



Volume 66 ♦ Number 10 ♦ October 2020 ♦ A monthly newsletter for and by the members of MAGS

October News

W. C. McDaniel, MAGS President



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Sunday, October 11
Membership Meeting

1. Will be held at **Freeman Smith Park, 4620 N. Brunswick Rd., 1:00-3:00 P. M.**
2. The program will be presented by Lou White (March program was cancelled).
3. No outside visitors.
4. No Library
5. Junior program will be part of the adult program.
6. No food/drink (ok to bring your own but no sharing).
7. Must wear a mask.

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INFORMATION NEEDED FOR MAGS FREE 2021 RENEWAL

BOB COOPER

Recently W. C., our MAGS President, sent out an email with an attachment stating that all current MAGS Members will have a choice to continue their 2020 MAGS membership into 2021 at no charge. To update my membership records, I will need three pieces of information from anyone who chooses to continue their membership into 2021.



1. Your current address
2. A contact number (home or cell phone)
3. Since MAGS pays about \$5 yearly per member (adult & kids) for insurance/SFMS dues, I need to know who you want on your membership for 2021. I have found over time that some members forget who they have listed.

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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

MAGS Show Website: 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.

The October DMC Field Trip has been cancelled. Clubs scheduled to host for the remainder of this year, from July through December, have the option to preemptively reschedule to 2021.

Links to Federation News

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

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October News

Continued from P. 1

8. Must maintain social distancing.
9. Must stay home if you feel sick or may have been exposed to Covid-19.

Estate sale October 31

1. Information regarding the sale is presented elsewhere in newsletter.
2. This sale will benefit the Show/club.
3. Members will be asked to prepare and help conduct the sale. Be on the lookout for additional information.

Board extension and Membership dues

1. Members approved a request to extend the current officers to 12/31/21.
2. Your current membership has been extended to 12/31/21. Please read Bob Cooper's information on what you need to do.

Information Needed ...

Continued from P. 1

I need a prompt response from you with your decision.

Send your response to me at rocks4us@hotmail.com.

NOTE: For all 2019 MAGS Members who have not renewed their 2020 membership, you will have until November 1, 2020, to renew your 2020 membership to qualify for the free 2021 membership.

Thanks,
Bob Cooper
MAGS Membership Director

Congratulations!



Linda McCall, President, North Carolina Fossil Club, 2012-2017, and Research Fellow - University of Texas at Austin, is this year's winner of The Paleontological Society's Strimple Award, in recognition of her sustained contributions to the science of paleontology. The Strimple Award annually recognizes outstanding achievement in paleontology by amateurs (someone who does not make a living full-time from paleontology).

Rejoice, Dr. Who Fans

Matthew Lybanon, Editor



Australian palaeontologists have named a newly-found species of trilobite in honor of someone who could travel back 450 million years to see the segmented sea creature when it was alive. The fossil, *Gravicalymene bakeri*, was found preserved in shale rocks in Northern Tasmania that date back to the Late Ordovician period. The species name refers to Tom

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Memphis Mineral Fossil Jewelry Show

and
Estate of a former club member/show dealer
presents

Treat and Treat Halloween Rock Estate Sale
Saturday, October 31

9-3:00

Sale will be outdoors

8280 Bon Lin Dr

Memphis, TN

Near Wolfchase Mall

901-490-3570

1. Estate sale with over 100 boxes, most not opened since the 1990's
2. Included in the sale/collection:
 - Fossils- ammonites, trilobites, orthoceras, Moroccan specimens
 - Arkansas quartz, clusters and points-Grade A
 - Geodes
 - Brazilian agates and amethyst display specimens
 - Mica with garnets, lots of single garnets
 - Dino bones, many polished, gem grade
 - Petrified wood. Especially Eden Valley, polished and unpolished
 - Tumbles stones, Apache tears
 - Lots of misc. material and boxes not yet opened

All Memphis- Shelby County Covid-19 regulations will be followed:

- **Mask required**
- **Social distancing**
- **No Early Birds**
- **No Parking in driveway**
- **Sale proceeds to benefit the show(MAGS) and estate**

Photo Contest Winners

The winners in the Great MAGS Field Trip Finds Photo Contest are

1. Danny Baker
 2. Debbie Schaeffer
 3. Lauren Schaeffer
- Honorable Mention. Kim Hill

The winning photos are shown in our September issue, except for Kim Hill's (You can see it in the August issue; it's photo #6.)

The first two prize winners are shown at right, with their prizes. Lauren is out of the country and won't be back for several months. Kim can pick up her prize at any MAGS meeting. Thanks to everyone who participated in the contest.



