



Volume 67 ♦ Number 04 ♦ April 2021 ♦ A monthly newsletter for and by the members of MAGS

Roadcut Gravel Fossil

W. C. McDaniel, MAGS President



Last month **Roadcut** took a trip to the creeks, rivers, and gravel pits and collected agates. **Roadcut** returns to the same deposits to collect gravel fossil. There are not too many sites where you can bend over, pick up a nice agate, and also collect a 400-million-

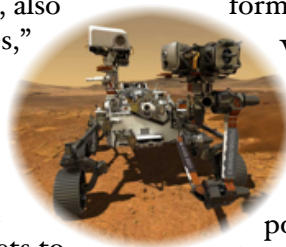
year-old fossil embedded in a piece of gravel. It happens and here is why.

The fossils located in the gravel deposit are mostly external impressions and internal molds of various extinct sea creatures that in- *Continued, P. 3*

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MARTIAN BLUEBERRIES?

Moqui Marbles (pronounced Mo-Key), also known as "thunderballs" or "shaman stones," are an unusual geological anomaly. They are formed when water seeps through layers of sandstone, dissolving into pockets within the layers, carrying iron oxides like goethite, limonite, and hematite. The iron oxides accrete around the outside of pockets to



STEPHANIE BLANDIN, MAGS MEMBER form spheres.

When the sandstone wears away, the iron concretions are left behind. They range from small marbles to baseball sizes.

Windblown sand and water, geological pressure, and variations in the shape of pockets where the orbs form create a variety of shapes. They come in flat *Continued, P. 4*

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.

All 2021 DMC field trips have been cancelled and rescheduled to 2022. The next MAGS-sponsored trip is currently scheduled for October 2024.

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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Roadcut Gravel Fossils Continued from P. 1 habited the seafloor during the Paleozoic Era, mainly the Mississippian and Devonian periods (420-320 million years ago). Over long periods of time and meandering journeys these gravel fossils made to the streams and gravel deposits of the Midsouth and into your collecting buckets. Some of those fossils include Crinoids, Brachiopods, Bryozoans, Tabulate and Rugose Coral, Gastropods.

When searching for the fossils look for the shapes and impressions in the gravel. Most are going to be a small part of the actual gravel, while the Tabulate and Rugose Coral will frequently be the entire gravel. Brown is the dominant color. Take your time and be sure to look on all sides and use a magnifying glass.



Crowley's Ridge



Items in collections from Nonconnah Creek and Vulcan Quarry (gray crinoid stems)



Crowley's Ridge



Crowley's Ridge



Crowley's Ridge

President's Message

**MAGS21—April 9
Membership Meeting
Zoom to Church Grounds**

Friday, April 9, 6:00 P. M.
(note early start time)

1. No formal program
2. Displays
 - Found something or a whole lot of stuff. Bring it and show us.

- Made something. Bring it and show off.
- Added to your collection? Bring it and show us.
- Or just bring a display
3. Auction
 - Petrified wood. The displayed piece from the FossilFest
 - MAGS cookbook
 - MAGS stickers
 - Surprises
4. 12 months of Door prizes
5. Never too late Easter egg hunt.
6. Drinks and packaged snacks provided.

COVID 19

- ▶ **Face mask required**
 - ▶ **Social distancing a must**
- May 22—Field Trip and Rock Swap to Memphis Stone and Gravel, details later**

W. C.

Martian Blueberries? saucer
Continued from P. 1 shapes, clus-
ters, walls,
towers, buttons, noses, and globe
on a stick shape (Bogi—some-
times spelled Boji—Stone).
Weathering can break them open
and create iron oxide bowls or
curved shards.

The most common place to find Moqui Marbles is in Utah. They are found in the U. S. (Arkansas included) and on several continents in the ancient archaeological excavations. **They are even found on Mars.** The NASA scientists on the Opportunity Rover team discovered them lying about on the surface of Mars between sandstone formations. The team nicknamed them “blueberries” and the geologists realized they were Martian Moqui Marbles.

