



NARG NEWSLETTER

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2018 Federation Show in Yakima, WA Pg. 1-2

20018 NARG Long Trip to NV Pg 3-8

Fossils From NARG,s NV Trip Pg 9-16

My Summer Vacation Pg 17-20

Pine Cones in WA Pg 20
Beaches Concretions

Talmadge Middle School Fossil Horse Research Project Pg 21-23

The Stray Salmon Saga, or Science Lost and Found Pg 24-25

An Expedition to Return a Living Fossil to OR Pg 26

Fossil Hunter's Level of Discovery Pg 27

Archeology Road Show, June 2, 2018, Portland State U. Pg 28

Siberian Mammoth Tooth Plate Repair Pg 29

NARG Library Pg 30

NARG Membership Pg 30

Portland Regional Pg 30

Fossil Calendar Pg 31

NARG Officers Pg 31

NW FossilFest Pg 31

2018 Federation Show in Yakima, WA

By Robert Rosé

The Federation Show in Yakima took place April 27-29, 2018. NARG was asked to participate so Robert Rosé and Greg Carr installed several displays. Greg put in his Thalattosaur cases (4) and brought the Saber-toothed Salmon and two crinoid plates while Robert brought Oregon fossils on loan from various NARG members.



Greg's Thalattosaur display pulled people in from far away and once they were near we introduced them to the other fossils we had in cases or on a large round table in front of our displays. On the table were parts of the Thalattosaur skull 3-D prints, a large pecten from the Astoria Formation, an ammonite,

Greg's 3-D printer was also a very big hit and people would

come by several times to see progress on what was printing. Surprising how many people had never seen such a printer in action.

On the table holding the low case with the Salmon and the crinoids we had petrified wood specimens, a limestone block with Devonian stromatoporoids, and leaf and brachiopods to give away. We also gave away lots of NARG NW Fossil Fest cards (2018) and information three-fold brochures.

Joe Start loaned his large Magnolia petrified wood round, Greg Gentry two crab specimens, Phil Knutson his blue Sequoia petrified wood and a seed pod from the Lyons flora, two gastropods from the NARG collection, a fish skull and Leatherback turtle carapace from Nick Oberzil, a salamander specimen on loan from the University of Oregon Museum of Natural and Cultural History and two Clarno plants fossils from Bob Manley's collection



2018 NARG Long Trip to Nevada

By Robert Rosé



Robert R, Bill & Linda H collecting corals east of Pahrump, NV in the Spring Mountains.

The object of this trip was to collect mostly Paleozoic fossils in the western part of Nevada. The participants met in McDermitt, Nevada and proceeded south to Pahrump. Initially Doug and Robert Olson, Peg and Rick Johnson, Linda and Bill Harvey, Jr., and Robert Rosé were the participants. Most of the stops were camping opportunities.

East of Pahrump in the Spring Mountains we collected Late Carboniferous solitary and colonial corals. West of Pahrump in California we found Early Cambrian trilobite parts and oncolites (circular objects created by bacteria in carbonate rocks).

As we prepared to leave the Pahrump area the Rosé car developed a flat tire in addition to its habit of overheating. This led to changing the tire at the campsite and spending the morning in Pahrump getting the tire fixed and working on replacing the temperature-sensitive fan clutch. By noon all participants had restocked their larders and the Rosé car was fixed.

Heading north toward Beatty, Bare Mountain was our next stop. There was parking for our campsite near the road but a long way from the Cambrian outcrops. Doug and Robert Olson scouted the route for us while the RVs set up and we made camp. It was a long hike into the canyon to get to the rocks so only a few adventuresome individuals decided to try. We did not find the expected trilobites but did run into numerous pseudomorphs of limonite after pyrite and oncolites. Doug Olson found a mountain sheep skull with horns intact—the best find of the day!



Continuing north the next day we went stopped in Beatty for fuel and continued on to Lida Junction where we met up with Greg Carr. A few miles west of the Junction we made camp off the road in the sagebrush. Our aim was to travel south toward hills that had Early Cambrian trilobites, oncolites and hyoliths. After a drive through sagebrush-covered country, we did find what we were looking for. The hyoliths were in thin beds made entirely of the fossils and are a nice yellow-brown color.



Collecting Area

On the second day from our Lida camp we traveled south and west. We were looking for more Cambrian fossils and anything of interest. We found early Cambrian quartzites and limestone with some indications of fossils including hyoliths, all covered with light-colored volcanics. We found interesting bryozoan-like fossils on a fan close to where we parked. In the afternoon several participants drove over to Gold Point which they thought was a very unusual rustic town.



Goldpoint, NV Saloon/Museum. Drink's were by donation to the museum.



The next day we headed north through Tonopah and fueled up, bought groceries and ate lunch at a local casino and bar. At Mina we found a place to camp where trucks stop for the night. Here we drove up into Dunlap Canyon and the Olsons' found a very fossiliferous cliff and steep talus slope to collect. This outcrop of the Luning formation of Late Triassic age contains sponges, mollusks, corals, bivalves and vertebrate fossils.

The following morning we returned to Dunlap Canyon for more fossils before driving north to Gabbs where we refueled. In Nevada it is always best to work from the top part of your fuel tank because you never know where you will be able to get more fuel.

The Olson's Collecting at Dunlap Canyon, NV in the Luning Formation.



Gabbs, NV Magnesium mine. Magnesium is turned into Dr. Teal's Epson Salt.

