



Volume 68 ♦ Number 10 ♦ October 2022 ♦ A monthly newsletter for and by the members of MAGS

October Program

Presented by Mike Baldwin

Adults and Juniors



I and my family have been members of MAGS since 1997. Roger Van Cleef greeted us at the door that first meeting, and we felt right at home. I had never collected a rock before joining the club, but my wife Sherri loved rocks and fossils. Now, so do I. Even more

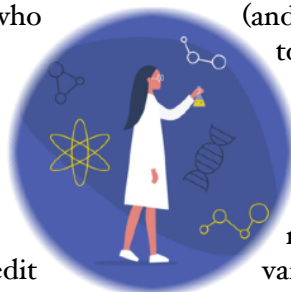
than collecting rocks, minerals, and fossils, I enjoy visiting elementary, middle, and high schools, universities, civic clubs (like 4-H, Kiwanis, and MAGS), libraries, and scout troops to talk about geology, mountain building, plate tectonics, rocks, *Continued, P. 6*

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IMPORTANT SCIENTIFIC DISCOVERIES BY WOMEN

When we think of famous scientists who made important discoveries, names like Copernicus, Darwin, Einstein, Faraday, Galileo, Lavoisier, Newton, Pasteur, Pauling, and Steno (featured in the last issue) may come to mind. All of these great scientists were men.

Though they may not get as much credit



MATTHEW LYBANON, EDITOR

(and publicity), women have also contributed to the advance of science. Madame Curie is one familiar name. But can you think of another?

There are other less familiar women scientists whose contributions deserve to be recognized. Two who made important advances in geoscience are *Continued, P. 3*

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: <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 20th of the month is the deadline for next month's issue. Send material to lybanon@earthlink.net.

October DMC Field Trip

WHERE: Chattooga County, GA

WHEN: Sunday, October 23, 10:00 A.M.-2:30 P.M.

COLLECTING: Crazy lace agate, banded agate, druzy quartz

CONTACT: Dion or Toby Stewart, (678) 417-1786 or cchgms.fieldtrips@gmail.com

Links to Federation News

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

*Important Scientific ... Women
Continued from P. 1*

named in the next paragraph. And the work they did is outlined in later articles in this issue.

Inge Lehmann and Eunice Newton Foote are those two women. One of them was the first to deduce details of the interior structure of the Earth, and the other was the first to describe the effect of carbon dioxide on climate (climate change is implicated in most if not all of the mass—and more minor—extinctions in Earth’s history).

Let’s give these women the credit they deserve.

President’s Message

Plan Ahead—Field trip to Farmington, Missouri. Betty Marler, a longtime friend and field trip leader for MAGS, is having her “retirement field trip” during the first week of November. Betty turned 90 in April and has taken MAGS on trips spanning three decades. Here is some preliminary information:

- Collection dates Friday, November 4, and Saturday, November 5
- Collecting druse quartz, barite, calcite, and lace agates
- Motels are in Farmington
- Specific meeting times and trip sites will be published later

MAGS Rock Swap

- Saturday , October 8, 9 am-2 pm
- 3805 Melanie June Lane, Bartlett, Tennessee
- From I-40, north on Whitten/

OVER 20
DEALERS &
DEMONSTRATIONS

49th Annual
Central Arkansas

NEW
LOCATION

**Gem, Mineral &
Jewelry Show
October 1st & 2nd, 2022**

Saturday - 9:00am-6:00pm
Sunday - 10:00am-5:00pm

Cabot Event Center, 508 North Lincoln Street,
Cabot, Arkansas 72023

Gems, Minerals, Fossils,
Jewelry, Beads, Kids
Dig, Demonstrations

Admission: \$3.00 (Kids
under 12, Boy Scouts,
First Responders & Military
Personnel in uniform are free!)

