



Volume 66 ◊ Number 11 ◊ November 2020 ◊ A monthly newsletter for and by the members of MAGS

Membership Meeting Update

W. C. McDaniel

MAGS President



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Editor's Note: The Board is continuing to monitor the situation. At publication time the plan is for the November meeting to be **Zoom only**.

Planning for the remainder of 2020 remains inclusive as we monitor local Covid-19 status and determine what will be in the best

interest of the club's members. So here are some current thoughts:

November 13 Membership Meeting:

1. *Decision on the type will be later as we get closer to the meeting.*
2. *Hybrid type meeting.*

Continued, P. 3

BORAX CRYSTAL DECORATIONS

Reprinted with minimal editing from the January 2012 issue. Also see "Rockhound Holiday Decorations" on P. 3.

Everybody at the MAGS Holiday Party enjoyed the outstanding table decorations that were provided by Bonnie Cooper. What could be more appropriate than decorations made out of crystals? And they were beautiful!



The decorations consisted of borax (sodium borate or sodium tetraborate decahydrate) crystals grown on frameworks made of pipe cleaners. Here is a brief description of how to make them:

Twist three 5-inch pieces of pipe cleaner together to form a snowflake, then add a 1 1/2-inch piece to each point. Tie the *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.

The November 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

MEMPHIS ARCHAEOLOGICAL AND GEOLOGICAL SOCIETY

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Membership Meeting Update Continued from P. 1

- Membership may attend at the church or participate via Zoom.
3. **Zoom meeting only**
 - **No in person church meeting**

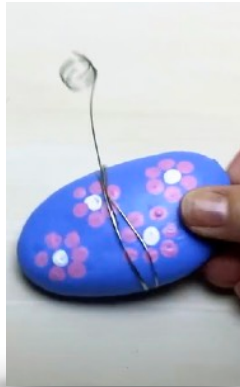
December 11 Membership Meeting

1. December Holiday Party is usually well attended and would require some modifications. Here are some planning ideas:
 2. Move the meeting from Friday night to Saturday (12th) morning.
 3. The party would be from 10-12 noon. The party would consist of:
 - Divide members up by last name, half coming first hour and second batch in last hour.
 - Pass out traditional holiday gifts (will make it some type of game).
 - Holiday shopping, club members to set up to sell.
 - Possibly some packaged snacks and drinks but no buffet.
 - Check out the December newsletter for updated plans.
1. All meetings will adhere to current Covid-19 procedures.
 2. No visitors.

Rockhound Holiday Decorations

Carol Lybanon

The holidays are just around the corner. Since we are all at home more right now, I thought it would be fun to find some do-it-



yourself decorations. So I checked “decorations” on the computer and came up with a few things, a couple you can even do with the kids.

Of course one easy craft is rock painting. Using holiday themes, you can attach a bead hanger and put them on your tree, or attach a wire photo holder (check out YouTube—“How to Make this Cute Rock Photo Holder | Easy Gift Idea”, <https://youtu.be/518dYXSC1Y0>). I found an easy Christmas tree using rocks—of course you should use your own imagination for decorating—check out “How to make Christmas tree/ DIY Christmas tree using Rocks/stones and old CD”, <https://www.youtube.com/watch?v=WhfePGwJexA>.

I know there are many different ideas. Share a craft idea using rocks, minerals, etc. We will put

them in the December newsletter. Better yet, send us a picture of your craft idea. Email your ideas and pictures to lybanon@earth-link.net.

A Trip to Middle Tennessee

Charles Hill

On Saturday, October 17, a small group of MAGS members took a long trip to Middle Tennessee. We went to Dale Hollow Lake to hunt for fossils—mainly crinoids. The weather was a little chilly in the morning, but still perfect. The drive that we had on this adventure took us through winding roads and rolling hills, all with bright autumn colors. We arrived at the site and immediately started finding crinoid stems. The water was low, and the fossils were plentiful. Personally, I made four trips to the truck,

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Borax Crystal Decorations flake with
Continued from P. 1 string to a
pencil.

Find a big enough jar so the suspended flake won't touch the sides. Fill with 3 tablespoons borax and 1 drop blue food coloring per 1 cup of boiling water. Hang the snowflake in the jar. Let sit overnight; remove.

MAGSters can find more detailed instructions at <https://www.marthastewart.com/269342/crystal-snowflake>. Another useful website is www.instructables.com/id/How-to-make-Borax-crystal-decorations-to-impress-a/, and a Google search will turn up others.