Moqui Marbles are used in a lot of spiritual rituals. Hopi and other tribal shamans used them to create special effects. When they are tossed into a fire they explode, sending up an impressive shower of sparks. In Hopi, the word “Moqui” means “dear departed ones.” Hopi tradition says the spirits of dead ancestors come down to Earth at night to play games with the marbles. They leave them behind to assure their descendants that they are well and happy in the spirit world.

Moqui Marbles are considered healing stones by some spiritualist practitioners today. If you hold the Moqui Marbles in your hand and pull them apart slowly, you will sense a slight pull or push. [**Editor's Note:** some Moqui Marbles are slightly magnetic.] Not all of them will do this but I have a pair that

you can feel push against each other. I held one behind rainbow obsidian and the rainbow actually got brighter! They are really fun and unique rocks!



Editor's Note: This article was originally published in *Arkansas Rockhound News*, the *Central Arkansas Gem, Mineral and Geology Society (CAGMAGS)* newsletter. It is used here with permission. Interested readers can find more information on Moqui Marbles at <https://geology.utah.gov/map-pub/survey-notes/glad-you-asked/moqui-marbles/>.

Field Trips

James Butchko, Field Trip Chair

There wasn't much interest in the March trip to Blue Springs so we cancelled it. The next trip is another day trip to Melba Cole's property to find selenite and whatever else is there. We will go April 17 and meet at 10:30.

Where are some places you'd like to go? I heard that Vulcan Quarry near Parsons, Tennessee, is allowing some trips again. If I hear from enough people I will try to

schedule a trip there. So call, email, text, or come by and yell.

Jim Butchko

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There's An App For That

The Digital Atlas of Ancient Life is designed to help you identify fossils and explore the diversity and history of life on Earth. It began as a digitization project funded by the PaleoNiches Thematic Collection Network (TCN), a series of interconnected National Science Foundation grants to multiple principal investigators. It was later funded by the Cretaceous World TCN. In the beginning, the project was envisioned as a series of Digital Atlases (field guides) covering different regions of the United States during specific time periods. A series of teaching resources (exercises) related to the four Digital Atlases created so far were also developed for different grade levels.

Four Digital Atlases have been developed covering different time periods and regions of the United States:

- Cretaceous Atlas of Ancient Life: Western Interior Seaway
- Digital Atlas of Ordovician Life: Exploring the Fauna of the Cincinnati Region
- Neogene Atlas of Ancient Life: Southeastern United States
- Pennsylvanian Atlas of Ancient Life: Midcontinental United States

Each Digital Atlas is akin to the types of field guides that naturalists might use to

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There's An App For That identify
Continued from P. 4 bird or
plant

species. The data underlying each Digital Atlas are derived from specimens in museum collections that have been "digitized."

All of this is available at <https://www.digitalatlasofancientlife.org/>. Or you can download Version 2.0 of the free Digital Atlas of Ancient Life App, available now for iOS and Android devices.

SFMS William Holland Workshops

The SFMS William Holland Workshops are online. Please go to sfmsworkshops.org for class descriptions and instructor bios. Below is a list of classes:

- ✓ Paul Roberts—Cab II class
- ✓ Bill Boggs—Intarsia
- ✓ Chuck Bruce—Silver III—Inlay II (waiting list only)
- ✓ Cindy Moore—Metal Mania
- ✓ Dale Koebnick—Silver II—Cab Alt. w/Bezel Prongs & "Step Bezel" Tab Setting
- ✓ Debora Mauser—Low Tech Casting
- ✓ Micah Kirby—Electro-Etching with Silver forming
- ✓ Janet Pace—Flame Painting on Copper (waiting list only)
- ✓ TBD—Wire II
- ✓ Jerri Heer—Gem Trees
- ✓ Tom Slavicek—Leather

Cindy at William Holland hopes you will join her for this fun and educational week: June 6-11, 2021. She knows we're all ready to get back to normal

Ancient Amphibian in Arizona

Mathew Lybanon, Editor

The 1936 movie, "The Petrified Forest," based on the smash hit Broadway play by Robert Sherwood, starred Leslie Howard and Bette Davis, the stars of the play. The studio wanted Edward G. Robinson to play the role of gangster Duke Mantee. But Leslie Howard threatened to drop out of the picture unless Warner signed the actor who had played the role in the play, Humphrey Bogart.