From Gabbs we headed east to Berlin-Ichthyosaur State Park which opened on Memorial Day weekend. This drive takes one over a 6,947 foot high pass which caused Harvey's RV to overheat. The weather here was variable with rain, wind and thunder showers. On our way to the campsite in the park we drove through a hail storm. We enjoyed the tour through the big building to see the nine Ichthyosaurs in place in various states of preservation. This is the Late Triassic Luning Formation again and, according to the rangers, there might be as many as one hundred of these reptiles present in the park! Doug found a couple of ammonites just outside the park. Ichthyosaur bone is also present but not collectable.



The Berlin Mill

This building was a beehive of activity while Berlin was in its heyday.

One man tended to the primary crusher and did other odd jobs, another tended the 30 stamps and the concentration tables, and a third man fired the five boilers and looked after the four steam engines. One engine powered the primary crusher and the stamps, another powered the concentrating tables, the third drove the direct current dynamos that supplied electricity for lights, and the fourth engine was combined with a compressor that furnished air to run the drilling rigs and pumps in the mine.

The area between the mill, machine shop and boarding house was piled high with cord wood used to fuel the boilers. Mine rail tracks were laid between the long piles of wood and flat rack trucks rolled on the tracks to bring wood close to the boilers



Berlin-Ichthyosaur State Park Fossil Shelter



Rick J., Peg J. and Greg C. listening to talk about Ichthyosaur fossils found under the shelter.

Photo by Robert Olson



From the State Park we headed west and then north to visit Buffalo Canyon fossil leaf site. The two-track into the quarry area is very bad so we made camp near the entry road and not close to the site where we collected in 2008. Robert Olson found a partial fish and we did find some leaves. The shale was too wet to split into nice partings. A hill next to where we camped proved to have some nice leaves in an opalite.

Fallon was our next stop to top off our fuel and propane. Doug treated us to pizza and Peg treated all to ice cream bars. We drove east to Devil Gate where Late Devonian rocks of the Devils Gate Formation crop out along highway 50 near Eureka, Nevada. We searched all afternoon and found some brachiopods, bryozoans and stromatoporids.



Devils Gate, NV



Robert O at Buffalo Canyon looking for plant fossils.



Photo by Robert Olson

The next day we fueled up in Eureka and drove south and east to the Butte Mountains. North of highway 50, the Gerster Formation crops out along a dry wash where brachiopods occur in abundance. The brachiopods were mostly productid and spirifer types with a few odd ones plus bryozoans. Robert Olson found an elk antler and Peg Johnson found an oyster shell.



Robert and Doug Olson looking for brachiopods in Butte Mountains, Gerster Formations.

Back in Eureka, we all had dinner at the local restaurant.

We headed north once again on the last leg of our trip. Carlin Canyon was our destination just east of the town of Carlin along I- 80. Here there is a wonderful example of an angular unconformity where two formations overlie each other at different bedding angles. The Tonka below is nearly vertical and Lower Carboniferous and the Strathearn above is dipping northeast and shallower.

We camped along the Humboldt River and collected the Strathearn first — large productid brachiopods along with bryozoans and crinoid columnals. In the Tonka it was not easy to find the fossiliferous bed but did locate robust bryozoans and several types of brachiopods.

So ends the NARG long trip for 2018. The trip lasted 13 days and covered approximately 1400 miles. Weather was variable giving us everything but snow. We collected many fossils, saw some beautiful sunsets, collected some non-fossil items and saw lots of wonderful country.



Our campsite along the Humboldt River near Carlin, NV

Photo by Robert Olson

Robert R. and Robert O Looking for fossils on hillside in the Tonka Formation.

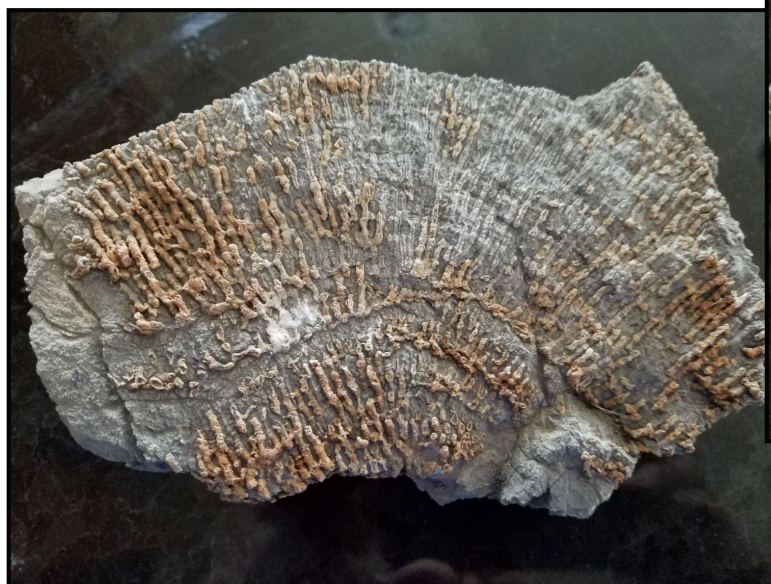


Fossils from NARG's Nevada Trip

Spring Mountains, Wheeler Pass
BirdsptingFormation
Upper Carboniferous Age



Solitary Coral



Colonial Coral

Syringapora

**Emigrant Pass, CA
Nopah Mountains, Carrara Formation
Early Cambrian**

Trilobite cephalons and thorax



Near Lida Junction, NV Sandstone & Limestone, Early Cambrian age



Plates with Trilobite molts near
Goldpoint, NV

Hyaloliths and Oncolites



**Dunlap Canyon, Mina, NV
Luning Formation
Late Triassic**



Sponges Nevadathalamia Cylindra



Union Pass, Shoshone Mountains Luning Formation Late Triassic



These ammonites were found just outside
of Berlin-Ichthyosaur State Park



Buffalo Canyon Early Miocene (18 million years)



