MEMPHIS ARCHAEOLOGICAL AND GEOLOGICAL SOCIETY

MAGS Rockhound News

Volume 63 ◊ Number 09 ◊ September 2017 ◊ A monthly newsletter for and by the members of MAGS

# Opals

*Barry Gilmore* *September Presentation*

During the presentation we will discuss various types and kinds of Opal, geographic sources of Opal, patterns of Opal fire, how rough Opal is cut into a useable gemstone, and characteristics that determine Opal values. There will also be a question and answer session.

***Editor's Note**: "Why Are These Rocks Pretty?", in the December 2016 issue of MAGS Rockhound News, gives some information on play of color in opals. MAGS Member Barry Gilmore will tell you more about it at the September meeting..*

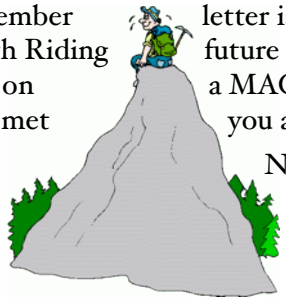
## In this issue



## THE SNOWS OF KILIMANJARO

Hemingway lovers, rejoice! MAGS Member Nina Riding tells us that her husband Keith Riding made it to the summit of Mt. Kilimanjaro on August 13. He did it with some friends he met from his climb in Mexico. He went on a African safari adventure before his climb.

Want more details? That's all we were able to learn before putting this newsletter issue together. We hope to have more in future issues. Maybe we can get Keith to come to a MAGS Meeting and tell us the whole story (can you arrange it, Program Director?).



Nina Riding's note is a great response to the plea for articles about trips to interesting places. Let's hope this inspires others.

Kilimanjaro is a really big rock!

## 2017-2018 MAGS BOARD



# 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

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.

## September DMC Field Trip

WHERE: Clarksville, GA (fee site, $10 per person)

WHEN: Saturday, September 30, 10:00 A. M.

COLLECTING: Kyanite blades and cobbles, mica, graphite

INFORMATION: Daniel Miller, (423) 273-0487

## Links to Federation News

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

## Adult Program Schedule

*W. C. McDaniel*

| | |
|---|---|
| September 8 | Barry Gilmore, MAGS Member<br>"*Opals*" |
| October 13 | Jennifer N. Gifford, Ph. D.<br>Assistant Professor<br>The University of Mississippi<br>"*The Geology of Roadcuts and Outcrops*" |
| November 10 | Konrad Armstrong, MAGS Youth Member<br>"*The Truth About Radiation*" |
| December 8 | Holiday Party. Food, gifts, and games |

## It Was A Real Gas!

*Matthew Lybanon, Editor*

Paleontologists recognize five mass extinctions. The most recent is the one at the end of the Cretaceous period (about 66 million years ago), which killed off 75% of the living species, including the dinosaurs. That extinction is believed to have been caused by a large meteorite impact near Chicxulub, Mexico. In other cases, scientists are still not sure.

The largest mass extinction, at the end of the Permian Period, which defines the Paleozoic-Mesosoic boundary, eliminated nearly 95% of all living species, but the cause of that event was not known—until (possibly) now. Geologists from the U. S. Geological Survey (USGS) and the Massachusetts Institute of Technology (MIT) think they have found the precise event.

In a paper published in *Nature Communications*, the team reports that about 251.9 million years ago a huge pulse of magma rose up through the Earth, in a region known today as the Siberian Traps. Some of this molten liquid stopped short of erupting onto the surface and instead spread out beneath the Earth's crust, creating a vast network of rock stretching across almost 1 million square miles. As the subsurface magma crystallized into geologic formations called sills, it heated the surrounding carbon-rich sediments and rapidly released into the atmosphere a tremendous volume of carbon dioxide, methane, and other greenhouse gases.

Since the 1980s, scientists have suspected that the Earth's most severe extinction events were triggered by **large igneous provinces** (LIPs—expansive accumulations of igneous rock, formed from protracted eruptions of lava over land and intrusions of magma beneath the surface) such as the Siberian Traps. But first author and former MIT graduate student Seth Burgess was struck by a certain incongruity in such hypotheses.

"One thing really stuck out as a sore thumb to me: The total duration of magmatism in most cases is about 1 million years, but extinctions happen really quickly, in about 10,000 years. That told me that it's not the entire LIP driving extinction," says Burgess, who is now a USGS research scientist.

