



fossil@flmnh.ufl.edu



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TheFossilProject

FOSSIL Project Updates by Bruce J. MacFadden

We are pleased to announce that the FOSSIL project has a new coordinator, Eleanor Gardner, who started with us in May. Eleanor is rapidly coming up to speed as an active member of the project team. For more about Eleanor, see the article later in the newsletter.

During the past quarter, the FOSSIL project partnered with fossil clubs to promote activities of common interest that advance the science of paleontology and are building a national, networked community. On May 16th we participated in the 2nd Annual "Women in Paleontology" Day sponsored by the Florida Fossil Hunters and held at the Orlando Science Center. The FOSSIL project sent five of our students who presented talks and hosted a display table. We are committed to broadening representation and encourage women to be engaged in paleontological activities, and we applaud the Florida Fossil Hunters for their leadership in this regard.

There is considerable interest in having a 3rd annual event, and a FOSSIL-sponsored "WiP Working Group" has been formed, consisting of Bonnie Cronin (FFH), Betty Dunckel (FOSSIL), Eleanor Gardner (FOSSIL), Cindy Lockner (FFH) and Lisa Lundgren (FOSSIL). We are seeking one or two other volunteers to be members of this working group, with priority placed on members of fossil societies or clubs who might want to participate from other parts of the U.S. For more information, contact Eleanor Gardner at fossil@flmnh.ufl.edu.



Women in Paleontology at the Orlando Science Center

In May, six members of the FOSSIL project participated in the Aurora Fossil Festival in NC during Memorial Day weekend. Two of our students, Catalina Pimiento and Victor Perez, presented talks about fossil sharks, and the team also hosted a FOSSIL display table. At the end of the weekend we travelled to the Calvert Marine Museum in Solomons, MD, where we participated in the field conference along with about 40 other members of a dozen fossil societies and clubs. The formal talks, discussions, evening social ID session (including sampling of the paleontologically-themed beer,

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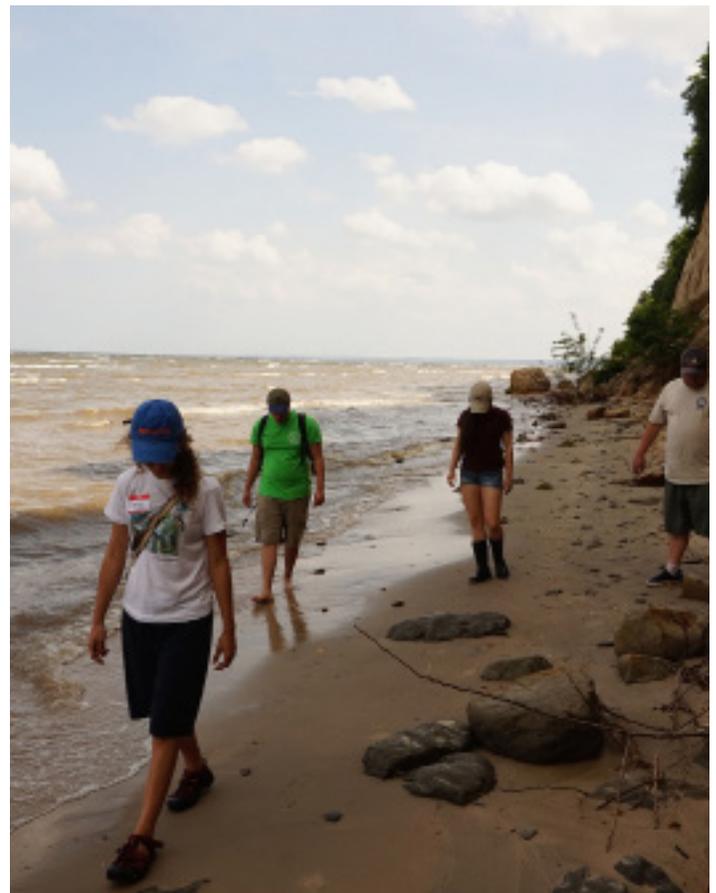
Bone Dusters Paleo Ale), as well as the spectacular field trips all resulted in a rewarding and memorable experience. We thank both the Special Friends of the Aurora Fossil Museum Club and Calvert Marine Museum for welcoming us to their events; we especially thank University of Florida (UF) graduate student Victor Perez and CMM paleontologists, Stephen Godfrey and John Nance, for organizing this event.



The FOSSIL table display



Identifying fossils at Calvert



Fossil hunting along the Calvert Cliffs

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On June 15, George Phillips, paleontology curator at the Mississippi Museum of Natural Science and a FOSSIL outreach partner, travelled to Little Rock, AR. There, he presented a paleontology program for the Mohawk District Cub Scout Day Camp. The theme of the day camp was “Jurassic Journey,” and George did a great job engaging over 100 young scouts (see article later in this issue).

In June (15-17th), the FOSSIL project partnered with iDigBio (www.idigbio.org), the national effort to digitize natural history museums (including 100 million fossils), to bring together 50 professionals, students, K-12 teachers, and members of eight fossil clubs to Gainesville for three days. At this 3D Digitization of Fossils Workshop, held on the UF campus, we learned about the recent advances in the 3D scanning and printing of fossils, particularly as these methods relate to research and education. You can learn more about the workshop [here](#).



3D Workshop Participants

Over the past year we have been working with Atmosphere Apps to develop the next version of the myFOSSIL web portal. This has involved user testing of the web portal while in development. We thank the members of fossil societies and clubs who have helped us in this process and for their great suggestions and input to build the community resource. We will be launching the new and improved myFOSSIL.org soon, so stay tuned for further updates.

FEATURED PALEONTOLOGIST: JULIE MEACHEN

by Eleanor Gardner

This issue we focus on Julie Meachen. Julie got interested in paleontology as an undergraduate at the University of Florida! She is now Assistant Professor of Anatomy at Des Moines University.

Your current research focuses on Pleistocene megafauna. Were you a huge fan of megafauna as a child? Were they your entry point into the field?

Actually, I wasn't all that interested in extinct animals as a child. I was always interested in big mammals though, so I always knew I wanted to do something with animals. I didn't realize I wanted to be a paleontologist until I was an undergraduate at Florida. They had a great paleo museum collection and I started volunteering there between my sophomore and junior year in college. That is when I realized that I wanted to be a paleontologist, and work of course, on large mammals.



Dr. Julie Meachen

I read that Des Moines University is a medical and health science university. Are you the only vertebrate paleontologist employed at the university?

Do you connect paleontology to modern medicine in the courses you teach?

I am not the only paleontologist here. Rachel Dunn (who collaborates quite a bit with Jon Bloch of FLMNH) was also hired the same year as I was. We also just recently hired Sarah Werning who will start on July 1. We also have two paleoanthropologists here too. So in that regard, I have a nice group of paleo colleagues. Generally, medical students are not terribly concerned with paleontology; however, my knowledge of comparative anatomy does help me because it gives me insights into human developmental biology and some interesting genetic issues that humans can have. I usually try to impart this type of knowledge to the medical students.



Julie rappelling

What is a typical work day like for you? Or what are some of your favorite parts of your job? Your least favorite?