Sponsored by: Central Arkansas
Gem, Mineral and Geology Society

For more information, contact
lenoramur@aol.com
www.centralarrockhound.org



- Kirby Whitten, left on St. Elmo’s, right on Melanie June.
- Rocks and minerals
- Fossils, geodes, petrified wood
- Jewelry and beads
- Open to members and public
- Bring your drinks and snacks
- Bring your own tables and chairs.
- Sell or swap



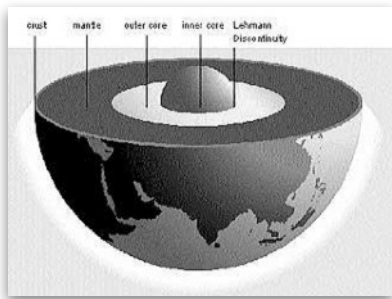
**Inge Lehmann,
Science Pioneer**

Matthew Lybanon, Editor

The Earth’s internal structure is one of the most basic topics in geology. Temperatures inside the Earth are too hot, pressures too extreme, and distances too vast to be explored by conventional probes. So scientists rely on seismic waves to reveal the structure of the planet’s interior. Thousands of earthquakes oc-

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Inge Lehmann, Science Pioneer
Continued from P. 3



cur every year, and each one provides a fleeting glimpse of the Earth's interior. Seismic signals consist of several kinds of waves. Those important for understanding the Earth's interior are P-waves, (primary, or compressional waves), and S-waves (secondary, or shear waves), which travel through solid and liquid material in different ways.

The seismograph was invented in 1880. By the end of that decade seismic stations were in place all over the world. At the time, geophysicists believed Earth to be made up of a liquid core surrounded by a solid mantle, itself surrounded by a crust, all separated by abrupt density changes in the Earth called "discontinuities."

Now we know that the inner core is a hot, dense ball of (mostly) iron. It has a radius of about 1,220 km. Temperature in the inner core is about 5,200°C. The pressure is nearly 3.6 million atmospheres. The inner core's temperature is far above the melting point of iron. However, unlike the outer core, the inner core is not liquid or even molten. The inner core's intense pressure prevents the iron from melting. The pressure and density are simply too great for the iron atoms to move into a liquid state. Because of this unusual set of cir-



cumstances, some geophysicists prefer to interpret the inner core not as a solid, but as a plasma behaving as a solid.

Who was responsible for bringing about the change in the way scientists think about the Earth's internal structure?

Inge Lehmann, who called herself "the only Danish seismologist" working in the 1930s, was a pioneering figure in the study of Earth's interior. Lehmann was the first to identify Earth's solid inner core, and became a leading expert in the structure of the upper mantle as well.

She was born on 13 May, 1888, near Copenhagen, Denmark. The child was sent to a small private school run by Hannah Adler, an aunt of physicist Niels Bohr. This school was co-educational, a feature that was rather unusual for the time. As Lehmann later recollected, boys and girls were treated alike: "[n]o difference between the intellect of boys and girls was recognised, a fact that brought some disappointment [to me] later in life when I had to recognise that this was not the general attitude."

In 1929 a large earthquake occurred near New Zealand. Lehmann studied the shock waves and was puzzled by what she saw.

A few P-waves, which should have been deflected by the core, were in fact recorded at seismic stations. Lehmann theorized that these waves had traveled some distance into the core and then bounced off some kind of boundary. Her interpretation of this data was the foundation of a 1936 paper in which she theorized that Earth's center consisted of two parts: a solid inner core surrounded by a liquid outer core, separated by what has come to be called the Lehmann Discontinuity. Lehmann's hypothesis was confirmed in 1970 when more sensitive seismographs detected waves deflecting off this solid core.

A critical and independent thinker, Lehmann subsequently established herself as an authority on the structure of the upper mantle. She conducted extensive research in other countries, benefiting from an increased global interest in seismology for the surveillance of clandestine nuclear explosions.

Inge Lehmann was the first woman to receive the prestigious William Bowie Medal, the highest honor awarded by the American Geophysical Union. In 1997, the AGU created the Inge Lehmann Medal, recognizing a scientist's "outstanding contributions to the understanding of the structure, composition, and dynamics of the Earth's mantle and core."

