fun to hear what special fossils were found over the weekend. A special shout out goes to my family that sent 7 members to help with set up and take down. I heard they terrorized the town during show hours. I'm still waiting for a bill from the City of Newport. All in all it was a successful event. Thanks again to Bill Hanshumaker for arranging the event.

Crab Photo's by Greg Gentry



Macroacena shenki from Keasey formation



Pulalium vulgarius from Pelle Washington, Lincoln Creek fm.

Winter Fossiling

By Robert Rosé

In December of 2018 Peg Johnson and Robert Rosé collected fossils in southern Nevada. Just before Christmas we drove north and east of Las Vegas along Interstate 15 looking for the off ramp that would take us to the north Muddy Mountains west of the Valley of Fire. Rocks of Paleozoic and Mesozoic age crop out in these mountains.

At the Ute exit is a paved road that takes you east to a gap in the mountain front which is pretty impressive. Steeply dipping beds of limestone and shale tower above the road as it snakes its way through a narrow canyon. Beyond is a wide open space in a valley carved out in the Chinle Formation. From information gleaned years before, Robert knew that in places the Shinarump member of the Chinle Formation contains petrified wood.



After locating the Shinarump, we took a 4-wheel drive road north along the Shinarump outcrop. This road is noted by signs as a trail. We stopped periodically along the road to look at the Shinarump outcrop and usually we would see the impressions of wood in the sandstone but no wood pieces. The road travels along ridge tops and through narrow washes with the transition between the two being very steep hillsides.



At our last stop of the day we were near a thick section of the Shinarump. At this locality we found abundant sections of petrified wood on the surface. Some pieces were buried in the wash by sand and careful observation was necessary to not miss some of the larger pieces. Peg was looking for colorful pieces and Robert was looking for wood with cell structure. The wood found here is not as colorful as that found around Petrified Forest National Park but is the same age. All is Triassic and most likely contains *Araucarioxylon* and *Woodworthia*. We collected a bucket each of small and large pieces.

Because of the lateness of the day we decided to continue north rather than return by the very difficult trail we were on all day. We did find a nicer road in a large wash and finally ended up near the village of Moapa and the freeway. We had a very nice weather day, enjoyed the peace of desert landscapes and found fossils. What could be better!

Shinarump outcrop in the Chinle Formation. (You can barely see Robert collecting wood in the background.)

Shinarump



Clam Fossil



Making a Quieter Air Scribe

By Greg Carr

Pneumatic air scribes work by using compressed air to drive a hard-pointed stylus (normally made of tungsten carbide) in-and-out in an oscillating fashion in the manner of a small jack-hammer. The exhausted air normally blows out the side or the front of the scribe which has the added benefit of blowing the chips of matrix away from the working area. It also has the effect of generating loud noise, since oscillating pulsations in the air stream are actually noise. Noise levels from most air scribes are loud enough to require the use of hearing protection most of the time.

I wanted to see if it would be possible to reduce the noise level to something more comfortable. It would be very useful to have quieter air scribes in the OMSI Paleo lab as we volunteers spend a lot of time talking with our visitors. Frequently removing and replacing ear protection is a bother using conventional scribes.

Since the majority of the tool noise actually is present in the discharge air, it makes sense that capturing the exhaust air and directing it a long distance from the working area would reduce the noise level.

I started with one of my workhorse tools, a Chicago Pneumatic. These tools are typically modified for Paleo use anyway, so more modifications are not unusual. I modified a tool by replacing the guide tip with forward-facing air vents with a new guide tip that had no air vents. I then drilled and tapped a hole in the side of the main body at the location the air exits the internal cylinder. A miniature pneumatic fitting was installed in the side port (8x32 tapped fitting) and a flexible hose was attached. The hose was taped to the supply tubing for a short distance and then allowed to hang free. This allowed me to drape the exhaust hose under the worktable to direct the noise away from my head and ears.

The modification appears to work well. Noise level readings taken at OMSI measure a noise reduction, taken at right angles to the tool at 30 cm to be lowered from 86 dB to 79 dB. This means the actual sound energy was reduced by 80%. This is significant, meaning that long exposure to the scribe even without hearing protection should not be damaging!