One of the best things about my job is that my day is always different; there is no formula or regular schedule. Some of the things that I may do in the course of my job are teaching and preparing lectures and labs, working on my research, working with students on research projects, attending meetings, answering emails, talking to reporters, giving talks to high school kids or other outreach, or traveling for field work, museum visits or conferences. My favorite parts definitely include fieldwork, visiting museums and working with students on research projects. My very least favorites are when I have to do administrative busy work.

Given that the goal of FOSSIL is to link amateur groups with professionals, what are your thoughts about the role of amateurs in the science?

Amateurs can be a very important part of science. I especially love dealing with children and science. In my opinion amateurs are very important for two reasons: 1) They are my army of volunteers and helpers to get my research projects done. For example, this fall I brought back multiple hundred fossils from my field site and 6 high school students (with no prior fossil experience) supervised by my research assistant did all of the cleaning, gluing and ID-ing of these fossils. This important step would take so much longer if I didn't have their help; and 2) Involving the public in science shows them the importance of what we do. Citizen science is the bridge between the general public and the science community. In this day where science is constantly being attacked by politicians, having the public understand what we do and see value in it is more important than ever.

I understand that you had to learn to rappel in order to get access to Natural Trap Cave in Wyoming, where you found the "treasure trove" of megafauna mammals. Can you comment on your experience? Was it nerve-racking?

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Yes, I learned how to rappel and more importantly, ascend to get in and out of Natural Trap Cave. To tell you the truth, I was much more worried about the ascending part than the rappelling part. I am not afraid of heights, but I was worried that I couldn't make it out of the cave on my own steam. It was a little nerve-wracking. To help prepare me I went to the local rock climbing gym and practiced the single rope techniques we were going to use to ascend. But I still had never rappelled until the day of the first descent. That was actually the fun part. You don't go very fast and you get to just look around. A little nervousness is good, because it helps to make sure you are prepared. It turns out I am actually pretty good at ascending too. I wouldn't like to do it for a hobby, like cavers do, but I certainly can do it 90 feet to get out of Natural Trap Cave.



Natural Trap Cave in Wyoming

Many of our fossil clubs and societies are very committed to education and work hard to engage youth. Do you have any advice to share about effective ways to get children and teens interested in paleontology and collections?

I think the absolute best way to get children interested in what you do is to love it yourself. Be excited about what you do and make it sound like something fun. Telling kids that I rappel in 85 ft like a female Indiana Jones and then unearth giant extinct ferocious carnivores like American lions automatically makes them interested, but even slightly more mundane things can sound great if you love them. The other important part of talking to kids is to make your research accessible. Don't use technical jargon and, whatever you do, minimize the number of equations! Almost everyone is scared of math. At the same time, you have to make sure that you don't talk down to the kids, never assume that they aren't smart just because they are young.

What research question currently excites you the most?

The research questions that currently excite me the most are: "How did the extinction events of the last ice age affect modern populations?" and "How does climate affect morphology?" These are the two questions that my research program is focused on right now. I find these big picture pattern questions fascinating.

Do you have a favorite fossil discovery?

My favorites include the first paleo project I ever worked on in Florida, where we pulled the enormous sloth that is now on display at the FLMNH out of the ground at Haile, just outside of Gainesville. My ex-husband and I also found a specimen of the bear *Agriotherium schneideri* at Hagerman Fossil Beds National Monument when we worked there in 2006, and that discovery pushed back the date of extinction of that bear in North America by almost 1 million years. I was also pretty excited this summer when I found cranial pieces of the American lion at NTC. Now if only we could find more short faced bear.....



To learn more:

Read more about Julie's work in Natural Trap Cave in the [Des Moines Register](#).

Watch the scientists at work in the cave in this [youtube video](#).

Listen to an interview with Julie last summer on [NPR](#).

Read one of Julie's papers on coyotes during the end of the Pleistocene Ice Age in [PLoS ONE](#).

And learn more about Natural Trap Cave at this [National Park Service site](#).

AMATEUR SPOTLIGHT: GEORGE W. POWELL, JR.

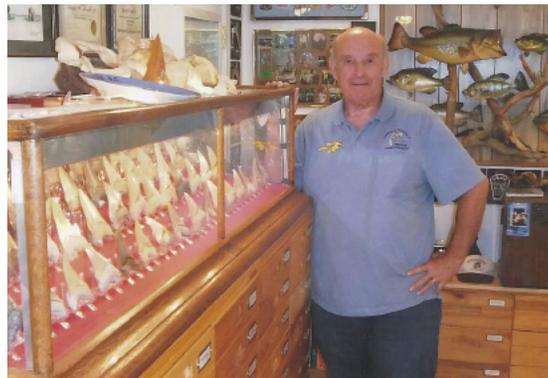
By Eleanor Gardner



George W. Powell, Jr. has so many fossils, he built a special 1500-square foot addition onto his Greenville, North Carolina, home to display them. He has over 100,00 specimens in his collection – 99% of which he personally collected at localities such as the famous PCS Phosphate Mine (Lee Creek) in Aurora, North Carolina, and throughout the Potomac River Basin in Virginia and Maryland. In addition to his private museum, George is well known for donating more than 20,000 fossils to various institutions, including the Smithsonian, the North Carolina Museum of Natural Sciences, and the Aurora Fossil Museum.

Growing up in the mountains of western Virginia, George was fascinated by the region’s geology and found himself frequently digging up odd-looking rocks. His true passion for fossil collecting began at the age of 12 during a deer hunting trip: after sitting down at a rock outcrop to eat lunch, he picked up a Pennsylvanian-aged mollusk shell, and that is the moment he switched from deer hunting to fossil hunting. He has been collecting fossils for more than 56 years now. Throughout this time, George has amassed an impressive working knowledge of the field of paleontology, in part thanks to the strong relationships he developed with professionals such as Bretton Kent at the University of Maryland and Frank Whitmore, Robert Purdy, David Bohaska, and Storrs Olson at the Smithsonian Institution.

One of George’s favorite fossil finds is a nearly complete set of Parotodus teeth (114 associated teeth) that he collected from the Lee Creek Mine in Aurora, North Carolina. It was such a rare and spectacular find that George was offered \$100,000 dollars for it, but rather than sell, he chose to donate it in 1996 to the Smithsonian for study. David Pawson, then Associate Director for Science at the Smithsonian Institution’s National Museum of Natural History, called the donation “the fossil shark equivalent of the Mona Lisa.” In 1999, George and Bretton Kent co-authored a paper in the journal *The Mosasaur*, which is published by the Delaware Valley Paleontological Society. The article is entitled “Reconstructed dentition of the rare lamnoid shark *Parotodus benedeni* from the Yorktown Formation (Early Pliocene) at Lee Creek Mine, North Carolina” and appears in the journal’s sixth volume. Some of George’s other important fossil finds were published in a massive Smithsonian Institution volume edited by Clayton Ray and Dave Bohaska; it is called “Geology and Paleontology of the Lee Creek Mine, North Carolina, III.”



In line with his passion for fossil collecting is George’s passion for outreach and education. He regularly travels the state of North Carolina in order to give presentations to school-aged groups, including programs at the “A Time for Science” learning center in Greenville, the Imagination Station science & history museum in Wilson, and regional elementary, middle, and high schools. He also periodically instructs continuing education classes at East Carolina University and gives invited talks at colleges and universities such as Lynchburg College and the University of

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Maryland. George loves seeing the spark in children's eyes when he tells them about an interesting fossil, and he always encourages youth to "keep looking and keep asking questions – and if you find a hobby you like, put 100% into it." He inspires children and teens with his personal story of growing up dyslexic and bullied, quitting school to join the Navy at age 16, and later finding his calling in fossils. George feels it is crucial for amateur paleontologists to provide exciting and meaningful outreach experiences for the next generation and for the amateur community to stay better connected to each other and to the professional community through endeavors such as the FOSSIL Project.