You can find more information on Inge Lehmann and her work in this area on this Harvard University web page:

<https://courses.seas.harvard.edu/climate/eli/Courses/EPS281r/Sources/Inner-Core/Lehmann-1936-extracts+interpretation.pdf>

Fabulous Tennessee Fossils

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

FTF 92

Kenneth V. Bordeau—UT Martin Micropaleontologist



This is the first of a series of essays that I will write to highlight the paleontologists that live and work in Tennessee, including many university professors that some of you may have taken classes under in your college days. Not only does Tennessee have a remarkable fossil record, but it has been home to some impressive researchers and teachers who specialize in the ancient life of Tennessee. I have mentioned several of these notable people in previous essays about specific fossils, I but want to give these folks their due by highlighting them for you. I will begin close to my home by introducing you to my predecessor at UT Martin, Dr. Kenneth Vernon Bordeau, who died in 2011. Upon the death of his widow “Elvi”, and because the Bordeaus had no surviving family they felt close to, I became the recipient of Ken’s entire library and microfossil collection, along with their family papers and memorabilia. In addition, she bequeathed the bulk of their sizable estate to UT Martin for the express purpose of supporting students and research in paleontology. That over \$500,000 endowment now funds our work at the UT Martin Coon Creek Science Center.

Kenneth V. Bordeau was born in Nashua, New Hampshire, to Eunice and Edward A. Bordeau on March 29, 1923, just the right time for him to be of drafting age for

World War II. After high school he worked for the Nashua Gummed and Coated Paper Company into World War II. In early 1943, Bordeau was drafted into military service and stationed in the European Theater. Bordeau’s deployment extended after armistice, and while in Germany he met Elisabeth Elvira Legel, who had fled Silesia before the Russian invasion in February 1945. At the end of the war, “Elvi” became a liaison translator between German SS prisoners of war and war crimes investigators of the 16th Armored Field Artillery in Happurg, Bavaria. Upon his discharge, Ken Bordeau returned to Nashua, New Hampshire, to work as a laboratory assistant for the Beebe Rubber Company. Elvi followed soon after and Ken and Elvi were married in 1947. I should note that Elvi Bordeau was a remarkable person in her own right and left behind a tremendous resource of letters, papers, artwork, diaries, and photographs of historical value.

Bordeau used the G.I. Bill to attend the University of New Hampshire, where he completed his Bachelor of Science degree in geology in 1951. He then went on to receive his Masters of Geology from the University of Oklahoma (1965), where he began his paleontological career as a micropaleontologist by studying the palynology (plant spores and pollen) of the Drywood Coal (Pennsylvanian age)

of Oklahoma. In this work he named one new genus and nine new species of spore. He stayed on at Oklahoma to undertake his Ph.D., this time working under famed micropaleontologist Reginald W. “Bucky” Harris, who was an influential paleontologist with the Paleontological Society and a leader in micropaleontology. Ken developed a life-long friendship with the Reggie and Ruth Harris. Later when Harris retired, Ken was the recipient of much of Harris’ library and collections. Bordeau began his contributions to Tennessee paleontology with his dissertation on the micropaleontology of the Ordovician-age Fernvale Formation of both Oklahoma and Tennessee, which he completed in 1967. His dissertation work focused on conodonts (now considered teeth to early groups of fish) and ostracod microfossils, but also included some work with brachiopods and trilobites as well. To this day, his dissertation is the primary reference source for the Fernvale in Tennessee.

Bordeau embarked on a professional career as a micropaleontologist for Union Producing Company in New Orleans, Louisiana, focusing on stratigraphic correlations. He also spent three years in Libya, North Africa, with American Overseas Petroleum Company as chief micropaleontologist, where he

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MEMPHIS ARCHAEOLOGICAL AND GEOLOGICAL SOCIETY

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Fabulous Tennessee Fossils established their paleontological laboratory and conducted paleontological investigations. *Continued from P. 5*

Upon returning to the U.S., Bordeau joined the faculty of the University of Tennessee at Martin as one of the “founding fathers” of the new program in geology. Bordeau taught courses in biostratigraphy, Earth history, and stratigraphy for over 20 years. He was a member of the American Association of Petroleum Geologists, the Society of Economic Paleontologists and Mineralogists, the Paleontologists Society, the Paleontological Research Institute, Sigma Xi, the American Association of Stratigraphic Palynologists, the International Paleontological Union, and the Commission Internationale de Microflore du Paléozoïque. Bordeau was the first person in the UT system to develop extension courses (then called correspondence courses) in geology at UT. He was known as a “very difficult” professor and had high expectations of his students. He even had a grading scale in which a

