# JANUS

The Newsletter of the North Carolina Fossil Club
www.ncfossilclub.org

2008 Number 2


## 2008 Summer Calendar

**July**

**12** **Dino Day** – Museum of Life and Science, Durham. Exhibitors may set up beginning at 8:00. Museum open to public 9:00 - 5:00. Contact: Trish Kohler (919) 383-6328 or trishk@nc.rr.com

**20** **NCFC Meeting** – NCMNS, 11 West Jones Street, Raleigh. 1:30 pm, Level A conference room. James Bain, *et al*.: "The Utah-Wyoming-Colorado Trip Show-and-Tell."

**September**

**6** **Mini Fossil Fair** – Rankin Museum, 131 W. Church St., Ellerbe, NC Contact: Ruffin Tucker (704) 784-1672 or paleotck@netscape.net

**21** **NCFC Meeting** – NCMNS, 11 West Jones Street, Raleigh. 1:30 pm, Level A conference room. Ruffin Tucker and Tony Furr: "Precambrian fossils in the Tarheel State: The Ediacaran of Stanly County, NC."

Editor's note: The Ediacaran Period (named after the Ediacara Hills of South Australia) is the geological period just preceding the Cambrian Period. Its status as an official geological period was ratified in March 2004 by the International Union of Geological Sciences (IUGS); it is the first new geological period declared in 120 years.


Plate of associated ganoid scales of an Eocene gar (*Lepisosteus* sp.?) embedded in shale of the Green River Formation, discovered and photographed by NCFC's Mike Malaska on the first day of scouting our 2008 spring trip Out West. It is not legal to collect vertebrate fossils on public lands without a special license so we left it where it was found in Duchesne County, Utah, in a roadcut on the south side of US 40. See back cover for another photograph from this trip. We will have a complete report in the next issue of *Janus*.

### Presidential Column

Our spring season of collecting trips, school programs, and the Aurora Fossil Festival brought lots of high adventure, camaraderie, and good fun. Several of these days were quite soggy, including the morning of the Festival. (But hey, at least our drought is over or at least receding in the Tarheel State.) I would like to focus once again on the educational programs organized by individual members of the North Carolina Fossil Club, Inc. If you are not doing so already, I encourage you to think of ways in which you might reach out to schools, Scout groups, town fairs, women's shelters, or other opportunities, however small. Between March 19th and April 11th, Roxada and Robert Story, working with Greg Meadows (mine manager) and Danny Humphrey of the Onslow Quarry, Martin Marietta Materials, coordinated visits by some 900 elementary students, with help from members of our Fossil Club, including Rich Olsen, Rufus Johnson, Jodi McDaniel, Sharron and Ron Edwards, Rita McCabe, Richard Chandler, and Cindy Muston and her son, Nathan Snelling. My hardhat is off to them all. Roxada and Robert assure me that every student left with at least one fossil. In an era when the litigious atmosphere in our country causes numerous mines to prohibit collecting, we owe a special thanks to the leadership of Onslow Quarry for providing such a safe, fun, and educational experience to so many members of the public, including collecting trips by our own Club. Turning to the richly fossiliferous Miocene Pungo "reject" gravel generously donated by PCS Phosphate via the Aurora Fossil Museum (AFM), I want to report on successes Becky Spencer and I had with wet-screening exercises in Hillsborough and Durham, NC, in early April (215 students, grades 1 through 6). Seeing the delight that this mine waste brings to so many, we have started calling it, "kid happiness in a bucket." After unloading about 700 pounds of "reject" in buckets in Hillsborough on the evening of April 10th, Becky and I set up a big tent, laid out hoses and screen boxes, and then drove into town for dinner. While walking, we were struck by a car driven by a gentleman who is approaching his ninth decade of life. (He ran a red light.) Though Becky and I both sustained fractures and soft-tissue damage, we felt really badly for the driver--the police grilled him for more than an hour. The following day, we got a pleasant surprise. We gritted our teeth, drove to Hillsborough, and finished setting up the fossil show for the kids. We were quite battered, and trying not to grimace, when the kindly gentleman who had hit us the night before called and insisted on joining us for the entire day, where he led parental and teen volunteers in wet-screening all 700 pounds of that dirt for fossil-hungry, rambunctious little children. Several lessons derive from screen-washing exercises we hosted in late '07 and early '08. First, as several of you have pointed out, it really is wasteful for us to wash the raw "reject" gravel on quarter-inch hardware cloth. Well more than half the mass (and the tiny treasures it contains) passes right through the screen and is lost. If time and resources permit, perhaps we should pre-wash the material on a finer mesh and dry it before taking it to schools. Second, to help you estimate how much gravel you will need, we keep finding that regardless of grade level, during an hour-long exercise, the average child can pick their way through about