I am still working to improve it. The exhaust hose, although soft rubber, is still stiff enough to create a noticeable effort to manipulate the scribe. I have some soft Silicone tube on order that may do the trick. I am also trying various mufflers for the end of the exhaust hose to reduce the noise there, as any noise there contributes to the overall noise of the room, even though it is small.

I will keep you all informed as to the progress. Modifications to other tools may also be possible, done in the same manner. If anyone wants me to experiment with their tools, drop me a line (gpcarr@comcast.net) or give me a call 503 245 4563.

Sincerely, Greg Carr

The modified scribe is (on the right) and an un-modified scribe (on the left).



What are the Squiggles in the Rock?

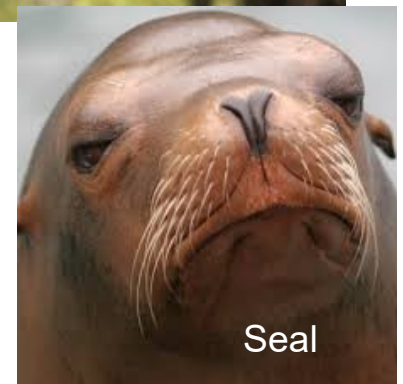
By Bob Oblack



The fossil with all the squiggles is part of a skull with cross-sections of 'turbinal' bones.



These are thin bones in the nasal passages of many mammals that have a good sense of smell. Take a look at a dog skull, or any mammal that uses its nose and you will see these thin bones inside the nasal cavity. Your fossil likely is part of the skull of a large sea lion or perhaps even a desmostylian, and there are some land mammals from the Astoria Formation too. These bones give more surface area for sensory cells hence the enhanced smelling ability, compared to us.