student could end-up with a negative score! His personal microfossil collections are housed at UT Martin and include all microfossil groups (e.g., foraminifera, conodonts, ostracods, diatoms, radiolaria, and much more) from many areas of the Southeast, Midwest, and North Africa, including microfossil samples from drilling projects during his consulting years with Amoco and the Oklahoma Geological Survey. With his wife Elvi, Bordeau also translated the work of Franz Ludwig Cancrinus on the principles of salt mining, which was published in Germany in 1773 as Geological Society of America Microfilm Memoir 10, published in 1980. In 1988, Bordeau retired from UT Martin at the rank of Professor Emeritus. He continued his interest in microfossils and expanded his collections through his travels. In retirement he expanded his interests in the history of magic tricks (with a library of over 200 books) and prestidigitation. He was often a guest performer at numerous children’s birthday parties. Kenneth V. Bordeau died at the age of 88 on July 6, 2011, at Jackson General Hospital in Jackson, Tennessee.

His paleontological legacy includes a rich legacy of microfossil paleontology in Tennessee as well as helping to ensure the continued conservation, research, and educational outreach of the Coon Creek Science Center through the Kenneth V. Bordeau Paleontology Endowment at UT Martin, which supports activities and internships for students and researchers.



Figure 1. Photo of UT Martin micropaleontologist Kenneth V. Bordeau taken in the 1960s in Oklahoma with his classic western hat and hand lens studying microfossils in a rock sample. (Photo from Bordeau Archive at UT Martin).

October Program minerals, fossils, and with the James Webb telescope now mapping the stars, planetary geology is one of my favorite indulgences. I love fluorescent minerals and geodes. At the October MAGS meeting I will have over 1,000 rocks, minerals, and fossils on display for you to pick up, examine, and ask questions about. I hope to see you there. *Mike*



Jewelry Bench Tips by Brad Smith

WINDING JUMP RINGS

If you need a few jump rings the same size, it's easy to grab a round rod and wind as many as you need. But when you need a lot of them, some form of winder saves a lot of time. A variable speed screw gun makes quick work of winding the coils. Screw guns are quite inexpen-

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**Eunice Newton Foote,
Science Pioneer**

Matthew Lybanon, Editor

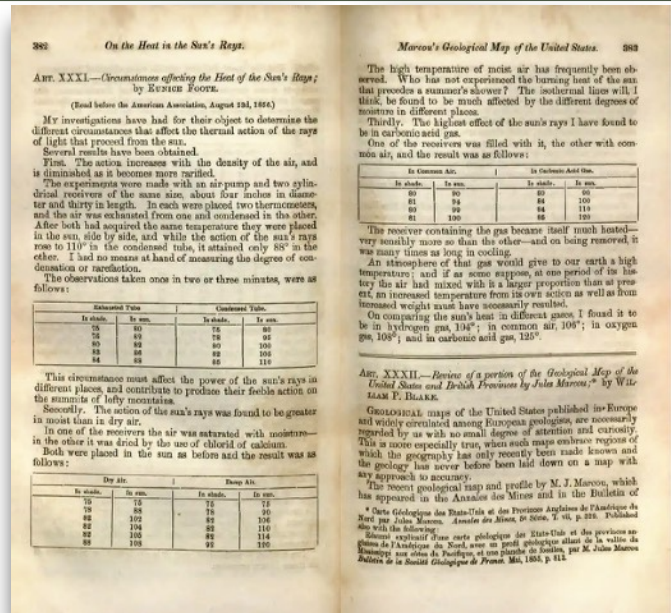
Carbon dioxide is an odorless, tasteless, transparent gas that forms when people burn fuels, including coal, oil, gasoline, and wood. As Earth's surface heats, one might think that the heat would just radiate back into space. But it's not that simple. The atmosphere stays hotter than expected mainly due to "greenhouse gases" such as carbon dioxide, methane, and atmospheric water vapor, which all absorb outgoing heat. This is well-known now, but let's go back to the 19th century.

