



NARG NEWSLETTER

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Newport Fossil Fest 2014

By Dan O'Loughlin

NARG and its members had an overwhelming presence at this year's Newport Fossil Fest on April 26. The event is usually held at the Hatfield Marine Science Center on the second Saturday of February, but was rescheduled this year due to snow. (As an aside, I still went in February with my son Chris, and niece Meghan. Yes, we did get some pictures of snow on the beach.) The turnout was fantastic this year with over 850 visitors attending the free show. Talks were given by Dr. Bill Orr, Guy DiTorrice, and NARG member Greg Carr. Kent Gibson, who last year generously donated several fossil skulls to the Smithsonian, was present with many examples from the Astoria formation. For those of us that asked he also had a complete Megalodon shark tooth that he found after visiting the Calvert Cliffs in Maryland recently. This was part of his trip back to the Smithsonian to visit the collections. Guy DiTorrice, a local fossil expert, was at the fossil identification booth along with NARG head advisor, Dr. Bill Orr and NARG president Aaron Currier. Many interesting fossils and pseudofossils were presented to



Larry Purchase, Mike Full, Dave Ellingson and Marvin Reken



Kent Gibson

stump the experts. Guests love this part of the event and often save odd specimens they have collected all year to see if someone can name them. Mike Full, site administrator for the Willamette Valley Pleistocene Project and the Yamhill River Pleistocene Project

<http://www.yamhillriverpleistocene.com/>, brought a wide variety of bones and humor from the great work they do throughout the Willamette Valley. The complete *Bison antiquus* skull was impressive. NARG was center stage selling shirts, posters, books, etc. We had a display of lovely invertebrate fossils from Anguilla, an island in the Caribbean. These were collected and brought by Peg Johnson. The Jurassic marine reptile recently described and named after our group, *Zoneait nagorum*, was on display. This fossil was described by Dr. Christopher A. Brochu and his PhD student Eric Wilberg at the University of Iowa (<http://ir.uiowa.edu/cgi/viewcontent.cgi?article=3155&context=etd>). *Z. nagorum* made the top 10 significant finds for 2007 according to the National Geographic Society (<http://news.nationalgeographic.com/news/2007/12/071226-top-dinosaurs.html>).



Aaron at ID table



Mason & Elizabeth Triplet, Larry Purchase and Aaron Currier

Its significance is due to the fact that this vertebrate likely died near East Asia then was transported through plate tectonics over to Oregon. There was also a display of crabs in concretions for guests to enjoy. They were securely enclosed in a tamper-proof case. Of course a Newport Fossil Fest would not be complete without some 50-70 mya real fossil shark teeth from Morocco for kids to take home. All said, this was a fantastic show! NARG members usually take to the beach after the event to search for fossils. The rain dampened our spirit. A few members tried their luck at various beaches. Aaron went with me to 68th street to remove a partial *Aturia angustata* I found on Friday afternoon, while walking the beach with Cindy & Peg. If the complete specimen was present it would have measured nearly 8 cm across. Later that evening, a large group of NARG members met for dinner at Georgie's Beachside Grill. It was great company. Most of the group left for home afterwards due to the threat of more rain for Sunday. A few diehards tried the beaches on Sunday and Monday. The weather on Sunday turned out to be isolated showers that soaked parts but not all of Newport. I started Sunday morning at Moolack and

*Aturia angustata*

Mason's pecten

found a few invertebrates in concretions. From there I ventured to 68th street, Ona Beach, and Seal rock. I did not find many keepers though I did gather a few to hand out to kids at our events. Greg and Gloria Carr, Tim & Tonya Fisher, Elizabeth & Mason Triplet were seen drifting along the beach. With luck on my side, the rain came down, wherever I was not, so the weekend ended comfortably. Some of the beach finds for the week-end by the group were, 1st cervical vertebra of a whale, a large pecten in a concretion, a scapula, partial *Aturia angustata*, and crepidula.

Thank you to NARG members: Peg Johnson, Dan O'Loughlin, Tim and Tonya Fisher, Greg, Gloria and Eric Carr, Steve and Debra Jackson-Shannon, Cindy Yablok, Robert Rosé, Aaron Currier, Larry Purchase, Elizabeth and Mason Triplet, Phil Knutson, Merri Strayer.

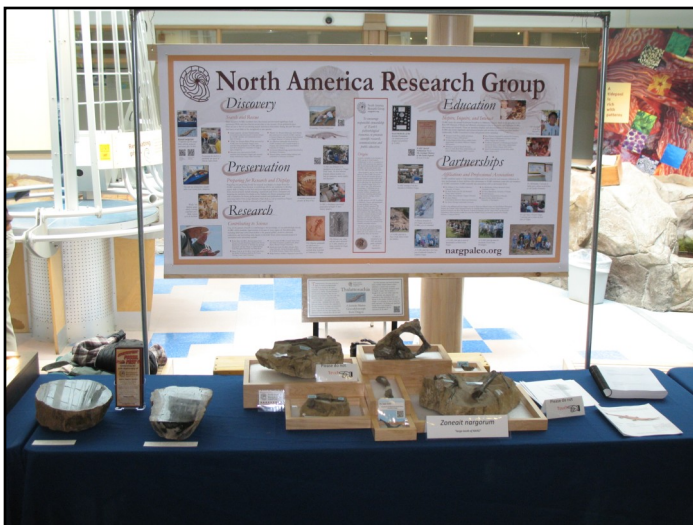
Tim's 1st cervical vertebra of a whale



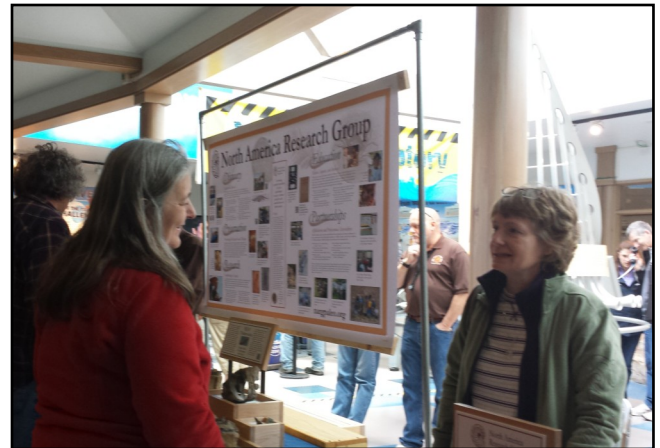
Debbie Shannon, Larry Purchase, Phil Knutson and Robert Rosé



