



Volume 67 ♦ Number 02 ♦ February 2021 ♦ A monthly newsletter for and by the members of MAGS

# February Program

Dr. Will Jackson, Department of Earth Sciences, U. Memphis



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**Title:** "What zircons in sedimentary rocks can tell us about plate tectonic processes: An example from the eastern Tibetan Plateau"

**Summary:** Detrital zircons are common accessory minerals in sandstone and conglomerate

rocks. Zircons also represent the ideal mineral for calculating U-Pb ages. To investigate the development of the Tibetan Plateau, the largest and highest plateau on Earth, we dated zircons from syn-tectonic sedimentary deposits in southwest Sichuan *Continued, P. 3*

## IT IS THOSE DARN TEETH

Megalodon is one the most well-known and recognized fossils in all of the fossil world. The two primary reasons are its size and those darn teeth, The Megalodon first appeared around 16 million years ago and was extinct around 2.5 million years ago. It lived globally, with the Antarctic being the only continent where teeth have not

## MEGALODON

W. C. MCDANIEL



been found. The extinction has been contributed to the chilling of the oceans leaving little prey for this massive shark. "Massive" is one the descriptions of the megalodon, and here is why:

### Size

•Skeletons of sharks rarely fossilize, primarily due to *Continued, P. 5*

# MEMPHIS ARCHAEOLOGICAL AND GEOLOGICAL SOCIETY

MAGS Rockhound News ◊ A monthly newsletter for and by the members of MAGS

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## MAGS AND FEDERATION NOTES

### Memphis Archaeological and Geological Society, Memphis, Tennessee

The objectives of this society shall be as set out in the Charter of Incorporation issued by the State of Tennessee on September 29, 1958, as follows: for the purpose of promoting an active interest in the geological finds and data by scientific methods; to offer possible assistance to any archaeologist or geologist in the general area covered by the work and purposes of this society; to discourage commercialization of archaeology and work to its elimination and to assist in the younger members of the society; to publicize and create further public interest in the archaeological and geological field in the general area of the Mid-South and conduct means of displaying, publishing and conducting public forums for scientific and educational purposes.

MAGS General Membership Meetings and MAGS Youth Meetings are held at 7:00 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, Tennessee.

MAGS Website: [memphisgeology.org](http://memphisgeology.org)

MAGS Show Website: [www.theearthwideopen.com](http://www.theearthwideopen.com) or <https://earthwideopen.wixsite.com/rocks>

We aren't kidding when we say this is a newsletter for and by the members of MAGS. An article with a byline was written by a MAGS Member, unless explicitly stated otherwise. If there is no byline, the article was written or compiled by the Editor. Please contribute articles or 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](mailto:lybanon@earthlink.net).

All 2021 DMC field trips have been cancelled and rescheduled to 2022. See P. 4 of this newsletter for the official announcement. The next MAGS-sponsored trip is currently scheduled for October 2024.

### Links to Federation News

- ➔ AFMS: [www.amfed.org/afms\\_news.htm](http://www.amfed.org/afms_news.htm)
- ➔ SFMS: [www.amfed.org/sfms/](http://www.amfed.org/sfms/)
- ➔ DMC: [www.amfed.org/sfms/dmc/dmc.htm](http://www.amfed.org/sfms/dmc/dmc.htm)



*February Program* Province, China. Our results help illustrate the spatial and temporal development of high topography in the eastern Tibetan Plateau and provide insight to the physical processes responsible for plateau formation. We will also discuss experiences from conducting geologic field work on the Tibetan Plateau.



**President's Message**

The Memphis Mineral, Fossil Jewelry Show scheduled for April 24-25 is cancelled. We are in the process of attempting to schedule a small show during the month of November. We will keep you informed as that develops.

W. C.

**Breathe!**

*Matthew Lybanon, Editor*

Billions of years ago, life on Earth was mostly just large slimy mats of microbes living in shallow

**Hearts of February—Part 1**

Photos by W. C. McDaniel



Carved heart petrified wood—Madagascar



Natural heart shaped granite—Unknown location

water. Sometimes, these microbial communities made carbonate minerals that over many years cemented together to become layered limestone rocks called stromatolites. [See *Fabulous Tennessee Fossils 67* in our August 2020 issue for more on stromatolites.] They are the oldest evidence of life on Earth.

