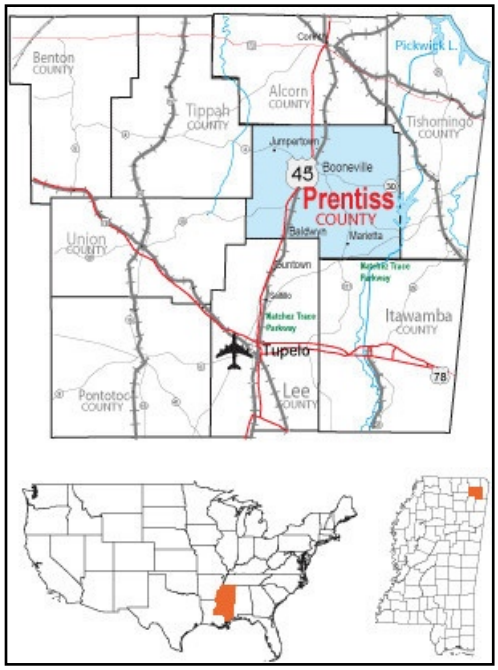
MEMPHIS ARCHAEOLOGICAL AND GEOLOGICAL SOCIETY

MAGS Rockhound News

Volume 61 ◊ Number 03 ◊ March 2015 ◊ A monthly newsletter for and by the members of MAGS

Dinosaurs in Mississippi

David Hanes, SFMS State Director for Mississippi *March Adult Program*



Editor's Note: MAGSters can get related information from our own website, memphisgeology.org. On the Articles page, look for *Upper Cretaceous fossils of Frankstown, Mississippi*. On the Educational Resources page, go to the Field Guide to Rocks, Minerals and Fossils Blog. In the blog you will find an entry with the same title, *Upper Cretaceous fossils of Frankstown, Mississippi*. More information is available in a Mississippi Department of Environmental Quality, Office of Geology publication (given as a reference at the end of this article).

The dinosaur fossil discoveries from Prentiss County in Mississippi give us a brief look at the diversity of dinosaur species that roamed the barrier island chains of ancient Mississippi. The associated reptilian and invertebrate fossils found along with the dinosaur fossils indicate that Cretaceous dinosaurs lived near the inland sea, which was filled with an incredible diversity of life.

Imagine looking out onto a barrier island chain on the edge of the great blue inland sea, 85 MYA, *Continued, P. 3*

In this issue

MAGS2015/SHOW2015 APRIL 25 AND 26

1. Volunteer, volunteer, volunteer.
2. The 2015 Show will feature Steve Arnold from the TV show *Meteorite Men*.
3. The 2015 Grand Door Prize: Carved Parrot.
4. March 7—Work Day at the shed. Show up and go to work. Volunteer.

Steve Arnold was one of the stars of the Science Channel series, *Meteorite Men*. Season one of the series won a 2010 Telly Award in the documentary category and was described by the media as "a hit series." Steve and his partner Geoff Notkin visited areas around the world where meteorites have impacted the Earth's surface.

2015-2016 MAGS BOARD

MAGS AND FEDERATION NOTES

President's Message

It's March time. So here are your Marching orders for the show:

1. **Record these dates**—April 23-27—in your mind, work schedule, vacation and school calendar. These dates are the single most important time for the club as we present our club and hobby to the Mid-South.

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MAGS General Membership Meetings and MAGS Youth Meetings are held at 7:30 P. M. on the second Friday of every month, year round. The meetings are held in the Fellowship Hall of Shady Grove Presbyterian Church, 5530 Shady Grove Road, Memphis, TN.

MAGS Website: memphisgeology.org

We aren't kidding when we say this is a newsletter for and by the members of MAGS. If an article has a by-line the author is a MAGS Member, unless explicitly stated otherwise (we welcome articles by nonmembers). If there is no byline, the article was written or compiled by the Editor (a MAGS Member). Please contribute articles or pictures (everybody likes pictures) on any subject of interest to rockhounds. If it interests you it probably interests others. The 15th of the month is the deadline for next month's issue. Send material to lybanon@earthlink.net.

March DMC Field Trip

WHERE: Vulcan Materials Co., Cartersville, GA

WHEN: Saturday, March 7, 10:00 A. M. to 2:00 P. M.