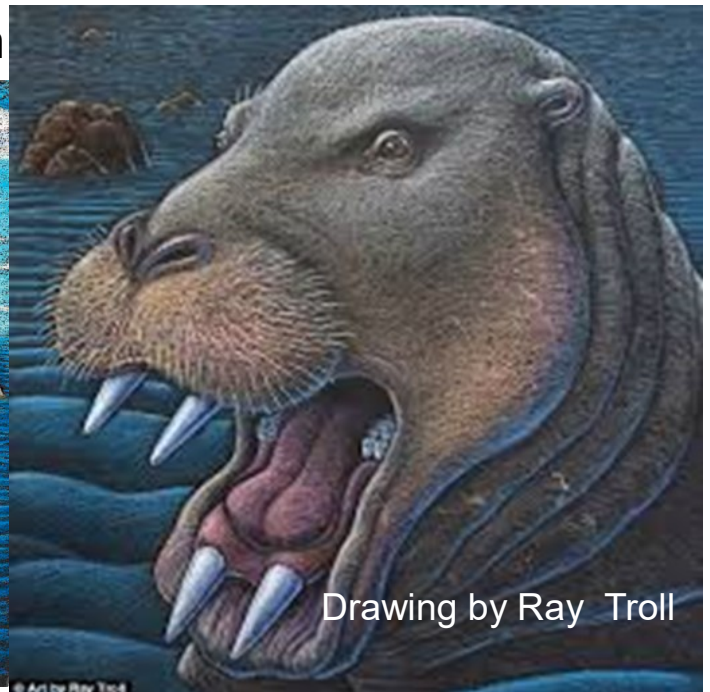
Seal

Credit: James Goedert

Desmostylian

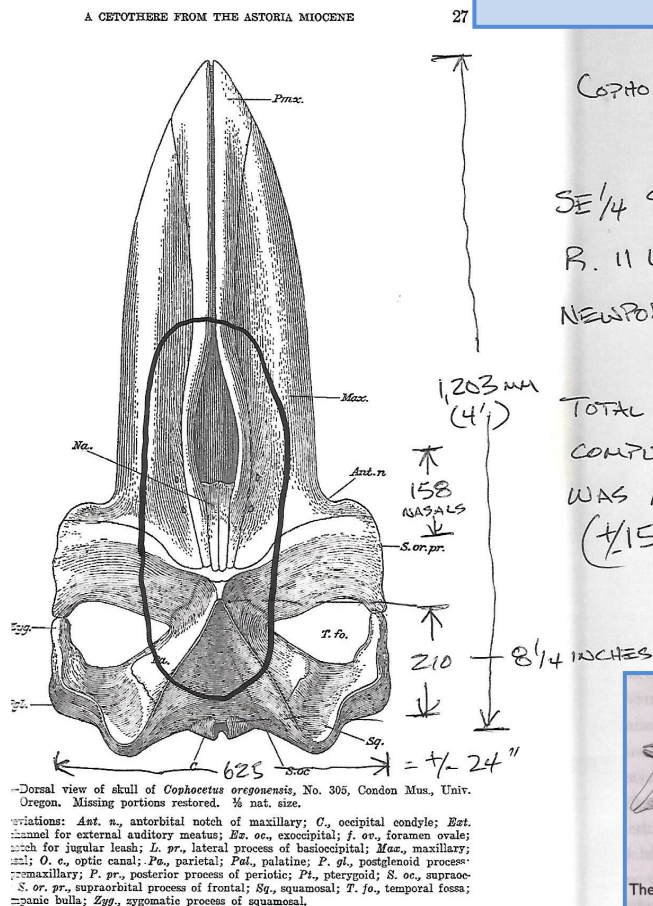


Drawing by Ray Troll



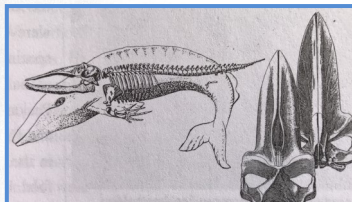
Drawing by Ray Troll

Credit: Jim Goedert for Skull and
Whale Dimensions



Cophocetus
oregonensis
S
SE 1/4 SEC. 7, T. 11
R. 11 W
NEWPORT, OREG.

TOTAL LENGTH OF
COMPLETE SKELETON
WAS ABOUT 4.6 M
(4 1/5 FEET)



The baleen whale *Cophocetus* is the most frequently recovered fossil whale in Oregon. The spade-shaped skull is typical of cetaceans. (From Orr and Orr 1999b; Packard and Kellogg 1934.)



Drawing above: Outlined area of fossil whale skull collected by Bob Oblack on Moolack Beach, April 29, 2017 and positioned on complete skull.

Drawing below: Whale outline sketched by Bob Oblack, whale ~19 feet long; skull outline ~ 4 feet



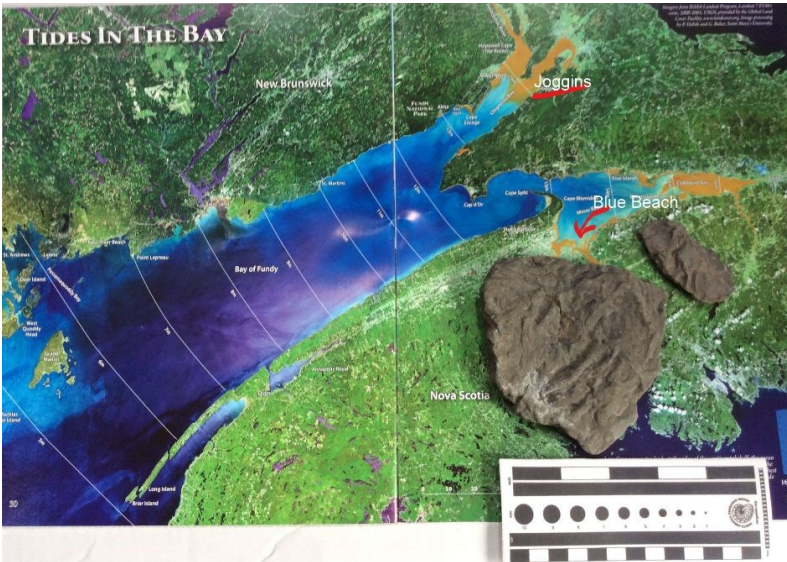
A Couple of Fossil Sites on the Bay of Fundy

By G. F. Lukos

With the highest tides in the world – more than 16 meters in some places – Canada's Bay of Fundy is a fascinating destination for anyone interested in geology. And, of course, it has fossil sites!

The Bay of Fundy starts at about the eastern most point of Maine's Atlantic coast, right around the western border of Canada's New Brunswick province. The eastern and southern coasts of the bay are in Nova Scotia.