Bogart got the part, and his performance was so electric that Warner signed him to a long-term contract. It was the start of Bogie's long career as a major Hollywood star. And he never forgot Howard's generosity. Years later, he and Lauren Bacall named their daughter Leslie after him.

The movie is set in Arizona's Petrified Forest. Now a national park established in 1962, it contains one of the most continuous sections of Triassic-aged rocks anywhere in the world. These rocks were deposited by enormous rivers between 208 and 228 million years ago and include an incredible diversity of fossils.

One of those fossils, the well-preserved head of a giant Triassic Period amphibian, came to life in horrific detail when experts in an Arizona lab peeled away debris to find its mouth, nose, and empty eye sockets. The fossil skull has a texture resembling leathery skin. In a sign of the times, Petrified Forest National Park reported this January 8 on their Facebook page.



The skull belonged to a Metoposaur. *Metoposaurus*, meaning "front lizard," is an extinct genus of amphibian, known from the Late Triassic. This mostly aquatic animal possessed small, weak limbs, sharp teeth, and a large, flat head. It mainly fed on fish, which it captured with its wide jaws lined with needle-like teeth. *Metoposaurus* was up to 3 m long and weighed about 450 kg. This particular Metoposaur was *Anaschisma browni*.

A photo shared by the park shows the fossil looking frighteningly like a dehydrated alligator, right down to the scales. Hundreds have reacted to the park's photo, some expressing amazement at the skull's life-like appearance, particularly the "skin texture." As for that "skin," park officials noted looks are deceiving. "This is the bone itself," the park wrote. "Unfortunately skin is not preserved but presumably (skin) sat over the bone and may have shown this texture."

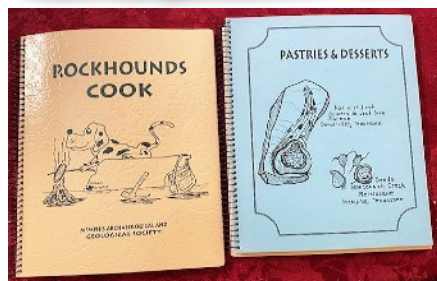
The skull was collected in 2017 from the park's Blue Mesa Member site and "fossil preparators have slowly been

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Ancient Amphibian in Arizona
Continued from P. 5

removing the rock from the skull, vertebrae, and ribs,” officials wrote. The eyes were uncovered fully on January 2. Park officials say it is one in a series of metoposaur skulls that have turned out to have clearly preserved eye sockets. The Blue Mesa Member is made up of mudstones and sandstone beds dating 220-225 million years, the National Park Service says.

New species are frequently discovered at the park, experts say. In October, it was announced that a strange “new species of a 220 million-year-old burrowing reptile known as a drepanosaur” had been found. Fossils of the species show it had “enlarged second claws, bird-like beaks, and tails ending with a claw.” This new species, named *Skybalonyx skapter* by a collaborative team of researchers from Petrified Forest National Park, Virginia Tech, University of Washington, Arizona State University, Idaho State University, and the Virginia Museum of Natural History, was announced on October 8th in a study published in the *Journal of Vertebrate Paleontology*.



Brown Sugar Brownies
(Stephanie Blandin)

- ¼ cup melted oleo
- 1 egg
- 1 cup brown sugar
- ¾ cup flour
- 1 pinch salt
- 1 cup nuts (chopped)
- 1 tsp baking powder

Mix all dry ingredients together. Then add melted oleo and egg. Put in well-greased baking pan (8 in square). Bake at 350°F for 20 to 25 minutes.