COLLECTING: Blue quartz

INFORMATION: Jay Batcha (478) 784-1965 or (478) 957-5002 (cell), rocky1s@cox.net

Links to Federation News

- AFMS: www.amfed.org/afms_news.htm
- SFMS: www.amfed.org/sfms/
- DMC: www.amfed.org/sfms/_dmc/dmc.htm

Infant Hadrosaur Jaw (T-S Site)

Hadrosaur Rib Fossil (T-S Site)

Hadrosaur Toe Bones (T-S Site)

Dinosaurs in Mississippi Continued from P. 1

in the earth's past, during the Cretaceous, in what we now call Mississippi...

Salt marshes stretch between the shallow waters and sandy islands, where a mix of reptiles, fish, dinosaurs and small mammals compete for space and meals. A fresh water river meanders down from the distant hills, through the maritime plains and into the salt water swamps. Broken trees brought down by violent storms and floods, further inland, flow into the swamps between the sandy islands, building a barrier between the shallows of the Cretaceous ocean and the lush Cretaceous landscape. ***Is this Mississippi of the past or present?***

It's amazing—herds of hadrosaurs flow across the plain, adults protecting the infants and juvenile offspring. These hadrosaurs flock together while they feed, allowing their young to grow and replenish the flock.

But their day-to-day existence is not so easy. Dinosaur predators can suddenly attack the young and sick. Sometimes, the mauled corpses of these victims end up in the fresh water rivers that flow through the plains. Sudden violent thunderstorms grab the corpses on the banks of the river, floating them in the rivers, and rush them past the swamps and sometimes into the deep channels that drain into the deeper areas of the inland oceans, surrounding some of the barrier islands.

This is a verdant but naturally harsh environment, where nothing "dead" is wasted. Do you see that hadrosaur carcass bobbing in the deep channel? What you don't see are the sharks that tear and mangle the corpse as it settles into the water and sandy mud. The crocodiles patiently wait for pieces of the corpse to flow back into the swamp during high tide. There they will feast on rotting flesh and bones.

Further out into the shallow ocean, turtles swim through the ocean searching for their meals. Even fish are interested in small pieces of the corpse that slowly settle through the water, down to the sandy bottom. Sharks, turtles and fish all compete for the pieces of the hadrosaur meal. Schools of ammonites shoot through the blue waters.

Now, go back into the plains and see what other animals roam among the dinosaur herds. Look there! Is that a nesting area for the great hadrosaur herd? Yes it is...but notice the muddy mounds where the next generation of the great herds are hatching. Many dinosaur eggs will never hatch. Mammals and smaller dinosaurs steal the eggs from nests regardless of the fierce attention that the adults give to their nests. Maybe the hadrosaur herd migrates to this same Mississippi place and time, a maritime paradise to create and raise their next generations.

And notice..a newly hatched hadrosaur calls out for the protective adults—an alert adult guards a group of three infants from a nest of 12 broken eggs. Just yesterday one infant walked away from the nest unnoticed, into the grass and low flowering bushes, going toward the river bank. The mother hadrosaur's urgent calls failed to bring this infant back into the protected nesting field.

Its life is now endangered by hungry dinosaur predators...velociraptors patrol the woods and plains for lost juvenile hadrosaurs. They hide among the rushes of the river, and violently slash their claws to incapacitate their prey.

It's past too late for this infant hadrosaur...it's been spotted by a velociraptor patrol, that makes quick work

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Dinosaurs in Mississippi
Continued from P. 3

of this victim. After their meal time, the partially devoured corpse of this infant lies in the sun, on the bank of the river, until a surge of water from a storm washes this corpse into the deeper channel.

The corpses of the adult and infant hadrosaur meet in the mix of the river current and ocean tides. The crocodiles, sharks and fish could make quick work of these corpses. But some of the skeletal remains manage to sink to the bottom among the rotting logs of the conifers and palms, dead fish, ammonites and sharks.

However the present story does not end here. The hadrosaur corpses settle to the bottom of the channel and become covered with sand and mud. Over the course of the Cretaceous in this part of ancient Mississippi, the ancient inland sea recedes and the mass of other sediments cover a once verdant dinosaur paradise. Geologic time passes and the Mississippi landscape changes. The remains of the turtle, crocodiles, sharks, and fish that once lived in this maritime space settle into the same mud and sand, a record of a slice of time. The North American continent changes shape through another millions of years, pushed and pulled by moving continental plates, the rise of the majestic ancient Appalachian mountains, and the relentless erosion of the mountainous land. Sediments harden and hide this slice of time.

Over time, many other animals and plants grow, evolve, diversify and become extinct. This spot of Mississippi becomes the home for other animals and plants. But a slim possibility brought the hadrosaur corpses and remains of the other life forms to this spot, and only some of the remains fossilized, over the millions of years... between the death of two hadrosaurs and the present time when one lucky fossil hunter and one industrious Mississippi farmer uncovered a part of our past, here in Mississippi.