Water Lilly

Photo by Robert Olson



Devils Gate, NV Devils Gate Formation Late Devonian limestone



Circular and branching Stromatoporoids

Butte Mountains Gerster Formation, Permian Age



Butte Mts, Ely, NV - Gerster
Permian Age

Oyster Back



Butte Mts, Ely NV -
Permian Age

Oyster inside of fossil shell



Brachiopods

Spiriferids, Productids, *Composita*

Carlin Canyon, Carlin, NV **Strathearn Formation** **Carboniferous Age**



Crinoid stem

Strathearn Fm. bryozoan plate and large brachio-



Carlin Canyon, NV



My Summer Vacation

Debbie Shannon

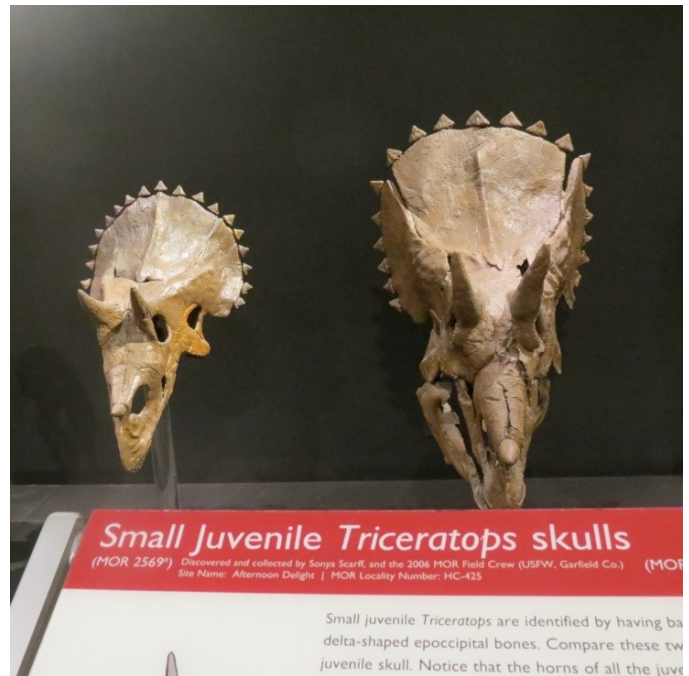
This year for our vacation my husband Steve and I drove from Portland to Wisconsin to visit his relatives. Along the way we visited several museums and did a bit of fossil hunting. We took I90 for the eastbound trip and Highway 2 for the westbound return, not bad driving but there was a lot of road construction so if you use either of these roads this summer, allow for additional time.

On the way to Wisconsin, we stopped at the Museum of the Rockies in Bozeman Montana, Little Bighorn National Monument, Devils Tower National Monument, the Black Hills (including Deadwood, Mt Rushmore, Dinosaur Park in Rapid City, The Museum of Geology at the South Dakota School of Mines and Technology in Rapid City and the Mammoth site in Hot Springs), and Badlands National Park. On the return trip, we stopped at Lake Superior to look for agates, and Malta, Montana to see 2 museums and to fossil hunt.

You've probably already heard about the Museum of the Rockies but if you haven't been there, go. They have a lot of Dinosaurs including a hall that includes many T-Rex skulls including juveniles a whole age range of Triceratops skulls from juvenile to adult. Pretty cool!



Big Al, Allosaurus from Big Horn County, Wyoming





T-Rex and Triceratops at Dinosaur Park, Rapid City, South Dakota



Ammonites at South Dakota School of Mines and Technology, Steve Shannon's foot for scale.

The Geology Museum at the South Dakota School of Mines and Technology is small but full of South Dakota fossils. Also some fossils from other states like Oregon. They also have bones from the Big Pig Dig in Badlands National Park, giant ammonites, bison skulls and many other fossils.

The Mammoth site in Hot Springs, South Dakota is another really awesome place to visit. It's a privately run museum that has a building covering an old sinkhole/spring that contains the remains of many Pleistocene mammals. To date they have found 122 mammoth tusks so they say that they have found 61 mammoths. They have also found many other mammoth bones including at least 1 complete skeleton and they have found the bones of camels, wolves and short faced bears. The site has been excavated down about 20-30 feet so far and is still being actively excavated. One interesting connection, my paleontology Professor from Northern Arizona University was Larry Agenbroad. He was the site Director at the museum until his death about 3 years ago and there is a display with pictures of him in the gift shop.



The Mammoth Site, Hot Springs, South Dakota

On our trip home, the highlight was the town of Malta, Montana. Malta has 2 dinosaur museums: the Great Plains Dinosaur Museum and the Phillips County Museum. In addition, there is a road cut about 19.5 miles north of town on highway 191 where you can get access to the Cretaceous Pierre Shale and find ammonites and baculites. The Phillips County Museum has several fossils found locally in the Cretaceous Judith River Formation. Elvis is a *Brachylophosaurus* and that is almost complete, and they have an articulated *Allosaurus* that greets you as you enter the museum. They also have good exhibits on the human history of the county.