He surmised that the root cause of mass extinctions might be a shorter, more specific interval of magmatism within the much longer period over which LIPs form. So Burgess re-examined geochronologic measurements he made as a graduate student.

When he looked back through the data, he noticed that rocks dated within the 300,000-year window prior to the start of the extinction were almost exclusively volcanic, meaning they formed from lava that erupted onto land. In contrast, the subsurface sills only started to appear just before the start of the extinction, 251.9 million years ago. Based on his new observations of the data, Burgess has outlined a refined, three-stage timeline of the processes that likely triggered the end-Permian extinction:

1. 252.2 million years ago, the start of widespread eruptions of lava over land. As the lava spews out and solidifies over a period of 300,000 years, it builds up a dense, rocky cap.
2. Around 251.9 million years ago, the lava cap becomes a structural barrier to subsequent lava eruption.

Acending magma *Continued, P. 5*

# Fabulous Tennessee Fossils

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

**FTF 32**

***Berryophyllum Leaf Fossils***

With summer in full bloom in West Tennessee, along with allergies, plants and plant fossils come to mind. As I wrote in earlier articles, West Tennessee is bountiful in fossil plant material, especially from the Eocene Epoch, especially within the Claiborne Formation. The Claiborne clay pits exposed in a north south belt that includes Weakley, Henry, Carroll counties in particular are world-renowned for the diversity and preservation of plant leaves, flowers, pollen, and to some extent, associated insects. I was conducting some fieldwork earlier this month and happened to be in a nice stand of large and old beech trees (*Fagus*) that made me think about the fossil genus *Berryophyllum*, which is thought by most paleobotanists to be ancestral to the modern beech trees—or perhaps oak trees. The Family Fagaceae, to which both oaks and beech trees belong, are deciduous arborescent flowering plants that are characterized by simple leaves that alternate and produce nuts that are cup-shaped (think about the typical acorn with its cap—My grandmother had an oak tree next to her driveway in Midlothian, Virginia, and I still very fondly recall my late Uncle Joe teaching me how to hold the acorn cap close to my lips making a small triangular opening between my two thumbs through which I could blow and make a shrill whistle audible for great distances).

The fossilized leaves, *Berryophyllum*, began their history under other names. For example, the great Johns Hopkins paleobotanist Edward Wilber Berry (1975-1945) erected the original genus as *Banksia tenuifolia* in a 1916 in a U. S. Geological Survey Professional Paper summarizing the Eocene flora of the entire southeast. In 1988, Jay H. Jones (a 1984 Ph. D. graduate student of David Dilcher at the University of Indiana) and David L. Dilcher (Professor emeritus from both Indiana University and University of Florida, who continues to do studies in our region) amended this taxon moving Berry's species into the genus *Banksia*. As it turns out, Berry was what some paleontologists call "a splitter", rather than "a clumper", meaning he had a tendency to erect many taxa based on very minor differences, especially when comparing to living (extant) species. Dilcher estimated that as much as 60% of Berry's original taxa contained some issues of error related to taxonomy and there is a long literature trail of more recent paleobotanists revising his earlier works. Regardless, we need to realize that Berry's early work was pioneering in documenting the plant diversity of the southeast—he was the leader for his time.

| |
|---|
| Kingdom Plantae |
| Phylum Tracheophyta |
| Class Magnoliopsida |
| Order Fagales |
| Family Fagaceae |
| Genus *Berryophyllum* |
| Species *tenuifolia* (Berry) Jones et Dilcher, 1988 |
| Species saffordi (Lesq.) Jones et Dilcher, 1988 |
| Species *warmanense* Jones et Dilcher, 1988 |

Using leaf fossils, in 1988 Jones and Dilcher revised this one part of Berry's original work, placing the *tenuifolia* species within a new genus, *Berryophyllum*, which translates to "berry leaf" in Berry's honor. In this case, the genus refers only to leaf fossils and does not include the other plant parts (this is typical in paleobotany where plants parts separate—often different parts get different names). *Berryophyllum* is now one of several leaf forms that used to fall within a "catch-all" morphologically diverse genus of "*Dryophyllum*". Other species of *Berryophylum* in our region include *B. warmanense* (Fig. 1) and *B. saffordii* (named in honor of the second state geologist of Tennessee James Safford). *B. warmanense* was a new species erected by Jones and Dilcher, but *B. saffordi* began was originally called *Quercus saffordii* (after being named by paleobotanist Leo Lesquereux in 1959. *Continued, P. 5*