Looks pretty simple, but anyone who has tried growing crystals knows that some unexpected problems may pop up. Here are some tips from Bonnie on what she actually did.

1. The size of your snowflake (or other design) is only limited by the size of your container since the snowflake can't touch the sides or bottom of the container.
2. If using a larger container you can use a chopstick, bamboo skewer or dowel to lay across the top of container to suspend your ornament from.
3. If possible use a glass container that will fit into your microwave. This will make it easier to reheat your water & "melt away" any crystals that have grown on the inside of the container.
4. For the "ornament hanger" instead of the wire that was suggested in the directions I used "Christmas ornament hangers".
5. When making your pipe cleaner snowflake you can twist them as

the directions call for, however, I preferred to hot glue all my pieces together. If you do use your hot glue gun go light on how much glue you use. I don't know if everyone saw the borax creations that the youth group did but all of them were just twisted together.

6. The borax solution can be reused over and over. Each time you'll have to heat your water and dissolve the borax crystals. You will also need to add additional water and borax as needed.
7. The crystals grow due to evaporation so the time needed to grow crystals can vary. On your original batch it will probably take as many hours as the directions mention but on later batches where you've added additional water and/or borax the time could vary. What I usually do is start checking the snowflake after 2-3 hours. Don't remove the snowflake when checking its progress because you could stir up the solution. Just observe the progress by viewing thru the side of the container.
8. The directions didn't mention where to get the borax but you can find "20 Mule Team Borax" in the laundry area at most stores. It's considered a laundry booster so you'll find it usually with the bleach alternatives. I've compared prices at Walmart, Kroger's and the commissary at the Navy base. The base was the best price but the next best price was Walmart (around \$3 a box).
9. If you have any problems feel free to contact me. The snowflakes were time-consuming but a lot of fun to make and grow.

A Trip to Middle Tennessee filling up
Continued from P. 3 two
buckets.

Everybody found more crinoids than they could carry. The water was down, and there were the most crinoids I have ever seen at this site.

We had originally planned to hunt for fossils on Saturday and go to the Ledbetter farm on Sunday for geodes. Sadly, the geode portion of the trip was cancelled because of the virus. As it turned out, a club member, Carol Lybanon, sent a link* to an article from *Rocks and Minerals* about the geodes that can be found at Dale Hollow Lake, just north of Willow Grove boat ramp. (Thank you, Carol!) I mentioned to the other MAGS Members that I was going to go there after lunch to look for geodes since I still had two empty buckets. They immediately decided to go hunt with me. When we go there, the shoreline was lined with shale, a lot of which had flaked off in small pieces. Bordering the lapping waves, the pieces stood on edge, as if put there by a sculptor. We did find a few small geodes, but not many. However, the beauty of the lake and the drive there were well worth the trip. You guys missed a great adventure!

* <https://www.tandfonline.com/doi/abs/10.1080/00357529.1967.11765326?journalCode=vram20>, "Geodes in North Central Tennessee," by David L Rife.

Photos on P. 5.

No November field trip. December field trip details and 2021 field trip calendar in next issue.

Newsletter Honor



This is an award for *MAGS Rockbound News*, not just for one person. The certificate recognizes the quality of the newsletter. If you contributed pictures, articles, or anything else to *MAGS Rockbound News*, pat yourself on the back. The variety of topics, points of view, and expertise is what's responsible for making this newsletter more than just a dry list of club activities and events. My main contribution is convincing you to send me stuff. Thanks to all who contributed. This is your award.

From the AFMS website:

The Bulletin Editors' Hall of Fame was established in 1995 as a way to recognize and honor the hard working editors of local gem and mineral clubs throughout the United States, Canada and other areas

of the globe where there are organized clubs.

The brainchild of Shirley Leeson, the initial group of inductees included many "old time" editors whose exceptional work over a number of years had fostered interest in the hobby, in the local clubs, and at the regional and national federation level. A committee, consisting of one inductee from each regional federation and Canada was formed and it is this committee that recommends future inductees.

Announcement of new honorees is made each year during the AFMS Annual Convention with certificates presented at the annual AFMS Breakfast with the Editors and Webmasters.

A Trip to Middle Tennessee—Photos

Photo Credits: Charles Hill, Leigh Bartram



World's First Furnace?