Mason Triplett with hail on the beach on Sunday.



NARG's Display



New member Merri Strayer talking to Cindy Yablok



Tim & Tonya Fisher



Cindy Yablok helping a visitor with a T-shirt

(More pictures on pg 19)

Small Crab

by Bruce Thiel

Here is a very small crab that was found in a piece of scrap from a larger incomplete crab from the Keasey Formation, near Vernonia. You can see its size, compared to my thumbnail. It was prepared under a microscope using a microjack #1 from Paleo tools® --the smallest air tool Paleo makes. All their larger tools exhaust their air toward the needle to help clear the dust and debris away from the point, but some preparers complained that in really small fossils, their tools would blow away any pieces that come loose in the preparation. The #1 is not a tool I use very often but handy to have for these small delicate fossils. One has to periodically puff away the dust that comes loose that will often obscure the fossil. A few flakes did come off, but they were so small, that I couldn't attempt to try to pick them up and glue back on.

To help identify the crab I sent a picture to NARG advisor Torrey Nyborg, and shared it with fossil crab friends on Facebook. The consensus was that it is probably a small *Pulalium vulgaris*. Torrey noted that:

"It would be good to use for noting any morphological changes from juvenile to adult so please keep it in your collections."



In Washington, a Discover pass is required on state recreation lands and water-access sites managed by Washington State Parks (State Parks), Washington Department of Fish and Wildlife (WDFW) and Washington State Department of Natural Resources (DNR). These lands include state parks, water-access points, heritage sites, wildlife and natural areas, DNR and WDFW campgrounds, trails and trailheads and all DNR managed uplands (natural areas and trust lands, but not aquatic lands.)

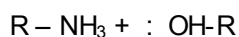
The annual Discover Pass and the complimentary Vehicle Access Pass are now transferable between two vehicles. For passes already printed, use ink to legibly write in a second license number, either in the license plate box or in a blank spot on the front of the pass. **The pass is still only good for one vehicle at a time.**

Getting Rid of the Blues (by Getting Rid of the Greens!)

By Greg Carr

Summary: treating fossil matrix with household chlorine can reverse the greening effect of cyanoacrylic adhesive accelerant on glauconite matrixes. 24-48 hours contact time seems sufficient.

This article shows how to reverse the green coloration of specimens that occurs as a result of using accelerant to speed up the cure of cyanoacrylate adhesives, sometimes known as Superglue®. Sometimes we just want to speed up things and use accelerant to speed up the set of superglue. Commercial accelerant is an organic amine, a molecule that has the chemical formula of



In the rest of the molecule, N is a nitrogen atom and H3 is three hydrogen atoms stuck on the nitrogen. This whole molecule has a positive charge which is balanced by a negatively-charged OH⁻ molecule. It is actually this negatively charged OH⁻ molecule that is the catalyst that accelerates the cure of the superglue.

However, it is the organic amine that causes the color change with some specimens. Many marine fossils and some terrestrial fossils are found in a matrix of Glauconite. Glauconite is an iron potassium phyllosilicate. The key is that the iron can be in either the Fe²⁺ state (ferrous) or the Fe³⁺ state (ferric). Buried in the ground, iron will be in the ferrous state since it is not exposed to oxygen. In this state it is green. When exposed to air, it will oxidize to the ferric state and turn red or brown. When exposed to the accelerant, matrix containing glauconite will turn green over a few days, generally in a patchy and unappealing manner. The iron in the matrix is being reduced from the oxidized form to the reduced form, changing from brown to green. The exact mechanism is not known, but that is not important. It could be a biological action as bacteria consume the amine, or perhaps the amine is breaking down catalytically and acting as a reducing agent.

Based on the hypothesis that reduction of the iron is the source of the problem, I conducted an experiment. First, I applied accelerant to some glauconite matrix from the Mist Bluff crinoid locality. After three days it turned nice and green as expected. Then I applied a variety of oxidants to the surface of the specimen to see if the effect could be reversed. I used three oxidants: a non-chlorine laundry bleach, Comet® cleanser with calcium hypochlorite oxidizer, and good old household liquid bleach with sodium hypochlorite as an oxidizer. The two powders (non-chlorine bleach and Comet) were mixed with water to form a paste, applied to the surface, and occasionally re-wetted with water when they dried out. The bleach was applied to a small pad made from paper towels and kept wet by occasional applications of more bleach. All oxidants were applied for two days (48 hours) to the matrix.

The results were good. All three oxidizers were capable of reversing the color change. The non-chlorine bleach was difficult to apply and damaged the surface of the matrix, removing some rock. This could be really bad if there was a fossil underneath. The Comet was fine, but messy. The household bleach was the easiest to use while being effective.

I then tried chlorine bleaching on my big crinoid plate with fine success – matrix is back to looking normal brown color. I recommend that if there are green areas on specimens after applying cyanoacrylic adhesive accelerant, reverse it with the application of standard household liquid bleach. Cut a pad of the approximate size and place it over the discolored area, moisten with bleach, and keep it moist with bleach for a day. Remove after 24 hours, rinse and allow to dry. If it needs more oxidation, try again.