*Fabulous Tennessee Fossils* *Continued from P. 4*

Because the leaf characteristics are evolutionarily "primitive" compared to modern Fagaceae, *Berryophyllum* is sometimes considered with the ancestry of oaks and sometimes within the ancestry of beech trees, as it shows features common to both groups. Jones and Dilcher consider *Berryophyllum* to be more Oak (Quercoideae); whereas other popular fossil plant books will describe it as a beech tree. Clearly the evolutionary history of this group is incomplete at this time. Reconstructions of the tree bearing *Berryophyllum* leaves shows a 65-100 feet tall tree with up to 4 inch leaves. The Eocene Epoch was a warmer world generally (tropical to subtropical). *Berryophyllum* is one of many plants that record that climate shifts have affected West Tennessee's past. The fossil leaves still retain their vein patterns and often the outer cuticle is preserved. They make nice additions to a fossil collection. Well, if you will excuse a bad pun, it is time for me to end this essay and "turn over a new leaf" in next month's essay.

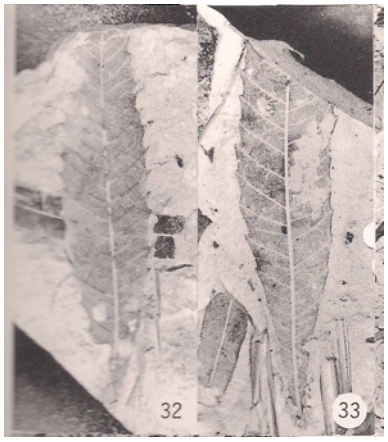



**Figure 1**. *Berryophyllum warmanense* paratype specimen housed at the Indiana University (from Jones and Dilcher, 1988. A study of the "Dryophyllum" leaf forms from the Paleogene of Southeastern North America: Palaeontographica B: 208:1-80.)

*It Was A Real Gas!* *Continued from P. 3*

stalls and spreads beneath the lava cap as sills, heating up carbon-rich sediments in the Earth and releasing huge amounts of greenhouse gases to the atmosphere—almost precisely when the mass extinction event began.

3. Around 251.5 million years ago, the release of gases slows, even as magma continues to intrude into the sediments.

Could similarly short pulses of sills have triggered other mass extinctions in Earth's history? Similarities in the data make that a possibility. However, the Cretaceous-Paleogene event looks different. Burgess noted that the LIP that was erupting at the time is primarily composed of lavas, not sills, and was erupted into granitic rock, not a gas-rich sedimentary basin. Thus, it likely did not release enough greenhouse gases to exclusively cause the dinosaur die-off. Instead, Burgess says a combination of lava eruptions and the Chicxulub asteroid impact was likely responsible.

***Ref***: Burgess, S. D., Muirhead, J. D., Bowring, S. A., Initial pulse of Siberian Traps sills as the trigger of the end-Permian mass extinction, *Nature Communications* 8(1), doi: 10.1038/s41467-017-00083-9.

***Editor's Note**: Thanks go to Dr. Albert Green for contributing the MIT News article on this research—and the title.*

## September Birthdays

| | |
|---|---|
| 1 | Wayne Pinner |
| | Debbie Greusel |
| 2 | Eric Marbury |
| 5 | Leo Koulgianes |
| | Emily Fox-Hill |
| | Richard Hill |
| 7 | Connor Smith |
| 8 | Peggy Barbee |
| 10 | Alishia Parks |
| 11 | Belinda Loyd |
| 14 | Jane Coop |
| | Lisa Goossens |
| 15 | David Bruce |
| 16 | Cormac Stockwell |
| | Michael Montgomery |
| 18 | Logan Parish |
| 19 | Karen Schaeffer |
| 20 | Tavyon Williams |
| 21 | Dominik Suarez |
| 22 | Park Noyes |
| 23 | Mildred Schiff |
| | Dr. Earl Reyer |
| 24 | Lucia Clarke |
| 28 | Bonnie Cooper |
| 29 | Gunnar Wallace |
| | Caroline Cox |
| 30 | Vicki Sanders |

## New Members

Cheryl Yarbrough

Pam Chase and Frank Horrell, plus Zoey Rogers, Tommy and McLain Walls

## July Board Minutes

*Mike Baldwin*

Called to order 6:32. Present: Mike Baldwin, Charles Hill, Bob Cooper, Bonnie Cooper, Kim Hill, Leah Gloyd, James Butchko, Carol and, Matthew Lybanon, David Clarke.