To learn more:

[The Mosasaur](#)

1998 [Washington Post](#) article about George

Geology and Paleontology of the Lee Creek Mine, North Carolina III www.sil.si.edu/smithsoniancontributions/Paleobiology/.../SCTP-0090.pdf (Note: This pdf is over 300 pages.)

OP-ED: Creating a National Amateur/Avocational Fossil Organization Association

by Linda McCall, President - North Carolina Fossil Club; Research Fellow - University of Texas at Austin

The FOSSIL Project is a wonderful and well-thought out creation, and I think it is perfect for its intended purpose: to bring professional and amateur paleontologists together to share paleo-related outreach with the broader community by communicating electronically through the myFOSSIL web portal, engaging in training and development, attending meetings and workshops, and by digitizing collections (both personal and institutional) for public use. That is its focus and is appropriate.

It is also clear that the FOSSIL Project was perfectly correct when your research indicated that we in the amateur/avocational fossil community are not well-networked. In studying that, I have come to realize that our community needs to have a voice, and that voice needs to come from us.

We are a valuable and overlooked resource in the field of paleontology, and the more we can unite and demonstrate to those in the professional community and the government just what that value is, the better off we will be.

To that end, I intend to create a National Amateur/Avocational Fossil Association, modeled in part after the American Federation of Mineralogical Societies, to be the hub for the amateur/avocational community. This will provide a forum for concentrating our efforts while keeping abreast of current events, gathering and disseminating information relevant to our world, and unifying our voice in political matters and other arenas.

I feel this new organization will live on well beyond the mandate of FOSSIL, and I want it to be a compliment to the FOSSIL Project - not a competitor. I believe that if structured correctly, the two entities could be symbiotic, partnering together for the greater good of both.

I will be in contact with each member organization of FOSSIL to solicit feedback, and I look forward to and would appreciate any guidance, advice, and insights you might have as we move forward with this process.

You can contact me at lndmccall02@yahoo.com.



Linda McCall

FEATURED ORGANIZATION: SOUTHWEST FLORIDA FOSSIL SOCIETY

by **Chuck Ferrara, President, SFFS**

This issue we highlight the Southwest Florida Fossil Society, which has developed a partnership with an out-of-state fossil club (Special Friends of the Aurora Fossil Museum in North Carolina) that might serve as inspiration for other organizations.

THE SOCIETY

The membership of the Southwest Florida Fossil Society [SFFS] is comprised of fossil enthusiasts across Florida, other U.S. states, Canada and Europe, and includes professional paleontologists, geologists and museum curators. Our purpose is to promote and foster the science of paleontology through the collection, identification and preservation of fossil remains. We provide a regional forum for education, training and experience in paleontology in a fun, family-learning atmosphere. We meet the second Saturday of every month at 118 Sullivan St., Punta Gorda, Florida. At each meeting, a professional or highly qualified avocational paleontologist gives a lecture, slide show, or update on current research. Other activities include monthly field trips, raffles, and participation in regional education and outreach events such as National Fossil Day, among others.



Chuck Ferrara

OUR HISTORY

In 1983, Mitchell Hope and Bill and Lelia Brayfield formed the Southwest Florida Chapter of the Paleontological Society. Within that first year, the name was changed to the Southwest Florida Fossil Club. The Brayfields lived in El Jobean in Charlotte County, Florida, where (with assistance from the Royal Ontario Museum) they built a facility called the “Brayfield Research Lab” on the back of their property. The lab was wall-to-wall with fossils that were collected locally. At that time it was easy—just some conversation, a handshake, and you were in. All the pits were mom and pop family run; the times have certainly changed.

The Brayfields are probably best known for discovering the first fossil occurrence of *Heliaster microbrachius* (a species of sun star) outside the eastern Pacific. In 1986, Lelia found a large slab of well-preserved *H. microbrachius* in late Pliocene (2.5 – 2.2 Ma) strata in a local El Jobean quarry pit. The Brayfields donated a substantial portion of the specimens to the Florida Museum of Natural History, where Douglas Jones and Roger Portell studied them and, in 1988, published a paper describing their significance for understanding the timing of the formation of the Isthmus of Panama. Mitchell Hope also made some noteworthy finds on the Peace River in the late 1960s, especially specimens of the Columbian mammoth, *Mammuthus columbi*, found along the river near Wauchula, Florida. With the help of his special fossil-collecting Boy Scout troop, Mitchell excavated the mammoth specimens; they now reside in the Smithsonian Institution.



SFFS Members

Since those early days of meeting in the Brayfields’ fossil lab, the club’s membership and mission have grown substantially, with a few moves of meeting location to accommodate the growth needs. Two years ago we transitioned to a 501(c)(3) nonprofit organization to become a legitimate paleontological society and also to be able to accept monetary donations. With the need to grow outside of the “fossil club” box and diversify, as well as build partnerships and stay fresh for the future, there also came a name change to the Southwest Florida Fossil Society.

In 1997, we initiated a scholarship fund with two scholarships awarded to graduate students in paleontology at the University of Florida/Florida Museum of Natural History. We also started a grant funded by a portion of society dues; the grant committee starts meeting this summer to decide on the awards. The society supports the science

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of paleontology and related interests, and continues to expand its outreach and educational programs to provide inspiration for the public, and to build mutually beneficial partnerships with other fossil organizations. With the FOSSIL project now giving us [the FOSSIL community] the tools to better our outreach and educational materials, the future is bright. Our membership is currently 220 and growing. We are utilizing all opportunities to make our organization a success.

OUR RELATIONSHIP WITH SPECIAL FRIENDS OF THE AURORA FOSSIL MUSEUM

This year, we celebrate 10 years of cooperation between the Special Friends of the Aurora Fossil Museum club and SFFS—working, sharing, and learning together in the spirit of the FOSSIL project. The last ten years have been a wonderful “classroom” to watch the museum grow to what it has become today.



Julia Tejada, SFFS scholarship recipient

I first came to Aurora in 2004 to go into the now-closed PCS Phosphate (Lee Creek) mine. The mine is what brought everyone to this eastern North Carolina town of 525 people on the shore of the Pamlico River. Just a short 20-minute car ferry ride across the river is historic Bath, N.C., with colonial houses to tour (Blackbeard the pirate hid out here also). After that first trip, I was hooked because of the quaintness of the area, the people, the local history, and the parade which is so “Mayberry USA” (for those familiar with the Andy Griffith Show).



Hall at the Aurora fossil event

The fossil exhibits at the Aurora Museum were built by volunteers past and present. Amateur and avocational paleontologists with a can-do attitude come up for festival week and volunteer their time in prepping the whale exhibit, setting up fossil displays, hanging banners, cleaning, mopping floors, and setting up tables and chairs. No one is above doing what is needed to make it all come together. This year, SFFS brought a display to promote our organization and show fossils.