Matthew Lybanon, Editor

Some MAGSters may remember a DMC field trip (May 2015) to Cumberland Furnace, in northern Dickson County, Tennessee. The village was the site of an ironworks furnace that began operation in 1796. During the War of 1812 Montgomery Bell, who had purchased the furnace, became the chief supplier of heavy ammunition for both the Navy and General Andrew Jackson's army. The furnace continued operating, under various owners, until 1942. In 1988 the village of Cumberland Furnace, with over 30 buildings and sites associated with the iron industry, was listed as a historic district on the National Register of Historic Places.

This was a pretty old furnace, but hardly the world's oldest. When was the world's oldest furnace constructed? It's hard to say for sure, but a recent paper in the *Journal of Archaeological Science: Reports* describes one that is definitely one of the earliest of its kind.

The discovery of fragments of furnaces, crucibles, and slag from a big copper smelting workshop at the Horvat Beter archaeological site in Israel was reported by researchers from Tel Aviv University, the Geological Survey of Israel, and the Israel Antiquities Authority. Their find, a fixed furnace made of clay built into the ground, is dated to around 6,500 years ago. The workshop employed a sophisticated two-stage process: furnace-based primary smelting of the rock, followed by further melting or refining of the metal in crucibles.

These early metallurgists in the Be'er Sheva Valley are associated with the so-called Ghassulian culture of the Chalcolithic period, which existed about 6,500 to 5,800 years ago. The Ghassulian culture still used stone tools for everyday use, and also smelted copper—which at least some of them crafted magnificently. In 1961, archaeologists discovered a cache of gorgeous copper statuettes, bowls, and other artifacts in a cavern overlooking Nahal Mishmar, a stream that flows into the Dead Sea, that dated to about 6,500 years ago.

Metal might have filled a need, but it wasn't a material one. "It started with an aesthetic. For thousands of years the use of metals was nonfunctional, not to do with material improvement," according to Prof. Erez Ben-Yosef of Tel Aviv University, one of the researchers.

Over 10,000 years ago, peoples around the Mediterranean basin were hammering unheated rock rich in pretty green copper ore and making objects with it. The primal technique of crucible smelting involved putting bits of copper ore into a small clay pot, adding charcoal, and igniting it to melt the copper out of the rock. The pot wasn't covered.

The ore has to be heated to at least 1,200°C to melt out the copper. This required a certain degree of technical sophistication; a bonfire on the beach may reach 500°C, not nearly hot enough. The embryonic metallurgist would blow air into the crucible to raise the temperature. The earliest evidence of crucible smelting was

found in Anatolia and Iran, dating to the late sixth millennium B. C. E.

The furnace was the next step. The earliest furnace was slightly bigger and was a fixed structure, built into the ground with an elevated rim. Technically, a furnace is a big crucible stuck in the ground. So the transition from portable crucibles to furnaces wasn't a big technical advance, but a change in outlook. The Be'er Sheva find indicates that by around 6,500 years ago there was a high degree of craft specialization.

After several hundred years of using crucibles, some places introduced furnaces, possibly in Be'er Sheva for the first time. Then they spent thousands of years perfecting the technique. If a crucible could produce perhaps 20 to 30 grams of copper in each smelting cycle of three to four hours, an Iron Age smelting furnace (by the time of the so-called King Solomon's Mines) could produce several hundred grams.

Ref: Dana Ackerfeld et al, *Firing up the furnace: New insights on metallurgical practices in the Chalcolithic Southern Levant from a recently discovered copper-smelting workshop at Horvat Beter (Israel)*, *Journal of Archaeological Science: Reports*, Volume 33, 2020, 102578, <https://doi.org/10.1016/j.jasrep.2020.102578>.



Fabulous Tennessee Fossils

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

FTF 70

Dolomite and Magnesite Fossil Replacement



If you know much about how minerals are classified, there are eight primary groupings of minerals (native element minerals, sulfides and sulfates, oxides, silicates, phosphates, carbonates, and a mixed group that includes halides, fluorides, molybdates, vanadates, and chlorides, etc.). Silicates are the most common rock-forming group of minerals, hence silicification and chertification replacement are very common to encounter. The sulfide metal specimens are probably the next most easily recognized replacement form. In the last FTF installment, we looked at replacement of original fossil shells during fossilization by new siliceous minerals such as quartz and chert, and sulfide mineral replacement such as pyrite—the three most common replacement minerals, especially for Paleozoic fossils. I also listed additional metallic minerals that replace original calcite in fossils. In this installment, we want to look at the less common non-metal replacement minerals that can be found.