**Secretary**: May minutes have been corrected. June minutes distributed via email and hardcopy. Reviewed and approved with minor revisions.

**Treasurer**: Statements distributed, including a copy of the checking and the summary. Rent has been paid through the end of the year. Discussion followed concerning the size and cost for the library room. Electronic copies of the bank statements were distributed earlier this week. Report approved. No more big expenses for the rest of the year.

**Membership**: Two new members since last meeting, one renewal. Bob and Bonnie may not be at next week's Membership Meeting. Kim volunteered to man the membership table.

**Adult Programs**: July, Belinda Fish, carving jade, followed by a field trip to Belz Museum on July 15, beginning at noon. August, indoor rock swap and picnic. September, Barry Gilmore, opals. October, Dr. Jennifer Gifford, geology of roadcuts and outcrops. November, Konrad Armstrong, radioactive minerals. Juniors will join the adults for the November program with reserved front row seating. December program: holiday party.

**Web**: Website updated with July calendar and program information, July hardcopies of the newsletter printed & mailed. Bonnie reimbursed Mike for June and July postage.

**Youth Programs**: Mike Baldwin will present "Earth Science Experiments for Every Kid" at the July meeting. The August meeting will be a joint indoor rock swap/picnic. Matthew is doing the September program.

**Library**: The MAGS closet door was open last time Leah dropped by the church to work on the library. Cabinets are being damaged by the chair carts. W. C. presented a book to Leah for the library.

**Rock Swaps**: Rock swap and picnic is well in hand for August. Carol needs help preparing the room for the August Rock Swap. Reservations have been made with the Bartlett Recreation Department for Sunday, October 22, noon to 6:00 for our community rock swap. This will be the last rock swap of the year, rain or shine. Carol is in the process of making a picture book of MAGS history. There is a gap from 2003 to 2011. If you have any pictures during that time, please send them to Carol. She doesn't have any pictures of Alan Parks, Lou White, or Melba Cole rock swaps.

**Newsletter**: The next deadline for material for the August newsletter is July 20. After that date, articles may not make it until the next edition.

**Show**: A few people dropped by to help clean rocks. James will use the newsletter to promote rock-cleaning in the future. Looks like just about everything has cleared the books except a couple of people who owe for Member tickets. Matthew will close the Show accounting at the end of July and make a formal presentation from the Show to the club at the August Rock Swap.

**New Business**: Solar-Eclipse glasses will be distributed to members attending the August Membership Meeting, free of charge. Discussion followed about places to view the eclipse. We have some awesome opportunities in the south.

Adjourned 7:25.

## July Meeting Minutes

*Mike Baldwin*

Called to order 7:10. 48 Members, 2 visitors. Charles reminded Members to get permission before collecting on private land. He suggested that Members refresh themselves on the rules of collecting etiquette, which can be found on our website. He also informed members that purple paint on tree trunks indicates the property is posted for no trespassing.

The 2018 Show is only 281 days away. Show rocks are available for you to pick up, clean, and bring back to James Butchko's house. The reward is that you get to keep the large rocks. Call James for details and directions. The October 22 rock swap will be at the Freeman-Smith Pavilion in Bartlett City Park. Details, July newsletter.

The August field trip will be August 12 to the Hedger Quarry in Arkansas for agates. No hardhat required. The September field trip will be to Nonconnah Creek in Memphis. The July field trip will be to Belz Museum in Memphis. The club will pay half the entry fee for each member attending. Check out new books in the library.

There were four displays.

- an 18 lb. Northern Iowa agate
- Richardson's Landing agates and other finds
- California, Las Vegas, and Valley of Fire State Park road trip treasures
- Mt. Ida, Wegner Mine quartz crystals

Youth were dismissed to participate in hands-on geology experiments presented by Mike Baldwin. Carving Jade adult program was presented by Belinda Fish.

Adjourned 8:35.

**Save the date:**
Sunday, October 22, 12:30-3:30. Picnic and Rock Swap, Freeman Smith Pavilion, Bartlett

## August Meeting Report

I hope everyone who attended the August Indoor Picnic and Rock Swap had fun. It always takes the efforts of many Members to put on any event. Thank-yous should go to our Board (along with their spouses), who came in early and set up tables. Special thanks go to our plant donators: Julie Lybanon, Cornelia McDaniel, Debbie Schaeffer, and Sherri Baldwin. Teri Noyes, thanks for stepping in and helping with the kids craft project. And thanks to everyone who helped with the cleanup.