The festival is one of the busiest times for the museum and friends. It is one of the biggest outreach/educational events for the surrounding community with all of the fossil

displays, food, fun, games, vendors, guest speakers, a parade that takes you back to days gone by, and the piles of matrix brought in for kids to look for small shark teeth and other fossils. These are the ingredients that have built the character, personality, and charm of the Aurora Museum and that make it a unique and different experience.

The Aurora Fossil Museum took a big step for the future with the addition of new director Cynthia Crane. She brings a lot of expertise and I have no doubt that she will make careful and measured changes while striving to maintain the uniqueness, character, and charm of the museum that has attracted so many visitors and volunteers, like members of the SFFS, to come back year after year.

“Remember, always keep your head held high, but look down too once in a while – you don’t know what you might be stepping on.”

To learn more, visit the [SFFS website](#).



RESEARCH: PALEOBIOLOGY OF THE KILLER CONE SNAILS

by **Jonathan R. Hendricks**

Dr. Hendricks received his B.S. degree from the University of Wisconsin-Madison and his Ph.D. from Cornell University. He is currently an associate professor of geology at San José State University, San José, California.

Although telling people that I study fossils for a living is often a good conversation starter, telling them that my research is focused mostly on snail shells tends to have the opposite effect. Snails can be a tough sell: they are slow, slimy, and many people are perhaps most familiar with them as garden pests. They are, however, a spectacular evolutionary success story. They have mastered marine, freshwater, and terrestrial habitats and along the way have achieved a level of biodiversity trumped only by the insects. Owing to their strong, mineralized shells, snails also have a rich and well-preserved fossil record that extends back hundreds of millions of years. Snails (Phylum Mollusca, Class Gastropoda) are thus a very important group for understanding macroevolutionary processes over geological timescales, including the responses of species to ancient environmental changes.



Dr. Jonathan Hendricks

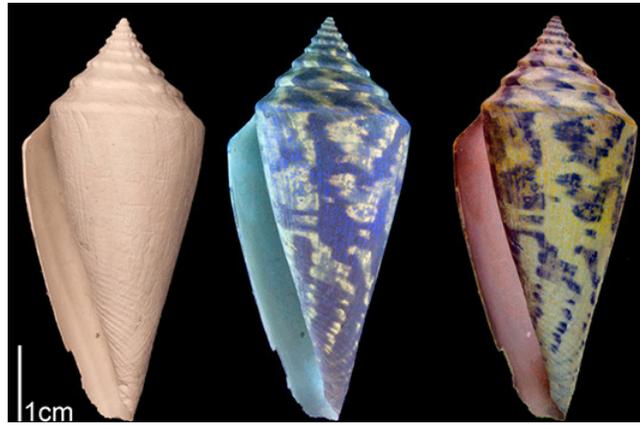
While many gastropods may not be especially charismatic, that cannot be said of the cone snails (Family Conidae, which includes four genera: *Conus*, *Conasprella*, *Californiconus*, and *Profundiconus*). Collectors have coveted the beautiful and intricately patterned shells of cone snails for centuries. But that is not what has made them most famous: some cone snails have caused human fatalities! Cone snails—which are found in tropical and sub-tropical marine habitats around the world—are all venomous predators and use a harpoon-like structure to capture and envenomate their prey before it is pulled inside the shell and consumed. These animals are highly specialized predators and usually focus on one type of prey. Most cone snails eat worms, members of one subgroup eat other snails, and two subgroups have even evolved the ability to eat fish. It is the latter species that are especially dangerous to humans, as their venoms have evolved to target vertebrates. Substantial biomedical research is currently being conducted on cone snail venoms for their potential use in developing new drugs. A final claim-to-fame for cone snails is that, with over 700 living species, they are one of the most diverse groups of gastropods.

My paleobiological research is focused on the extensive Eocene to Pleistocene fossil record of cone snails in tropical America, including the Caribbean, Gulf of Mexico, and southeastern United States. In particular, I seek to better understand the origins of the modern cone snail fauna in this region, which—according to a recent taxonomic revision by Dr. Alan Kohn—includes just over 50 species, some of which have fossil records extending back to the Neogene. Paleontologists have extensively researched the Neogene fossil record of tropical America, as it coincides spatially and temporally with the closure of the Central American Seaway (CAS) due to the rise of the Isthmus of Panama. The region thus serves as a “natural laboratory” for understanding how ancient species responded to this significant environmental event, which substantially affected ocean conditions on either side of the Isthmus.

Understanding how the modern fauna developed—including in response to ancient environmental changes like the closure of the CAS—depends upon recognizing ancient species, along with documenting both their durations through time and their biogeographical distributions. While many species of fossil cone snails have been described from tropical America, many of these are synonymous (i.e., multiple names have been assigned to the same species). Recognizing fossil species is often a challenge for taxonomists and this is especially true in groups like cone snails that are diverse, but have relatively conservative shell morphologies. An added problem is that fossil cone snails are often naturally bleached white from the fossilization process, removing evidence of the complex and diverse coloration

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patterns that are useful for recognizing modern species. In the 1960s, however, Axel Olsson discovered that exposing fossil shells to ultraviolet (UV) light sometimes causes organic matter associated with formerly pigmented regions of the shell to fluoresce, revealing the original coloration patterns of the shells (if not the colors of the pigments themselves). I have found this technique to be very useful for recognizing and differentiating ancient species, as well as for determining their relationships to each other and modern species. A recent article that I published in PLOS ONE on fossil cone shells from the Neogene of the Dominican Republic gives further details on the UV technique, as does



Conus adversarius after exposure to UV light procedure

a short article I wrote in 2007 for the Florida Paleontological Society. If you decide to try this approach yourself, take proper safety precautions, as UV rays are harmful to both the skin and eyes.

Museum collections—including both fossil and modern specimens—have been and always will be critical to my research program. I have greatly benefited from the efforts of the professional and avocational collectors who originally collected the material that I have studied, as well as the museum staff who curated it and made it available for my research. While direct access to museum collections is typically restricted to staff and visiting scientists, I am interested in ways to make the information contained in such collections more widely available to the general public. Along these lines, I am currently involved with a National Science Foundation supported project—with fellow Principal Investigators Bruce Lieberman (University of Kansas) and Alycia Stigall (Ohio University)—to develop a Digital Atlas of Ancient Life (www.digitalatlasofancientlife.org). This new, freely accessible online resource seeks to assist individuals with the identification of fossil specimens, as well as to provide information about the temporal and spatial distributions of individual species (including maps showing the ranges of ancient species). We are currently focusing on developing Digital Atlases for three regions and time intervals: the Ordovician of the Cincinnati, Ohio region (www.ordovicianatlas.org); the Pennsylvanian of the midcontinent United States (www.pennsylvanianatlas.org); and the Neogene of the southeastern United States (www.neogeneatlas.org). If you are interested in fossils from one or more of these regions, I encourage you to have a look at these websites. You can also follow project updates on Twitter @PaleoDigAtlas.

To learn more:

Read a short article about the UV procedure in the [Washington Post](#).