I have used an accelerant (at Como bluff) made up of 50% Acetone, 50% water, with some sodium bicarbonate added. It works to accelerate the gluing process. However I have not tried it on glauconite matrix. It should not have a reducing effect so it should be color-safe.

The NAPC Conference and FOSSIL Project

By Robert Rosé

In February of 2014 Aaron Currier and Robert Rosé attended the 10th North American Paleontological Convention (NAPC) in Gainesville, Florida. The day after the convention both members attended the FOSSIL Project workshop (Fostering Opportunities for Synergistic STEM with Informal Learners) with Aaron being the official NARG representative.

The NAPC is sponsored by the Paleontological Society and supported by many corporations with ties to paleontology. It is held every four or five years at varying locations and includes all disciplines in paleontology. It was a four-day event where more than 300 talks were given and about 70 research posters were presented. A volume of abstracts was given to each registrant. This volume is Paleontological Society Special Publication, Volume 13, and a copy is in the NARG library.

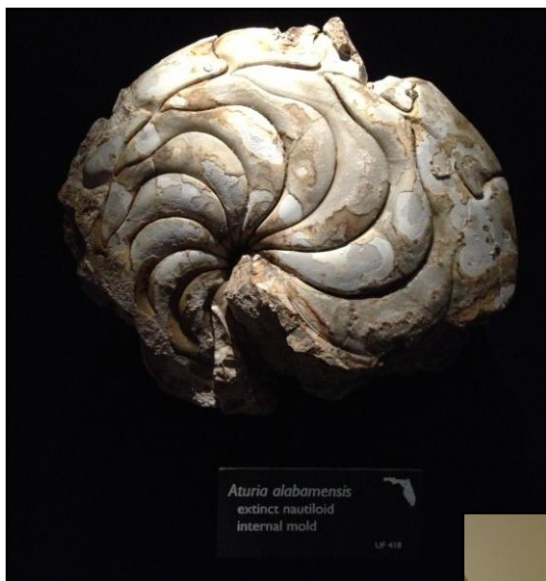
The FOSSIL Project workshop.

This project is the result of work by University of Florida paleontologists in obtaining a four-year grant from the NSF (National Science Foundation) to bring together amateurs and professional paleontologists in an educational and practical working relationship. This grant includes money enough to support transportation and lodging for one representative from each amateur club in the United States to attend a yearly meeting. The year 2014 was the first year of this endeavor. The end goal is to educate amateurs and connect professional paleontologists with club members to support each other in paleontological activities. Communication between clubs, as well as between professionals/academics and clubs will be facilitated through a website called myFOSSIL. This communication will include newsletters, webinars, exchange of fossil images, educational videos and any other ideas people can think of to communicate. The workshop in February concentrated on formulating the goals of FOSSIL through breakout sessions in which club members brainstormed within specific topics designed to bring out useful ideas. Summation of all ideas brought forward will be done by the organizers of the workshop and presented to the clubs at a later date. Some thirty clubs participated and over fifty clubs/friends-of-museums exist in the United States.

The benefit to NARG could be substantial. We have the opportunity to obtain educational videos and webinars for our meetings, access to fossil sites through the clubs in nearly every state, exchange of fossils by individuals in the various clubs, and our ability to tell our story to other clubs by writing articles and making lectures to be used by other clubs. Our access to interested professional paleontologists is also a very possible outcome.

While in Gainesville Robert and Aaron visited the University of Florida paleobotany collections at the invitation of Dr. Steven Manchester, curator. Robert looked at and photographed plant fossils from Denning Spring (near East Birch Cr.) to help in our effort in the East Birch Creek flora sites. He also looked at professional publications and added location information to their database. Aaron looked at and photographed specimens from the Clarno Formation.

Steven Manchester is very happy for us to use his collections and encourages us to contact him when we have paleobotany questions. Because Steven comes from Oregon, there are many Oregon localities represented in the museum collections. Additionally, his knowledge of local flora is quite extensive.



Aturia alabamensis internal mold
10 inches wide.



Robert Rosé standing in front of a
megalodon shark mouth with real
teeth.



Aaron Currier standing by a late Pliocene giant
ground sloth (*Eremotherium eomigrans*).



Large elephantid is a mastodon.



Aaron standing in front of our poster he presented at the National
Association of Paleontologists Conference.



A fossil fern from the Clarno (xxx), for comparative research with a NARG specimen.



The Miocene sinkhole dig site at Thomas Farm where hundreds of fossil mammals have been excavated.



Aaron Currier at Thomas Farm Quarry



A display of fossil mollusks in the Florida Natural History Museum.



Dr. Steve Manchester looking over leaf fossils with Paul Kester, NPA Pre sident who joined us for tours and re- search in the lab.



Amphicyon longiramus, a giant bear-dog attacking *Archaeohippus blackberi*, a three-toed dwarf horse.

Darwin's Discovery Day

By Dan O'Loughlin

This was the second year NARG was invited to participate in Darwin's Discovery Day at Willamette University in Salem, OR. It is kind of a 2-hour, souped-up science fair held in the Sparks Center. This year's Expo showcased the many ways that students interact with science in our K-12 schools and universities as well as how science is used out in our community. Local Salem-Keizer grade schools, middle schools, and high schools have science projects that they present. University students gave talks about their science programs. Then companies throughout Oregon explain the use of science in their company. Companies included the USFS, Evergreen International Aviation Inc., and of course NARG. This year Aaron Currier and I were stationed at our booth. Greg Carr, who was present last year, was off giving a talk at the Vertebrate Prep Meeting in Utah. We had a lot of interest in *Zoneait nargorum* and our activities. We met many people that were really interested in coming to our NW FossilFest at the Rice Museum in August. It was delightful to see all the enthusiasm and creativity out of our up-and-coming young scientists. I can't wait to be invited back to next year's event.