Mark your calendar for our end-of-the-summer/start-of-fall outdoor picnic and rock swap at Freeman Smith Park. The date is Sunday, October 22. More details in the October newsletter.

*Carol Lybanon*


Each year proceeds from the annual Show go to MAGS. The Show gave the club a big check at the August meeting (there was a real check, also).

## Where Did They Go?

*Matthew Lybanon, Editor*

Mesa Verde (Spanish for "green table") is not only the place where, over 6,000 feet above sea level, a certain MAGS Member found a fossil shark tooth. It's where, over 1,400 years ago, a group of people living in the Four Corners region decided to live. For more than 700 years they and their descendants lived and flourished there, eventually building elaborate stone communities in the sheltered alcoves of the canyon walls. Then, in the late AD 1200s, in the span of a generation or two, they left their homes and moved away.

President Theodore Roosevelt created Mesa Verde National Park in *Continued, P. 8*

*Where Did They Go?*
*Continued from P. 7*

1906. It occupies 52,485 acres in Montezuma County, Colorado. With more than 4,300 sites, including 600 cliff dwellings, it's the largest archaeological preserve in the U. S. The cliff dwellings make Mesa Verde unique.

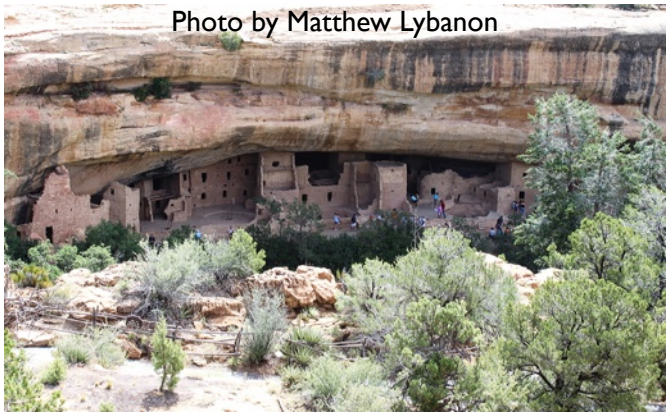


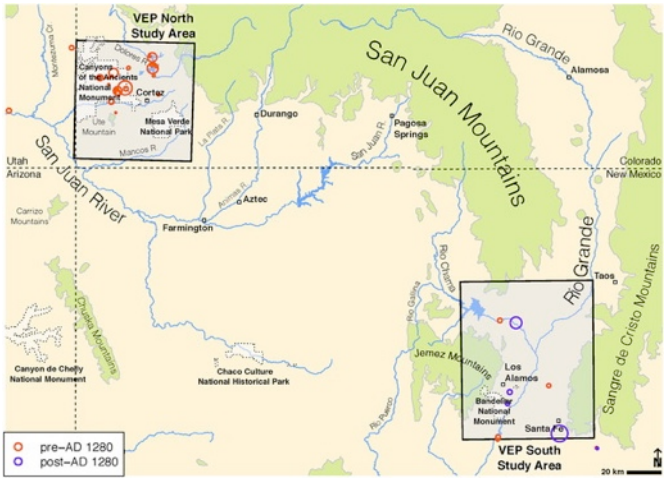
Photo by Matthew Lybanon

Sometime during the late 1190s, after primarily living on the mesa top for 600 years, many Ancestral Pueblo people began living in pueblos (Native American communal dwellings in the southwest, consisting of contiguous flat-roofed stone or adobe houses) they built beneath the overhanging cliffs. The structures ranged in size from one-room storage units to villages of more than 150 rooms. While still farming the mesa tops, they continued to reside in the alcoves, repairing, remodeling, and constructing new rooms for nearly a century. By the late 1270s, the people began to leave. By about 1280, their occupation of Mesa Verde ended.

What happened to them (and why they left) has been a mystery. One theory was the group—also known as the Anasazi—had simply migrated several hundred kilometers east. But there wasn't much evidence to support that or any other theory. The Anasazi (and other Native Americans) had no written language. But they did have oral history.