Dr. Hendricks' [website](#)

Further reading:

Hendricks' 2015 PLOS ONE paper on fossil cone shells from the Dominican Republic, highlighting coloration patterns revealed on these fossils using ultraviolet light: <http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0120924>

Hendricks' 2007 article in the Florida Paleontological Society Newsletter (vol. 24, no. 2) detailing the use of ultraviolet light for revealing ancient shell coloration patterns: <http://floridapaleosociety.com/wp-content/uploads/2010/11/fpsfall07.pdf>

EDUCATION: GEO2GO DISCOVERY TRUNKS

by Sarah Horgen, University of Iowa Museum of Natural History

The University of Iowa Museum of Natural History (UIMNH) started their “Discovery Trunk” series in 2010 as a way to complement their existing educational resources and provide a new distance outreach service to educators across the state. UIMNH educators were regularly pulling together materials from their teaching collection and library for their own programs or at the request of an educator for assistance with a specific topic being taught. Over time, our staff realized there were several topics that were being repeatedly requested and utilized—both internally and externally—and perhaps it was time to create formal, topical sets of materials for regular use. We decided to begin with topics and time periods in geology and paleontology because of our strong relationship with the UI Department of Earth and Environmental Sciences (formerly Geoscience) and Paleontology Repository as well as demonstrated interest from educators.

We designed the trunks to be used by educators to complement a visit by their class to the Museum of Natural History in Iowa City, as well as for groups who have never visited the museum if distance or cost makes a museum visit impossible. As school budgets shrink around the country, field trip funding is often one of the first cuts. Resources like our Discovery Trunks allow the Museum to help provide a museum experience—handling real specimens and other hands-on items—without making it to the museum. The trunks are also popular with home-schooling programs, libraries, and nature centers. UIMNH educators also utilize the trunks themselves when doing outreach programs in the museum, around town, or around the state. The first series of Discovery Trunks were named “Geo2Go” to play off the portability of the resources, which are housed and transported in large, wheeled tool boxes available from home improvement stores or online. These boxes are relatively easy to transport by hand even when filled with heavy books and fossils, as well as sturdy enough to ship to off-site locations.

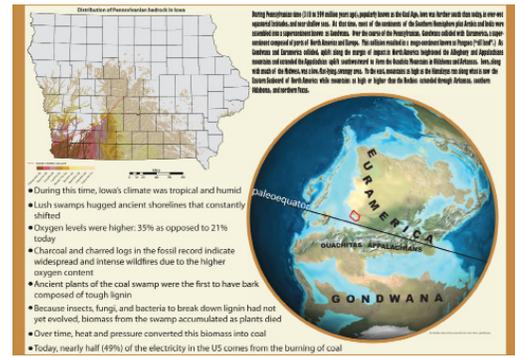


The first Geo2Go trunk focused on the Pennsylvanian Period, approximately 300 million years ago when coal swamps covered Iowa, and was funded by a grant from the Iowa Academy of Science. The trunks include replicas and real specimens, books, DVDs, and activities and lesson plans. Real fossils for the trunk were selected from non-provenanced teaching collections at the Museum or the UI’s Paleontology Repository or were donated by collectors. Replicas or models were ordered from online stores or purchased at rock and fossil shows from reputable vendors. The lesson plans are linked to standards used in the Iowa Core Curriculum and the Next Generation Science Standards to



continued from page 12

help teachers incorporate the trunks into their classroom teaching. Various masters' students with backgrounds in geoscience assisted with the development of activities and lesson plans with input from their professors. In addition to development of two trunks, funding was also requested for development of an educational poster on the Pennsylvanian Period that has since served as a model for other posters associated with Geo2Go trunks, as well as for purchasing a large quantity of posters of the then newly redesigned Bedrock Geological Map of Iowa. To advertise the new "Geo2Go: Pennsylvanian Period" trunk, copies of the Iowa Bedrock Geological Map and the Pennsylvanian Period posters were mailed to K-12 science educators across the Iowa to announce the availability of this new resource and plans for future titles.



A Geo2Go trunk and poster on the Devonian Period soon followed, which is a time period that many in eastern Iowa are familiar with due to the nearby Devonian Fossil Gorge (DFG) at Coralville Lake just north of Iowa City. UIMNH staff developed this trunk in close coordination with US Army Corps of Engineers staff, who oversee the DFG and often request outreach assistance for visitors and tours of the site. A grant from The Paleontological Society funded development of two trunks—one for UIMNH and one to be utilized at the DFG Visitor Center—as well as a poster on the Devonian Period modeled after the initial Pennsylvanian poster. A small internal University of Iowa grant was received to fund student research time developing content for the trunk and material for the DFG website.

One goal for the Geo2Go series is to have a trunk developed for each major geologic period as it is relevant to Iowa. Museum staff are currently finalizing two related Pleistocene or Ice Age trunks to add to the collection. One centers on the Tarkio Valley Sloth Project, an excavated giant ground sloth site which the Museum has been coordinating for several years. This trunk contains multiple rapid prototypes of bones from the Tarkio Valley site and utilizes those replicas to learn about sloth anatomy as well as the importance of this burgeoning technology in science and museums. The other trunk will focus on mammoths and mastodons and will include recent discoveries made at the Mahaska County Mammoth Site in southeast Iowa, another long term research project and excavation that the museum is involved in. Two dinosaur themed trunks are also in the works—one focused on the Jurassic and one on the Cretaceous—because of multiple requests from educators since we started this series.

The UIMNH Discovery Trunks, including the Geo2Go series, are currently available to educators and groups free of charge due to an internal grant from the University of Iowa, and museum staff hope to keep the program free with future funding sources. We are currently working with researchers in various departments to develop more trunks on themes such as water, astronomy, and energy. We are also working with researchers who are submitting grants to the National Science Foundation to include funds for the development of trunks on their research as part of the NSF's Broader Impacts requirement for funded projects. UIMNH has also been able to incorporate University of Iowa students in the development of the trunks, from Science Education students helping to write curriculum for the topics or students in each field of study helping to select objects and resources.

For more information on our Discovery Trunks or our other educational resources, please feel free to contact Sarah Horgen (UIMNH Education and Outreach Coordinator) at (319) 335-0606 or sarah-horgen@uiowa.edu.

To learn more:

University of Iowa Museum of Natural History [Education Resources](#)

[Devonian Fossil Gorge](#)

by **Gabriella Nicholas**

For the second article in our series on paleo art, we focus on Erin Fitzgerald, a Chicago-based paleo artist. Erin's work has been featured at the National Museum of Nature and Science in Tokyo, and she has piece in a National Geographic Society exhibit that opened in Milan, Italy on June 6.

Growing up, Erin Fitzgerald was drawn to two career paths: artist and paleontologist. But, she hated her modern art classes and her biology courses. In art school, she veered away from modern art and gravitated towards more realistic pieces, especially those including bones.

Erin began volunteering as a preparator at The Field Museum during her first year of college. Toward the end of her college career, Erin began working under Paul Sereno at the University of Chicago. When she started working for Sereno, she realized she could combine her work as a fossil preparator and paleo artist.



Erin Fitzgerald

As a fossil preparator, Fitzgerald receives specimens from the field, removes them from a protective plaster shell and prepares the bones for researchers. A lot of the specifics of the bones are how researchers identify the genus or family of a dinosaur. Most of the time, specimens are not complete and paleo artists help to fill in gaps.

If the family or genus of the dinosaur is known, it is possible to use parts from different individuals to complete the reconstruction. In addition, previous research can provide insight on other bones for paleo artists to use as comparisons. “You can find out what dinosaurs are closely related to this particular animal, and you can read those scientific papers,” Fitzgerald said. “You use the best scenario from similar animals to fill in the gaps.”