A key component of the oxygen cycle occurs when plants and some types of bacteria take sunlight, water, and carbon dioxide, and convert them to carbohydrates and oxygen, which are then cycled and used by other organisms that breathe oxygen. But these microbial mats existed for a billion years before oxygen was present in the atmosphere. We owe the Earth's oxygen to these ancient microbes that photosynthesized and released it into the world's oceans. So what did they use instead?

From a biochemical perspective, there are only a few possible

candidates: iron, sulfur, hydrogen or arsenic. A lack of evidence in the fossil record and minuscule amounts of some of these chemicals in the primordial soup suggests neither iron, sulfur, nor hydrogen would be likely candidates for the earliest form of photosynthesis. That leaves arsenic.

In 2014, a research team of geologists, physicists, and biologists from the University of Connecticut found the first clue that stromatolites were produced by arsenic-assisted photosynthesis and respiration. They collected pieces of 2.72-billion-year-old stromatolites from the pre-oxygen world by drilling into an ancient reef in the Outback of Australia. By measuring the X-rays that came off thin slivers when they bombarded them with photons, they made a map of the chemical elements in the sample. If two kinds of arsenic are present in the map, then it is a sign that life was using ar-

*Continued, P. 6*



## Dixie Mineral Council Field Trips

The Southeast Federation of Mineralogical Societies, Inc



The Friendly Federation - Founded in 1976 to serve  
DMC Program of the SFMS Field Trip Committee  
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## DMC Field Trips Cancelled for 2021 Schedule Moving Forward One Year

I hope everyone is healthy and safe as we enter this new year. COVID-19 vaccines are providing some post-COVID optimism. We are nearing a time when we can share field trips with one another again.

Unfortunately, even with vaccines available, it appears that the virus may still be a problem this year. Until we know for certain that we can gather together safely, we must approach the situation with great caution.

So in the interest of safety, I am moving the entire DMC schedule forward by another year.

All trips scheduled for 2021 are moved to 2022, 2022 to 2023, 2023 to 2024, and 2024 to 2025.

The new schedule is posted on the SFMS website here: [http://www.amfed.org/sfms/\\_dmc/dixie-proposed-ft.htm](http://www.amfed.org/sfms/_dmc/dixie-proposed-ft.htm)

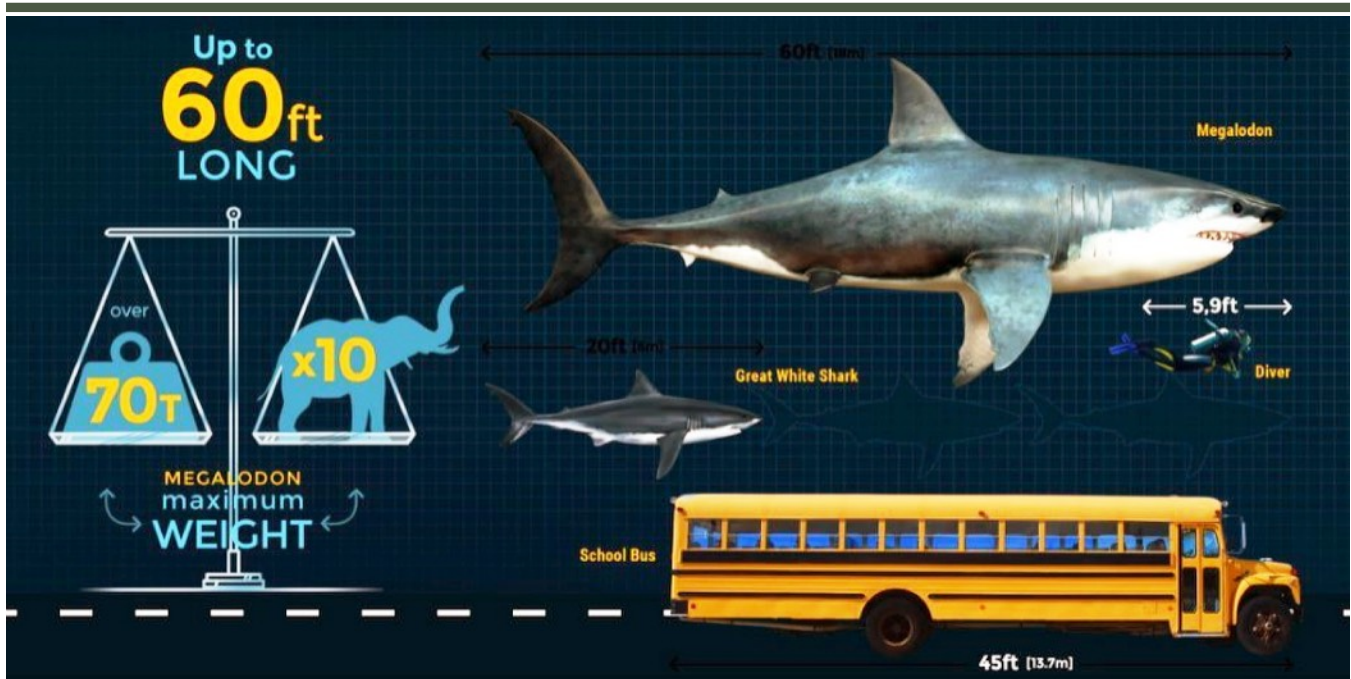
Please let me know if you have any questions.