For many years John Tyndall, a prominent Irish physicist, was recognized by scientists as the first person to discover the greenhouse effect. In 1859, Tyndall reported his research, using a Leslie cube and a differential spectrometer, showing that various gases both trapped and emitted infrared radiation rather than sunlight. His work, "Note on the Transmission of Radiant Heat through Gaseous Bodies," was published that year in the *Proceedings of the Royal Society*, of which he was a fellow.

But women academics in the late twentieth century rediscovered some forgotten publications by an obscure woman scientist. In 1856 and 1857, an American woman named Eunice Newton Foote published the only two scientific papers in the field of physics to be written by an American woman prior to 1889. Her 1856 paper is notable in that it demonstrated the absorption of heat by carbon dioxide and water vapor and hypothesized that changing amounts of CO₂ in the atmosphere would alter the climate.

Her 1857 paper was also notable in that it was the first time an American woman's work had been published in the *Proceedings of the American Association for the Advancement of Science* and the first known publication in physics by a woman in a scientific journal. Hers were the only two scientific papers in the field of physics to be written by an American woman prior to 1889.

Foote conducted a simple experiment. She put a thermometer in each of two glass cylinders, pumped CO₂ gas into one and air into the other and set the cylinders in the Sun. The cylinder containing CO₂ got much hotter than the one with air, and Foote



realized that CO₂ would strongly absorb heat in the atmosphere. Foote's discovery of the high heat absorption of CO₂ gas led her to conclude that "...if the air had mixed with it a higher proportion of carbon dioxide than at present, an increased temperature" would result.

Tyndall was apparently unaware of Foote's work (or didn't think it was relevant—after all, she was only a woman). As often happens in science, if one person hadn't made a certain scientific discovery someone else will eventually (usually soon) make it. But the prize for being the first to discover the greenhouse effect goes to Eunice Newton Foote!

Foote's work is now recognized as the earliest known scientific research to demonstrate the existence of greenhouse gases and their potential to effect changes in climate. The publication of her 1857 paper in that year's *Proceedings of the American Association for the Advancement of Science* is acknowledged as the first time an American woman's work had been published in the journal. The American Geophysical Union instituted The Eunice Newton Foote Medal for Earth-Life Science in 2022 to recognize exceptional scientific achievements in research which focuses on the convergence of Earth and life science.

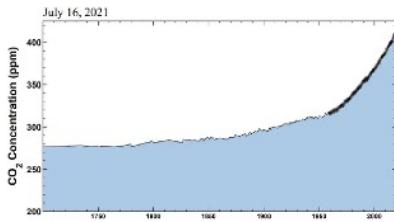
The science of greenhouse-gas-induced climate change was understood well over 100 years ago! Burning more and more fossil fuels has been adding an ever-increasing amount of CO₂ into

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*Eunice Newton Foote, Science Pioneer
Continued from P. 7*

the air. Initially, scientists thought a possible small rise in the Earth's temperature could be a benefit, but these scientists could not envision the coming huge increases in fossil fuel use.

The first quantitative estimate of carbon dioxide-induced climate change was made by Nobel laureate Svante Arrhenius. In 1896, he calculated that "the temperature in the Arctic regions would rise 8 or 9 degrees Celsius if carbon dioxide increased to 2.5 or 3 times" its level at that time. Arrhenius's estimate was likely conservative: Since 1900 atmospheric carbon dioxide has risen from about 300 parts per million to around 417 ppm as a result of human activities, and the Arctic has already warmed by about 3.8°C.



In 1965 scientists warned President Johnson about the growing climate risk. Now fast-forward to today. "The best-case scenario is still that this is the coolest summer you'll experience in the rest of your life," according to Ben Zaitchik, an earth and planetary sciences professor at Johns Hopkins University, who studies extreme weather events. "We're going to be facing heat waves of at least the intensity we've been experiencing the past couple of years and almost certainly of greater intensity, even if we decarbonize along the best-case scenario."

Save
the date!