Aaron Currier awaiting the next question



NARG's display table





United States Department of Agriculture
Natural Resources Conservation Service

SNOTEL

By Dan O'Loughlin

Several years ago NARG member, Tim Fisher (<http://orerockon.com>), directed me to a very useful site to determine snow levels at Arbuckle Mountain. This kind gesture kept me from digging through almost 2 feet of snow to find fossils. Since then, I have viewed the site prior to most trips I take. Now Tim, if you could please find me a "Sandtel" site to notify me of beach sand conditions, I would appreciate it.

SNOTEL is an automated system of snowpack and related climate sensors operated by the Natural Resources Conservation Service (NRCS) of the United States Department of Agriculture in the Western United States. Installation of SNOTEL sites began in the mid-1970s. These sites collect real-time data. A central computer at the NRCS's National Water and Climate Center in Portland, Oregon receives the data collected by the SNOTEL network.

Sites are designed to operate unattended and without maintenance for a year. They are battery powered with solar cell recharge. The condition of each site is monitored daily. There are over 600 SNOTEL (or snow telemetry) sites in 13 states, including Alaska. The sites are generally located in remote high-mountain watersheds where access is often difficult or restricted. Access for maintenance by the NRCS includes various modes from hiking and skiing to helicopters.

All SNOTEL sites measure snow water content, accumulated precipitation, and air temperature. Some sites also measure snow depth, soil moisture and temperature, wind speed, solar radiation, humidity, and atmospheric pressure. These data are used to forecast yearly water supplies, predict floods, and for general climate research.

To use the site, go to the link below and find the state of interest. Each state is slightly different in its map layout. Next find on the state map a SNOTEL site nearest your planned dig site. The altitude is given for the site so you can compare it to your dig site. I then look at the 7-Day Summary Report for current snow depth. They now have a historical data section which is great for predicting when a site may be snow free. Happy hunting and remember to thank Tim for keeping you warm and dry.

<http://www.wcc.nrcs.usda.gov/snow/>



DIY (Do It Yourself) Precision Scraper from Ebay Parts

By Greg Carr

Precision fossil preparation sometimes requires extremely precise scraper tools. At the 7th annual Fossil Preparation Symposium I attended a workshop session on preparing very small vertebrate specimens. Essentially they demonstrated cleaning fossil mouse teeth in a jaw. The mandible (lower jaw) was about ¼ inch long and had 5 or 6 teeth in it. Most of the work was done under 40x power microscope – very exacting work.

One of the main tools used was a precisely sharpened tungsten carbide rod. The rod was 1mm in diameter, sharpened with a small rotary diamond rasp on a Dremel rotary tool. However, the rod is not easy to find, they mentioned one seller. So I thought I'd find an alternative supply of small carbide rods to use, and include a good holder while at it.

Going to my favorite on-line store, Ebay, I find that there is a good selection of miniature carbide drill bits. The search can be 'miniature carbide drill bit'. These bits are used to drill small holes in printed circuit boards. Here's a picture of a typical offer:



These are \$30 for 50 of them. They can also be purchased by the 5's or singles. They are certainly thin enough if sharpened. However, they are too short – a handle is needed. Again, going to Ebay we can find "1/8 pin vice" and find things like this. A double-ended jewelers pin vice for about \$5 – and free shipping:



Ok – only one last item – we need some way to sharpen the drill bits to needle points. Again, searching for “1000 grit diamond sharpener” and you come up with things like this: a 3 1/4” x 8” diamond coated sharpener from China. It may take a couple of weeks to get it in the mail, but they only cost \$18 and again you get free shipping. And they will never wear out in this service.

So for an investment of about \$55 you get 50 precision scrapers, from < 1/2 mm to 2 mm, with handle and permanent sharpener. Pretty good results for about 10 minutes of work.

The screenshot shows an eBay product page for a "3-5/32" 80mm x 8" 200mm x 1mm Fine(1000 Grit) Thin Flat Diamond Stone Sharpeners". The item is listed by the seller "diamondtools30" with a 100% positive feedback rating. The price is US \$17.80, and there is a "FREE SHIPPING" badge. The page includes a main image of the sharpener, a "Buy It Now" button, and an "Add to cart" button. There are also links to "Add to watch list" and "Add to collection". The seller information section shows a "Top Rated Plus" badge and a "Follow this seller" button. A promotional banner for eBay MasterCard offers a "\$30 BACK" as a statement credit. The bottom of the page shows the Windows taskbar with the Start button and several open applications.

PS I still cannot find just plain 1mm tungsten carbide rod anywhere – and I don't need to!

Tick Season

By Richard Kimbell

Having contracted Lyme disease from a California tick, I decided to send along this information I got from a paramedic treasure hunting friend in California, Mark Dayton. Maybe we can spare someone else what I am going through. As far as removing ticks, my newest information says that a cotton ball with liquid soap on it, removes the tick without breaking off its head, by making it back out on its own in about thirty seconds. They wind up clinging to the cotton ball.

Tick Season:

It's the season for ticks!!!! Ticks are very small bugs that can't jump or fly, they simply just live in grass, bushes or trees waiting for a warm blooded mammal to pass by so they can latch on to you and slowly move to an area on your body where they can bite into your flesh and embed their heads into you.