Tortellini Soup
(Stephanie Blandin)

- 1 lb Italian sausage (hot or mild)
- 2 large cans tomatoes
- 1 can Rotel (Italian style)
- 2 cans water from the tomato cans
- 1 pkg Tortellini (dry)

Brown sausage and drain. Add tomatoes, Rotel, tortellini, and water. Let simmer until tortellini is soft.

Mosasaur Sighting

Cornelia McDaniel took this picture of the Pink Palace’s new greeter at its Central Avenue entrance. The life-size replica was built by the Memphis Metal Museum.



Jewelry Bench Tips by
Brad Smith

BEZEL PROBLEMS

When bezel setting a cab that has rather sharp corners, have you ever had problems pushing the metal down at the corners? It’s a common problem often causing a wrinkle in your bezel and a grimace on your face.

In order for a bezel to capture the stone, the top edge of the bezel must be compressed and become shorter to lie down onto the stone. With a round or oval stone this naturally happens as you push and burnish the bezel. But when setting a stone with corners, the tendency is to push the long sides of the bezel down first. No compression occurs along the sides, and all excess metal is left at the corners. Compressing everything there is difficult. Often the only way to remove the extra metal at the corner is to make a saw cut and fold the two sides in to touch.

If you want a smooth bezel all around the corners, the simple solution is to set the corners of the bezel first. Then push in and burnish the sides. In this way the necessary compression is distributed along the length of all sides and not forced to occur at the corners. With the corners set first, the top edge of the bezel can easily be compressed along the sides.



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P. 9

Fabulous Tennessee Fossils

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

FTF 75

Laura's Fossil Horse Bone



In recent essays I have focused on biotic interactions among different organisms that can be preserved and later recognized through biotic interaction analysis. Biotic interactions among living organisms vary widely in nature and purpose from symbiotic relationships (parasitism, commensalism, mutualism, etc.) to competition for resources (space, food, mates, etc.), but one of the most prevalent biotic interactions is predation. Predation dynamics, especially predator-prey population dynamics, is one of the primary foci of modern ecology. There is a considerable amount of literature in modern ecology devoted to the importance of predator-prey (along with sex selection) as being the most important factor structuring ecological communities and as a measure of ecosystem health and resilience in ecosystems.

Predation occurs when an organism purposely exploits another organism as a food source by actively dispatching the prey and ingesting all or part of the prey. This is a "direction interaction" between two individuals and usually spans a relatively short interval of time. The very nature of the predatory interaction is antagonistic and usually ends up with the prey organism receiving extensive damage, breakage, dismemberment, and obvious loss of biomass (the juicy soft parts that was the

reason for the predator focusing attention on the prey in the first place). We normally think of a predator, like a lion, eating the entrails and muscle of its prey; however, many predators will ingest hard parts (shell, bone, etc.) during their eating. I am sure you have watched your pet dogs and cats spend happy hours crushing and demolishing bone for both the tasty food residue and bone marrow, but also to hone their teeth. In fact, most vertebrate predators have very specialized teeth adapted towards their more common prey (curved incisors, serrated teeth edges, etc.). In the modern observable world, biologists can readily identify acts of predation by watching the event unfold or by examining a recent carcass for telltale signs. These avenues are not available to the paleontologist, especially when the remains are later redistributed by geologic processes. Most acts of predation have "low preservation potential" unless there is a physical record of the predation in a hard part.