0.5 gallons of "reject." A 5-gallon bucket packed with wet, raw "reject" weighs about 70 pounds, so you can do the math and see that you might need a small truck to carry enough "reject" to entertain 100 kids. Third and last, the smallest kids benefit from the use of lightweight screen boxes. In recent exercises, the youngest children (1st grade) did much better when they used the lightweight, yet strong screens made by George Oliver, M.D., and currently sold by the AFM. (I embarrass George by asking that he autograph them with a ballpoint before I lacquer them--I call them my "Dr. George Oliver Signature Model Fossil Screens.") These weigh about 1 pound per screen box. Little kids struggled when attempting to use the more robust boxes that Becky and I made last year and similar boxes given to me by the late, great Richard Tellekamp (both types weigh about 3 pounds each). When working with younger children in the future, we will strive to have the lighter models on hand. Regardless of the age of the students, I guarantee you that you will derive much pleasure from helping them find fossil loot. So please be on the lookout for opportunities to reach out. I hear that Trish Kohler is still accepting volunteers to help with Dino Day at the Museum of Life and Science in Durham. You can contact her at trishk@nc.rr.com.

James Bain

John & Becky at Aurora, 9/14/2007

**An appreciation of John S. Bain, USMC.**

John Bain, age 21, is presently a Corporal in the US Marine Corps, based out of Camp Lejeune. Throughout his childhood, he collected fossils all over the West with his cousin Edward and his uncle James. Much of that material was later given away as door prizes and "party favors" at NC Fossil Club meetings and town fossil fairs in North Carolina, 2002-2008. While living with his uncle and finishing high school in NC, he attended several of our meetings, and frequently assisted in hauling gravel from Aurora up into the Piedmont for use in school exercises and other "teachable moments." He is shown here with Becky Spencer, loading gravel into his Ford Ranger in the big meadow at Aurora on September 14th, 2007, after his return from Iraq, and prior to his current deployment in Afghanistan. While he has been overseas, his uncle has shamelessly made heavy use of his truck as a "baggage wagon" for Club functions. In the news, you might see references to John's unit as the Weapons Company, First Battalion, 6th Marine Regiment. During this deployment, the "1/6" is also known as Battalion Landing Team 1/6 attached to the 24th Marine Expeditionary Unit, under the command of NATO's International Security Assistance Force or ISAF. The last I heard on the news, his unit was on the offensive against Al Qaeda and the Taliban in Helmand Province. Please join me in sending good thoughts John's way.

James Bain

**Corporal John S. Bain, United States Marine Corps**

## Déjà vu, all over again
## Dave Grabda

Have you ever seen something new yet there is something so familiar about the object?

We are leaving Myrtle Beach, S.C. on US17 at a quarter to six A.M. Saturday morning to go to the Jamestown Quarry in South Carolina. That gives us time to drive thru a quick stop to pick up a coffee and ham biscuit and get to the quarry by 7 A.M. We drive south to Hwy 521/17A in Georgetown, left on US17A outside of town, then left on US17A/State hwy 41. We pass the entrance to the Georgetown Quarry, now reclaimed.