Twice a day, every day, 115 billion metric tons of water roll out to reveal gravel beds and mudflats and then (mostly) gently flow back in to cover the places you were walking just a few hours before. In little harbors along the coasts, the boats of the local fishing fleets that aren't out working the waters spend much of the day sitting on terra firma.



Last summer I went on a 10-day tour that circled the Bay of Fundy, from St. Martins, N.B., heading east and around the end of the bay into Nova Scotia and then west to Digby, where we took a ferry across the bay to St. John, N.B. CA. There is lots to see and learn and experience in this part of Canada, including the culture and history of the region, how tidal power is being used to generate electricity, and great seafood. Fossils were only an incidental part of the trip, but we did make brief stops at two fossil sites.

Joggins Fossil Cliffs, across the northeast arm of the bay from the much-photographed Hopewell Rocks, is a UNESCO World Heritage Site. According to the field guide that can be purchased in the gift shop, the cliffs "reveal the most complete fossil record of terrestrial life from the Pennsylvanian Coal Age." The site stretches

(Fossils from Blue Beach): On a map of the Bay of Fundy, a couple of modest burrow trace fossils rescued at Blue Beach.

about 10 kilometers along the coast; the field guide covers about one kilometer near the visitor center, representing about one million years.

Of course, you have to carefully time your visit to the tides, which come right up to the staircase that provides access to the beach. But it is those same tides that make Joggins Cliffs endlessly productive for people who want to see fossils as incoming waters erode the cliffs of this former coal mine site and reveal long-hidden specimens. Twice a day, every day.

Among the fossils scattered on the exposed beach are aquatic animals; terrestrial plants, including trees, bark, ferns and calamites; tracks and other trace fossils, including amphibians and horseshoe crabs; and the rare terrestrial animal. The most famous discovery at Joggins, and the one that made the site known, was *Hylonomus lyelli*, purportedly the world's first reptile.

At Joggins, between tides, you can freely roam the beach discovering, touching, holding and taking photos of easily found fossils, but nothing can be removed from the site without a research permit.

A few days after our too-brief visit to Joggins Cliffs, along another arm of the bay – specifically the Minas Basin – we arrived at Blue Beach. This two kilometer stretch of beach at Avonport, N.S., is an important site for Mississippian Age fossils.



Joggins Fossil Cliffs at low tide



Joggins—a few finds): A few finds from Joggins. All had to be left on the beach to await the next

could indeed take fossils. Unfortunately, as a group tour with a set schedule, we had only a little time to hunt. I selected a couple of small burrow samples that would fit into my over-packed suitcase.

If I ever have the chance to visit Nova Scotia again, I would definitely like to include a few days near Avonport so I could make multiple visits to Blue Beach after high tide has again rearranged the treasures to be found there. Twice a day. Every day.

Websites:

Joggins Fossil Cliffs: <https://www.jogginsfossilcliffs.net/>

Blue Beach Fossil Museum: <http://www.bluebeachfossilmuseum.com/>

The Blue Beach Fossil Museum, which sits off a trail that leads to the fossil-cluttered beach, was established by Chris Mansky and his wife, Sonja Wood (who owned the little stretch of beach where she met the strange young man who kept asking for permission to explore). Chris talked to us about the museum's collection, which is jammed into a very small space, and about what we could expect to see at the beach. Purportedly the oldest collection of fossil tracks comes from Blue Beach, and the little museum has many specimens.

Chris told us that he would likely find tetrapod tracks within 15 minutes of arriving at the beach. He did. There is little chance that he planted the slab to find it later and

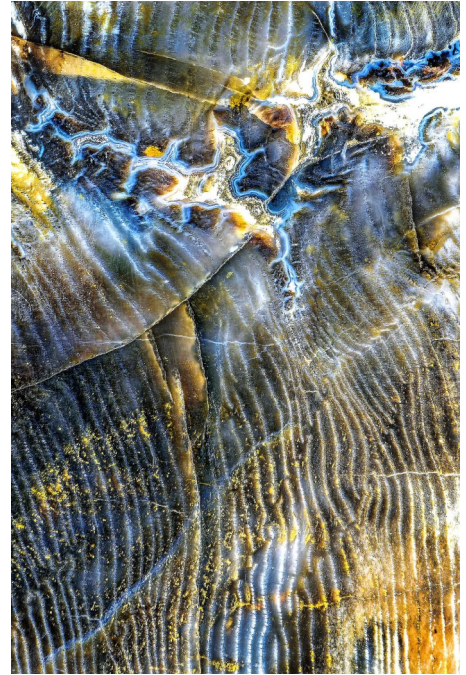


(Blue Beach terapod tracks): Chris Mansky quickly found some tetrapod tracks.