Are the past, present and future really separate slices of time? How can we be certain that that herds of dinosaurs aren't roaming the very spot of earth that we "now" occupy. What if we could slip through a shimmering sluice of time into that very Cretaceous day, wander cautiously among the towering conifers and look onto the maritime plains, where now "extinct" animals herd together. Look...the barrier islands basks in the Cretaceous sun.

Quick!, if we slip through another sluice of time, would we arrive in a future Mississippi where only nests of armored ant-like insects can compete with small flying reptiles for survival in a harsh sun-baked environment, where some of our fossilized bones might be now found in the bottom of sandy canyon, in Mississippi?

Ref: Earl Manning and David Dockery. A Guide to the Frankstown Vertebrate Fossil Locality (Upper Cretaceoous), Prentiss County, Mississippi. Circular 4; Mississippi Department of Environmental Quality. Office of Geology. Jackson, Mississippi. 1992.

President's Message
Continued from P. 2

2. **Volunteer your time**—The Show requires an astonishing amount of commitment from our members to show up and work. So just do it.
3. **Market the Show**—Take an active and visible role in promoting the Show.

W. C. McDaniel

Dig Dates

The Ben E. Clement Mineral Museum in Marion, Kentucky, has announced its schedule of digs for 2015. You can dig fluorite and related minerals during the day, and fluorescent minerals at night.

The dates:

- ✓ April 18
- ✓ May 16
- ✓ June 6 & 7 (also the dates of the Ben E. Clement Annual Gem, Mineral, Fossil, & Jewelry Show)
- ✓ July 18
- ✓ August 15
- ✓ September 12
- ✓ October 10

Pre-registration is required, so register early as space is limited to the first 30 people per date. Registration forms can be found on the museum website.

For more information contact the Ben E. Clement Mineral Museum, P. O. Box 391, Marion, KY 42064. Or call (270) 965-4263

www.clementmineralmuseum.org

MAGS Show April 25 & 26
We need your help.

SignUp Genius

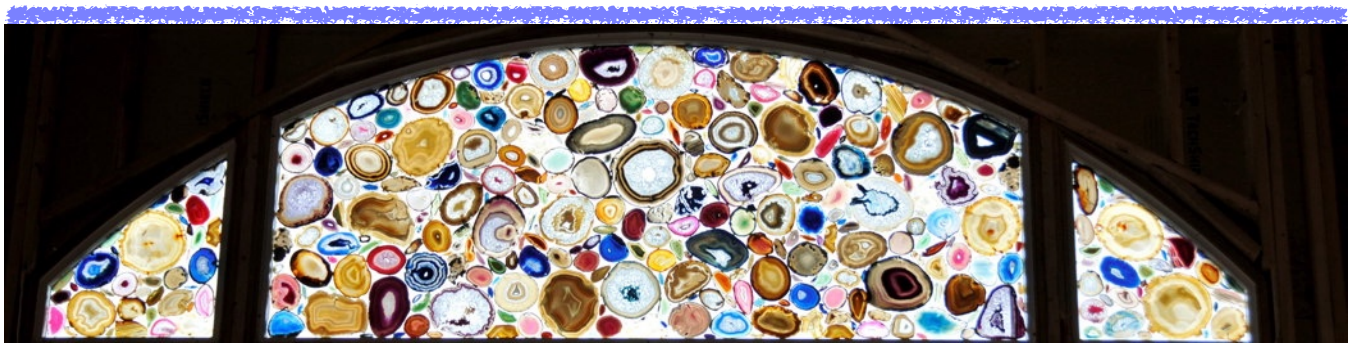
Carol Lybanon

Every Member with email received an invitation to sign up as a Show volunteer with SignUp Genius. This is a good way for me to keep up with those people who volunteer to help at the Show. All you need to do is click on the link in the email message and follow the directions on the SignUp Genius website.

You will need to create a login with your name, email address, and a password. Very simple! Then you can add your name to the list in as many places as you would like. SignUp Genius will send you a reminder two days in advance of your signup times.

Still have questions? Call Carol at (901) 757-2144.

Please volunteer to help on both Saturday, April 25, and Sunday, April 26.



New Window

Susan Thompson

We are building a new home, and I wanted an accent piece which I could incorporate into the design and would reflect my interests. I so enjoy all the rocks, minerals, and gems which I have collected over the years since my boys and I joined MAGS that I started thinking how I could somehow use them.