We always found something interesting at this quarry. That's where Lucille did her striptease. We were working a hill between two pits. I turned around to see her tearing off her clothes. I ran up to her and asked, "What are you doing?" Two words explained everything. She yelled, "FIRE ANTS", as a sock whizzed past my head. I brushed and patted her down, beat her jeans and socks and scraped ant bodies off her boots, leaving their pincers still imbedded in the soft leather. She had lingered too long in the same place. How many times have I done that in these Eocene quarries? Now the quarry is overgrown with brush, the hills beaten down by dirt bikes and ATVs. In Jamestown we turn left on State Hwy 45 and about 2 miles on left is the quarry. The gate is open so I drive in to find the foreman to get permission to hunt fossils and when to be out. Sometimes we have to be out at 10 A.M.; sometimes its 2 P.M. Today we need to be out by noon. The quarry is what is called a "wet" quarry. They dynamite the limestone into a pond then scoop it up to dry out in piles next to the pond, later to be hauled off. These hills don't weather out long enough to give up fossils but small piles and blocks of limestone left around the ponds are good places to hunt as are the flat work areas and/or roads around the ponds. The quarry doesn't give up its fossils, easily. Discounting a thirty pound limestone with a *Carcharocles auriculatus* imbedded in it, I still haven't filled up a small shoe box with fossils. Whole *C. auriculatus* are only found in a limestone block. It rained some the day before and the roads are still a bit damp but I figured this would flush out a few more fossils, We brought our little Chihuahua and she is having a fit to get out of the truck. I thought she would stay near me so I set her down, That was a mistake! She is having fun racing along the low lanes between Lucille and me till her paws are full of mud. She lies down and tries to lick them clean but can't get the grit out of her mouth. I don't think dogs can spit. I pick her up and holding her at arms length take her back to the truck. I find an old towel and clean her up as best I can and place her in her car seat. Now I have a truck and a dog to wash when we get home. Two hours after we've arrived home I finally have time to see what we found and add the fossils to the shoe box. We finally found a peculiarly interesting sand dollar that I had an eye out for that is free of Bryozoa hash and is all there. I pull out two others from the shoe box in various states of completeness and Bryozoan cover. Maybe I could put a name to these sand dollars now. The interesting thing is how triangular the marginal outline is and the periproct is a full millimeter above the margin. I pull out ay copy of "The Echinoids of the Middle Eocene Warley Hill Formation, Santee Limestone, and Castle Hayne Limestone of North and South Carolina" by Porter M, Kier, I look up *Protoscutella mississippiensis rosehillensis* since we'd collected them twenty some odd years ago at Fussell's Quarry, now reclaimed, in Rose Hill, North Carolina and remembered the periproct is on the margin but they are subcircular in marginal outline with a hint of three sides but not as triangular as the Jamestown species. I wondered if the Rose Hill faunal zone could be present at Jamestown? The Jamestown quarry is not included in Kier's report but the Georgetown quarry is, just a few miles as the crow flies. No echinoids were present at Georgetown quarry from Moultrie Member I which is equivalent to Warley Hill Formation, early zone of Rose Hill. In the county where Jamestown Quarry is *P. mississippiensis* (Twitchell) has been found on the west side at Wilson's Landing and I personally found a bryozoan incrusted specimen at Cross Martin-Marietta Quarry that is subcircular in marginal outline with periproct on margin. In the same quarry I found a singular echinoid *Santeelampas oviformis*, bryozoan-incrusted but identifiable by the periproct, height greater than width, and this same echinoid was also present at the Fussell Rose Hill Quarry. I go back to the shoebox. There they are, deflated *Santeelampas oviformis* specimens with the telltale periproct greater in height than width.

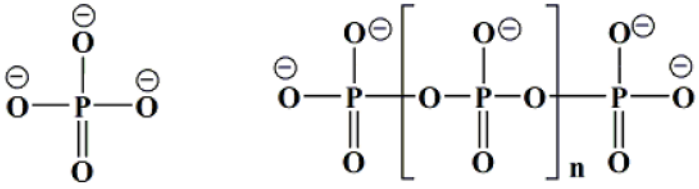
In "The Mesozoic and Cenozoic Echinodermata of the United States" by Clark and Twitchell 1915, U.S. Geological Survey Monograph 54, *Protoscutella mississippiensis* (Twitchell) is written up as "marginal outline is less circular and more anteriorly pointed form. Periproct below but touching posterior margin". Plate LIX, fig la-1f and 2 shows a sand dollar that could be described as subtriangular but still not as triangular as the Jamestown sand dollar. Original specimens were found in Clarke Co., Mississippi and Palestine, Texas. In Kier's report P. mississippiensis mississippiensis (Twitchell) from Alabama had their periprocts above the margin but no description of marginal outline which may represent a separate subspecies.

So I'm pretty sure I have identified these echinoids and that they can be considered as new subspecies. But one question answered seems to always bring up two more. Why didn't we find them at the Georgetown Quarry that's just a few miles away although it is in a different county? They weren't in a different county 40 million years ago. Why are the echinoids in such odd or deflated shapes? The "human" answer would be lack of food. Nature doesn't always work the way we think though. Perhaps the shapes allowed them to hide faster from predators, "Enemy Above! Dive! Dive! Dive!" and the rounder inflated echinoids got ate up. Perhaps they were in colder deeper waters. Its a strange puzzle to me. Don't expect to find a whole lot of fossils at the Jamestown Quarry. It takes three trips to find something worthwhile but being so close its nice just to get out there. We look and find other fossils out there but that's another story! Happy Hunting