impress us since the beach and cliffs are assaulted twice a day by the huge tides, sweeping away small shards on the surface and revealing a whole new crop of fossils. In addition to a wide variety of trace fossils, you may find an assortment of plants and fauna, including fish and arthropods. We were assured that since this is a private beach we

Petrified Bog Wood

Photo's by Joe Cantrel. The Bog wood is from Larry Purchase and Joe Cantrel collections. Location of the wood is not known.



Fossil Preparation by Air Scribes

By Greg Carr

When do we use air scribes?
When the matrix is too hard for hand tools -or-
When it is desirable to rapidly remove matrix

What kinds are there?

"Chicago Pneumatic" type – stylus
hit by an internal oscillating piston



Paleotools ME9100
Chicago Pneumatic with modification
Chinese knock-offs with Modifications



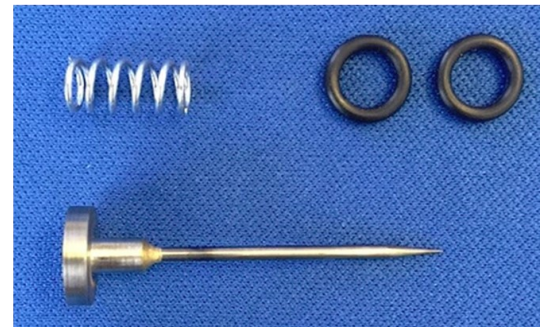
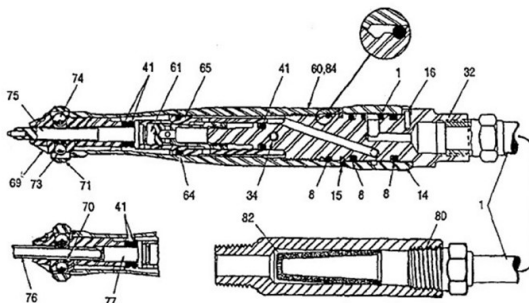
Direct Oscillation of
stylus with air seal
"ARO", "Paleo Jack"



Air Scribe Maintenance

Most important – frequent stylus sharpening – maybe several times a day
Daily – oiling and O-ring replacement (for "ARO" type) (purchase in bulk online)
Air Dryer Media replacement as needed (weekly, monthly)
As needed – cleaning , stylus replacement, internal piston replacement

"CP" type internals – piston,
cylinder, stylus



Stylus sharpening

- Stylus has a tungsten carbide rod with the end ground to a sharp point or a flattened chisel. This must be ground on a diamond wheel or plate. They get rounded by breakage or abrasion.
- Sharpness of the point is not the same as the grind angle – blunt or acute! Blunt grind is for hard matrix, acute grind is for deep excavations or softer matrix.
- The difference between a sharp point and a rounded point is on the order of microns – generally not visible to the naked eye except in the form of a point of light reflected off a rounded point. But you can feel the difference when using them! Inspect under the microscope.
- Sharpening the stylus will shorten it. Plan on replacing stylus – purchase or make your own! When working on the Oregon Thalattosaur I had to sharpen the stylus every hour and they only lasted 2-3 weeks. At \$75 each from Paleotools I decided to make my own – approximately \$5 in supplies – but I need a lathe to make the brass stops and a propane torch to silver-solder the stops to the carbide rod.

Original CP stylus –
practically useless!



CP9100 sharp stylus

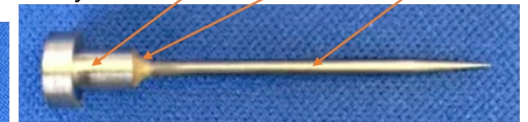


CP9100 chisel stylus



Very acute
Microjack#4

Stop Braze Joint Carbide Rod



Air Dryer

The air used in the scribes should be clean and dry. Home air compressors will not dry the air. In use, the tools may spit water droplets or there may be liquid water droplets left in the tools when shut down. This causes the tools to rust.