Museum greeter, Philips County Museum, Malta, Montana



Elvis's head, Philips County Museum, Malta, Montana

The Great Plains Dinosaur Museum and Field Station is smaller than the county museum but from what I was told, they do a lot of digs in the local area so they also have a lot of local fossils on display including a mummified hadrosaur *Edmontosaurus regalis* that shows the complete comb on the animal's head.



Mummified *Edmontosaurus regalis*, Great Plains Dinosaur Museum and Field Station, Malta, Montana

We also went on a fossil hunt while in Malta. About 19.5 miles north of town there is a road cut in the Cretaceous Pierre Shale where you can find ammonites. Unfortunately we weren't the first ones there after the June rainstorms so we did not find any ammonites on the surface. Steve did find a nice piece of baculites and we found some plant (?) fossils that may be stromatolites? Not sure what these are but there was a lot of it in the road cut. Any ideas?



Pine Cones in Washington Beach Concretions.

Bruce Thiel took these pictures while visiting a friend, who found them in the uplifted Washington fossils.



Talmadge Middle School Fossil Horse Research Project

By Aaron Currier

Students in Aaron Currier's 8th grade science class at Talmadge Middle School in Independence, Oregon performed the Fossil Horse Teeth project to determine relationships between the horse tooth hypsodonty index and the respective prehistoric habitats. Four students decided to take the project to another level and research additional fossil horse teeth specimens to determine if they, in fact, fell within the expected measurements. Twelve specimens were used to compare measurement results with the 15 specimens that were initially provided as 3-D models in the project. The following analysis is presented by the students.



Fossil Horse Teeth Analysis

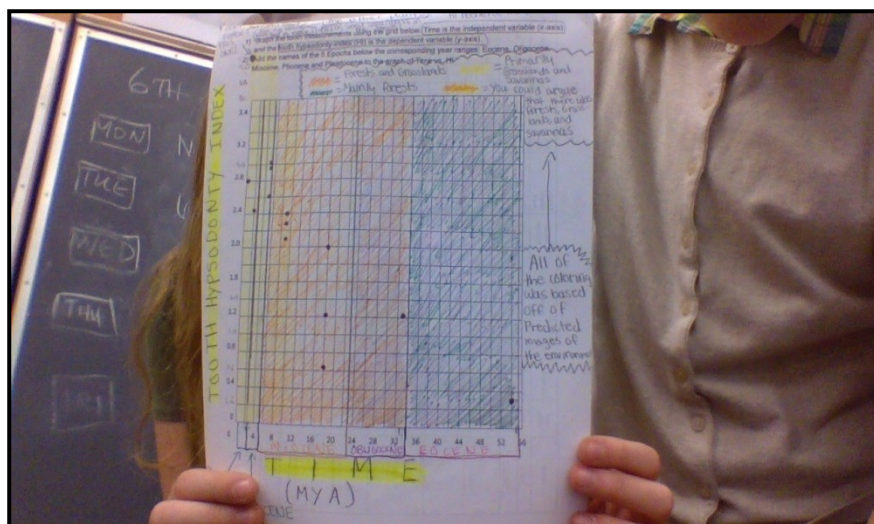
We calculated the HI (hypodensity index). index for the 12 fossil teeth using the same method as the lab. Our main objective was to compare the trend of our horse teeth data with the lab data on a scatter plot where x was our time in epochs, and y was our HI This chart not only shows the correlation between time and tooth size, but also the correlation between teeth specimens provided by University of Florida and the horse teeth from Mr. Currier's personal collection. Does the data match? Will it give us a clearer picture of early horses and their niches and adaptations or will the data not correlate?

Hypothesis: If we measure 12 horse teeth fossils accurately and plot each tooth with the HI index (Y), and the epoch (X) on a scatter plot compared with our 3D printed fossil horse teeth measurements, then there will be a matching correlation, because as the world-wide climate changed over time, so did the vegetation and horses adaptation to survive their niches.