I wanted to make a large window piece which would sit high in the wall of our living room, on a wall which would receive light all day and would be backlit at night in order to make it glow.

I knew the pieces would have to be thin enough for the light to shine through, and I knew it would take a lot of them. I started collecting agate slices,both natural and dyed, so that the finished piece would have a variety of colors, shapes, sizes.

The window which I bought was quite sizeable...8' long by 4' high, but that wall needed something large. One center piece, flanked by two smaller ones, were as tightly covered with the agate slices as I could manage, and all were covered—twice—with layers of non-yellowing (I hope) resin.

I was terrified as the carpenters wrangled it up two flimsy ladders, knowing I would slit my wrists—and theirs—if they dropped it, but they somehow managed to get it placed perfectly.

After months of seeing it lying flat on the work table, I was thrilled to see the light streaming through it.

I am certain we will enjoy it for many years, but, now, I am wondering...what will I do next???

Jewelry Bench Tips by *Brad Smith*

WINDING JUMP RINGS

Whenever you need a few jump rings the same size, it's easy to grab a round rod and wind as many as you need. But when you need a lot of them, some form of winder saves a lot of time. A variable speed screw gun makes quick work of winding the coils. Screw guns are quite inexpensive at discount stores and are remarkably handy *Continued, P. 6*

Jewelry Bench Tips Continued from P. 5 for odd jobs in the shop and around the house.

To wind a coil, just bend a right angle on the end of the wire about a half inch long and insert this into the screw gun chuck. Then wind slowly, keeping a tight coil. I like to rest the end of the mandrel on the edge of the table or bench pin. Finally, one note of caution. If you are winding an entire length of wire, be careful as you get near the end of the wire. If the end passes under your thumb, it can cause a nasty scratch or cut.

TOUCHING UP A BEZEL

Pumice wheels are good for touching up a bezel after you've set the stone. The hardness is about 6 on the Mohs scale, less hard than quartz, so it shouldn't scratch any of your agates or jaspers. However, I'd avoid or be real careful of using pumice near the softer stones like turquoise, amber, howelite, etc.

If you're unsure about the hardness of your wheels, test them on a piece of glass. Glass is about 5 ½ on the Mohs scale, softer than quartz. So if the wheel doesn't harm glass, it's safe for use on the quartzes and harder stones.

My preference is the one inch diameter ones such as those shown at riogrande.com/Product/AdvantEdge-Pumice-Wheels-Medium/332722?pos=2.

Get all 101 of Brad's bench tips in "Bench Tips for Jewelry Making" on Amazon.

January 2015 Board Minutes

Bonnie Cooper for Mike Baldwin

Meeting called to order at 6pm at the Agricenter by Charles Hill. Present: Charles Hill, Bonnie Cooper, James Butchko, Bob Cooper, Kim Hill, Nannett McDougal-Dykes, Matthew Lybanon, and Marc Mueller. Visitors were MAGS member Kathy Baker, and Matt LaBuda with the Commerical Appeal (both gave a presentation to the Show committee on marketing ideas for the 2015 Show).

Motion was made to appoint Matthew Lybanon as Newsletter Editor and Mike Baldwin as Webmaster for the 2015-2016 term. Bonnie Cooper made the motion; seconded by Bob Cooper. Motion was approved by all.

Secretary: No report. (Carol had previously emailed a copy of the December Board Meeting Minutes & Membership Meeting Minutes to all board members for review.)

Treasurer: No report from Bill. Bonnie advised she doesn't have any of the treasurer's records yet.

Membership: Bob reported that the renewals are coming in. We still have a lot of people who have not renewed. Bob did request Matthew to put a renewal request in the newsletter, which Matthew did. W. C. also sent out a recent email requesting members to renew their memberships. Charles advised when he discusses field trips he will mention that to attend you must be a member.

Field Trips: Charles reported that In January we have (2) trips planned. January 10 is a mini-trip to Pickwick Lake. Charles has spoken with the Engineers there and they have advised the water level is low which should allow for more "finds". Charles has decided to increase the number who are allowed to go from the original (5) up to (7). On Jan. 17 we go on our field trip to Twin Creek Crystal Mine where we can work on the actual wall face. On February 15th there is a trip planned to Nonconnah Creek @ Brooks Road. The old Mall of Memphis area was also discussed as a future possible trip. March 28 trip will be to Crater of Diamonds State Park in Arkansas. Charles has been in contact with the Park personnel there. April—no trip due to the show. May—trip to 20 Mile Creek. June—a trip to Turkey Creek which Bob Cooper will lead. Also in June there will be a trip to Crow Creek or Burnam Island, Illinois (still working on getting information on this location). Charles advised at Burnam Island you can find agates, jasper, Indian artifacts, fossils and bison teeth.