Drying the air can be done by modifying a water filter to insert in-line in the air supply. A cartridge filter is placed in the housing and a silica Gel dessicant poured between the filter and the housing. As air passes through the dessicant it is dried, then filtered. The dessicant is replaced when it changes from blue (dry) to pink (wet) and can be regenerated in a warm oven.



Fossil Considerations

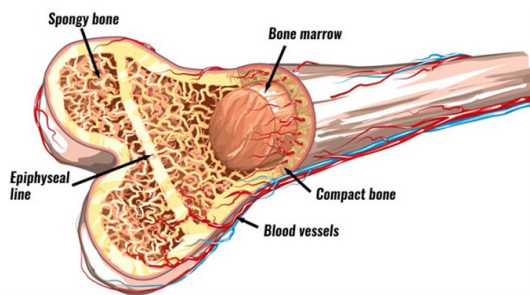
Fossils of interest can be areas of weakness in the rock caused by the organism like leaf impressions causing a layer of weakness where they prevented the rock grains from interlocking during the hardening process. Or they can be remnants of the original organism, generally mineralized internally as well as encapsulated within the matrix.

If the organism had a smooth impervious surface the matrix can be removed by breaking it away relatively easily. However, if the surface was rough or reticulated, the matrix cannot be easily be broken away from the surface. It must be removed layer by layer until enough of the object appears to meet the need. If we are attempting to determine overall bone shape, loss of a few tenths of a millimeter may be acceptable. This is what we have in the Ichthyosaur material.

Fossil leaf – just a weak layer in the rock.
Hammer & Chisel work!



Rough bone surface - where exactly is the surface on the sub-mm scale?



Smooth bone surface – easy to take off any adhering matrix

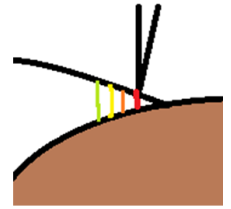


Manual Techniques

1. Get a good work area – table with great illumination, comfortable chair, binocular microscope with a boom mount. EBAY can be a good source if you know how to clean and align microscope optics.
2. Use protective gear – ear protection, eye protection, dust collection (if you can), dust filter if the matrix contains crystalline silica or uranium (example Hagerman horses, Morrison Fm. dinosaurs).
3. Take frequent breaks – continuous use of a vibrating tool can cause nerve damage to hands. I recommend a 10 minute break every hour. This can include bathroom breaks, refreshments, talking with visitors, documenting work with a camera, just looking at the specimen and planning the next move, etc.
4. Be careful with your glasses – rock dust and chips will cause lens scratches! Plan on a ‘disposable’ set of glasses which can be scratched.
5. There is no correct way to hold the tools – changeup is helpful. Don’t hold the air scribe too hard, and arrange the air hoses so that they do not tug on the tool. Large “U” and “S” curves help with minimizing the force necessary to hold the tool correctly.
6. Keep glue handy. Superglue is useful and may be allowed by your institution, but is not yet universally accepted by everybody. Apply to small cracks as soon as they appear, preferably before the loosened pieces fall off! Clean the area frequently so that if a small chip comes off you can find it and glue it back on ASAP.

Removal Techniques

- Remember, rock is strong in compression and weak in tension. Air scribes work by punching into the rock, causing cracks, and allowing the matrix to crack off into free air. Air scribes make poor drills.
- Match your tools to the task at hand. Rough shaping and removal of large barren chunks can be done by good old-fashioned hammer and chisel – I prefer ¼" wide carpenters chisels.
- I use the larger tools such as Chicago Pneumatic for most work, reserving the Paleotools #1 for very fine work where the fossil is very susceptible to cracking. If the CP is very sharp I can use it for surface work, since eye-hand coordination under a microscope is more important than the actual power of the tool.
- I have 3 main movements that I use –
 - Fast removal chiseling – push the tool tip into the rock so as to chisel out a continuous groove. Use your forearms, not the wrists. Keep the grooves roughly parallel, and shallow enough that the tool does not stall. Tool path is parallel to the rock surface, generally 1-4 mm removal at a time. Watch for pieces of specimen to appear in the groove – if you see them you've gone too deep or taken off too much!
 - Sideways scraping. Move the stylus sideways back and forth by flexing the wrist. Advance the tool by a part of a mm each pass. If desired rest the back part of the stylus bevel on the specimen to limit the removal to 1/10 mm or less on each pass. This can generally remove all matrix down to the specimen surface, and is necessary to remove fine layers when the matrix is tightly bound to the fossil.
 - Punch and wedge. Where the specimen surface is smooth and the matrix separates, you can push a sharp stylus directly down into the matrix right at the edge of the specimen, causing the matrix to be broken and pushed sideways off the surface. You have to have good control so that the tip of the stylus does not touch the surface of the specimen since it will leave a hole. Can leave an excellent surface.
- Don't be afraid to use both hands to guide your tools.