They are disgusting to think about. Scientists are baffled by the phenomenon of the tick as it seems to know where game trails are and hiking paths and other places where there is a greater likelihood to find a mammal host to bite. They are found on blades of tall grass, and bushes up to about waist height as well as in trees laying on the underside of leaves and branches where when they detect any carbon dioxide, they immediately let go and fall straight down from the tree. As mammals, we humans breathe out carbon dioxide every time we exhale. The ticks drop out of the tree and many times land right on top of the person or animal under them. Ticks have a way of moving on our bodies where we don't feel them, especially when you're engaged in activity like hiking, jogging, biking, etc.

Ticks carry some very nasty organisms, that can cause illness in humans. Many have already heard of a disease called "Lyme Disease", which is caused by a bacterial organism carried by ticks. It was originally discovered in the Deer Tick in the Eastern USA where several cases of severe illness including juvenile rheumatoid arthritis were diagnosed. Eventually they found that these were all attributed to tick bites from the deer tick. Unfortunately, scientists have now discovered that it is not only the deer tick that carries these disease organisms, it is now the Western Dog Tick and the Black Legged Tick. These 3 different species of tick are found all across the USA. And this is no longer just an East Coast disease. In fact a recent study out of Stanford University has found that the Northern California Bay Area may be the worst.

Ticks are a huge concern, please be diligent about checking your entire body after being out in the wilderness, in tall grass, underbrush, near bushes, plants and under trees. Especially check your belly button, behind ears, behind knees, your back and in your hairline. Another phenomenon about ticks is how they know to go to our backs or places where they can't be seen.

This is also a concern for your pets, especially dogs. Talk to your vet about that. I won't go into treatments or how to remove them but the plan should be to not give them enough time on your body to move to an ideal area then bite into your flesh. You can consider using products like Deet on your clothing and it's a good idea to wear a belt to keep your pants tight and be aware that they will be on your shoes and working their way up your legs. I wear snake boots which go all the way up to my knees and are very tight around my calves and I spray them with Deet as well as my pants. But they still find their way on to our upper bodies so check carefully."

Mark Dayton

Adhesives and Consolidants for Paleontology

By Dan O'Loughlin

Part II

The first part of this three part article can be found in NARG Newsletter "Spring 2012". It defined terms and gave the principles of a good adhesive/consolidant. The first article also names some adhesives that we are trying to move away from for scientific purposes. In this article, two categories of adhesives/consolidants commonly used for scientific collections will be discussed. These would be the reactive adhesives and solution adhesives. The final article in this series will focus on Paraloid B-72, a solution adhesive gaining ground in the preparatory field.

First of all, some important principles of adhesives will be repeated from the first article. If the fossil is headed to a researcher, he/she may have a preference how the material is handled. If not, there are several principles we should try to adhere to.

1. **Apply nothing!** It is ALWAYS best to not apply an adhesive/consolidant to a fossil. Future studies may involve chemistry which is altered by treatments. This is especially important for plant material which may only be a thin carbon layer on matrix.
2. **Apply to matrix only.** This stabilizes the specimen without compromising the fossil. A good example of this are the fossils found in the Astoria formation along Oregon's coast. Once this matrix dries, it often crumbles so consolidation of the matrix may be used without treating the fossil.
3. **Apply sparingly.** Applying adhesives/consolidants in an excessive manner, especially during field collecting, may make lab preparation more tedious and time consuming.
4. **Think reversible.** If you can use a reversible product (100% is not possible) for the same purpose then do so. This may make future handling of the fossil easier.
5. **Record your adhesive.** Future researchers would like to know what was used on a fossil so that they may better be able to make alterations to the fossil if needed.

Worldwide fossil preparation is being upgraded and somewhat standardized to improve the information gained from a fossil. An annual fossil preparation symposium is held to help with techniques and standardizations (<http://vertpaleo.org/>). As amateur paleontologists wanting to contribute to science, NARG members should try to stay current on accepted adhesives/consolidants. The products listed in this article are currently considered acceptable for museum research. As new products are developed, this list may change.

The current adhesives and consolidants that are used the most fall into two categories: The reactive group consisting of epoxies and cyanoacrylates, and the solution group consists mostly of thermoplastics.

Reactive adhesives

Reactive means a chemical change occurs to form the final adhesive. The two most commonly used reactive adhesives are epoxies and cyanoacrylates (CA). Both of these are "newer" to paleontology so their long term use is still unknown. This means if they are used, they should be used sparingly. Secondly they are not reversible. This is because of the many crosslink bonds that are formed. Spilled on a fossil or extending above a glue line may take a lot of effort to remove them. The main advantages are their strength and permanency.



Epoxies

A resin and a hardener react chemically to make a polymer with many crosslinks. These crosslinks give epoxy its strength and thus its nonreversible nature. In general, epoxy is used where strength and a permanent bond is necessary. The "5 Minute" epoxies are not as strong as slower setting epoxies due to fewer crosslinks. A slow setting epoxy can be used to soak into a fossil or fracture line more which may be useful. Epoxy may be softened by heat to aid in its mechanical removal. All epoxies yellow with age. One useful adhesive in this group is the epoxy putty. One useful adhesive in this group is the epoxy putty. Putties, such as Paleo Sculp can be used to sculpt missing parts of a fossil.

Cyanoacrylates (CA, Super Glue®)

There are multiple forms of cyanoacrylates (ethyl CA, butyl CA, ethyl CA + polymethyl methacrylate). They all harden by reacting with trace amounts of water on the fossil. Breathing on a CA bond will quicken the setting time. Too much water and the CA never has time to adhere to the fossil surface, making them useless for wet fossils in the field. They also make an aerosol accelerant for a faster bond time. Some fossils (iron component) react with CA or its accelerant and turn the area green. A common product line used in paleontology is PaleoBOND™ (http://www.paleobond.com/Home_Page.html). The CA this company produces come in varying viscosities. In addition, PaleoBOND™ now makes an adhesive remover which is helpful for thin layers of CA. Otherwise, mechanical removal is needed. Strength of bond, various viscosities, and ease of use make this a good adhesive for permanent bonds.