Left: Jamestown *Protoscutella mississippiensis* subspecies
Right: *Protoscutella mississippiensis rosehillensis*

## Thoughts on how marine phosphates form

Marine phosphate beds are often rich in fossils. Geologists have long been puzzled about how these ore deposits form. Both calcium (Ca++) and phosphate (PO4---) are plenty soluble in water--why would they precipitate out of solution in seawater such large masses as apatite, approximately $Ca_3(PO_4)_2$? A new study by graduate student Julia Diaz and her coworkers ("Marine polyphosphate: A key player in geologic phosphorus sequestration," *Science* 320: 652-655, 2008) implicates inorganic polymers called polyphosphates, which are made by glass-shelled algae called diatoms. Her team studied samples collected in a fjord on the west coast of Vancouver Island. They found that certain diatoms, such as *Skeletonema* spp., which bloomed when nutrients were abundant in the spring of 2007, stored excess phosphate as a polymer of orthophosphate units joined with phosphoanhydride bonds, shown here in a sketch redrawn from Figure S1 of their 2008 report (n = 1 to >100). This chemistry



**Phosphate** **Polyphosphate**

might look exotic, but many of you will recall that short strings of phosphoanhydride bonds are key components of the little "powerhouse" molecule that serves as a key currency of energy exchange in the cells of most or all living things, adenosine-5'-triphosphate or ATP. Polyphosphates were previously known but were thought to be inconsequential sources of phosphate deposits. Using a complementary set of state-of-the-art analytical technologies, Diaz et al. found that "inorganic polyphosphate represented a substantial 7 % of total phosphorus in surface water biomass." As the diatoms reached the ends of their lives, Diaz's group found that they sank, and took their phosphorus-rich polymers with them. And as the diatoms decompose on the bottom, the polymers (strong polyanions) can form insoluble precipitates by binding with multiply charged cations (a major one in seawater is calcium), thus nucleating growth of apatite crystals in the muck. The authors note that other marine microorganisms, such as certain blue-green "algae" (cyanobacteria), are also capable of synthesizing polyphosphates, and might be important sources of phosphates that form in tropical and subtropical seas where those bacteria are abundant.

This is wild-eyed speculation, but my guess is that this same mechanism could extract other multiply charged cations out of ocean sediments, including radioactive metallic elements. Mined phosphate can contain minute amounts of uranium, radium, polonium-210, and lead-210. When we eat foods containing tiny quantities of radioactive cations, most of bad stuff passes through our digestive tract, presumably with little harm done. This is beyond my competence as a scientist, but in a casual literature review, I found no studies that show a health effect above natural background radiation when mined phosphate is used to fertilize food crops. But in the case of tobacco that is fertilized with mined phosphate and then smoked, radioactive particulates can accumulate in the lung and elsewhere, where they are thought by some to contribute to lung cancer (e.g., Jerome Marmorstein, "Lung cancer: Is the increasing incidence due to radioactive polonium in cigarettes?" *Southern Medical Journal* 79:145-150, 1986).

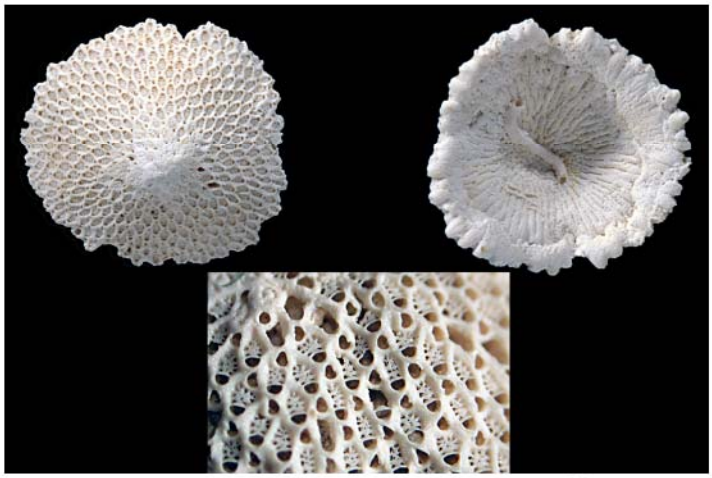
James Bain

## My Favorite Fossil

This is driving me to distraction. For many years now, I have seen (and occasionally purchased) lapidary rough and finished pieces of this crinoidal "marble," said to be from the [?] Permian of [?] northern China. In common with so many other people who like to collect things, I am a little on the obsessive-compulsive side, and it bugs me that I cannot pin down the geologic source of this material. I really like the jumble of disarticulated crinoid ossicles in this limestone, which is hard enough to take a polish. The creams and grays and blacks are typically offset by a light pink that appears to be real (jasper?) and not an effect of dyeing. So here is my challenge to you: If you can identify this material, ideally by directing me to a publication in the primary scientific literature, then I will give you a polished egg made of this handsome "crinoid hash."