Many thanks to all of the clubs who continue to support the DMC Field Trip Sharing Program as we work our way through this.

Stay healthy, stay safe.

Lori Carter  
DMC Coordinator  
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*It Is Those Darn Teeth*  
Continued from P. 1

cartilage  
deteriorat-  
ing, leaving

only teeth.

- Current research estimates the megalodon size in the range of 60-70 feet, weighing about 50-70 tons.
- The Megalodon is larger than the great white shark, gigantic theropod dinosaurs such as *Spinosaurus*, *T-Rex*, as well as the large ocean-going marine reptiles such as *Basilosaurus* and *Tylosaurus*. Its size is frequently compared to a school bus.

### Teeth by the Numbers

- They are big, dominating, and good to hold and look at.
- Megalodon teeth are measured on the slant, using the longest side as the length.
- 276—number of teeth dispersed over 5 rows. As they lose a tooth it is replaced.



sharks' teeth are black due to phosphate, especially those from the eastern USA coast.

- 20,000 is the estimated number of teeth the shark would produce over their life span. YEA!
- 7.48 inches is the largest known and confirmed Megalodon tooth. Teeth over six inches are rare. The average is around 3-5 inches.
- The color of the fossilized teeth—as with most fossils—is determined by the mineral content of the soil. Most

### Myths

- Great White Shark and Megalodon are related? **No**. This has been the subject of debate for decades. The original classification—back in 1843—placed the great white and megalodon in the same class. Since then, research studies and new technology have concluded the two are not related primarily due to size, teeth, and structure.

*Continued, P. 6*

*It Is Those Darn Teeth*  
*Continued from P. 5*

•The megalodon is still alive and swimming around the deepest parts of the ocean. **No.** The most basic reasons include no confirmed sightings or fossil finds and no massive sharks floating around the ocean or up a beach somewhere. Megalodons lived in warm shallow water due to its abundant food source. None of that is available in deep oceans.

- It was on TV and internet that the Megalodon was alive and swimming around the oceans **No.** Several years ago a tv channel produced and broadcast a show that stated this. Those “conclusions” have been widely disputed, one of the most notable issues is that apparently that the scientists and experts appearing in the show were paid actors. One fossil site even provided the names of the actors.

**Credits:** [FossilEra.com](http://FossilEra.com), [www.fossilguy.com](http://www.fossilguy.com).

## Hearts of February—Part 2

Photos by David Day



A variety of semiprecious stone, heart carvings mostly by Beth Prussia Day, plus alabaster, fossil, and rock.



A basket of naturally occurring rock hearts we found down by the Mississippi River and on many MAGS field trips. Once family and friends discovered that we collected stone hearts, they began to bring us stone hearts they found as well.

*Breathe!*

*Continued from P. 3*

senic for photosynthesis and respiration. In

these relics of ancient life they found lots of both forms of arsenic, but not iron or sulfur.

A breakthrough happened when the team discovered active microbial mats in the harsh conditions of Laguna La Brava in the Atacama Desert in Chile. The Atacama Desert in Chile is the driest place on Earth, flanked by volcanoes and exposed to extremely high UV radiation. It’s not too different from how the Earth looked 3 billion years ago and they

found what they were looking for there.

Laguna La Brava is a very salty shallow lake deep into the harsh desert. A shallow stream, fed by a volcanic groundwater spring, led into the lake. The streambed was a unique, deep purple color. The color came from a microbial mat, thriving quite happily in waters that contained unusually high amounts of arsenic, sulfur, and lithium, but missing one important element—oxygen.