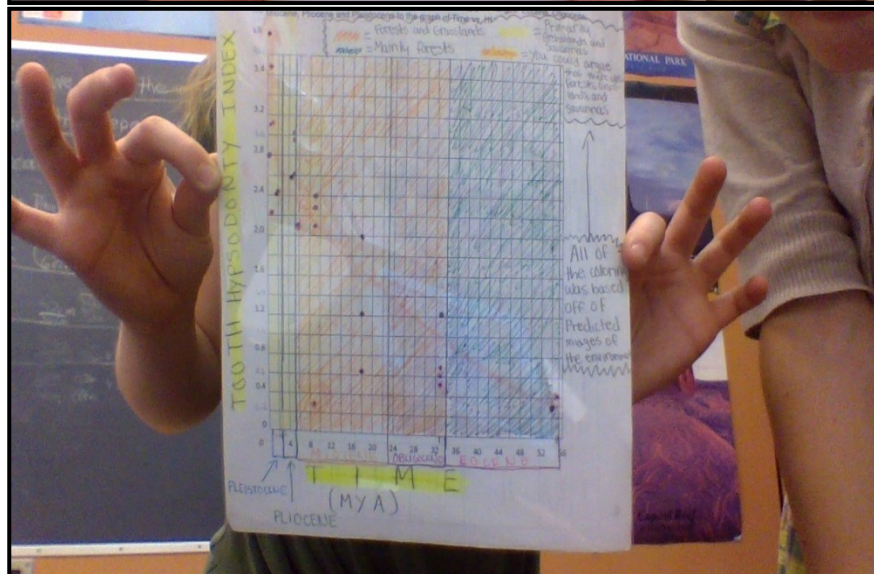
Data

Specimens

1. *Hyracotherium* sp., Unknown, Eocene, 55 mya
2. *Mesohippus bairdi*,¹ Nebraska, Oligocene, 33 mya
3. *Mesohippus bairdi*,² Nebraska, Oligocene, 33 mya
4. *Mesohippus bairdi*,³ Nebraska, Oligocene, 33 mya
5. *Neohipparion trampansense*, Florida, Miocene, 9 mya
6. *Hipparion*?, China, Miocene, 6 mya
7. *Hipparion tehonense*, Florida, Miocene, 5mya
8. *Nannipus* sp., Florida, Pliocene, 2mya
9. *Equus hemionys*, Florida, Pleistocene, 1 mya
10. *Equus* sp.¹, Florida, Pleistocene, 1 mya
11. *Equus* sp.², Florida, Pleistocene, 1 mya
12. *Equus* sp., unknown, Pleistocene, 1 mya



Original UF horse teeth data



Correlated UF data with new data

The data point identified by the circle is an outlier.

Accuracy

Our data collection was accurate because we measured with calipers to the nearest 0.05mm. We measured the crown height (furthest length from the sides of teeth to the other furthest point, not including root) and the APL (top of the tooth that is not the root that contains the lophos; the width of the "W") of each tooth five times before we calculated the average. We double checked all of our measurements. Double checking your measurements is good because the first check of your measurements could be wrong, so the second one you are for sure you have the right measurements. We also collaborated with each other to make sure we had measurements that were at most 0.5mm apart from each other, thus producing data that would ensure accuracy. We did have errors that we fixed during our data collection.

Errors

Errors that our team could have made were not measuring precisely on the fossil's crown heights, and APL because of the misinterpretation from one's opinion versus another on where to measure from. We worked to solve this challenge by explaining our opinions to each other and then choosing the best explanation to make adjustments to misleading measurements. We also examined outliers to confirm if and how they needed to be fixed.

Measuring data incorrectly can be time consuming because you will have to re-measure. This affected our results because we had a deadline for presenting our data to Sean. In the beginning of this project our team was very unorganized while measuring all 12 teeth at once, and basically just wasting our time by being jumbled with our measurements. To add, writing down the wrong epoch for the information on a horse is a bad ordeal. Writing the wrong epoch or writing down a measurement for the wrong fossil will create outliers on our scatter plot and many misinterpretations. The importance for us to have correct data was to help our main objective -- creating a correlating curve and spotting true outliers.

Limitations

A limit in this experiment that challenged our reliability was lack of prior knowledge on the horse teeth. For all we knew, many of the teeth could have been broken, chipped, or eroded down and this may have been a leading factor to whether the measurements were accurate or not. Without the prior knowledge of these teeth, it made our job a lot more difficult to measure these accurately.

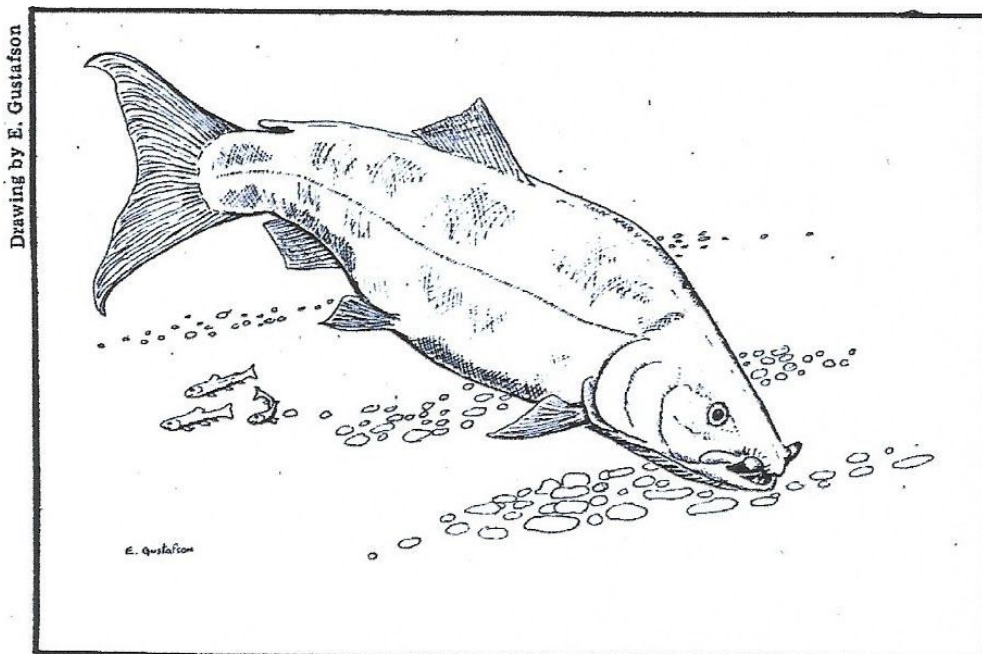
To conclude, we had to consider the major trade off between excessive measuring and discussing to accomplish very accurate results versus less accurate results, but completing the research on time. Ultimately, these errors and limitations did not prevent us from collecting good and accurate data.