Problems and Tips

- Specimens without firm, smooth surfaces may require removal of a little bit of the specimen surface to reveal the underlying structure. This is particularly the case where there is no hardness or color difference between the specimen and the matrix. This is the certainly the case for the California Ichthyosaur material.
- Specimens can be distorted and not go the expected way. "Following the surface" (see below) can help.
- Specimens are frequently broken along microcracks and will be offset. Be on the lookout for the surface popping up above the plane you are working on. If the specimen apparently vanished, dig down a little and see if it is offset down.
- Following the edge or surface of a specimen is often the safest way to uncover it. Digging a pit with an air scribe to find where the surface goes can lead to unwanted damage.
- If you break it, re-glue it. Often it is unknown if a fossil is in a matrix (example crab concretions) . The choices are to slowly dig down through a concretion looking for a crab, risking some lost time if the concretion is barren. The other option is to break it, and if a specimen is encountered then glue it together and do it correctly.
- If you have thin sections, add some temporary supports during the preparation process. For example, a thin scapula or illium can be prepared on one side, and then a support applied. The support can be polyester innerliner layers and Vinac glue, or latex mold material and plaster. After the support is applied, prepare the entire other side, then remove the support. I have prepared thalattosaur illiums 8x10cm about 1-3mm thick in this manner.
- Oxidation by air frequently follows cracks and bones since these are easier diffusion paths. Sometimes there is an red/orange/brown layer of matrix for 1-2 mm at the bone surface. Be aware of color changes.

Fossil Hunting in the Snow



The snow pictures are to show you what weather I went fossil hunting in. I traveled from Tillamook to Beverly. This was my first time fossil hunting while it snowed on the beach. I have some other finds I haven't taken pictures of yet. The shells wouldn't come out of the rock in one piece. I found a wide variety of fossils and concretions. I had about three days to fossil hunt. The rocks from Moolack were interesting but harder to find amongst all the rocks. Beverly had a recent slide that was filled with fossils.

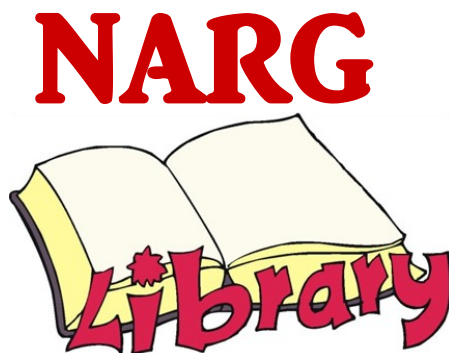
Lorna Christenson



Pantinopectin



Anadara



The NARG library has just become easier for members to use. The 533 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.

2019 Fossil Calendar

TVGC	Forest Grove, Oregon	March 8-10
Western Association of Vertebrate Paleontologists	Eugene, Oregon	March 15-17
Sweet Home Rock and Mineral Society	Sweet Home ,Oregon	March 30-31
Association for Materials and Methods in Paleontology	Hays, Kansas	April 16-20
WAMS	Rickreall, Oregon	April 19-21
Mt Hood Rock Club	Portland, Oregon	May 17-19

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
 Vice President: Dan O'Loughlin (503) 866-5997
 Secretary: Tami Smith (503) 620-5317
 Treasurer: Peg Johnson (253) 370-8892

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 MacKenzie Smith (503) 403-8941
 Robert Rosé (541) 367-2052
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Honorary Directors:

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 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