They cut a piece of the mat and looked for evidence of minerals. A drop of acid made the min-

erals fizz—carbonates!—this microbe community was forming stromatolites.

The team measured the chemistry of the water and the mat with their field equipment during day and night, summer and winter. Not once did they find oxygen, and back in the laboratory they confirmed that sulfur and arsenic were abundant. The microscope showed purple photosynthetic bacteria, but oxygen-producing cyanobacteria were eerily absent. DNA samples from the mat showed genes for arsenic metabolism.

Subsequent analysis supported the presence of a vigorous arsenic cycle in the absence of oxygen in this unique modern stromatolite. This validates the idea that the fossil Australian samples that the University of Connecticut team studied in 2014 held evidence of an active arsenic cycle in deep time on our young planet.

The harsh conditions of the Atacama are so similar to Martian and early Earth environments that NASA scientists and astrobiologists turn to it to answer questions about how life began on our planet, and how it might start elsewhere. Mars 2020 is a NASA Mars rover mission that includes the Perse- *Continued, P. 7*



*Breathe!* verance rover and the Ingenuity helicopter drone. It was launched on 30 July 2020, and will touch down in Jezero crater on Mars on 18 February 2021. The rover carries an instrument that can observe elements using the same process the Connecticut scientists used to make their element maps. Perhaps it will discover that arsenic is abundant in layered rocks on Mars, suggesting that life on Mars also used arsenic.

**Ref:** Pieter T. Visscher et al. *Modern arsenotrophic microbial mats provide an analogue for life in the anoxic Archean. Communications Earth & Environment, 2020; 1 (1) DOI: 10.1038/s43247-020-00025-2*

## December Board Minutes

Mike Coulson

Zoom meeting called to order 6:30. Present: W. C. McDaniel, Mike Baldwin, Carol Lybanon, Matthew Lybanon, Bonnie Cooper, Bob Cooper, Dave Clarke; Nannett McDougal-Dykes, Melissa, Mike Coulson, Melissa Koontz, Jane Coop.

### Old Business:

1. Proceeds from Estate Sale have been divided, check sent to the family, and club's portion deposited into MAGS checking account.
2. Need to work on standing rules. W. C. will start looking at it and invite input at next meeting.

### New Business:

1. Holiday Party and December Membership meeting cancelled
2. Should we send out an email wishing Members a happy holiday?

**Secretary:** Copies of the November minutes were distributed via email during the meeting.

**Treasurer:** Club finance report was presented and approved. Several expenses coming up.

- SFMS RENEWAL: The SFMS website hasn't posted the renewal form/fee yet.
- SFMS CLUB INSURANCE: The new rates and forms are out now. The cost will be \$2 per Member. As of today, we have 190 adults & 32 juniors (224 total).
- SFMS SHOW INSURANCE: The cost for show insurance is \$220. We need to start discussing if we will have a show or not. Would we want to move the show date to later in the year?
- WEB EXPENSES: Mike will have bills to turn in for AT&T web hosting and Earthlink domain.

### Membership:

- Bob advises that we are down to 3 Members we haven't heard from yet regarding the "free 2021 renewal".
- We picked up 1 renewal (2020) since the last Board Meeting.
- The December newsletter has been mailed out.

**Field Trips:** Not present but plans to keep things moving forward in January and February.

**Adult Programs:** Membership meeting on Zoom. W. C. will send out the link and information on the meeting. Members can watch even if they don't have a camera on their computer.

- January—talking to a couple of presenters to do Zoom
- February—W. C. suggests asking Mike Gibson, Coon Creek District Administrator, if he could give a Zoom presentation. Then possibly a field trip to Coon Creek.

**Junior Programs:** On hold until further notice. No school talks or anything like that.

**Library:** Replacing books. Missing 32 now down to 20. Have acquired

some library books for a Dotty Coulson Memorial.

**Show:** We will wait until after the first of the year to evaluate and decide if we will have a 2021 Show.

**Rock Swaps:** None planned.

**Editor:** December newsletter is out. Everything comes to Matthew by email so send him material. Deadline for next issue is approximately December 20.

**Web:** Web site will be updated after the December Board meeting, tomorrow. Anything you might want to add about how we are handling programming next year can be added.

Adjourned 7:15.

December Membership Meeting and Holiday Party cancelled for 2020 due to a rise in Covid-19 here in Shelby County.