Adult Programs: No report. (Carol's programs for Jan.–April are on page 1 of the newsletter.)

Junior Programs: Jim advised the juniors will do sand painting in January and in February he will give a presentation on the diet of Jurassic dinosaurs.

Show: Possible conflict with a Gun Show. W. C. is working on this problem.

Library: Marc was filling in for Ron Brister but he advised there was no report to be made.

Newsletter: Everyone commented on a great January newsletter. Matthew advised that they (Carol & Matthew) will be out of town from Jan. 21 thru Feb. 1 so anything to go into the February newsletter needs to get to him by Jan 19 to make *Continued, P. 7*

January 2015 Board Minutes
Continued from P. 6

it into the February newsletter. The board also congratulated him on his appointment as the new 2015-2016 Newsletter Editor.

Webmaster: No report.

Historian/Rock Swap: Nannett reported that the Holiday party went really well. Nannett has already started working on setting up a date in May for our first 2015 rock swap at the McNeil's. She also mentioned that we have the opportunity to promote the Rock Show by setting up a MAGS table at the Easter event held at Shelby Farms in April. If the weather is nice it was also mentioned we might want to make it a rock swap.

Old Business: Bonnie asked about the status of shelves in the shed. Jim advised that the shelves had been put on hold. Charles volunteered to build the shelf units. It was discussed and decided that Charles, Jim, and Nannette would meet at the shed on Jan. 24 at 10am to measure and figure board feet needed to build the unit. After this information is figured Charles will go to the board to get approval for money to build the unit.

New Business: Kim advised her job as Assistant Program director is the monthly displays. In order to encourage more people to bring in displays she would like to have a point system for the displays that are brought in and award monthly prizes. The points earned each month will add up all year and at the end of the year have a larger prize for whoever has the most points. Exact details to be worked out and info to be sent to Matthew so he can send out a mass email before the January membership meeting. A date change was discussed and agreed upon for the Crater of Diamonds trip in March. The trip was set up for March 21st and will now be rescheduled for March 28th. Charles asked Matthew to put the change in the newsletter.

Displays

Kim Hilll

Well alrighty!! Again, MAGSters, you stepped up for the February displays.

THANK YOU SO MUCH!! I would have hated being a flash in the pan...LOL. So you know what that means, right??!! You have to keep bringing in your beautiful, interesting specimens!!

Hasn't it been fun seeing what people bring in? It is a rock club meeting, so we need to bring in the 'rocks'!!!

We had 10 displays with eight people taking part in the display contest. We had crystals from the recent Arkansas field trip, some that were dug up many and many a year ago. There were samples showing what to expect in upcoming field trips, some beautiful carved hearts, and natural shaped ones, and even some fossilized hearts to celebrate Valentine's Day, fossilized shells dug in 1962, some beautiful plant fossils from Fayette County, and some outstanding unique crystals brought in by the Kratzes.

I believeI am correct in saying everyone loved seeing and voting for the displays!!! So I will say it again: KEEP BRINGING IN THOSE DISPLAYS. It helps make the meetings more interesting.

Charles Hill was our winner this month with a triple display of crystals from the recent Arkansas field trip, samples of what he found at Pickwick (I am still mad about chickening out on that trip), and samples of agates and petrified wood from Nonconnah Creek.

The March themes will be samples from the Nonconnah Creek and Shelby Forest field trips—and it doesn't have to be from these trips, it can be from past trips. Lets have fun. Since St. Patrick's Day is in March, let's have some green rocks, natural or carved, whatever shape they come in. See y'all in March.

Texas Ammonite Trip

Anyone interested in joining the March 20-23 ammonite-hunting field trip to Texas should contact Matthew or Carol Lybanon at (901) 757-2144 or lybanon@earthlink.net.

Magic Springs

Another benefit of your MAGS Membership: MAGS now has an arrangement with Magic Springs & Crystal Falls in Hot Springs, Arkansas, that will allow you to purchase discounted admission tickets. Contact Matthew or Carol Lybanon at (901) 757-2144 or lybanon@earthlink.net to get the details. You can print your tickets before you go.