Conclusion

The results did support our team's hypothesis that if we measure 12 horse teeth fossils accurately and plot each tooth with the HI index (Y), and the epoch (X) on a scatter plot compared with our 3D printed fossil horse teeth measurements, then there will be a matching correlation, because as the world-wide climate changed over time, so did the vegetation and horses adaptation to survive their niches.

The Stray Salmon Saga, or Science Lost and Found

Eric Gustafson



Back in the late Miocene, a truly majestic fish cruised the rivers and seas on the Pacific coast of North America. A fossil specimen of this fish, including the skull, was found in central Oregon back in 1964, donated to the University of Oregon's Condon Museum (part of the UOMNH), and described in the museum's Bulletin series as *Smilodonichthyes rastrosus* by Cavender and Miller in 1972. Other specimens of the so-called saber-toothed salmon had been found, but most were isolated vertebrae or other bones. The enlarged saber teeth were not found attached to the skull; they were restored as having pointed downwards.

In 1981 I had been Curator of the Condon Museum of Geology for

four years, but was preparing to leave to take a job in Nebraska. I was notified that a collector living in Portland had found another excellent specimen of the big fish, including a nice skull. A photo (by Bill Murphy) of Bryant Holleman and his specimen made it into a Portland newspaper (Oregon Journal, May 19, 1981).

I made arrangements with Bryant to visit his apartment and examine his collection. On seeing the collection, which included some very nice fossils from several coastal and inland sites, it was obvious that the star was the *Smilodonichthyes*. It was in three parts; a series of vertebrae, the main part of the skull, and the snout, which had several bones and the large breeding teeth in their original positions. It was obvious from the specimen that the teeth did not point downwards. Rather, they jutted sideways, something very unusual in a salmonid. It had come from the same gravels and sand lenses as the type specimen, along a road near Gateway, north of Madras. The owner declined to donate the specimen to the UO, and I left with interesting observations but no specimen. No specimen meant no further study. I soon put together a small expedition to look at the site, including my daughter and a couple of grad students, and a friend who wrote articles for fishing magazines, Ed Lusch. We went out to Gateway, but only found a few scraps in the gravels. We did find the hole the fish had come out of, a deep (and very unstable) excavation in a sand lens, unsafe to try digging in.

A few days later, Ed had put together a short article for the magazine *Salmon-Trout-Steelheader*, describing fishing on dry land for eight-foot-long salmon. He needed an illustration, so I drew up a restoration of what the fish might have looked like, including the sideward-jutting teeth. The article got accepted, but the editor complained about the drawing. Surely no fish looked like that? I assured him the drawing was accurate, and the article was published in July 1982.

Fast-forward to 2014. More specimens of our champion fish come to light, from the same deposits near Gateway. Lo and behold, two more skulls have been excavated, and they have the big teeth in place, as in the 1981 specimen. This time, the specimens are donated to the Condon Museum, and are enthusiastically studied and promoted by Collections Manager Ed Davis and others. The previously-found skull had been forgotten, as happens to most specimens not entrusted to a well-curated public collection. A flurry of publicity in university publications and news articles spread the news about the new specimens, with emphasis on the orientation of the teeth, first revealed in the 1981 specimen.

Fast-forward again to 2018. The long-lost 1981 specimen has been found, on eBay. The original collector (now in Chicago) has put it up for sale, and NARG (in the person of Greg Carr) has purchased it, and finally it will go to the UO, to join the other fine members of its species. I certainly never expected to see it again. The stray fish has swum home.



Bryant Holleman, the original collector of the spike-tooth salmon.

A ceremony to officially donate the fossil spike-tooth salmon *Smilodonichthyes rastrosus* specimens to the Condon collection at the University of Oregon will be held during NW FossilFest August 11 at 11am. Dr Ed Davis from U of O will comment on the significance of the specimen and the support of NARG in its acquisition. The specimens will receive their official collection id numbers, but will remain on display at OMSI under the stewardship of Greg Carr. During the ceremony Greg will also comment on his perspectives of the acquisition from the collector and present the specimens on behalf of the collector Bryant Holleman. The following donated money to acquisition the salmon fossil. Greg Carr, NARG, Dan O'Loughlin, Peg & Rick Johnson, Garrett Romain, Dave Ellingson, Bruce Thiel, Jerry Dodson, Debbie Jackson, Linda Harvey, Ann Sivers, Pat Jordan, Larry Purchase, Aaron Currier and Jim Vaughn.

An Expedition to Return a Living Fossil to Oregon

By Tara Baker

The best time to plant a tree was 20 (million) years ago. The next best time is now. ~ Chinese Proverb (minus the million)

In 2005, Oregon declared *Metasequoia*, or the Dawn Redwood, the official state fossil. This came after two NARG members, MacKenzie Smith and Guy DiTorrice, petitioned state legislators to adopt the tree fossil. *Metasequoia* is a common fossil found in many areas near the John Day Fossil Beds north of Mitchell. Most fossils are imprints of needles on branches, though some fossilized cones have also been found. From the number of fossils found, *Metasequoia* was probably a dominant species in a warm broad-leaved, deciduous forest that covered the inland Oregon and Washington regions.

Many *Metasequoia* fossils have been found in rocks dating between the Cretaceous Period to the Miocene Epoch, but evidently no fossils from more recent times exist. Because of this, it was thought that the *Metasequoia* went extinct sometime early in the Pliocene Epoch. However, a tree, and then a small grove of trees, was discovered growing in China in the 1940's. The rediscovery and reintroduction of the living tree to Oregon is an exciting tale of intrigue worthy of Indiana Jones including sacred shrines, wars, revolutions, and treks through exotic lands.