Rejoice, Dr. Who Fans Baker, who portrayed the fourth Doctor Who in the long-running BBC science fiction series of the same name.

The newly-identified specimen is unusual, for while trilobites were common in Australia during the entire Ordovician period, *Gravicalymene bakeri* belongs to a group that has not previously been discovered on the continent. *Gravicalymene* is a small genus of calymenid trilobites that flourished from the Ordovician to the Devonian period.

"During this time, Australia was part of the great landmass Gondwana, when complex marine ecosystems were starting to develop," said researchers Dr. Patrick Smith from the Australian Museum Research Institute and Mac-

quarie University and Dr. Malte Ebach from the University of New South Wales. "It was also a time when the first primitive plants were appearing on land."

The researchers said Doctor Who inspired their scientific careers. 'It was the character of Doctor Who—and especially the actor Tom Baker—that inspired me to explore the natural world,' Dr Ebach added.

'So, it is a joy to name a trilobite in his honor. My sister-in-law has even knitted a replica Doctor Who scarf for the occasion,' he concluded.

Ref: Patrick M. Smith & Malte C. Ebach (2020) A new Ordovician (*Katian*) calymenid, *Gravicalymene bakeri* sp. nov., from the Gordon Group, Tasmania, Australia, *Alcheringa: An Australasian Journal of Palaeontology*, DOI: 10.1080/03115518.2020.1797874.

October Field Trip

Charles Hill

Hello, all. It's me again. I want to tell you about our next field trip. On October 17th we will travel to Middle Tennessee to hunt for geodes and fossils. On Saturday we will hunt for the unique fossils at Dale Hollow Lake, which will be mostly crinoids, both loose and in plates. The special thing about these is that they have a beautiful blue hue. We will find other fossils there, as well; and if the water is low, we will find them in great abundance. We will meet at 9:00 A. M. at the Dairy Queen in Byrdstown, Tennessee, located at 1245 Livingston Hwy. 38549-4595. Livingston Hwy. is Hwy. 111. The GPS location is 36.560443, -85.166467. Thank you, Bob Cooper, for the coordinates. From

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Fabulous Tennessee Fossils

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

FTF 69

Fossil Replacement—Part 1



I have written about taphonomic processes of preservation in three articles for *Fabulous Tennessee Fossils* so far: #7 (beekite rings), #10 (steinkerns), and #60 (permineralization). In this article I want to return to types of preservation in fossils, specifically “replacement”, of which the beekite rings from FTF #7 is one example. Most marine organisms use either calcite or aragonite, both carbonate minerals, to construct their shells; however, sponges and some microfossil groups are known to use silica as part of their hard-part construction. Aragonite and calcite are polymorphs of one another and share the chemical formula CaCO_3 . Carbonates are susceptible to dissolution whenever there is an acid present and whenever the surrounding waters are undersaturated with respect to Ca and carbonate (CO_3). In tropical settings, which includes the numerous globally warmed periods of Tennessee’s geologic past, during which most of our limestone was formed, carbonate was formed at a rapid rate. Carbonate was both chemically precipitated and biologically secreted, resulting in fossil shell numbers well above trillions, much to collector’s delight. After millions of years of being buried, upon exhumation these ancient carbonates are exposed to weathering. Rainwater is slightly acid, which explains the pervasive weathering of limestone in Tennessee to form many sink holes

and cave systems in the state, along with many of the valleys in the Valley and Ridge region. As with most carbonates, the fossils within these rocks will under dissolution as well and be lost, unless collected by you and me. Eventually this carbonate is recycled back to become the salt in our modern oceans.

The fossilization process requires burial to depths that remove surface processes from destroying the original shells and introduces chemical processes of groundwater percolation through the sediments at elevated temperatures associated with depth of burial and tectonic processes affecting the area. Fossilization can be relative quick (thousands of years) to exceedingly long (millions of years) and may even occur in phases such that a fossil undergoes fossilization several times. We all learn the basic processes of fossil preservation, “modes of fossilization” in our grade school science classes (it is part of the Tennessee Science Standards for middle school): molds and casts are made, some fossils “recrystallize” while others are “replaced”. In recrystallization, the original mineral remains the same mineral; however, it will re-grow into new crystals that are often larger than before and results in the destruction of any biologically produced shell structure from the growth years of the living animal. Calcite remains

calcite (although aragonite may change to its polymorph calcite). The recrystallized carbonate fossil readily fizzes in dilute hydrochloric acid and is susceptible to dissolution by freshwater entering the deposit as the deposit nears the surface of the Earth due to erosion. One of the more prominent beds just within the Coon Creek Formation, just above the aragonite- and calcite-rich fossil beds is a good example. It consists completely of molds and casts of mollusks that used to be a densely packed shell-bed, until groundwater dissolved all of the carbonate away as the formation neared the surface. Most collectors ignore this part of the formation because they do not find shell fossils.