Even though Erin didn't enjoy biology in college, she became familiar enough with the subject to be a paleo artist. “You kind of have to pick and pull what the animal is doing, based on what modern day animals are doing, and make a relationship,” Fitzgerald said. The first step is basic identification, then relation to modern species, and finally the selection of an individual animal to use as reference. “You use more science to reconstruct the skeletal makeup,” Fitzgerald said. “When you get to the art part, like more of the flesh reconstruction, you have a little more artistic license.”

In addition to an artistic background, Fitzgerald says that, in order to become a paleo artist, you need to be able to talk to researchers, enjoy reading papers, understand anatomy, and have a sense of biology. “Your conversation with the scientists lets them do their job and you do your job,” Fitzgerald said.

Artists are able to use X-ray, CT-scanning, and surface-scanning to build digital skeletons; the digital configurations are printed from a 3D printer and mounted as physical models. “One of our suggestions to artists is to hop into the digital world,” Fitzgerald said. “You're certainly going to have more doors open if you have that capability.”

For Fitzgerald, paleo art is a direct bridge of science and art. She compares it to astronomy, in the sense that it's a field with missing parts. Astronomical artists are unable to physically see the planets but they use information given by scientists to build the most accurate recreations. “In most cases, a paleo artist enhances the research of the paleontologist,” Fitzgerald said. “As artists, we have a perspective advantage.”

To learn more:

View Erin's portfolio at <http://erinfitzgeraldpaleoart.daportfolio.com/gallery/742931>

Read more about Erin and the entire Sereno team at <http://paulsereno.uchicago.edu/>

A “JURASSIC” JOURNEY FOR CUB SCOUTS IN ARKANSAS

by George Phillips, [Mississippi Museum of Natural Science](#)

“Jurassic Journey” – so reads the aptly themed title of the 2015 Quapaw Area Boy Scout Council’s Mohawk District Cub Scout Day Camp in Little Rock, Arkansas. With the summer release of the latest installment of the Jurassic Park movie franchise, Jurassic World, the steady flow of news items about dinosaur research (including the discoveries of new species, dinosaur blood/bone cells, additional feathered dinosaurs, etc.), and the undying fascination people have with the prehistoric world, it seemed natural for the Mohawk District day camp organizers to adopt a dinosaur theme for a fun-filled, week-long schedule that included a host of activities related to the natural sciences and exploration of the natural world.

Among the engaging activities designed by the Mohawk District summer camp team, the “Journey” included a series of presentations by George Phillips, a paleontologist from the Mississippi Museum of Natural Science, who introduced the eager Cub Scouts to facts about dinosaurs that are little known in popular culture. George’s program highlighted some interesting misconceptions the general public has about dinosaurs and focused on the question, “What makes a dinosaur a dinosaur?” An introductory series of slides of a variety of living, extinct, and even mythical creatures each bore the question, “Is this a dinosaur?” – followed by a round of “Why or why not?” discussions.



George Phillips and scouts at the 2015 Quapaw Area Boy Scout Council’s Mohawk District Cub Scout Day Camp in Little Rock, Arkansas

Children and teens are bombarded by lots of information these days, but converting that seemingly endless data to actual knowledge about specific subjects isn’t always easy. There is an incredible amount of media attention directed to certain popular groups of dinosaurs (e.g., Tyrannosaurus and Stegosaurus), but there is a distinct lack of devotion to basic knowledge of why dinosaurs are different from all other vertebrate animals. For each session, early in the program, a narrow majority of each group of Cub Scouts invariably shouted “YES!” (...it is a dinosaur) when shown a paleoartist’s rendition of a woolly mammoth. This error is because most young people – and some adults – often equate the term “dinosaur” with anything prehistoric or extinct. Dinosaurs are distinguished from all other vertebrates by their distinctive anatomy, just one of the principal differences discussed in the program having to do with the shape and structural organization of their girdles and limbs.

Naturally evolving from this dinosaur-definition discussion was the relationship between carnivorous theropods and modern birds. With the discovery in recent decades of over thirty different types of theropods bearing feathers, coupled with the great similarity in skeletal anatomy between theropods and developing birds, it is now a foregone conclusion that birds are descended from a group of early theropod dinosaurs that exhibit very avian-like features. By the last several slides, the vast majority of budding young paleontologists got it right when shown a picture of a flamingo, a duck, and baby chicks—YES! Those are dinosaurs, too!

FOSSILS FROM LEE CREEK MINE AND CALVERT CLIFFS

Ten teeth by Dr. Ronny Leder

Ten teeth ... just ten teeth ... this is all after a long day of field work in the marine sediments of the Leipzig embayment south of my home town Leipzig, in the heart of Germany. Now a recreational area composed as a landscape of several post mining lakes, the brown coal field of Leipzig was once one of the biggest in the world and a source of information for generations of geologists and paleontologists all over the world. It is as hard to find good fossils there like it ever was. Back in the 20th century scientists were able to investigate huge excavations and fresh cuts nearly every day, but now just a few points at the embankment of the post mining lakes are left to collect fossils. However, it is not collecting at all, it is moving tons of sediments, screen washing them over a cascade of sieves with different mesh size, managing the water flow with bilge pumps and searching for fossil under the scope. 1000 blanks and one winner. Ten teeth, just ten shark teeth after washing two tons of sediment.



Now this, this fossil supersaturated sediment from localities I had heard of from stories by my mentor at the University of Leipzig, Prof. Müller. “Lee Creek Mine” – those three words always sounded like fossil shark teeth heaven to me and now I’m here, standing in the middle of a huge pile of fossil marine shells, bones and teeth, excited like a kid digging for his first fossils. Lee Creek Mine – that means more fossil content than waste, hard to decide what to focus on, ten teeth - sure but please after ten seconds. Hah, not a problem at all. I was just thinking: it’s not fair, it’s that easy, it’s that overwhelming. Even though the mine is no longer accessible since 2008, the couple of truckloads of sediment the mining company was donating for the Aurora Fossil Festival was more than enough to make me feel happy, playing with the stuff I love so much.

Ronny Leder scouring the beach face at Plum Point in search of fossils. Photo credit: Victor Perez

Then as if this wasn’t enough the famous Calvert Cliffs were awaiting for me just one day later at the Calvert Marine Museum Conference. Are you serious? This is how paleontological work can also look? Walking along the beach, the water lapping around your feet, stoop here and there and grabbing just for the next amazing fossil. Whale bones, tons of scallops and shark teeth all in extraordinary preservation. Those guys working at the Calvert Marine Museum are so blessed with that outstanding fossil site and yes, they know it – I could see it in their smiling faces. What an experience and yes Prof. Müller’s stories were truth – this is just great! I was collecting sharks’ teeth, for the first time in my life at secondly intervals, here a Physo there a Leucas, next is a Snaggletooth ... and then Victor’s nice finding ... can’t believe it. Need to make a decision: ten teeth after two tons or after ten seconds?

I go along with the ten seconds and will definitely come back for more, more than just ten ...