Archaeology Day 2022

October 15th 10am—3pm



Flintknapping | Atlatl Contest | Guided Hike
Pottery | Musical Storytime | Birds of Prey
Trench Tour | Garbology | Touch Artifacts



Free Admission | Free popcorn & hotdogs while supplies last

C.H. Nash Museum at Chucalissa | 1987 Indian Village Drive, Memphis, TN 38109

901-785-3160 | chucalissa@memphis.edu | memphis.edu/chucalissa



Adult Programs

October 14: Mike Baldwin, Geology
November 11: Alan Parks, TBD
December 9: Holiday Party

Junior Programs

October 14: Mike Baldwin, Geology (with adults)
November 11: TBD
December 9: Holiday Party (with adults)

Field Trips

October 15: Nonconnah Creek or Crow Creek
November 4th: Missouri
November 12: Memphis Stone & Gravel Co.
December: None

New Members

Carole Martin and grandson Bishop
Lyndsay Saunders

October Birthdays

1 Gail Karr
2 Bill McManus
5 Michala Demo

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MAGS Notes

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- 19 Virginia Pierce
- 24 Keith Riding
Ann Austin
- 27 Arlene Oleartchick

🎵 **Want to Be a Member?**

To become a MAGS Member, just go to our website at www.memphisgeology.org and print out an application form. There is a prorated fee schedule for new Members only. Mail the completed application along with the dues payment to the Membership Director shown on the form. If you are unable to print the application, you can pick one up at the sign-in desk at any of our Friday night Membership Meetings, or simply join at the meeting. Visitors are

always welcome at our Membership Meetings but membership is required to attend our field trips.

The most important benefit of being a MAGS Member is getting to know and make friends with other Members who have similar interest in rocks, minerals, fossils, and archaeology. All new Members will receive a New Member Packet, a MAGS ID card, and a monthly newsletter via email. Members are entitled to go on our monthly field trips and get free admission to our annual Show.

Jewelry Bench Tips sive at discount stores and are remarkably handy for odd jobs in the shop and around the house.

To wind a coil, just bend a right angle on the end of the wire about a half inch long and insert this into the screw gun chuck. Then wind slowly, keeping a tight coil. I like to rest the end of the mandrel on the edge of the table or bench pin. Finally, one note of caution. If you are winding an entire length of wire, be careful as you get near the end of the wire. If the end passes under your thumb, it can cause a nasty scratch or cut.



TOUCHING UP A BEZEL
Pumice wheels are good for

touching up a bezel after you've set the stone. The hardness is about 6 on the Mohs scale, less hard than quartz, so it shouldn't scratch any of your agates or Jaspers. However, I'd avoid or be real careful of using pumice near the softer stones like Turquoise, Amber, Howelite, etc.

If you're unsure about the hardness of your wheels, test them on a piece of glass. Glass is about 5 1/2 on the Mohs scale, softer than quartz. So if the wheel doesn't harm glass, it's safe for use on the Quartzes and harder stones.

My preference is the one inch diameter ones such as those shown at riogrande.com/Product/AdvantEdge-Pumice-Wheels-Medium/332722?pos=2

Smart Solutions for Your Jewelry Making Problems
amazon.com/author/bradfordsmith

The Silurian Hypothesis

Matthew Lybanon, Editor

Complex life on our planet has existed for at least 400 million years. Yet as a species, we only managed to create an industrial civilization around 300 years ago. But what if an earlier industrial civilization existed on Earth millions of years ago? If it had, how would we be able to prove it—or disprove it? This is the crux of the Silurian hypothesis, a fascinating thought experiment that appeared in a study published in 2018 in the *International Journal of Astrobiology*.

Homo sapiens first appeared on Earth about 300,000 years ago. In the unlikely case that such an old industrial civilization had existed, it would predate our species. Gavin A. Schmidt, (first author, director of NASA Goddard Institute of Space Sciences), called the idea the Silurian hypothesis, paying homage to the sophisticated reptilian humanoids awoken by nuclear testing after 400 million years of hibernation in a 1970s episode of the British science fiction television series *Doctor Who*. The study authors decided to concentrate on the

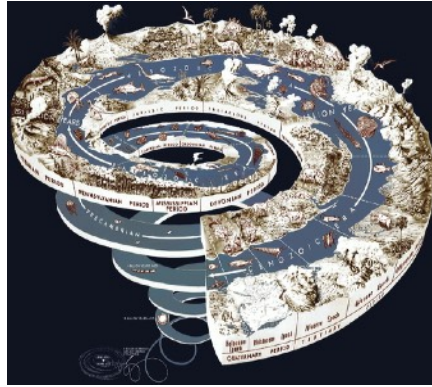
Continued, P. 10

The Silurian Hypothesis time period
Continued from P. 9 from four

million
years ago to 400 million years ago.