The older the sedimentary unit, the more likely that a fossil eventually interacts with heated burial fluids that can have more complex chemistries resulting from all of the post-burial history that affects these sediments and rocks. Quartz (SiO_2) is the most common replacing mineral, primarily because silicon (Si) and oxygen (O) are the two most common elements within the crust of Earth. Replacement by quartz is called “silicification”; however, sometimes the quartz is in the form of microcrystals, thus forming chert replacement. Marine invertebrates preserved in the Devonian-age Camden Chert is an excellent example

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Fabulous Tennessee Fossils of “chertification”.
Continued from P. 5 Agate is another form of silica replacement that commonly occurs in Tennessee and is easily recognized by the color-banded appearance of the fossils, especially fossil wood (however, this type of preservation is usually classified as permineralization rather than silicification; see F2F #60). In very rare circumstances, none of which seem to have occurred in Tennessee, fossils can be replaced by an opal, which is a hydrated form of quartz ($\text{SiO}_2 \cdot \text{H}_2\text{O}$) and much softer than typical quartz or chert.

Pyrite (FeS_2) is another mineral, a sulfide metal in this case, that commonly replaces calcite fossil shells in chemical settings in which sulfur reduction is prevalent as the water moves through the enclosing sediments and rocks. These fossils are highly prized collecting as the fossils take the appearance of having been cast in gold, in this case “fools gold”. They can be problematic in collections that are housed in humid settings as they can begin to oxi-

dize and crumble during the breakdown of the mineral. This is called “pyrite’s disease” by some. “Pyritized” fossils are found in many of the dark shale units in Tennessee, especially the Mississippian-age Chattanooga Shale in middle and east Tennessee. Pyrite is found as coatings and small crystal clusters on brachiopods from the Devonian-age Ross Formation. We have recently identified very minor pyrite formation within some fossils in the Cretaceous-age Coon Creek Formation as well. Marcasite, which is a polymorph of pyrite, is common in the Eocene-age Claiborne Formation of West Tennessee. This formation is famous for fossilized leaves, flowers, and pollen. The marcasite is generally associated with the fossil wood and can also be found as flattened disc-shaped “marcasite dollars” that may have nucleated around fossil plant fragments.

Although not reported from any Tennessee fossils, other metallic minerals that are known to replace fossils include: bornite, chalcocite, cinnabar, and covellite, which have been reported replac-

ing wood in the western U. S.; galena, a lead-sulfide, has been reported to replace Permian-age foraminifera in Germany; along with the zinc-sulfide sphalerite. Although East Tennessee has two well-known sphalerite districts, no fossil replacement by sphalerite has been reported. Can other metals be found as replacement minerals for fossils? On my list of “must find for my collection” would be the native element silver (Ag), which has never been found in Tennessee, but was reported in 1898 by J. E. Spurr from mollusks in the Aspen area of Colorado. Don’t rush to plan a collecting trip though as the actual geologic formation is “lost” to science. Imagine silver fossils! In the next FTF installment, we will look at other minerals that occur as replacement minerals for fossils, including other silicates, phosphates, other carbonates, oxides, fluorides, and more.

Editor’s Note: You can find a recent Smithsonian Magazine article, How Do Fossils Form?, at <https://www.smithsonianmag.com/smithsonian-institution/how-do-fossils-form-1-180972340/>

October Field Trip there, we will
Continued from P. 4 travel to a boat landing at Dale Hollow Lake. Coordinates for the boat ramp are 36.546514, -85.212340. Once again, thank you, Bob. On Sunday, we will go (also 9:00 A. M.) to the Ledbetter farm for a geode hunt. If it is wet at the farm, be prepared to load up with someone with a 4X4, or else do some walking. The fallen leaves will cover the ground, so bring a rake and digging tools. From Led-

better’s we will be going home.

Hope to see you there,
Charles



🎵 Meetings

October: Lou White, “Collect Memphis”

November & December: TBD

🎵 Field Trips

October 17: Dale Hollow Lake & Ledbetter Farm

November & December: TBD

🎵 October Birthdays

1 Gail Karr
Dave Shiffman

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MAGS Notes

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- 2 Bill McManus
- 5 Michala Demo
Matthew Lybanon
- 7 Connor Smith
Alan Jacobs
Chris Vaughn
- 9 Charles Hill
- 10 Deborah Crowder
Fulton Ledbetter
- 12 Mary Katherine Stout
- 13 Michael Baldwin
- 14 Patty Herman
- 19 Aaliyah Thomas
- 24 Keith Riding
Ann Austin
- 27 Ann Austin
Arlene Oleartchick
- 30 Candia Ludy

🎵 New Members

Christine McManus has added additional dependents to her family membership:

Laura McManus
Gypsee McManus

No Fall 2020 Clement Show

The Ben E. Clement Mineral Gem, Mineral, Fossil, and Jewelry Show has been cancelled. In the August issue we reported that this show had been rescheduled to October 10 & 11 from an earlier time. However, due to the pandemic there will be no show in October.