Most marine organisms make their shells out of the carbonate minerals calcite and aragonite, which are polymorphs of one another (CaCO_3), just like chalk or Tums®. Carbonates have the second half of their chemical formula occupied by “ CO_3 ”, which is called a “complex anion” in chemistry. If most marine organisms use carbonate to make a skeleton, would

not you expect that carbonate would also make a good replacement mineral during fossilization? The answer is absolutely. Most marine invertebrate fossils that use the aragonite polymorph carbonate to make a shell will “recrystallize” upon fossilizing and the aragonite will re-grow into the more stable calcite rhombohedral form. Some will classify this as recrystallization since it is still carbonate; however, because there is exchange of elements during the process and it produces a different polymorph mineral (calcite), this type of preservation could just as easily be considered a replacement style preservation. It is easily recognized by seeing rhombohedral crystal surfaces on a broken edge, along with the corresponding loss of any original shell layering structure formed during the initial growth of the shell during the life of the organism. Often there will also be calcite (and sometimes quartz) crystal grown on the inside of the shell.

The reverse replacement, aragonite replacing calcite, does not seem to be able to occur, or at least is extremely rare and not documented.

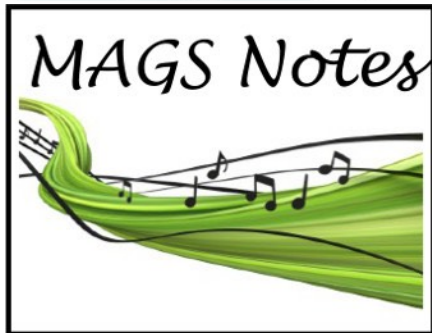
Many of us who collect minerals have several carbonate minerals in our crystal collections, including malachite $\text{Cu}_2(\text{CO}_3)(\text{OH})_2$ and azurite $\text{Cu}_3(\text{CO}_3)_2(\text{OH})_2$, which often occur together, cerussite, siderite (FeCO_3), smithsonite

(ZnCO_3), dolomite $\text{MgCa}(\text{CO}_3)_2$, rhodochrosite (MnCO_3), and magnesite (MgCO_3). Dolomite is a common mineral to find in rocks that formed from deposition in tropical carbonate sedimentary environments, especially during the Paleozoic. No organism made its shell from dolomite. Instead dolomite is a very common replacement mineral that forms as Mg-rich waters percolated through the buried sediments as burial took place. The mineral dolomite and the rock that it makes, dolostone, are common in Middle and East Tennessee, and yes, it is also common to find brachiopods and crinoid stem fragments replaced by dolomite. Dolomite replacement can be hard to recognize except under microscopic examination at high power, but sometimes larger replacing crystals can be distinguished on broken surfaces of a fossil by a pinkish tint in some specimens and by a sometimes “saddle” shape of crystals.

Magnesite, magnesium-carbonate, is often associated with dolomite, which would be expected due to the common occurrence of magnesium in the deposit. The occurrence of magnesite within fossils has been used by geochemists and paleontologists to argue for a low-temperature mechanism and sedimentary origin for some magnesite deposits. Magnesite forms

Continued, P. 8

Fabulous Tennessee Fossils under relatively high salinity conditions and is considered an anhydrous mineral, especially when associate with limestone. The extreme salinity and the necessary anhydrous conditions required for formation would make primary magnesite formation difficult and suggests that the organisms did not actively secrete the magnesite, rather the magnesite is a burial replacement mineral of the skeleton. Reports of magnesite as fossil replacement can be found as far back as the late 1800s, all within Paleozoic limestone, in brachiopods and crinoid ossicles. Magnesite is more commonly associated with fossilized wood and bone (which is permineralization, not replacement). Magnesite preservation within fossils has not been reported in Tennessee.



🎵 Meetings

November: Zoom meeting (see P. 1)

December: Holiday Party

🎵 Field Trips

November: No field trip.

December: TBD. Details plus 2021 field trip calendar in next issue.