James Bain

Chinese Crinoidal Limestone



Roxada Story's very neat Discoporella aff. umbellata bryozoa from Old Dock (it's about 2 mm wide).

## Trip Reports

The spring **Green's Mill Run** trip started with 8 members of the NCFC waiting at the Elm St. Park for a day of fossil hunting. After a slight delay due to frequent downpours, the weather finally cooperated enough to let us jump in. Even though GMR was slightly swollen from the rain, it didn't deter eagar fossil hunters. The day slowly turned sunny and everyone was digging and finding the usual mix that GMR offers. John Steffensen's nice 1½" great white gave us all hope that our persistance would pay off. As the day ended, several more *Carcharodon carcharias* teeth were found along with some always welcomed Cretaceous fossils. We had to call it a day when another rain shower, this time with lightening and thunder began to fall on the creek. Thanks to John Steffensen for guiding us to a great day fossil hunting.

Tracey & Chris Mayo

NCFC Members hunting GMR

John Steffensen's great white

Mix of GMR fossils

15 club members participated in the Spring trip to **Rocky Point** on April 24th. After signing in at the front gate we were off and running by 11:30 in the morning! Conditions were excellent for hunting after the hard rain that occurred just a few days prior. Lots of small teeth and echinoids were found by all. Lewis Kohler found two nice *ariculatus* (his first). New member Larry Byars on his first trip to the mine found a nice *ariculatus* while Chris & Tracey Mayo found three partials. Roxada Story found a beautiful *Linthia wilmingtonensis* and large *Plicatoria wilmingtonensis* (brachiopod). David Sanderson found three large *Nebrius thielensis* (nurse) The following members participated in the trip: Harriet Angeles, George Zervos, Ron & Sharon Edwards, Tracey & Chris Mayo, Scott Chapman, Diane Willis, Trish & Lewis Kohler, Rita McCabe, Roxada & Robert Story, Larry Byars.

David Sanderson

Lewis Kohler's hand with his first ever ariculatus


Larry Byars with a hand full of teeth including a small auriculatus

Roxada Story's hand with her loot

Cool, windy, and sunny conditions greeted 14 club members on March 20th for a hunt at **Castle Hayne**. Conditions were ideal for finding specimens due to heavy rains that occurred prior to the hunt. A Martin Marietta employee escorted the group into the mine and told us where to park. After a brief overview of the mine we were released to hunt a restricted area until later that afternoon when the whole mine was available. Some members chose to hunt piles of overburden dumped adjacent to the road and were quickly rewarded. Ron Edwards found the tooth of the day, a perfect, black, absolutely gorgeous 3¾" *ariculatus*! Michael Ford found a nice 1" *ariculatus* and David Sanderson found a worn 3 incher. All members were rewarded with the usual small Cretaceous shark teeth, echinoids, sand dollars etc. Participating club members were: Harriet Angeles, George Zervos, Ron & Sharon Edwards, Michael Ford, Jennifer Hamby, Freddie & Greg Mathews, Tracey & Chris Mayo, Earl Guertin, Lindsey Werden, and Scott Chapman. David Sanderson

NCFC Members at Castle Hayne

Ron Edwards' awesome tooth

Michael Ford's very nice 1" auriculatus

East Carolina University

*The Administration, Trustees,*
*Faculty and Graduating Class*
*of*
*East Carolina University*
*announce that*
*Cynthia Danielle Crane (Muston)*
*is a candidate for the degree of*
*Bachelor of Science*
*in*
*Geology*
*Summa Cum Laude*
*at the*
*Conferring of Degrees*
*Saturday morning, May tenth*
*Two Thousand Eight*
*at ten o'clock*
*Dowdy-Ficklen Stadium*

**PCS Trip - 3/29/08**

C'mon George, let's go!

George, quit procrastinating! Let's go!!!

Candace, Let's GO!!!

Nice to have you home, son! (Diane Willis with son Carl)

Where did I put that permission form??

Once more into the breach, dear friends

Can you spot the Notorhynchus tooth?