Between 1937-1945, China and Japan were at war. Within China, scientists were being moved around for their protection but also so they could work on war effort projects. Chan (Tsang) Wang, a Chinese geologist, was travelling via train across eastern Szechuan when he became sick with recurring malaria. In the village where he recuperated, a friend visited and told him of a unique tree in the region. When Wang felt well enough, he travelled to Shui-sa, or Water Fir, a village that was named after a sacred tree growing there within a shrine. The tree was related to the redwoods, but was deciduous, dropping its needles every winter. Believing the tree could be a living example of the *Metasequoia*, Wang carried specimens to his home lab and looked for confirmation. Because of the war, the identification was not verified by other Chinese botanists until 1946 when they announced the rediscovery of the mighty *Metasequoia*, now declared a living fossil.

This caused a stir amongst paleontologists and botanists around the world. In the United States, Dr. Ralph Chaney, a renowned paleobotanist from the University of California Berkeley put together an expedition to visit China and bring back specimens of the living *Metasequoia*. Chaney was well-acquainted with this particular tree as his expertise was on the fossilized flora of Oregon. An important member of the exploration party was Dr. Milton Silverman who was a writer for the San Francisco Chronicle. Silverman's many accounts of the 1947 trip were published in the paper and drew attention to the rediscovery of this living fossil. The trip through China was difficult. Bad weather marred the travels; political unrest slowed the group; even one bandit was reportedly shot along the way. However, the trip was also successful.

Chaney brought *Metasequoia* specimens, including cones and seeds, back to the United States. This was precipitous timing, as the revolution in China closed the doors to Westerners in 1949. Chaney gifted *Metasequoia* seeds to the Hoyt Arboretum in Portland, Oregon where several original trees still stand. In fact, trees in Hoyt produced the first producing cones grown on U.S. soil in 1952. After millions of years, the *Metasequoia* had returned to Oregon.



The Fossil Hunter's Levels of Discovery

Level 1

Visit a rock shop or rock show and purchase a fossil from a dealer.

Although this is the easiest level to achieve, there is some satisfaction finding: a good deal; a specimen that completes a collection; or improving the quality of your collection. This includes shopping online, which adds a level of risk to the challenge.

Level 2

Visit a Pay-to-Dig site.

Again, a fairly easy level to achieve, but to those of us out here in Oregon, it requires an adventure out of state. For example, you will need to travel to Kemmerer, Wyoming to the fish quarries, Delta, Utah for trilobites, or Chadron, Nebraska for Eocene mammals. You have to know where you are going, you have to negotiate a deal, and you have to do the digging. For the most part, however, you are guaranteed to find specimens.

Level 3

Travels and hunting with a friend.

This level of collecting is achieved alongside an experienced collector who, perhaps, has already been to the location. They bring you to the site, they point you in the right direction, and they may even show you how to find the specimens. Then, you find your own to bring home. If it's a good location (and a good friend) you're almost guaranteed success.

Level 4

X marks the spot.

This level starts with a map or a rock collecting guide book. There are directions and suggestions, but it's up to you to follow them and locate specimens. There is no guarantee if you find the spot that you will find the goods.

Level 5

The ultimate in self achievement—you find the formation and fossils all on your own.

The final level occurs when you are perhaps just scouting around... no maps, no directions, and no guidance. You have the skills to recognize the right sedimentary rock and discover fossils contained within. You might have looked at a geologic map or maybe not. Either way, as far as you know, you may be the first to find the outcrop. Of course, you have to be looking for fossils in the first place—just stumbling across them doesn't count.

Archeology Road Show

June 2, 2018

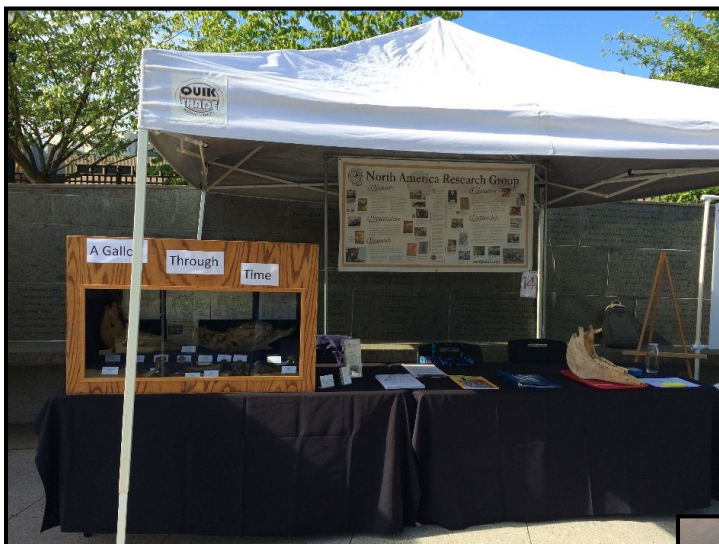
Portland State University

By Anne Sivers

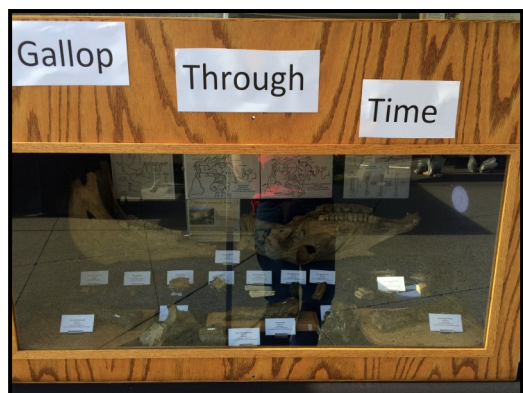
Debbie Shannon, Gerry Lucos, and Anne Sivers represented NARG at the annual Portland Archeology Road Show held on June 2 with a booth entitled "A Gallop Through Time". The theme of this year's road show was "Change". The booth included a display case with contemporary and fossil horse bones and teeth as well as a contemporary horse mandible that attendees could