## 2021 NATIONAL YOUTH POSTER CONTEST

*Sponsored by North Lakes Academy  
Rockhounds of Minnesota*

**THEME: "Rockin' Around the USA"—Rocks and Minerals from around the USA**

\*\*Pick a rock or mineral you are passionate about, create a poster featuring it, and provide a brief explanation of why you like that particular rock so much. **OR** Pick a location in the USA where you LOVE to go rockhounding and craft a poster around that while providing a brief writeup about where it is, what you've found and h others should go there.\*\*

**ELIGIBILITY:** Any student in 1st through 8th grade

*Continued, P. 11*

## Fabulous Tennessee Fossils

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

### FTF 73

Biotic Interaction Analyses: *Leptostrophia beckii beckii*



My next essays will be devoted to individual fossils from our collections with the purpose of showing you how to conduct a very specific type of paleoecological study that is one of my favorite things to do—biotic interaction analysis (BIA). For me, BIA is what elevates fossil collecting from a simple accumulation of nice fossils with names (like stamp collecting or art collecting) to the level of being a Sherlock Holmes interpreting the intimate relationships and stories that a fossil preserves. Most fossils in your personal collections are not just an example of a specific taxon. Rather they may contain subtle clues to events that occurred to that single organism during its lifetime. Your specimens may also harbor other organisms that are less conspicuous than the “host” but add bonus story to the history of this individual and whom it interacted with.

Every organism, like each of us, lives a life full of activity. Ancient organisms interacted with their environment in search of food and a place to live safely. They attracted mates, or at least provided offspring passively, grew to larger sizes, responded to conditions around them—always displaying behaviors. They not only lived within their environment, but they also contributed to changing the environment. Their shapes and form are evidence of

evolutionary changes and Darwinian natural selection. Shells preserve a geochemical record of the ocean water chemistry. These organisms also interacted with the other organisms in the environment. Their fossils can carry the evidence of the “biotic interactions”, such as predation, symbiosis, storm damage repair, malnutrition, disease, on or in their shells or skeletons. Paleoecology is the study of these relationships. *Paleoautecology* is the study of a single individual, or a single species; whereas, *paleosynecology* is the study of groups or communities of organisms and their interactions. BIA straddles paleoautecology (because required analyzing a single “host” individual) and paleosynecology (because the goal of the analysis is to relate the “sclerobionts”, “epibionts”, or “endobionts” with their host).

The best way for me to illustrate BIA is by example. Figure 1 (A. dorsal surface, B. ventral surface) shows the brachiopod *Leptostrophia beckii beckii* from the Birdsong Shale Member of the Ross Formation, which is exposed in the Vulcan Materials quarry near Parsons, Tennessee. This is a specimen I collected for my dissertation work back in 1985. Before we look at the other things that you can see on this specimen, we should observe the “host” brachiopod first. The fossil has been removed from the shale in which

it was completely encased nearly 400 million years ago, but you can see some of that matrix adhering to the cleaned shell. It is important in deductive reasoning to keep your observations separate from your interpretations, so I will start by separating each so that you see the pattern.

We can make four observations about the paleoautecology of this particular individual. *Observation #1*—The specimen was preserved in shale (dewatered and lithified), and unbroken (which is important here because the shells are very thin and lack strength). *Interpretation of Obs. 1*—This animal lived on a muddy substrate within a low-energy setting. *Observation #2*—*Leptostrophia* is a very thin and fragile strophomenid brachiopod without a functional pedicle for attachment as an adult (so it is “free-living”). *Interpretation of Obs. 2*—Strophomenid brachiopods evolved a flattened, thin-shelled, “potato-chip” shell to act like a “snowshoe” in snow, meaning it helps retard sinking. They also had accelerated growth rate to reach the wide and flat profile quickly. Both of these established facts reinforce interpretation #2 and indicate that strophomenid brachiopods could serve like little islands of hardness surrounded by the very soft mud that accumulated at that time. *Observation #3*—The shell is not crushed. *Photos on P. 9*  
*Text continues on P. 10*



*Fabulous Tennessee Fossils*  
*Continued from P. 8*

**Figure 1.** *Leptostrophia beckii beckii* from the UT Martin Ross Formation collections. (Photos by MAG, centimeter scale). **A.** shows the dorsal upper surface of brachiopod with numerous sclerobionts, also called epibionts, including fistuliporid bryozoans (A), the coral *Aulopora* (B), and *Spirorbis* worm tubes (C). Position D marks one of several interruptions in the growth of the shell. **B.** Ventral lower surface of same specimen showing little sclerobiont growth. Notice the bryozoan overgrowth on the lower left. That colony actually starts on the ventral surface and overgrows the margin of the host brachiopod.