There is another behavior that can sometimes seem to mimic predation but is not predation, although it is associated with a predatory act. Scavenging is a similar biotic interaction between two (or more) organisms that is usually relatively short-lived (although usually scavenging goes on longer than predation) and results in even more destruction to the prey or-

ganism. Like many acts of predation (except for maybe stalking and ambush predation), scavenging is "*facultative*", meaning it is generally an act of chance occurrence due to the fact that the scavenger (or predator) "runs across" a carcass left by a predator and is not choosy about what it will eat. Most scavengers are omnivores. The alternative to this behavior is "*obligate*" predation where a predator chooses a specific prey animal and will skip other opportunities in preference to its favorite meal. Scavengers are almost never obligate as they rely on another organism to choose and bring-down the prey first (and often must wait their turn at the carcass).

This brings me to Laura's fossil horse bone. Laura Suiter is a 2004 UT Martin graduate who has returned to her alma mater, now serving as the UT Foundation Director of Development. Laura is our lead person for fundraising at the UT Martin Coon Creek Science Center (so if you would like to donate to our cause, or just want to help us out in any way, let me know and I will get into contact with her). She is also highly interested in the outdoors, especially fossil collecting. Laura brought me one of her prized finds to identify (Figure 1). First, it is easily identified as a fossil by the brown coloration (due to oxidation staining in the

Continued, P. 8

Fabulous Tennessee Fossils sediment
Continued from P. 7 in which it
was en-
tombbed) and the density. Laura's
bone is heavier than most bones
would be of this size as it had be-
gun the fossilization process and
was beginning to "permineralize"
(see FTF 60 for a refresher on
permineralization) as minerals
were slowly crystallizing within
the porous insides of the bone.
Laura put a halt to that process
when she collected the bone,
which had washed out of its sedi-
ment grave and was in the process
of being reworked by modern ero-
sion. Laura saved that bone from
ultimate destruction.

The bone was easy to identify
as the metatarsal of a fossilized
species of horse, which are well-
known fossil finds in West Ten-
nessee. This metatarsal is about $\frac{1}{3}$
shorter than a modern adult horse
(*Equus caballus*) metatarsal, which
could mean it is a juvenile, or it
could mean that it belongs to an
earlier species of the horse group.
We are in the process of the taxo-
nomic study, but it is the taphon-
omy of the specimen that provides
biotic interaction information.
Also, the age of the bone remains
undetermined at this point as the
fossil was reworked into younger
sediments and we have not actual-
ly evaluated the site at this point
for more fossils. Hopefully I will
be able to tell you more about that
taxonomy and stratigraphy later
should we find more fossils when
we do the fieldwork.

What is important about this
metatarsal at this point is that it
shows gnaw-marks on both ends
of the bone and a few thin "cut-

marks" on the shaft (Figure 2). Was
this from the predator eating his
prey or was this scavenging?
Without witnessing the actual
event, we have to rely on physical
evidence on the bone, a single
bone, and parsimony. Although I
cannot be 100% sure, I interpret
the gnawing on the ends of the
bone to be from a scavenger. In
Figure 2 you can see extensive,
long, flat-bottomed, parallel
grooves that cut across the surface
of the ends of the bone. These
appear to be produced by a series
of shovel-shaped teeth that
scraped the surface of the bone.
The bone is not crushed on these
ends and there are no lines of cir-
cular or oblong divots in the bone
typical of the points of canine
teeth trying to crush a bone,
which would indicate a possible
predator. There are a few very
short, narrow, thin grooves on the
shaft that could be from a pointed
tooth or claw (perhaps for holding
the bone during gnawing). Most
likely the scavenger was a large
rodent using its front teeth to
scrape the surface of the bone to
remove lingering meat and sinew,
rather than chewing off the ends
of the bone to get access to the
inner marrow. I say large rodent
because the width of the shovel-
shaped grooves is wider than a
smaller rodent like a rat. If cor-
rect, then this interaction is
post-mortem to the prey horse
and could be classified as a "non-
interactive association" because
the horse was deceased at the time
that the scavenger did its part.
Biotic interaction analysis carries
with it some degree of uncertainty
and is sometimes much like a
Rudyard Kipling-like "just so"

story, only more parsimonious.