Save These Dates

	March	April	May
Adult Programs	David Hanes, "Dinosaurs of Mississippi"	MAGS Show, History and this year	Gary Patterson, University of Memphis CERI
Junior Programs	Matthew Lybanon, "Magnetism"	MAGS Show, Make displays	Herb Nicholson, "Fossils common to Tennessee and surrounding states"
Field Trips	7: Shelby Forest 20-23: Texas 28: Crater of Diamonds	None	9: 20 Mile Creek 16: Southaven

MAGS Meeting Dates: March 13, April 10, May 8

Fabulous Tennessee Fossils

Dr. Michael A. Gibson, University of Tennessee at Martin

Favosites foerstei Dunbar, 1920

When we utter the word "reef" it is usually accompanied by "coral". In our modern world corals are the conspicuous members of the reef community for humans, along with fish, but it may surprise you to know that coral is not necessarily the most common component of a reef. Reefs can be made of algae, sponges, and even worms. Additionally, not all corals are colonial and build massive reefs; many are actually solitary organisms. Reef-building corals are referred to as "hermatypic;" the term was coined by biologist John Wells from the Greek "herma" for reef and "typtein" for strike. Hermatypic corals often have zooxanthellae algal symbionts within their tissues that aid in the calcification process, thus resulting in the large framework reefs we recognize. Corals have been major reef-builders since the early Paleozoic, but can also produce non-colonial forms or small isolated colonies that never formed reefs, such as my subject in this Fabulous Tennessee Fossil column: *Favosites foerstei*.

If you have participated in any of the MAGS field trips to the Vulcan Materials Quarry in Parsons, Tennessee, then you may have this coral in your collection (See Mike Baldwin's summary of Birdsong fossils from MAGS newsletter of October 2006). *Favosites forerstei* was described by the famous Yale paleontologist Carl O. Dunbar in 1920 from collections he made while doing fieldwork for his dissertation under an even more influential Yale paleontologist, Charles Schuchert. *Favosites* itself is a very common middle Paleozoic colonial coral easily recognized by its hemispherical form and honeycomb pattern of coral openings (corallites) on the surface. Dunbar wasn't the first to discover this fossil, however. Dunbar named his new species after the Harvard paleontologist August F. Foerste (1862-1936) of Dennison University in Ohio, who originally discovered the new form while conducting fieldwork in Tennessee in 1899 - 1901, but never formally described it as a new species. Dunbar and Foerste recognized that the colony form of his specimens differed from the typical dome-shaped mounds by lacking a flat base to the colony, possessing a "more pointed *Continued, P. 9*

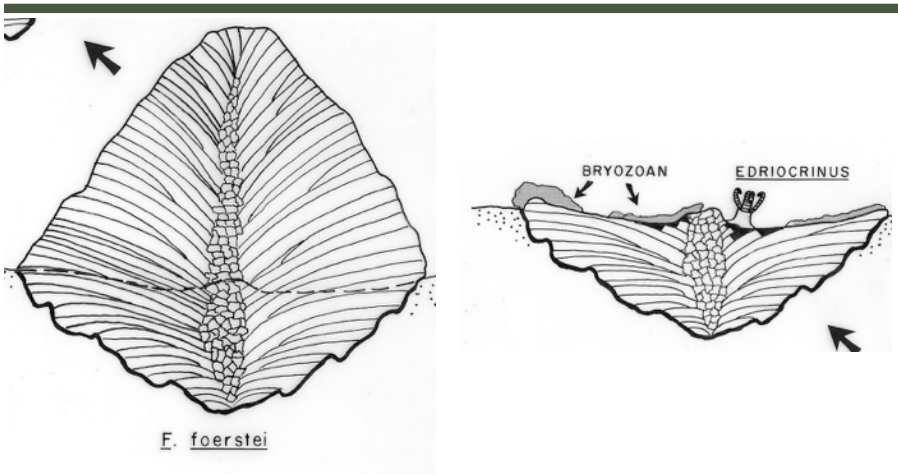


Diagram showing cross-section of *F. foerstei* growth form (left) and eroded form with epibionts (right). The heavy black line shows the thickened holotheca.

Two *F. foerstei* specimens from Vulcan Materials Quarry in Parsons. Specimen on left shows the thickened pseudoholotheca covering the base and a partially eroded and more weakly calcified upper dome. Specimen on right is typical of the eroded specimens that preserve only the base of the coral colony.

Fabulous Tennessee Fossils
Continued from P. 8

and decidedly excentric apex to its base", and by having a low irregular mound shape or no mound shape at all. *F. foerstei* seemed to be restricted to the West Tennessee Devonian beds, common to the Birdsong Shale of the Ross Formation.