It's got to be here somewhere!

Here ir is! But where's the other half??

Here it is !! (Trish Kohler and Matt Rever)


THE find of the season! (Jeff McGrady with his near-perfect, HUGE Hexanchus gigas)

This one's definitely worth a second look!!

# North Carolina Fossil Club, Inc.
**(Founded 1977)**

| | | | |
|---|---|---|---|
| **President** | James Bain | (919) 479-2320 | Bahama, NC |
| **Vice President** | Jeff Cohn | (919) 325-3405 | Apex, NC |
| **Immediate Past President** | Cynthia Muston | (252) 830-8897 | Greenville, NC |
| **Treasurer** | Trish Kohler | (919) 383-6328 | Durham, NC |
| **Secretary** | Joanne Panek-Dubrock | (919) 362-6392 | Cary, NC |
| **Membership Chairpersons** | Roxada/Robert Story | (919) 544-2017 | Durham, NC |
| **Editor, Janus** | Richard Chandler | (919) 851-2153 | Raleigh, NC |
| **Board** | Rick Bennett (2009) | (919) 839-1802 | Raleigh, NC |
| | Mary Boulton (2008) | (704) 541-9397 | Charlotte, NC |
| | Jonathan Fain (2008) | (919) 518-1591 | Raleigh, NC |
| | Joy Pierce Herrington (2009) | (919) 929-2661 | Chapel Hill, NC |
| | Jim Mahoney (2009) | (336) 643-0798 | Summerfield, NC |
| | Jodie McDaniel (2008) | (910) 455-5179 | Jacksonville, NC |
| | Eric Sadorf (2008) | (919) 466-8484 | Cary, NC |
| | Diane Willis (2009) | (919) 967-1008 | Chapel Hill, NC |

## 2008 Membership Application - North Carolina Fossil Club

Name(s) _____

Address _____

City, State, ZIP _____

Phone(s) (Include Area Code) _____

E-Mail Address _____

| Select One Type of Membership | | |
|---|---|---|
| (Enclose check or money order for the indicated amount.) | ❑ Individual (new) | $20.00 |
| | ❑ Individual (renewal) | $15.00 |
| | ❑ Household (new) | $25.00 |
| | ❑ Household (renewal) | $20.00 |

Children of NCFC members who are dependent minors and living at home may accompany parents on any trip *EXCEPT* PCS–Lee Creek or where otherwise noted.

Memberships are effective from January through December of the year (or portion of the year) of the date of application. For example, persons joining in August will need to renew their membership 5 months later in January.

**NCFC Liability Statement**

The Undersigned hereby acknowledges his/her understanding that fossil collecting is an inherently dangerous activity which can result in serious bodily injury or death, and/or property damage and hereby confirms his/her voluntary assumption of the risk of such injury, death or damage.

The Undersigned, in return for the privilege of attending field trips Related to the collection of and/or study of fossils, or any other event or activity conducted or hosted by the North Carolina Fossil Club (NCFC), hereinafter collectively and individually referred to as "NCFC Events", hereby releases the NCFC, NCFC Board members and officers, NCFC Event leaders or organizers and hosts, landowners and mine or quarry operators from any and all liability claims resulting from injury to or death of the undersigned or his/her minor children or damage to his/her property resulting from any cause whatsoever related to participation in NCFC Events.

The Undersigned agrees to comply with any and all rules and restrictions which may be communicated to the undersigned by the NCFC Event leader and/or landowner and mine or quarry operator and acknowledges that failure to comply will result in immediate expulsion from the premises.

The Undersigned acknowledges that this release covers all NCFC Events and will remain in effect at all times unless or until it is revoked by written notice to the current President of the NCFC and receipt of such revocation is acknowledged.

The Undersigned further attests to his/her intent to be legally bound by affixing his /her signature to this release.

Name _____ Signature _____ Date _____

Name _____ Signature _____ Date _____

**Mail To:** North Carolina Fossil Club, P.O. Box 13075, Research Triangle Park, NC 27709

North Carolina Fossil Club
P.O. Box 13075
Research Triangle Park, NC  27709

"Evel Knievel, the Eocene Weevil," collected by AB Berman during the NC Fossil Club's recent trip Out West: photo by Mike Malaska. We named this site "Bug-O-Rama Quarry" (Utah, Uintah County, on the road between the ghost towns of Watson & Rainbow). Early Middle Eocene, Green River Formation, upper Parachute Creek Member, ancient Lake Uintah (~48 MYA). Dime for size.