Going back hundreds of millions of years to find traces of a pre-Homo Sapiens civilization is not simple. “After a few million years, Earth is pretty much resurfaced. You’re not going to have any statues, buildings, or anything left,” Adam Frank, (second author, professor of astrophysics at the University of Rochester), says. Fossil records will be virtually nonexistent as everything will have crumbled to dust. The only evidence would come in the form of chemical imprints. “You’d have to look at each layer of rock, and then try and detect trends—look for changes in things like the carbon or oxygen isotopes, which are tracers of things like carbon dioxide. An industrial civilization would dump lots of carbon dioxide into the atmosphere, just like we do,” Frank says. Plastic or nanoparticles would also be good indicators of an industrial civilization.

Schmidt and Frank were intrigued by the period of geological history known as the Paleocene-Eocene Thermal Maximum (PETM), because Earth’s average temperature soared to 15°F above what we have today, and the world became a temperate and iceless place. They investigated the carbon and oxygen isotope ratios from the PETM and indeed saw spikes, but they also saw declines, and all of these over a few hundred thousand years, which is nowhere near the speed at which carbon is currently suffocating the atmosphere. Frank says the PETM’s



chemical differences pointed to a long-term climate change.

The experiment demonstrated certain shortcomings in our current scientific apparatus. “In case an earlier species’s industrial activity was particularly short-lived, we would not be able to detect it in ancient sediments with the tools and methods we have now,” Frank explains. “If you want to look for evidence of a previous civilization, you’d have to do studies that nobody’s done and develop novel methods—for example, you’d have to figure out ways to look at the rock record on a much finer timescale.”

No clear evidence of an earlier industrial civilization has yet been found. Though both Frank and Schmidt don’t really believe an industrial civilization existed before our own, the main takeaway of the Silurian hypothesis, Frank says, is that if you’re not explicitly looking for something, you might not even see it.

Ref: Schmidt, G., & Frank, A. (2019). *The Silurian hypothesis: Would it be possible to detect an industrial civilization in the geological record? International Journal of Astrobiology, 18(2), 142-150. doi:10.1017/S1473550418000095*

August Board Minutes

Mike Coulson

Zoom meeting called to order 6:30. Attending: W.C. McDaniel, Carol and Matthew Lybanon, Bonnie and Bob Cooper, Mike Coulson, Mike Baldwin, Nannett McDougal-Dukes, Melissa Koontz, Kathy Baker.

New Business:

1. YES/NO Votes to purchase Holiday Gifts at Franklin Show. Motion carries 9 yes and 3 no
2. Discussed pros and cons of moving Show to Pipkin Building vs. Agricenter. Board voted to stay with Agricenter in 2023.

Show: 2022 Show ended up with a healthy profit. 2023 Show: WC looked into other venues for the show and compared prices. While Pipkin Building’s rent was less, they didn’t offer a lot of the services provided by the Agricenter. Other services would need to be contracted and MAGS Members would be tasked to fill in the gaps creating a lot of work for club members and volunteers.

Treasurer: Report presented and approved. Club is paid up with church thru September. Newsletter printed and mailed.

Membership: No new Members.

Secretary: Minutes submitted, presented and approved.

Adult Programs: August 12: Swap. September 9: Dr. Jennifer Gifford. October 14: Currently talking with Lionel Crews.

Field Trips: August 27: Blanchard Springs trip will not take place. Caverns are closed. September 9: Richardson Landing. September 24: DMC Trip. October: Nonconnah Creek. November 3-6: Missouri trip led by Betty Marler. November 12: Memphis Stone and Gravel, specific location TBA. No field trip in December.

Youth Programs:

September: Intro to *Continued, P. 11*

August Board Minutes wire wrapping
Continued from P. 10 with Rena.

Editor:

Deadline to submit content for the newsletter is the 20th of the month.

Web: Waiting to update the website until field trip information is available.

Rock Swaps: August Rock Swap will be at the church during the Membership Meeting.

Library: Four new books added.