Editor's Note: *There were no meetings between March and September due to the pandemic. The March minutes were approved at the September meeting and are published here. The*

September minutes will be approved at the October meeting and published in the November newsletter.

March Board Minutes

Mike Coulson

Called to order 6:34. Present: W. C. McDaniel, Charles Hill, Kim Hill, Carol Lybanon, Matthew Lybanon, Bonnie Cooper, Bob Cooper, Dave Clarke, James Butchko, Nannett McDougal-Dykes, Mike Coulson.

Secretary: Copies of the February minutes were distributed and were approved by the Board.

Treasurer: Report reviewed and approved by Board. Wrote and sent out check to Chucalissa. Taxes have been done and accepted. Paid up rent for the church through June.

Membership: 2 new members, some individual and some family since last Board Meeting. Membership directory sent out. Newsletter mailed out.

Field Trips: Upcoming: March Hedger in Jonesboro, Arkansas. April, local day trip—Tour of Memphis rock hunting sites. May 2, Barite site has been sold but we can still make one more trip. First weekend in May, Missouri. May 16-18, Gainesville, Florida, Shark Teeth. June 20, local day trip. July 18, Malvern & Magnet Cove. August 22, Flora, Mississippi, Petrified Forest. September 19, Arkansas Diamond Mine. October 17, local day trip. November 21, Hot Springs Phantom Mine. December no outing.

Adult Programs: Upcoming: March, Lou White. April, Show. May, Activities, Demonstrations. Wire wrap, Jewelry, Lapidary, Tumbling, Sawing.

Junior Programs: Mar 13, Geology Along I-40 w/Mike Baldwin. Apr 10, preparations for the Show w/adults. May 8, making paint from minerals w/ Mike Baldwin, Jun 12, how caves form w/Mike Baldwin. Jul 10, finding precious stones and gold w/Charles Hill. Aug 14, indoor rock swap w/adults. Sep 11, making crystals w/Mike Baldwin.

win. Oct 9, fluorescent minerals w/ Mike Baldwin. Nov 13, native peoples of North America w/Mike Baldwin. Dec 11, Holiday Party w/adults.

Recent club promotion opportunities:

- Mike Baldwin traveled to western North Carolina in February to present a Rock Talk for 4th grade students in two elementary schools with about 125 fourth grade students.
- **Mar 4, 2020: Bluff City Canoe Club:** Wednesday, March 4 at the main public library. Meeting time is 6:00-8:00 with set-up at 5:00. I will be presenting basically the same program that I do for the schools, plus a few more bigger display items, like petrified wood, fossil starfish, trilobites, coral, and quartz crystals.
- **Mar 6-8, 2020: SFMS Executive Meeting and Rockhound Roundup:** 10 x 20 spaces are available for \$25 for the 3 days plus park entrance fee. Clubs are encouraged to bring items to swap and sell, and information about their next Rock Show. Attendees not selling only need to pay park entrance fee. I have Show postcards to take.
- **Mar 18, 2020: Lichterman Nature Center STEM Camp Talk:** Wednesday, March 18, 1:00-2:00. I did this event last year and about 80 children attended. Last year I did my standard Rock Talk. I think I will do the fluorescent display this year, and distribute Rock Show postcards and "Information About Rocks and Minerals" sheets.
- **Mar 28, 2020: 14th Annual Scouts Rock at Graceland,** Saturday, March 28, 10:00am-3:00pm, at Graceland's new event facility. About 1,000 Boy and Girl Scouts and their families are

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MEMPHIS ARCHAEOLOGICAL AND GEOLOGICAL SOCIETY

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March Board Minutes expected to attend. James Butchko traditionally mans this booth. James, will you be manning the booth again this year? I am available to help.

Library: Twenty-one books added to the library. Everything that went missing has been replaced.

Show: Dealers will move in on Thursday. Movers and vendors are set up. Leonard's, Maxwell's, still need to order tables. Jim will order wrist-

bands. Bonnie has requested Show insurance. Chucalissa will only be at the Show one day.