🎵 November Birthdays

- 1 W. C. McDaniel
- 11 Sean Collins
- 13 Matthew Lambert
- 15 Douglas Maki
Phillip Goossens
- 16 Chris Scott
- 17 Gabriella Wrasse
- 18 Cathie Jacobs
- 19 Nina Riding
- 20 Will Kitkowski
- 21 Tabitha Lambert
- 22 Melba Cole
- 23 Brittani Lambert
Shirley Ruth Chrisman
- 24 Charles Carter
- 27 Dylan George
- 28 Alan Parks
- 29 Nedra Baum
- 30 Robert Neill

September Board Minutes

Mike Coulson

Called to order 6:34: Present: W. C. McDaniel, Charles Hill, Mike Baldwin (Zoom), Carol Lybanon, Matthew Lybanon, Bonnie Cooper (Zoom), Bob Cooper (Zoom), Dave Clarke, James Butchko, Mike Coulson, Jane Coop.

Secretary: March minutes were distributed and approved by the Board.

Treasurer: Treasury report was emailed to Board members for review prior to meeting. No large expenses coming up other than for postage stamps. The club will receive a credit from the church for the months the room was not used.

Membership: The last membership received was the end of February for the Paislee Lyles family. Just received the 2020 renewal for the Schaeffer family. The most recent updated 2020 MAGS Membership Directory will be emailed to the membership by the

end of the month. Since we are in good financial shape, Bob proposed that due to the circumstances with the Covid-19 and how it has affected our meetings and field trips and probably will for the rest of the year, we consider giving all current paid 2020 MAGS Members their 2021 membership for free.

Field Trips: The August trip to Crow Creek went well. Upcoming field trips: September 19, Sugar Creek. October 21, Dale Hollow Lake and possibly Ledbetter Farm.

Adult Programs:

1. No programs scheduled since February.
2. March program by Lou White was cancelled due to lockdown. Possible program for next Membership Meeting with adult program.
3. Several possibilities for programs from different folks; some of these could be Zoom programs. I am not keen on this idea in part because of possible low turnout. But, can start scheduling Zoom programs if necessary and if decided. I can also start scheduling in person programs as soon as this is OK.

Junior Programs: Youth programs are on hold until further notice. Using previous schedule:

- Sep 11, no youth program planned
- Oct 9, Fluorescent Minerals w/Mike Baldwin (Most likely to be cancelled)
- Nov 13, Native Peoples of North America w/Mike Baldwin
- Dec 11, Holiday Party w/adults
- Jan 8, 2021: first youth program with the next director

Library: Nannett asked Jane to accept returned books at next meeting. I have 6 Memorial Books, donated by Marc and Nannett, that will be put into the Library to honor Members who have passed.

Show: Down payments or deposits to the Agricenter will be applied to next year. The material for *Continued, P. 9*

MEMPHIS ARCHAEOLOGICAL AND GEOLOGICAL SOCIETY

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September Board Minutes prizes and
Continued from P. 8 grab bags is
stored in

the shed at Cooper Moving and is ready to go. It is time to get a committee together but I think we can wait a month or two to meet. All of the dealers who requested refunds for the 2020 booth fees have been refunded.

Rock Swaps: Jane covered the sign up table to “take roll, pass out info on the Sugar Creek field trip and take the temperature of members”. Our September meeting is like a rock swap so do we want to have one later this year?

Editor: September newsletter is out. There has been a newsletter each

month, with some changes. Mostly affected were the lead articles, MAGS Notes, minutes and calendar.

Web: Web site updated.

Old Business: None.

New Business:

- Since meetings and field trips were suspended due to the pandemic, the Board voted to remain in office for one additional year rather than electing new officers.
- Board voted for free renewal for the 2021 membership fees to those Members paid up and in good standing for 2020.
- October 31 estate sale.

Adjourned 7:08.

September Meeting Minutes

Mike Coulson

Called to order 7:00 following the Board Meeting.

Field Trips: Sugar Creek next Saturday, meet at Popeyes Chicken parking lot in Millington and caravan to site. Signup sheet at the front table.

Adult and Junior Programs: No programs tonight.

Library: No report.

Show: Show for 2021 is in a holding pattern.

Displays: A few displays for Members to view.

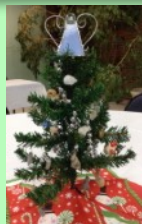
Adjourned 7:35.

We Remember Holiday Parties

Here is a selection of pictures from past MAGS Holiday Parties.



2019



2018



2017



2016



2013



2012

MAGS At A Glance

November 2020

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	
1	2	 3	4	5	6	7	
8	9	10	 11	12	Zoom Board/ Membership Meeting, 6:30/7:00	13	14
15	16	17	18	19	20	21	
22	23	24	25		26	27	28
29	30	1	2	3	4	5	

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