examine. We would like to thank Larry Purchase, Mike Full for the loan of horse fossils and Dan O'Laughlin for his gift of "The Evolution of the Horse" coloring book (Dover press). We made copies of the evolutionary charts from the coloring book for the display case and copies of the horse/cat comparison page for children to color. We also made a memo board where attendees could post comments about their personal experiences with horses.

To emphasize the archeological theme of "Change", we compiled a notebook with excerpts from Luther Cressman's book "The Sandal and the Cave" (Oregon State University Press, 1981) and from "The Subterranean Army of Emperor Qin Shi Huang", (China Travel and Tourism Press, 2001). From his excavations in Paisley Cave No.3 in Summer Lake Valley, Cressman found remains of a sagebrush campfire with broken



pieces of weapons and bones of the extinct horse, camel, bison and other animals that he speculated might have dated from as long as 11,000 years ago (pp. 40-41). Only about 9,000 years later, the Chinese were using the contemporary horse in extremely sophisticated battle configurations.



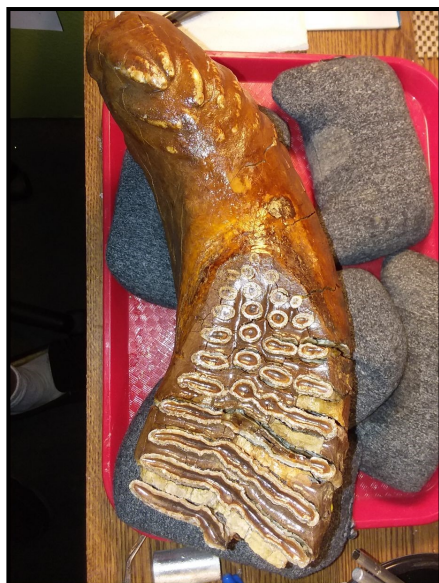
Held near the Farmers' Market on the Portland State University campus, the road show was well attended and many attendees showed an interest in NARG. We invited everybody to attend the Fossil Fest in August.

Siberian Mammoth Tooth Plate Repair

By Guy DiTorrice



Butvar & Vinac was used in varying dilutions to stabilize main body and replace big pieces.

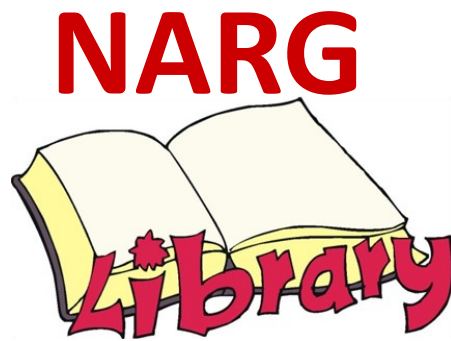


Mammoth tooth was bought with only a sealer on the outside, which didn't penetrate the tooth. The specimen started flaking apart after arrival and on display in the home.



While large-piece work is completed, now doing 3-D 'puzzle reconstruction with smaller pieces.

Completed repaired Mammoth Tooth was done by Guy DiTorrice



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.

THE PORTLAND REGIONAL GEM & MINERAL SHOW ASSOC.
(A Non-Profit Organization) Presents

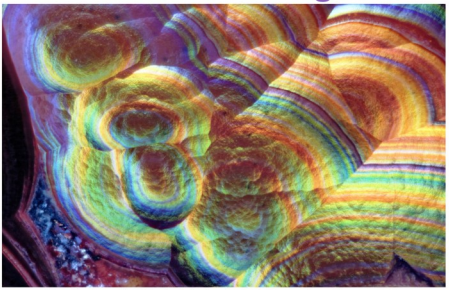


Fire Agate

45 Dealers
Demonstrators
Kids Activities

Displays
Presentations
Silent Auctions

The 38th Annual
**SHOW OF GEMS,
MINERALS & FOSSILS**
OCT. 12, 13 & 14th, 2018
Fri. & Sat. 10-6, Sun. 10-5
New Location
Clackamas Co. Fairgrounds



Micro Photograph of Fire Agate by Joe Cantrell. Come and see his presentation.

ADMISSION - ADULTS \$5, KIDS 12 & UNDER FREE
(694 NE 4th Ave., Canby, Oregon, 97013)
www.portlandregionalgemandmineral.com
Dealer registration contact: lindaharvey2010@gmail.com

2018 Fossil Calendar

Summer Fest - Rice NW Museum	Hillsboro, Oregon	August 4-5
NARG FossilFest at the Rice Museum	Hillsboro, Oregon	August 11
Portland Regional Gem & Mineral (Clackamas Fairgrounds)	Canby, Oregon	Oct. 12-14

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

Directors:

Garret Romaine (503) 591-8622
 MacKenzie Smith (503) 403-8941
 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 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