*Fabulous Tennessee Fossils*  
Continued from P. 8

*Interpretation of Obs. #3*—Compaction was minimal within the shale. *Observation #4*—The dorsal surface of the *Leptostrophia* (Fig. 1A) has many sclerobionts, but the ventral surface (Fig. 1B) is devoid of sclerobionts. *Interpretation of Obs. #4*—The dorsal surface was facing “up” into the water column and served as a substrate for the larvae of other organisms to settle upon (all larvae must settle on a hard substrate or “drown” in mud).

Notice position D in Fig. 1A which is marking the position of “arrested growth” or interruptions in the growth rate of the brachiopod shell (you can trace these around the perimeter of the shell). Such arrest lines could represent changes in growth rate related to growing seasons or “times” (most likely) or interruptions in growth rate related to disturbances in environment, such as storms (less likely in this case). Careful observation of these lines shows that you can count at last six arrest lines as you proceed toward the earlier inner portions of the shell. Some paleontologists interpret regular disruptions like these to be growth increments, say associated with seasonality. Perhaps these are yearly? Perhaps not (especially if this area was tropical). One could argue that these are like tree rings and can be counted to tell the age of the brachiopod, in this case at least six “years” old. We can delve into “aging” a shell in a later essay as this is not as straightforward as it sounds. There is more we could do with the “host” strophomenid brachiopod itself, but these obser-

vations will suffice for this example.

Let’s focus on the sclerobionts on the dorsal surface of the brachiopod (Fig. 1A). The dorsal surface is the surface of the brachiopod that faces upward into the water column when the living brachiopod is resting on the seafloor. There are many observations we can make regarding the sclerobionts, but I will only list a few of the more obvious for this example. *Observation #5*—The dorsal surface only has sclerobionts; not the ventral surface. *Interpretation of Obs. 5*—The brachiopod was in its living position on the seafloor (not at reworked specimen) at the time of encrustation. Combined with the interpretation for Obs. #2 and #3, we have more evidence that the host’s seafloor orientation throughout life, but that it also was buried in that orientation by a mud incursion event that was probably sudden. I can also verify that the specimen was in bedding-plane parallel orientation when collected and there were two generations of mud (one above and one below), so that the specimen was smothered by an influx of mud. *Observation and Interpretation #6*—Two fistuliporid bryozoan colonies (labeled A) encrusted the shell late in the life of the brachiopod host because they occur near the outside edge of the shell. *Observation and Interpretation #7*—Additionally, we can infer that the bryozoans most likely encrusted the shell for the purpose of using the feeding currents generated by the brachiopod to enhance its feeding efficiency. The bryozoans show preferential growth toward the outside of the brachiopod

shell (toward the feeding commissure) and spread laterally along that margin. This suggests a symbiotic relationship between the host brachiopod and the bryozoans. *Observation and Interpretation #8*—We can infer that the brachiopod died before the bryozoan colony because the largest of the colonies (lower right) begins to build upwards and even grows over the lip of the brachiopod to engulf the lower valve, thus sealing it shut.

Other organisms encrusted the brachiopod shell. *Observation #9*—A chain-like coral (B) grows on the right side of the host brachiopod. This coral is the genus *Aulopora*. The initial corallite individual of the colony is now encrusted over by one of the bryozoan colonies (A) but begins near the margin of the brachiopod and progressively grows back onto the brachiopod shell. It also grows with two of the colony runs paralleling the curved edge of the brachiopod and the other two lines then growing inward. *Interpretation of Obs. 9*—The corals colonized the brachiopod at the brachiopod’s last stage of life, but while the brachiopod was still living, again to take advantage of feeding currents. Later in the growth stages of the coral colony (astogeny), it abandoned the margin of the brachiopod and expanded the colony inward for more surface space (auloporid corals are sheet-encrusting epibionts that grow over a surface and cannot grow up above it). *Observation #10*—There is a stratigraphy preserved with these organisms: brachiopod as bottom substrate, overlain by the auloporid coral, *Continued, P. 11*



# MEMPHIS ARCHAEOLOGICAL AND GEOLOGICAL SOCIETY

MAGS Rockhound News ◊ A monthly newsletter for and by the members of MAGS

*Fabulous Tennessee Fossils* which is in turn overlain by the bryozoan. *Interpretation of Obs. #10*—The relative timing of the epibionts follows the Principle of Superposition (oldest on bottom and youngest on top), so we know the order of occurrence of the biotic interactions.