Figure 1. Laura's fossil horse bone, a metatarsal shaft bone, showing the brown coloration from partial fossilization. Note the ends of the bone have been chewed and there are a few thin cuts on the shaft of the bone. (Photo by MAG, centimeter scale).
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Fabulous Tennessee Fossils
Continued from P. 8



Figure 2. Close-up of the end of the metatarsal showing repeated, shovel-shaped, wide grooves due to teeth scrapping across the surface, not crushing. Note that each tooth groove set changes direction across the bone. (Photo by MAG, centimeter scale).

Jewelry Bench Tips
Continued from P. 6

CHEAPER & BETTER PICKLE

Most jewelers use a granular pickle mixed with water. The active ingredient is sodium bisulfate. This can be purchased online (<http://amzn.to/2HkNTro>) or from local stores as a common pool chemical used for adjusting the acidity of the water. It's sold under various names, so be sure to check the list of active ingredients for a brand that is 95% or more sodium bisulfate.

An added benefit is that the pool chemical is more pure in form than what is sold for jewelry use and does not cause the brown

grime often found floating on the top of the pot.

Smart Solutions for Your Jewelry Making Problems

[amazon.com/author/bradfordsmith](https://www.amazon.com/author/bradfordsmith)



Meetings

Zoom or “mixed” meetings.

April 9: See P. 3.

May 14: Michael Gibson, “Coon Creek”

June 11: TBD

Field Trips

April 17: Melba Cole’s property

May and June: TBD.

April Birthdays

- 3 Donna Neal
- 11 Ryan Ledbetter
Pam Papich
- 13 Paislee Lyles
- 15 Renee Lefler
- 21 Ian Ashurst
- 23 Marilyn Shiffman
- 27 Lori Carter
Luken Ledbetter
Tamie Dunn
Kathy Bullard
- 30 David Waddell
Bella Wilson

February 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, James Butchko, Nannett McDougal-Dykes, Mike Coulson, Melissa Koontz, Jane Coop.

Old Business: None

New Business:

1. Jim Butchko’s new phone number is (901) 921-3096.
2. To renew our SFMS membership Bonnie will send in our check plus our updated listings for 2021 SFMS Directory.
3. W. C. is looking into what we can do outside as a group to bring Members together safely.
4. Luke Ramsey from the Pink Palace Education Dept. joined the Zoom meeting to ask the club if they could help with an event they are putting on outdoors March 27-28 called “Fossil Fest, Dinosaurs in Motion.” Two members agreed to help and support two tables, lending some of their private collection to display.

Secretary: Copies of the January minutes were distributed via email and approved by the Board.

Treasurer: Club finance report was presented to and approved by the Board.

Upcoming expenses:

- **SFMS RENEWAL** To renew our SFMS membership the cost for 2021 is \$1.50 per member. We have a total of 224 Members so our cost will be \$336. The club information that will be in the SFMS Directory must be sent in along with our check. Once Bonnie has all of the updates she will send in the check and updated directory info.
- **SFMS CLUB INSURANCE** Once the SFMS renewal problem is resolved, Bonnie will do the 2021 club insurance.
- **SFMS SHOW INSURANCE** Cost this year is \$2 per Member. We have 224 Members *Continued, P. 10*

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

February Board Minutes

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so our cost is \$448.

- **WEB EXPENSES** No bills have been turned in yet.
- **CHURCH RENT** We are currently paid thru March for the storage room rent.
- **2020 TAXES** This is on Bonnie's list of things to do.

Membership: No new Members.

Editor: The newsletter has been coming out on time. No long-term (or even medium-term) schedules of meeting programs, field trips, rock swaps, and other club activities to include in the newsletter lately. Please provide as soon as it is available. Matthew suggested having Members submit recipes to the newsletter.

Field Trips: Discussed several options for local field trips beginning in March. March 20-Blue Springs.. April-Melba Cole's place. May-Frankstown, Twenty-Mile Creek. W. C. suggested a tour of the Pink Palace and collection.