A quick sorting of the fossils found at Belgrade Mine in New Bern, NC. Photo credit: Victor Perez



Some of the more interesting finds from the Belgrade Mine: an astragalus (possibly from a peccary), a crocodyliform tooth, a pathologic sand tiger shark tooth, a large sand tiger shark tooth, another large sand tiger shark tooth, and a mako shark tooth (from left to right). Photo credit: Victor Perez

On the Road to Fossil Gold by Victor Perez

As Ronny expressed above, this trip was very exciting and full of great fossil finds, starting off at the Belgrade Mine in New Bern, North Carolina. We were very fortunate to have the opportunity to scour the spoil piles in the mine. These spoil piles were a hodge-podge of stratigraphic horizons, ranging from Oligocene through the Pleistocene. Fossil finds included a rich and diverse array of sharks and stingrays, occasional sawfish rostral elements and crocodile teeth, and the rare occurrences of terrestrial mammal remains. The fun continued as we travelled on to Aurora, North Carolina for the Aurora Fossil Festival. Ronny and I went straight to the truckloads of matrix taken out of the famed Lee Creek Mine. Along with most other paleontology enthusiasts, we had been mystified by the shark-tooth rich fantasy land known as Lee Creek. Before the end of the festival, Ronny and I decided to bring back a little bit of this historic matrix in order to screen the material for the rich microfossil fauna. We're eager to explore what more exciting finds this sediment may hold.

On Sunday May 24th, our journey brought us further north to Solomons, Maryland. Ronny Leder, Lisa Lundgren, John Nance, and I promptly headed to Seahorse Beach on the southern end of the Calvert Cliffs. This locality is best known for its dense shell beds, occasional starfish, and fossil pine cones. John Nance quickly found a Bull Shark tooth, a cetacean vertebra, and later found a fossil pine cone as well. On Monday, we took our first conference field trip out to Camp Conoy, a locality along the Calvert Cliffs situated between the Nuclear Power Plant and Calvert Cliffs State Park. 38 people went out on this field trip and everyone found numerous fossils, including 5 Megalodon teeth. The smallest and largest of the five are imaged below. Later that night, many of us gathered together at the Calvert Marine Museum to show off our finds, which led to some very interesting discussions. On Tuesday May 26th, we split into two groups with half going to Parker's Creek and half going to Plum Point, two more popular fossil collecting sites along the Calvert Cliffs. Unfortunately, the winds were pushing the water towards the cliff, which left little beach exposed to collect and strong waves crashing on the shore. Even so, interesting fossils including a large crocodile tooth and a stingray scute, among other things, were found.

Megalodon teeth from the Calvert Cliffs



In both North Carolina and Maryland, we were all brought together by our shared interest in paleontology. It is always uplifting to meet so many like-minded people that find joy in exploration. Numerous people brought out fossils from various other past destinations and shared their exciting stories of discovery. I met so many people that I will undoubtedly stay in contact with and hopefully collaborate with in the future. This was an amazing experience that won't easily be topped.



John Nance, Ronny Leder, and Victor Perez prospecting Seahorse Beach on the southern end of the Calvert Cliffs. Photo credit: Lisa Lundgren

INTRODUCING ELEANOR GARDNER, PROJECT COORDINATOR

by Eleanor Gardner

I am absolutely thrilled to be joining the FOSSIL Project team, serving as coordinator for this exciting endeavor. I arrived at the Florida Museum of Natural History at the beginning of May and am still learning the ropes of my new position. I'm truly looking forward to working with the many different fossil clubs around the United States in the coming months and advancing the goals of the FOSSIL Project.

I come to Gainesville by way of rural West Tennessee, where I was a geology instructor at the University of Tennessee at Martin. During my time at UT-Martin, I taught introductory and environmental geology laboratory courses as well as summer lecture courses. (I mixed quite a bit of introductory paleontology into my summer lecture courses, since I am a vertebrate paleontologist at heart.) Each semester I organized field trips for the 200+ introductory physical geology students, and I co-

led travel study courses that took the geology majors to localities around the northwestern hemisphere. Additionally, while at UT-Martin, I pursued research investigating avian and mammalian bone taphonomy (taphonomy being the study of what happens to the remains of organisms before, during, and after fossilization). Last but certainly not least, at UT-Martin I was able to expand upon my public outreach activities; along with my previous colleague, Dr. Michael Gibson, who is an invertebrate paleontologist, I was awarded an Outreach and Education grant from the Paleontological Society for 2013-2014 to design and carry out a field-based short course on taphonomy for middle and high school teachers in the region.

My educational background includes degrees in both biology and geology. I hold a Bachelor's degree in biology from Agnes Scott College in Decatur, GA, where I focused upon evolutionary and developmental biology. My Master's degree is in geology from the University of Georgia in Athens, GA. There, I worked under supervision of Dr. Sally Walker on a modern (experimental) taphonomy project examining the roles of age and sex on bird bone weathering and the implications for preservation bias in the avian fossil record. I've had a variety of paleontological field experiences, ranging from excavating dinosaurs in Wyoming to documenting bird fossils in the Bahamas to collecting microfossils on an NSF cruise in the Atlantic Ocean to leading field excursions at the Coon Creek Formation type section (a Late Cretaceous Lagerstätte).

I am eager to hear from members of the professional and amateur paleontological communities as to how I can best serve them in my role of FOSSIL Project coordinator. Please feel free to contact me at fossil@flmnh.ufl.edu or call (352)-273-1936.

For further reading:

Gardner, E.E., & Walker, S.E. (2014). Preservation bias in the avian fossil record: a review and update. 10th North American Paleontological Convention, The Paleontological Society Special Publications, v. 13, p. 148. https://www.flmnh.ufl.edu/files/6813/9085/6747/NAPC_2014_Abstract_Book.pdf

Gardner, E.E., & Gibson, M.A. (2013). Subaerial bone weathering and degradation: a taphonomic field study about fossil preservation potential and the nature of scientific inquiry. Geological Society of America Abstracts with Programs, v. 45, no. 7, p. 794-795. <https://gsa.confex.com/gsa/2013AM/webprogram/Paper226083.html>

Gardner, E.E., & Walker, S.E. (2012). Modern avian bone taphonomy at the microscopic level: histomorphological and compositional analysis. Geological Society of America Abstracts with Programs, v. 44, no. 5, p. 66-67. https://gsa.confex.com/gsa/2012NC/finalprogram/abstract_202539.htm

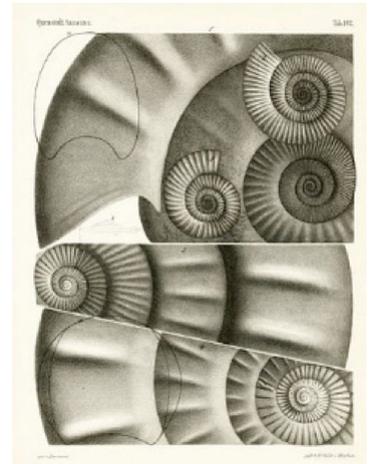


Eleanor Gardner

THE FOSSILS AND PALEONTOLOGY OF SOUTHERN GERMANY

By Bruce MacFadden

In June, I traveled for a week to southern Germany, which is a region famous for fossils and a long and rich tradition of paleontology. I was invited to give lectures at the University of Tuebingen on fossil horses and our Panama project. The university is located in a beautiful college town of the same name west of Stuttgart. The university was founded in 1477, 15 years before Columbus discovered America. In the 19th century, this university was one of the first to have an academic program and to develop a museum for paleontology. In fact, the seminal concept about evolutionary sequences of fossils in sediments, or the study of biostratigraphy, was developed by Professor Opper here in Tuebingen. Likewise, during this same era, Professor von Quenstedt of the same department published classic studies of the ammonites from the region (see drawing). The geology department and paleontology museum where I was hosted have spectacular fossils. For example, there are many complete ichthyosaur skeletons on display (see photo) in the paleontology museum at Tuebingen. Some individuals have unborn embryos preserved inside the skeleton.