Solution adhesives

Solution adhesives use a resin that does not react but rather dissolves in a solvent. As the solvent evaporates, the resin is left behind. Many solvents may be used but primarily acetone and ethyl alcohol (ethanol) are used because they are safer, less expensive, and easy to obtain. Ethyl alcohol evaporates slower than acetone so for workability and better penetration, a 50/50 mixture of acetone/ethyl alcohol or straight ethyl alcohol may be desirable. Better penetration may also be obtained by applying 100% solvent onto the fossil prior to applying the adhesive/consolidant. Solution adhesives are not thick enough to span large openings by themselves. The main benefit to solution adhesives is their partial reversible nature. Once set, the addition of solvent will thin the product on the fossil. Because these are thermal plastics, heat may be used to finely adjust a repair. All solution adhesives are slow to go into solution so stock (concentrated) solutions are made up and diluted down

when needed. The concentration of your solutions will increase with time due to evaporation of the solvent. Adding more solvent will correct this. Butvar®, polyvinyl acetate (PVA, Vinac™, McGean B-15), and Paraloid™ make up the most common thermoplastics used. A brief description of the common thermoplastics are below followed by simplified dilution calculations.



Butvar® (PVB, polyvinyl butral)

Butvar® B-76 is the most common grade used. It is one of the oldest and most popular products used by museums, so it is considered the "gold standard" by which other adhesives are compared. Butvar® does not adhere well to wet fossils. It is not as easily reversed as PVA and Paraloid™. In the prep lab, Butvar® is generally used as a consolidant at 2-10%. Below are various solution concentrations found in use.

<u>Butvar weight/volume</u>	<u>Solution volume</u>	<u>Approximate concentration</u>
1 Tbl (5 gm)	16 oz (473 ml)	1%
4 oz (113 gm)	1 gallon (3785 ml)	3%
75 grams	500 ml	15%

**Vinac™ (PVA, polyvinyl acetate, McGean B-15)**

Poly vinyl acetate is what we should be calling this product since the Vinac™ brand is no longer produced. The resin can still be obtained as PVA B-15 through Black Hills Institute of Geological Research, Inc. It has the lowest glass transition temperature (Tg) of the three solution adhesives so it may be more useful as a consolidant rather than an adhesive in warm weather (see the explanation below)*. PVA is less likely to haze (turn white) with a damp fossil. PVA B-15 off-gasses acid and crosslinks with time, so its long term effect on fossils is still to be seen. It can be used as an adhesive around 25-30% and as a consolidant from 2-10%. Below are various solution concentrations found in use.

<u>PVA weight/volume</u>	<u>Solution volume</u>	<u>Approximate concentration</u>
½ oz (14 gm)	1 cup (237 ml)	6%
½ lb (227 gm)	1 gallon (3785 ml)	6%
75 grams	500 ml	15%
75 grams	500 ml	15%

**Paraloid™ (acryloid, ethyl methacrylate)**

Paraloid™ B-72 is the most common grade used. It is quickly becoming the preferred solution adhesive in paleontology. Many museums, including the Burke Museum, use it almost exclusively. Paraloid™ B-72 is harder, less flexible, and more durable than PVA B-15. It does not yellow with time and is estimated to be stable for 100 years or more. It can be used as an adhesive at 20-30% and as a consolidant at 2-10%. The last article in this series will focus on the use of Paraloid in fossil preparation.

<u>Paraloid™ weight/volume</u>	<u>Solution volume</u>	<u>Approximate concentration</u>
75 grams	500 ml	15%

*The glass transition temperature (Tg) is the temperature in °C at which a substance goes from brittle to rubbery. PVA with a Tg of 35°C means at warm temperatures, glued joints may soften and thus shift or fall apart.

	<u>Tg</u>	
Butvar B-76	62-72°C	144-162°F
Paraloid B-72	40°C	104°F
PVA B-15	35°C	95 °F

General notes on solution adhesives

Four methods are used for dissolution:

First, prepare the solutions 1-2 weeks in advance. Mix daily.

Second, place the resin in a cheesecloth bag and suspend above just touching the solvent.

Third, place a twisted rubber band around the solution jar and place it on a rock tumbler to mix.

Fourth, and least practical. Use a magnetic stirrer.

In science, a weight/volume formula means you measure a certain weight of resin (solute) and add it to some amount of solvent bringing the entire mixture up to the final "volume of solvent" volume. Since the absolute concentration is subjective for our use, we can make things easier by adding absolute weight to absolute volume. Remember, the concentration of your adhesive changes with time due to evaporation of solvent. Additional solvent can be added to correct this change. Below are some quick calculations for your use.

Weight of resin	Volume of solvent	Percent solution
75g	250 ml (8 ounce)(1 cup)	30%
75g	500 ml (16 ounce)(1 pint)	15%
75g	750 ml (25 ounces)	10%
75g	1000 ml (33 ounce)(1 quart)	7.5%
75g	1500 ml (50 ounce)	5%
75g	2500 ml (83 ounce)	2.5%

Formula: Weight (grams) / Volume solvent (ml) x 100 = Percent (%)

Volume guestimates for 75g:

Butvar®B-76 1 heaping cup

Paraloid™B-72 1/2 cup

Vinac™ (PVA) 1/3 – 1/2 cup

Dilutions of 15% stock solution

Parts 15% Stock	Parts Solvent	Final solution strength
1	0.5	10%
1	1.0	7.5%
1	1.5	6%
1	4.0	3%