Adult Programs: Membership meeting on Zoom. Dave has established a Zoom Board Meeting link that can be used multiple times throughout the year so Board can always use same link. He will establish one for the Membership Meetings as well. Dave asks what we can do to boost attendance at the Zoom Membership meetings. Schedule: February 8-Dr. William Jackson, "What zircons in sedimentary rocks can tell us about plate tectonic processes: An example from eastern Tibetan Plateau". March-Mike Baldwin, Native American Anthropology. April-Mike Gibson, Coon Creek. Dave will contact Luke Ramsey from Pink Palace about a talk.

Junior Programs: On hold until further notice. No school talks or similar. Mike talks about rocks with around 14 kids in his neighborhood.

He plans on having a display set up in his front yard. Carol suggested doing the same thing for MAGS kids. Matthew can promote in newsletter.

Library: Working on list of replacements for books that went missing or were not returned. Already purchased 15 out of 30.

Rock Swaps: None planned.

Web: Website has been updated for January.

Adjourned 7:15

February Meeting Minutes

Mike Coulson

Dr. William Jackson gave a Zoom talk on "What zircons in sedimentary rocks can tell us about plate tectonic processes: An example from eastern Tibetan Plateau."

At the upcoming March meeting Board will talk more about events where MAGS can be safely involved. Upcoming event at the Pink Palace Museum, "Fossil Fest" March 27-28, 2021.

Adjourned 8:20.

Rock Crystal Weapons

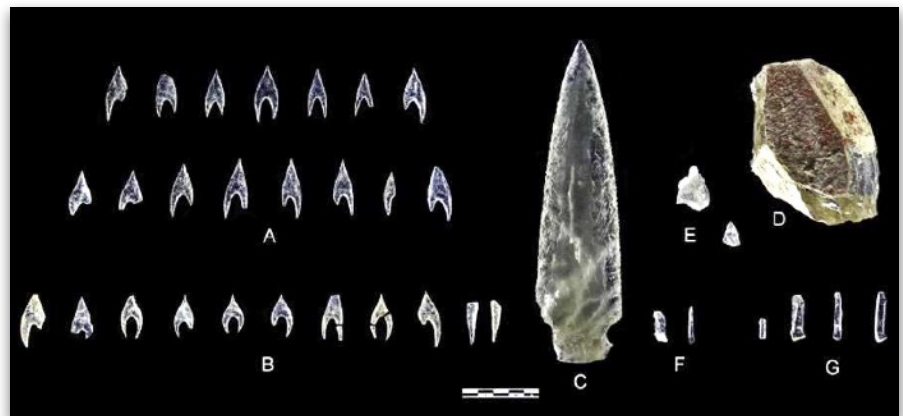
Matthew Lybanon, Editor

Any rockhound who has hunted in a quartz mine knows that it's a good idea to wear gloves. Those crystals can cut up your hands

pretty badly. A recent archaeological find shows that some people made practical use of that property of the crystals.

An excavation of megalithic tombs in Valencina de la Concepción (a town located in the province of Seville) in Spain led to the dramatic discovery of some rare relics, which experts described as exceptional and magnificently well-preserved. The objects are estimated to be over five thousand years old, dating back to at least 3000 BCE. The relics are an extremely rare set of weapons, including a long dagger blade, twenty-five arrowheads, and cores used for creating the artifacts, all made of crystal!

The Montelirio Tholos, excavated between 2007 and 2010, is "a great megalithic construction ... which extends over 43.75 m in total", constructed out of large slabs of slate. At least 25 individuals were interred within the structure, along with "an extraordinary set of sumptuous grave goods...the most notable of which is an unspecified number of shrouds or clothes made of tens of thousands of perforated beads and decorated with amber beads" And, of course, the



Continued, P. 11

Rock Crystal Weapons crystal tools. *Continued from P. 10* Five years after the excavation, researchers from the University of Granada, the University of Seville, and the Spanish Higher Research Council published their study of those tools.