As it turns out, *F. foerstei* is indeed excentric as compared to most favositid corals. In 1989 I co-authored a restudy of the coral with my advisor at UT Knoxville as part of my dissertation and later published in the journal *Lethaia*. By cutting the coral colonies and making thin-sections allowing us to see cross sections of the entire form, we realized that this coral grew with corallites branching outward from the basal apex to its living surface from the initial attachment points on the bottom of the colony. Only the outer surface of a coral colony is living (the internal areas represent earlier growth stages). As the colony grew, it expanded like a cone and would sink only slightly into the soft muddy seafloor. The expansion and growth pattern was the coral's adaptation to avoid smothering by sedimentation around the coral. Also unusual, the coral would secrete an extra layer of calcite shell in a banded pattern around the lower portions of the expanding coral colony as it grew to form a barrier between living corallites and the seafloor, thus sacrificing those corallites coming into contact with sediment being deposited around the coral. We termed this extra growth a "pseudoholotheca" and concluded that it strengthened and thickened this portion of the coral, protecting it from toppling in currents and later erosion by currents. Once a colony died for whatever reason, the more weakly calcified upper part would be corroded away leaving the characteristic flat to cup-shaped upper surface of exposed corallites. This upper surface then became a firm substrate "island" for small epibiont organisms to colonize, explaining why so many of the *F. foerstei* collected have the tops heavily encrusted by bryozoans, other corals, and sponges, while their pseudoholothecae remained devoid of epibionts. As it turns out, finding complete colonies is the hardest part, but we managed to collect a few, not available to Dunbar or Foerste, so we had a much more complete picture of the fossil's life history. So, keep on the lookout for *Favosites forestei*, which stands as a testament to the adaptive ingenuity of colonial marine organisms and is truly a unique Fabulous Tennessee Fossil.

Editor's note: Do you have a favorite Tennessee fossil you would like to learn more about? Contact Dr. Gibson at mgibson@utm.edu to have it discussed in a future chapter of **Fabulous Tennessee Fossils**.

Happy St. Patrick's Day

March Birthdays

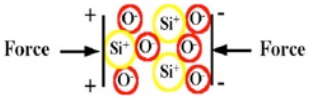
2	Kyle Brown
4	Chris Hill
	Ragan Medlin
7	Payne Wilson
8	Barbara Milka
10	Tess Cannito
	Kathleen A. Eglsaer
11	Nancy Folden
12	E. Neville Mayfield
15	Amelia Herrington
17	Robert Cooper
18	Chris Barnett
	Lauren Brem
22	Kara Gilmore
23	Alison Landrum
	Lillian Ernst
26	Stephany Rainwater
	Robert Connolly
27	Tamie Dunn
	Kathy Bullard
	Lori Carter
28	John McLane
	Alexander Galvalisi
30	Hisami McNeil
31	Hunter Hill

Quartz—Electrifying News

Before the iTunes Store, before MP3 players, before compact disks, before magnetic tape, how did people listen to music (other than live music)? People had phonographs. Remember? A turntable spun a record, an arm that contained something with a stylus (a better name than "needle") projecting from it placed the stylus into a very long spiral groove in the record's surface, and sound came out of the speakers.

How did this work? A clue: the "something" (cartridge) with the stylus had two wires coming out of the back. There were several types of cartridge, including the **crystal** cartridge.

The crystal cartridge contained an actual crystal, and it worked because of the *piezoelectric effect*. In some materials, applying slight pressures produces tiny voltages. The piezoelectric effect is seen not only in some crystals, but also some ceramics and even biological substances such as bone and tendon. The crystal in a crystal cartridge was usually Rochelle salt (potassium sodium tartrate), but other crystals exhibit this effect. One of them is everybody's favorite, quartz.



The word piezoelectricity means electricity resulting from pressure (from the Greek *piezo* or *piezein,* to squeeze or press). Piezoelectricity was discovered by the brothers Pierre and Jacques Curie, when they were 21 and 24 years old, in 1880 (Pierre later married Marie Curie, who conducted pioneering research on radioactivity).

So how does it do that? The nature of the piezoelectric effect is closely related to the occurrence of electric dipole moments in solids. (Not sure what that means? Don't worry.)

In most crystals (such as metals), the unit cell (the basic repeating unit) is symmetrical; in piezoelectric crystals, it isn't. Normally piezoelectric crystals are electrically neutral. The atoms inside them may not be symmetrically arranged, but their electrical charges are perfectly balanced: a positive charge in one place cancels out a negative charge nearby.