Supplies

PaleoBOND Inc.
902 Goodrich Avenue
St. Paul, MN 55105
1-651-227-7000

http://www.paleobond.com/Home_Page.html

Talas
330MorganAve
Brooklyn, NY 11211
1-212-219-0770
www.talasonline.com

Black Hills Institute of Geological
Research, Inc.
PO Box 643
Hill City, SD 57745
1-605-574-4289
www.bhigr.com

Conservation Resources International, LLC
5532 Port Royal Rd.
Springfield, VA 22151
1-800-634-6932

<http://www.conservationresources.com/>

For a more thorough discussion of adhesives, read:

Davidson, A. and S. Alderson. 2009. An introduction to solution and reaction adhesives for fossil preparation. In: Methods In Fossil Preparation: Proceedings of the First Annual Fossil Preparation and Collections Symposium, pp 53-62. Brown, M. A., Kane, J. F., and Parker, W. G. Eds.

Museum of Natural and Cultural History at University of Oregon

By Cindy Yablok

The University of Oregon's Museum of Natural and Cultural History will be having an "Explore Oregon," grand opening for the public with free admission on Sat. May 31 and Sun. June 1st after having completed two new rooms on fossils and geology of Oregon.

Included in the exhibit is a geologic map of Oregon with the corresponding rock samples with their information about the rock type and where they came from on the map. Additionally, there is a four-minute movie on evolution of Oregon, a moving tectonic plate table and more.

The fossils briefly include some fossils from Thomas Condon collection, an actual Mammoth vertebra, and rib from Tigard, Oregon (shown in picture on bottom right). The next picture on the bottom left is one of an ancient beaver skull. They had giant teeth, long ago and probably did not use them on trees. The second room should also include an exhibit on the evolution of horses and more. This new edition is very well done and wonderful to see (especially when going to visit your college age students).



ancient beaver skull



**Mammoth vertebra, and rib (at top of picture)
from Tigard ,Oregon**

Fossil Calendar

June 6-8	Tate Summer Conference http://www.caspercollege.edu/tate/conference	Casper College	Casper, Wyoming
August 9	Northwest FossilFest http://NARGPaleo.org	Rice NW Museum of Rocks and Minerals	Hillsboro, Oregon
September 6-14	Denver Coliseum Mineral, Fossil, and Gem Show http://www.coliseumshow.com/	Denver Coliseum	Denver, Colorado
October 10-12	Portland Regional Gem and Mineral Show http://www.portlandregionalgemandmineral.org/	Washington County Fair Complex	Hillsboro, Oregon
October 15	National Fossil Day http://stonerosefossil.org/	Stonerose Interpretive Center	Republic, Washington
November 7	NARG Auction http://NARGPaleo.org	Rice NW Museum of Rocks and Minerals	Hillsboro, Oregon
November 5-8	Society of Vertebrate Paleontology http://vertpaleo.org/Annual-Meeting/Home.aspx	Estrel Berlin	Berlin, Germany

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)

Continued from pg 3

Newport, OR Fossil Fest Pictures



Dan O'Loughlin holding a "pseudo" mammoth tusk at 68th Street entrance in Newport, OR.



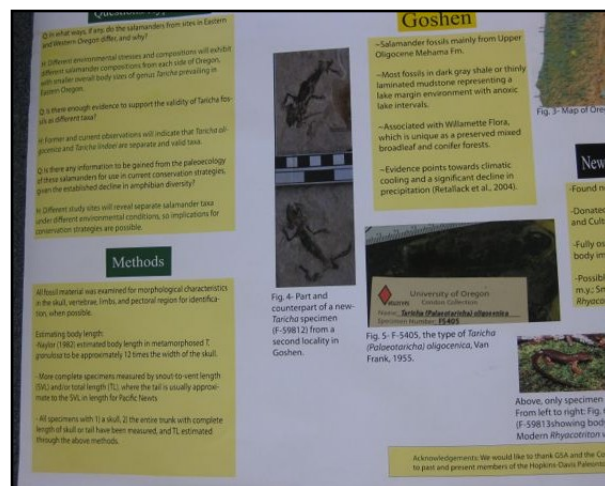
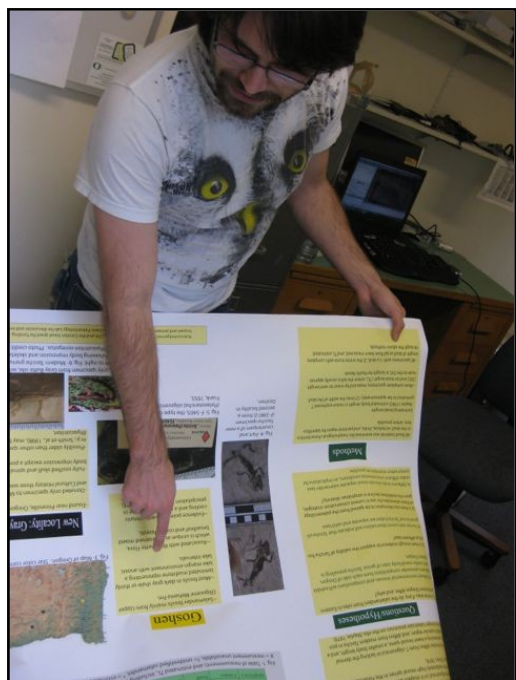
Peg Johnson on the beach, Friday afternoon.