The objects are made of rock crystal, which is the name given to all clear, colorless quartz. After examining the finds closely, archaeologists observed that the weapons are almost of the same shape as the flint arrowheads that were pretty common in that region during that time. However, the fact that there are not any crystal mines near the area implies that the skillful creators of the crystal weapons probably traveled for many miles to find the material they needed for the construction of their weapons and tools.

The shortage of crystal and the technical skill involved in creating the objects from crystal rather than flint, also suggests that these weapons were destined for a select group of people. The researchers note that while crystal objects were found throughout the site, the more technically sophisticated items were deposited in the larger megalithic structures. As such, it is reasonable to assume that although the raw material was relatively available throughout the community, only the kin groups, factions or individuals who were buried in megaliths, were able to afford the added value that allowed the production of sophisticated objects such as arrowheads or dagger blades.

Interestingly though, despite being found relatively frequently

in burials of the 4th and 3rd millennia BCE, crystal implements disappear from later funerary monuments in the Early Bronze Age (beginning of the 2nd millennium BCE)—a "truly striking" development, researchers say, as it would seem "the use of this raw material as grave goods was almost entirely abandoned," although the reason remains a mystery.



Ref: Morgado, Antonio & Lozano Rodríguez, José & Sanjuán, Leonardo & Lucíañez, Miriam & Odriozola, Carlos & Lamarca-Irisarri, Daniel & Flores, Álvaro. (2015). *The allure of rock crystal in Copper Age southern Iberia: Technical skill and distinguished objects from Valencina de la Concepción (Seville, Spain)*. *Quaternary International*. 424. 10.1016/j.quaint.2015.08.004.

Impact!

Matthew Lybanon, Editor

The Yarrabubba crater is an impact structure situated in the northern Yilgarn Craton near Yarrabubba Station between the towns of Sandstone and Meekatharra, Mid West Western Australia. It bears a singular distinction: it's the oldest known crater on Earth.

The rim of the original crater has been completely eroded and is not readily visible on aerial or satellite images. The evidence for the extent of impact comes from

the presence of shocked quartz and shatter cones in outcrops of granite interpreted to be near the center of the original crater, and from geophysical data. The diameter of the original crater is uncertain, but has been estimated to be from 30 to 70 km. And a team of researchers has found that it's about 2.229 billion years old.



The meteorite impact that created Yarrabubba would have slammed into our planet at the end of one of our "Snowball Earth" ice ages, the researchers say, and it's possible that the impact heated up our planet and ended that icy episode in Earth's history. To put a precise age on Yarrabubba crater, researchers analyzed minuscule features within tiny zircon and monazite minerals in rocks near the crater. These rocks, they say, must have formed by melting in the shock of the meteorite impact before recrystallizing afterward.

The recrystallized minerals contain some uranium, which naturally decays into lead over time. So by measuring exactly how much of the uranium has decayed into lead, the scientists were able to precisely pin down the age of the minerals, and thus, when the impact occurred. Through this measurement, the scientists found that the meteorite that formed Yarrabubba crater crashed into Earth 2.23 billion years ago.

Ref: Erickson, T.M., Kirkland, C.L., Timms, N.E. et al. *Precise radiometric age establishes Yarrabubba, Western Australia, as Earth's oldest recognised meteorite impact structure*. *Nat Commun* 11, 300 (2020). <https://doi.org/10.1038/s41467-019-13985-7>

MAGS At A Glance

April 2021

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
28	29	30	31	1 Zoom Board Meeting, 6:30 pm	2	3
4 	5	6	7	8	9 Zoom to Church Grounds Membership Meeting, 6:00 pm	10
11	12	13	14	15	16	17 Field Trip, Melba Cole's property, 10:30 am
18	19	20	21	22 	23	24
25	26	27	28	29	30	1

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