Rock Swaps: Next swap will be on Saturday, June 13, hosted by W. C.

Editor: March Newsletter is out.

Web: Web will be updated as soon as the March newsletter comes out. Website now transferred correctly.

Old Business: Check sent to Chucalissa for hires photos of some of the collection. W. C. has purchased some door prizes for display drawings.

Name the Table Contest: W. C. will get together suggested ways to have Members "Name the Table" contest.

New Business: None.

Adjourned 7:08.

March Meeting Minutes

Mike Coulson

President W. C. McDaniel made the decision that due to the Coronavirus pandemic the March 13 MAGS Membership Meeting is cancelled.

September Meeting Pictures



Grand Canyon Fossil Footprints

Matthew Lybanon, Editor

Editor's Note: *The following is a National Park Service News Release.*

Paleontological research has confirmed a series of recently discovered fossils tracks are the oldest recorded tracks of their kind to date within Grand Canyon National Park. In 2016, Norwegian geology professor, Allan Krill, was hiking with his students when he made a surprising discovery. Lying next to the trail, in plain view of the many hikers, was a boulder containing conspicuous fossil footprints. Krill was intrigued, and he sent a photo to his colleague, Stephen Rowland, a paleontologist at the University of Nevada Las Vegas.

The trailside tracks have turned out to be even more significant than Krill first imagined. "These are by far the oldest vertebrate tracks in Grand Canyon, which is known for its abundant fossil tracks" says Rowland. "More significantly," he added, "they are among the oldest tracks on Earth of shelled-egg-laying animals, such as reptiles, and the earliest evidence of vertebrate animals walking in sand dunes."

The track-bearing boulder fell from a nearby cliff-exposure of the Manakacha Formation. The presence of a detailed geologic map of the strata along the Bright Angel Trail, together with previous studies of the age of the Manakacha Formation, allowed the researchers to pin down the age of the tracks quite precisely to 313 +/- 0.5 million years.



The newly discovered tracks record the passage of two separate animals on the slope of a sand dune. Of interest to the research team is the distinct arrangement of footprints. The researchers' reconstruction of this animal's foot-fall sequence reveals a distinctive gait called a lateral-sequence walk, in which the legs on one side of the animal move in succession, the rear leg followed by the foreleg, alternating with the movement of the two legs on the opposite side. "Living species of tetrapods—dogs and cats, for example—routinely use a lateral-sequence gait when they walk slowly," says Rowland. "The Bright Angel Trail tracks document the use of this gait very early in the history of vertebrate animals. We previously had no information about that." Also revealed by the trackways is the earliest-known utilization of sand dunes by vertebrate animals.

Ref: *Stephen M. Rowland, Mario V. Caputo, Zachary A. Jensen. Early adaptation to eolian sand dunes by basal amniotes is documented in two Pennsylvanian Grand Canyon trackways. PLOS ONE, 2020; 15 (8): e0237636 DOI: 10.1371/journal.pone.0237636*

New Mass Extinction

Matthew Lybanon, Editor

Here's another article on a mass extinction. This one was not previously known. An international team has identified a major extinction of life 233 million years ago that triggered the dinosaur takeover of the world. The crisis has been called the Carnian Pluvial Episode (CPE).

The cause was most likely massive volcanic eruptions in the Wrangellia Large Igneous Province of western Canada, which produced volcanic basalt that forms much of the western coast of North America. The CPE also had an impact on ocean life. It marks the start of modern-style coral reefs, as well as many of the modern groups of plankton, suggesting profound changes in the ocean chemistry and carbonate cycle.

Recent field studies show that the CPE was a global phenomenon; geochemical data suggest that global warming triggered environmental and biotic changes and, along with a small number of radioisotopic ages coupled with biostratigraphic correlation, suggest a possible link to the eruption of the Wrangellia Large Igneous Province. Fossil finds have clarified the timing of extinctions and radiations of many groups during the CPE; recent studies show that, while dinosaurs originated in the Early to Middle Triassic, they remained rare and at low diversity and only radiated explosively during the CPE.

Ref: *"Extinction and dawn of the modern world in the Carnian (Late Triassic)" by J. Dal Corso and 16 others in Science Advances 6, eaba0099.*

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MAGS At A Glance

October 2020

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
27	28	29	30	1	2	3
4	5	6	7	8 Board Meeting, Zoom, 6:00 pm	9	10
11 Membership Meeting, Freeman Smith Park, 1:00-3:00 pm	12 	13	14	15	16	17 MAGS Field Trip, Dale Hollow Lake
18 MAGS Field Trip, Ledbetter Farm	19	20	21	22	23	24
25	26	27	28	29	30	31 

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