However, if you squeeze or stretch a piezoelectric crystal, you deform the structure, pushing some of the atoms closer together or further apart, upsetting the balance of positive and negative, and causing net electrical charges to appear. This effect carries through the whole structure so net positive and negative charges appear on opposite, outer faces of the crystal. There's also a reverse piezoelectric effect: applying a voltage causes a change in length.

The first practical application for piezoelectric devices was sonar, first developed during World War I. The detector was a transducer, made of thin quartz crystals carefully glued between two steel plates, and a hydrophone to detect the returned echo. During World War II the quartz mines near Hot Springs did a lot of business with the U. S military, supplying quartz for radio oscillators. Today your wristwatch contains a small version of one of these oscillators.

The piezoelectric effect is how crystal microphones work. The effect also finds application in medical imaging, ultrasonic transducers, and even in the spark lighter of your barbecue grill. One of the most intriguing applications of piezoelectric

Continued, P. 11

Quartz—Electrifying News *Continued from P. 10*

technology is in the Rotterdam nightclub Watt. The dance floor is suspended on a series of springs and piezoelectric crystals. As dancers move, the crystals compress, generating electricity (large.stanford.edu/courses/2010/ph240/winger1/).

One thing should be clear: the piezoelectric effect transforms energy, it doesn't generate it. More (mechanical) energy goes in than the (electric) energy that comes out (Star Trek's dilithium crystals must work some other way). Also, as already mentioned, the piezoelectric effect is not restricted only to some crystals. But we're MAGSters and we like crystals. Quartz crystals are not only beautiful, but you can literally get a charge out of them.

Drinks All Around

Debbie Schaeffer

Each year the Show provides sodas and water for all the thirsty vendors and MAGS volunteers. Last year people drank over 500 cans of soda and almost as many bottles of water. Please help out by bringing cans of Coke products and bottled water for the Show to the next MAGS meeting.

The Show Dinner will be Friday, April 24, after set-up. Be on the lookout for an email with more information and a signup list for the dinner.

February Meeting Pictures

L: Elizabeth Cruzado Carranza (Eli) talking about her archaeological research in Peru. R: Carol presenting speaker trophy to Eli.

Upcoming Field Trips

Charles Hill

Hi again to all MAGS Members and others reading this. It is time to talk about the next wave of field trips. Hopefully the weather will warm some by May because the plan is to do some creeking. In March we have three trips. On March the 7th we have the small trip, led by Barbara Milka, to Shelby Forest. This site will accommodate six people and Barbara. We will have a signup sheet at the February members meeting. The ammonite hunt in Texas is March 20th-23rd, led by Matthew and Carol Lybanon. Lastly, on March 28th we have the trip to Crater of Diamonds in Murfreeboro, Arkansas, to hunt for diamonds. There will be a signup sheet at the Member Meeting in March. I hope you have your tennis shoes on.

In April we have the MAGS Show, so we have no field trips.

On May 9th, we start with a trip to 20 Mile Creek hunting for shark teeth and other Upper Cretaceous fossils. This is a place where you are going to get wet. Most of us have been there, I think; but I firmly believe one can never have too many shark teeth.

We will have a small trip on May 16th. We are going all the way to Southhaven. There is a small creek that meanders through that part of north Mississippi and holds great promise. Large pieces of petrified wood have been found there, but most important to me are the garnets I found. Also, for whoever is interested, I plan on giving a short class on panning. Panning for heavies is something all rockhounds should learn.

Later trips will be listed next month. Below are some pictures from the February 15 Nonconnah Creek field trip.

Have you paid your 2015 dues?

MAGS At A Glance

March 2015

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
1	2 Show Meeting, 6:30 pm, Agricenter—open to all Members	3	4	5 Board Meeting, 6:30 pm, St. Francis Hospital	6	7 MAGS Field Trip, Shelby Forest; DMC Field Trip, Vulcan Materials Co., Cartersville, GA
8	9	10	11	12	13 Membership Meeting, 7:30 pm, "Dinosaurs in Mississippi"	14
15	16	17	18	19	20 MAGS Field Trip, Valley View, TX	21 MAGS Field Trip, Valley View, TX; MAGS Archaeology Interest Group, 10:00 am, Chucalissa
22 MAGS Field Trip, Valley View, TX	23 MAGS Field Trip, Valley View, TX	24	25	26	27	28 MAGS Field Trip, Crater of Diamonds State Park, Murfreesboro, AR
29	30	31	1	2	3	4

Memphis Archaeological and Geological Society
2019 Littlemore Drive
Memphis, TN 38016