Salamander Update

By Bruce Thiel

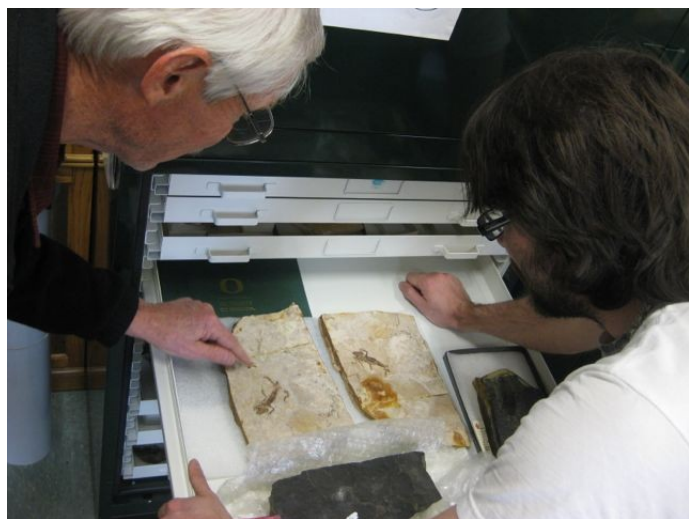
The salamander that Robert Manley donated to the Condon Collection at the University of Oregon, has become a focal point of study in a Masters Thesis by John J. Jacisin III, at U of O. Using Bob's salamander, John prepared a presentation on Oligocene salamanders of Oregon, which was given at the Society of Vertebrate Paleontology annual meeting in Los Angeles in November of 2013, and also at the Geological Society of America annual meeting at Denver in December 2013. John will graduate soon and move to University of Nebraska to begin work on his doctorate.

His conclusion seems to be that the salamander is not a new species, but an excellent example of a fossil species found years earlier in western Oregon, *Taricha oligocenica*.



Here is the lower left half of the poster that shows photographs of the specimen.

John is pointing out descriptive features of Bob's salamander on the poster, by pictures of the two plates containing the specimen.



John is showing Bob Manley the curated examples of salamander fossils in the University's collection.



Walt Wright's Petrified Wood Identification Seminar

**Hillsboro, Oregon
August 10, 11, 12, 2014**

Join the North America Research Group in welcoming Walt Wright to the Rice Museum for his acclaimed petrified wood seminar following NARG's NW FossilFest. Walt will introduce you to the wonders of wood, its petrification, and identification including use of microscopic structures. This customized workshop will focus on examining characteristics of wood of the region, as well as popular worldwide specimens.

Walt is a Botanist, Ecologist, Geologist, and Paleobotanist with professional experience working for the U.S. Forest Service, University of California, and as a consultant to government agencies in the field. He draws from a life-long passion for petrified wood to deliver an exceptional series of lectures that guide attendees through a unique learning opportunity.

Walt will give an introductory lecture during NARG's NW FossilFest on Saturday, August 9th, followed by the three day workshop. The \$110 workshop fee includes lunch and admission to the Rice Museum where one the most incredible petrified wood displays resides. An optional field trip to Hollywood Ranch will follow on Wednesday. To register or for more information, visit the workshop website hosted by NARG.

<http://www.nargpaleo.org/seminar>
NARG message phone # 503-364-2979

NORTHWEST FOSSIL FEST

**Celebrating the
10th Anniversary of**



North America
Research Group
nargpaleo.org

Inspire. Inquire. Interact

In addition to NARG's significant discoveries, an exquisite collection of petrified wood from the Pacific Northwest will be on display.

Plan to attend lectures on paleontology, including world-renown wood identification expert Walt Wright (see back for details).

Fossil identification help.

Observe and participate in fossil preparation demonstrations.

And, many educational activities for kids!

August 9, 2014

Saturday, 10:00am to 4:00pm

Rice NW Museum of Rocks and Minerals
26385 NW Groveland Drive, Hillsboro, Oregon

NARG message phone #: 503-364-2979

nargpaleo.org

NARG Up Coming Activities

* June 14-15 - East Birch Creek (Plant Fossils) near Pendleton, OR

* Wallowa Mtn. NARG Fossil (possible Trip)

Dates: Possibly the last week of July to 1st week of August may be chosen. The 9,000 foot Wallowa Mtn. peaks can cause the area to be snowed in during spring.

Part 1. Black Ammonites & Cycads, possibly late Permian, from near Wallowa Lake at Black Marble Quarry (north end of Wallowa Mtns.)

Part 2. From Martin Bridge, creek side, camp ground, plan to visit:

1. Summit Point's Triassic age sponges, algae, mollusks, sea urchins, corals, sponges, & pelecypods.
2. Spring Creek's corals, sponges, & pelecypods.
3. Excelsior Gulch's Jurassic clams, belemnites, & trace fossils.
4. Eagle Creek has more of the same.
5. Possible other sites.

* NARG Annual Campout (Crab Camp) July 11-13 at Bill Sullivan's place on the Nehalem River near Mist, OR.

* NARG FossilFest - Sat, August 9, 2014 at the Rice Museum (see page 21 for more info.)

* Walt Wright's Petrified Wood Workshop - Aug 10-12 (see page 21 for more info.)

* Holleywood Ranch Fieldtrip - Aug 13 (please sign-up)

* Como Bluff, WY - Mid July or Mid Aug. - Date TBA (See Page 7 Winter 2014 issue)

NARG Officers:

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 Vice President: Robert Rosé (541) 367-2052
 Secretary: Tami Smith (503) 620-5317
 Treasurer: Peg Johnson (253) 370-8892

Directors:

Bill Sullivan (503) 429-6707
 Larry Purchase (360) 254-5635
 Dan O'Loughlin (503) 866-5997
 Michael Santino (503) 981-8902
 MacKenzie Smith (503) 403-8941

Committees:

Newsletter: Peg Johnson
 Aaron Currier
 FossilFest: Linda Harvey
 Dan O'Loughlin
 NARG Auction: Linda Harvey
 Portland Regional: Dan O'Loughlin

NORTHWEST FOSSIL FEST

August 9, 2014

*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