Old Business: None.

Adjourned 6:54.

August Meeting Minutes

Mike Coulson

The Membership Meeting hosted a Rock Swap followed by food, fellowship, and MAGS Rock Bingo. 30+ Members attended.

Federation Meetings

The Gem & Mineral Society of Louisiana will host the 2022 AFMS and SCFMS Conventions October 13-16, in conjunction with their 50th Annual Gem & Mineral Show October 14-16. The events will take place at the John A. Alario Center, 2000 Bayou Segnette Blvd., Westwego, LA. 70094. For more information check www.gmsofla.org.

Report From Mars

Matthew Lybanon, Editor

The NASA Perseverance rover landed in Jezero crater, to investigate ancient lake and river deposits. Core samples drilled by Perseverance are revealing its geology.

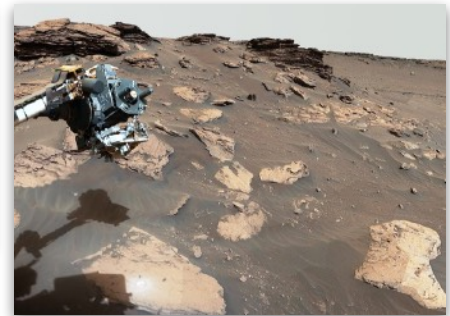
Jezero crater is 45 km wide, located just north of the Martian equator. It appears the area once



was abundant with water and home to a river delta, with river channels spilling over the crater wall to form a large lake. Scientists suspect the crater could have harbored microbial life, with evidence perhaps contained in lakebed or shoreline rock.

The samples, obtained by the car-sized, six-wheeled robotic rover and stored for future transport to Earth for further study, showed that rock from four sites inside Jezero crater is igneous. The scientists had thought the rock, formed roughly 3.5 billion years ago, might be sedimentary, formed as mud and sand deposited in a lakebed. The rocks also bore evidence of alteration through exposure to water, another sign that cold and arid Mars long ago was warm and wet.

The lowest exposed unit, informally named Séítah, is a coarsely crystalline olivine-rich rock, which accumulated at the base of a magma body. Fe-Mg carbonates along grain boundaries indicate reactions with CO₂-rich water, under water-poor conditions. Overlying Séítah is a unit informally named Mááz, which investigators interpret as lava flows or the chemical complement to Séítah in a layered igneous body. Voids in these rocks contain sulfates and perchlorates, likely introduced by later near-surface brine evaporation.



Since July 7, NASA says, the rover has collected four samples from the delta, bringing the total number of collected, "scientifically compelling rock samples" to 12. Perseverance is studying the delta's sedimentary rocks. The contrast with the crater "provides us with a rich understanding of the geologic history after the crater formed and a diverse sample suite," project scientist Ken Farley said in a news release.

With the help of an instrument called Scanning Habitable Environments with Raman & Luminescence for Organics & Chemicals, or SHERLOC, organic molecules were found in "Wildcat Ridge," a 3 foot-wide rock believed to have been formed by mud and fine sand in an evaporating saltwater lake billions of years ago.

"The fact the organic matter was found in such a sedimentary rock—known for preserving fossils of ancient life here on Earth—is important," Farley said.


"However, as capable as our instruments aboard Perseverance are, further conclusions regarding what is contained in the Wildcat Ridge sample will have to wait until it's returned to Earth for in-depth study as part of (NASA and European Space Agency's) Mars Sample Return campaign."

MEMPHIS ARCHAEOLOGICAL AND GEOLOGICAL SOCIETY

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

MAGS At A Glance

October 2022

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
25	26	27	28	29	30	1
2	3	4	5	6 Zoom Board Meeting 6:30 pm	7	8 Rock Swap, Lou White residence, 9:00 am-2:00 pm
9	10  COLUMBUS DAY	11	12	13	14 Membership Meeting, 7:00 pm Mike Baldwin, "Geology"	15 MAGS Field Trip, Nonconnah Creek or Crow Creek
16	17	18	19	20	21	22
23 DMC Field Trip, Chattooga County, GA	24	25	26	27	28	29
30  HAPPY HALLOWEEN	31	1	2	3	4	5

Memphis Archaeological and Geological Society
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