That, plus other information from biometry, linguistic prehistory, site architecture, and etymology suggested that the ancestral Tewa population of the Northern Rio Grande in New Mexico have links to the Ancestral Puebloans. (The name "Tewa" refers to linguistically related Native American peoples who live in seven pueblos, six of which are located adjacent to the Rio Grande in central/north-central New Mexico.)

Now, anthropologists from four universities have found evidence to support this hypothesis. What they found isn't definitive proof in itself, but combined with what was previously known it helps to form a picture of what happened. The combination of evidence sheds light on social responses to climate change, the sociology of social movements, and contemporary patterns of cultural diversity.




Biological evidence was difficult to obtain because of the complete disappearance of the Ancestral Pueblo population from Mesa Verde and nearby areas, along with restrictions on sampling human remains. As an alternative, patterns of genetic variation among domesticated species were used. Just as on *CSI*, *NCIS*, and similar shows, the researchers used genetic evidence.

The researchers studied the genetic composition of ancient dog and turkey bones buried in both the Four Corners region and the hypothesized destination. Results are consistent with a large-scale migration of humans during the 13th century. Mitochondrial DNA from ancient turkey bones found there had been an influx of fowl in the Northern Rio Grande area in the late 13th century, and prior to 1280 the turkeys' lineage had been different.

The evidence suggests the Anasazi suffered some kind of change in climate, political upheaval, drought or other during this time, lending weight to the theory that they migrated. "Results are consistent with a large-scale migration of humans, accompanied by their domestic turkeys, during the 13th century CE," researchers wrote. "These results

*Continued, P. 9*

*Where Did They Go? Continued from P. 8*

support scenarios that suggest contemporary Pueblo peoples of the Northern Rio Grande are biological and cultural descendants of Four Corners populations."

This is only an outline. The paper gives much more detail on the methodology used and the reasoning that led to the authors' conclusion. The fate of the first apartment dwellers in North America may no longer be a mystery.

***Ref**: Kemp BM, Judd K, Monroe C, Eerkens JW, Hilldorfer L, Cordray C, et al. (2017) Prehistoric mitochondrial DNA of domesticate animals supports a 13th century exodus from the northern US southwest. PLoS ONE 12(7): e0178882. https://doi.org/10.1371/journal.pone.0178882*

## Fun Field Trip at Hedger Aggregate

About 30 MAGSters went to Jonesboro.

There was a large variety of rocks and fossils. Everyone went home happy.

## Jewelry Bench Tips by *Brad Smith*

### JUST A DROP

Hobby shops and model airplane stores carry small plastic dispenser bottles that are handy for putting a drop of flux, oil, or glue just where you want it. They have a length of small metal tubing coming out the top that lets you squeeze out very small drops.

I use one with a short length of tubing for oil when I'm sawing or when drilling harder metals like steel. Another bottle I found in a plastics store has a longer length of metal tubing on it. Plastics people use them for dispensing fast drying glues to join pieces of acrylic. The long metal tube lets you reach into tight places. Either of these is handy for flux at the soldering station.


### FOREDOM MAINTENANCE

If you have a Foredom flexshaft, it makes sense to check it over every so often to be sure it's running properly. But how to do that? You've probably lost the little booklet that came with the unit. Well, being the good company it is, Foredom has put together an extensive set of videos on how to do almost anything.

The series covers set-up, lubrication, replacing a sheath, motor maintenance, and handpiece maintenance. Few if any special tools are needed. You can watch the videos at www.foredom.net/flexibleshaftmachinemaintenance.aspx particularly under "Foredom Basics" or the "Foredom Shafting..." categories. Any repair parts needed are available on the Foredom site or from most jewelry supply catalogs.

See all Brad's jewelry books at Amazon.com/author/bradfordsmith.

# MAGS At A Glance

## September 2017

| SUNDAY | MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY |
|---|---|---|---|---|---|---|
| 27 | 28 | 29 | 30 | 31<br>Board Meeting, 6:30 pm, St. Francis Hospital | 1 | 2 |
| 3 | 4  | 5 | 6 | 7 | 8<br>Membership Meeting, 7:00 pm, "Opals" | 9 |
| 10 | 11 | 12 | 13 | 14 | 15 | 16<br>MAGS Field Trip, Nonconnah Creek, 10:00 am/Chucalissa Volunteer Day, 9:00 am-1:00 pm |
| 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 24 | 25 | 26 | 27 | 28 | 29 | 30<br>DMC Field Trip, Clarksville, GA, 10:00 am |

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