*Observation and Interpretation #11*—Several coiled *Spirorbis* worms (C) encrusted the shell. The *Spirorbis* are randomly distributed and not associated with the commissure of the brachiopod, so were only using the brachiopod as a hard substrate. These encrustations could have occurred at any point in the life of the brachiopod. No symbiotic relationship between the brachiopod host and the *Spirorbis* can be inferred. *Observation #12*—The *Aulopora* seem to grow near to, but never over, the *Spirorbis*. The same holds for the bryozoan and the *Spirorbis*. *Interpretation of Obs. 12*—No definitive relationship can be inferred easily between these two organism sets with the data presented. For example, it is possible that the *Aulopora* was changing growth direction to avoid the *Spirorbis* or the *Spirorbis* selectively settled in between *Aulopora* individuals.

These are just a few of the many observations and interpretations that we can make using BIA along with organism morphology. This is, of course, also a perfect example of the deductive reasoning that makes paleontologists the “Sherlock Holmes detectives of deep time”. Keep in mind that all of this came from a single fossil. Imagine the stories to be told by the millions of fossils within each bed of this formation! So, go back to your collections and look much more closely. What organisms and relationships can you find preserved in those wonderful specimens in your cabinet? In future essays, I will analyze more fossils to illustrate more examples of biotic interaction analysis.

## POSTER CONTEST

*Continued from P. 7*

### ENTRY CATEGORIES:

Posters will be judged by grade level.

**PRIZES:** Ribbons and prizes will be awarded for 1st–5th place in each grade. Overall Champions will also be selected and will receive a prize.

### CONTEST RULES:

- All entries must be presented on 12”x18” paper.
- Include name, address, and school grade of participant on BACK of entry.
- The title should be on the FRONT of the poster.
- No three dimensional posters accepted.
- Accompany the poster with the background info requested in the 1st paragraph above.
- Posters will not be able to be returned.
- Any poster postmarked after

the deadline will not be accepted. (Please allow a week for posters to arrive.)

- All entries become property of the North Lakes Academy Rockhounds and AFMS.

### SCALE OF POINTS:

- Originality and Art Work—30 points
- Title /Theme Organization, Design, Spelling, Grammar—10 points
- Information Provided—Facts and Details—20 points

**ARTWORK:** Artwork can be done with pen, ink, crayons, magic markers, paint, print, photography, or any other artist’s medium.

**DEADLINE:** Entries must be postmarked by **May 1, 2021**.

### SEND TO:

Michelle Cauley  
c/o North Lakes Academy  
Rockhounds  
4576 232nd Street North  
Forest Lake, Minnesota 55025

**QUESTIONS:** Contact Poster Competition Coordinator Michelle Cauley by email at [mcauley@northlakesacademy.org](mailto:mcauley@northlakesacademy.org). Contest info on AFMS website, [www.amfed.org/kids.htm](http://www.amfed.org/kids.htm).

## Dagger from Space— Update

*Matthew Lybanon, Editor*



“Dagger from Space” in our August 2016 issue reported that a dagger found in the tomb of the “boy king” Tutankhamun was found to be made of iron from a meteorite (probably the “Kharga meteorite”). The dagger—which features a decorated gold handle and a gold sheath with a floral lily motif on one side and a feather pattern on the other—is now on display at the Egyptian Museum in Cairo.

**MEMPHIS ARCHAEOLOGICAL AND GEOLOGICAL SOCIETY**

MAGS Rockhound News ♦ A monthly newsletter for and by the members of MAGS

# MAGS At A Glance

## February 2021

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
31	1	2	3	4 Zoom Board Meeting, 6:30 pm	5	6
7	8	9	10	11	12 Zoom Membership Meeting, 7:00 pm, "What zircons in sedimentary rocks can tell us about plate tectonic processes," 7:00 pm	13
14 Happy Valentines Day	15 Presidents Day	16 MARDI GRAS	17	18 Mars 2020 spacecraft lands on Mars	19	20
21	22	23	24	25	26	27
28	1	2	3	4	5	6

Memphis Archaeological and Geological Society  
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