The surrounding region is also well known for classic Mesozoic outcrops and spectacular fossils from the Age of Dinosaurs. Some of the best examples of these come from the town of Holzmaden, where I also visited during my trip, thanks to an outing with my host Professor Dr. Herve Bocherens and his graduate student Martin Cotte. We visited two private museums that celebrate the 180-million-year-old Holzmaden fossils. We first visited the Fischer Museum, where in addition to exhibits, visitors of all ages are allowed to dig fossils right behind the museum. They can keep what they find and, judging from the enthusiasm of the kids, this school group was having a great time.

Next we went across the street to the Hauff Museum. It has beautiful and educational displays explaining the geological succession of fossils in the region, a sequence of dioramas depicting the sequence of fossilization, and many exquisitely preserved specimens including complete skeletons of ichthyosaurs, plesiosaurs, sharks, crocodiles, ammonites, and crinoids, to mention just a few.



Professor Bocherens and author at the Haupt Museum, with a large ichthyosaur in the background.



Wall of crinoid fossils growing on a log (horizontal, in center) with University of Tuebingen paleontology graduate student Martin Cotte.

Because of their exceptional preservation, the fossils from Holzmaden are world-famous. A fossil locality with exceptional preservation, including complete skeletons of many different species, is termed a Lagerstätte by paleontologists -- which roughly translates to "mother lode." Holzmaden is definitely elevated to this status and it was an honor to be able to see it and how the science of paleontology is celebrated at these museums and by the people of southern Germany. In closing, I also would like to take this opportunity to thank my host Professor Bocherens for the warmwelcome that I received during my stay in Tuebingen.

UPCOMING EVENTS AND OPPORTUNITIES

August 11 to 15: Nebraska Badlands Fossil Field Trip

The FOSSIL project is co-hosting (with the Panama and PaleoTeach projects) a Badlands K-12 Fossil Field Trip August 11 – 15 in western Nebraska. We will be collecting fossils for the FLMNH and K-12 education, learning about the local geology, and developing paleo-related lesson plans. We have up to 8 spaces available for prospective participants from fossil clubs and societies. Preference will be given to new participants (i.e., members of clubs and societies who have not previously participated on a FOSSIL-sponsored project), from either the Midwest or west, and those who can demonstrate how they would translate what they learn to K-12 teaching and learning. The FOSSIL project will provide meals and barracks-style housing at Ft. Robinson State Park near Crawford, NE. Participants will need to provide their own transportation to and from Ft. Robinson. A short online application to participate in this event can be found here, or you may email fossil@flmnh.ufl.edu for more information.



Fossil hunting in the Nebraska Badlands

October 12 to 17: DPS and SVP, Dallas, TX

The Dallas Paleontological Society (DPS) and the FOSSIL Project will be co-hosting a meeting of paleontological societies and fossil societies on Monday and Tuesday, October 12 and 13. Events will include a keynote and other talks, breakout discussions, a town hall meeting about fossil legislation, social activities, and a field trip. Scott Foss, paleontologist at the Bureau of Land Management, and Vincent Santucci of the National Park Service are planning to attend this meeting and they are interested in talking about the fossil legislation and National Fossil Day. Participants of the DPS meeting are encouraged to stay on for the Society of Vertebrate Paleontology (SVP) meeting held in Dallas October 14 - 17. A special registration fee has been negotiated, and the FOSSIL project will pay for up to 20 registrations of members of fossil clubs and societies to attend the SVP meeting; names of those attending must be submitted to the SVP host committee by August 14. For more information about the DPS meeting, contact Rocky Manning at president@dallaspaleo.org; for info on the FOSSIL-sponsored SVP Registration, contact Eleanor Gardner at fossil@flmnh.ufl.edu.

November 1 to 4: GSA (Geological Society of America) Annual Meeting, Baltimore, MD

The FOSSIL project will be partnering with the Calvert Marine Museum Fossil Club to host an exhibit booth that celebrates amateur and professional paleontologists. Talks will also be presented in the technical sessions about the FOSSIL project as well as updates on research activities by UF paleontologists. The GSA Annual Meetings typically attracts between 5,000 to 10,000 geologists, paleontologists, and educators from the U.S. and around the world. This will be an excellent venue to promote the FOSSIL community and we are grateful to the CMM Fossil Club for their interest in partnering with us. For more information, contact Eleanor Gardner at fossil@flmnh.ufl.edu.

November 10 to 12, Portland, OR: NSTA (National Science Teachers Association) Area Conference

The FOSSIL Project is looking for partners to present at the 2016 NSTA area conference in Portland, OR. At NSTA conferences, educators present on and discuss science content, teaching strategy, and research. Collaborate with science educators through discussing ways in which your fossil group does outreach or develop a session on how to use paleontological content in the classroom. Proposals are due in September 2015. For more information, please email Eleanor Gardner at fossil@flmnh.ufl.edu.

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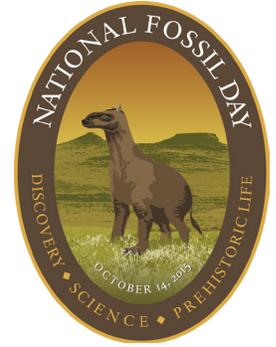
2015

September 18 - 20, Denver, CO. 48th Annual Denver Gem and Mineral Show

October 3, National Fossil Day MEGA Event at South Florida Museum in Bradenton, FL

October 14, 2015 [National Fossil Day](#) (everywhere in US) Please contact Eleanor Gardner at fossil@flmnh.ufl.edu about any events you have planned so that we can help publicize them!

October 17, Cincinnati, OH. Second Annual Fossil Festival, Dry Dredgers



2016

March 31 to April 1, GSA Southeastern Section Meeting, Columbia, SC. Working with local fossil clubs and societies, FOSSIL has submitted a proposal for a theme session focused on amateur contributions to paleontology. Additionally, Lee Cone from the Special Friends of the Aurora Fossil Museum has offered to lead a field trip for this meeting. The regional GSA meetings typically have a smaller attendance (hundreds) relative to the annual meetings (e.g., in Baltimore, see above), and offer a more informal, more relaxed atmosphere.

April 4 to 6, GSA Cordilleran Section Meeting, Ontario, CA. We are in the preliminary stages of developing a session about amateurs and professionals. This meeting includes talks, field trips, and lots of opportunities for networking.

Dry Dredgers, Cincinnati, OH we are in the early stages of planning for a mid-year meeting.

July 27 to 30 Denver, CO. NSTA (National Science Teachers Association) STEM Forum & Expo The FOSSIL Project is looking for partners to present at the 2016 NSTA STEM Forum & Expo in Denver, CO. This STEM-focused event is where informal and formal educators gather to share tools and resources that contribute to successful implementation of STEM education into schools and communities. Tools could include locations for collecting fossils, techniques for finding/digging fossils, or strategies for managing and/or digitizing a collection. Resources could include fossil clubs, museums, websites, or individual people. Proposals will be due in September 2015. For more information, please email Eleanor Gardner at fossil@flmnh.ufl.edu.

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