



Volume 59 ♦ Number 10 ♦ October 2013 ♦ A monthly newsletter for and by the members of MAGS

Crowley's Ridge

October Membership Meeting Adult Program



Paul Sides will talk about Crowley's Ridge: its history and what rockhounds can find there.

The MAGS website has an article about Crowley's Ridge: *Kelly Baldwin*, Selenite: the mysterious crystal of Crowley's Ridge.

Crowley's Ridge (named for Benjamin Crowley, one of the first European residents of the ridge) is an unusual geological formation that rises 250 to 550 feet above the alluvial plain of the Mississippi embayment in a 150-mile line from southeastern Missouri to the Mississippi River near Helena, Arkansas. The ridge contrasts sharply with the surrounding flat table land of the Delta. Although it averages only three to twelve miles across, its height makes it the most prominent feature of the landscape of the Mississippi Valley from Cape Girardeau to the Gulf of Mexico.

The ridge is generally thought to have once been an island between the Mississippi River and the Ohio River. It became a long and narrow hilly ridge after the rivers changed course millions of years ago, late in the Pleistocene epoch. Prior to the change in course, the Mississippi River flowed along the west side of what is now Crowley's Ridge, with the Ohio River meandering along the east side. The work of these major rivers and their subsequent shifting in course resulted in the formation of an erosional remnant that is now Crowley's Ridge.

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TEXAS FOSSIL MARATHON

The eagerly anticipated Texas Fossil Marathon took place over Labor Day weekend. Fossil hunters increased Valley View's human population by several percent, but they decreased the ammonite population slightly (don't worry, it took millions of years for that many ammonites to accumulate there, so there are plenty left).



MAGSters, Dallas Paleontological Society members, and others came and went at various times. We had three good days of hunting, including a session looking for other marine fossils at Post Oak Creek in Sherman. And there were a few other side trips. The result: lots of finds and lots of fun. You can see pictures and more on later pages.

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MEMPHIS ARCHAEOLOGICAL AND GEOLOGICAL SOCIETY

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

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MAGS and Federation Notes

Upcoming Field Trips

October 12: Gravel pit near Jonesboro, Arkansas (new site for MAGS)

November 2: Richardson Landing (gravel bar along Mississippi River near Millington, Tennessee)

November 16/17: Middle Tennessee—Ledbetter Farm (geodes) and Dale Hollow Lake (fossils)

January 3-5: Missouri (tentative)

Trip bulletins are published and available upon request for the October and November field trips. Contact Field Trip Chair W. C. McDaniel at w.c.mcd@att.net or (901) 274-7706.

Web Statistics for August 2013

[A] Hits = 44,141 [1424 per day]

[B] Pageviews = 29,542 [953 per day]

[C] Bytes downloaded = 3.45GB [114MB per day]

[D] Popular pages:

[01] Coon Creek Book Part 1 = 6953

[02] MAGS homepage = 3443

[03] Devonian Fossils of West Tennessee = 826

[04] Rockhound News 0813 = 668

[05] Birthstones = 638

[06] Coon Creek Book Part 2 = 612

[07] Rockhound News 0613 = 602

[08] Rockhound News 0413 = 229

[09] Space Geology—Eris = 209

[10] MAGS Day = 205

Please contribute articles or pictures (everybody likes pictures) on any subject of interest to rockhounds. If it interests you it probably interests others. The 15th of the month is the deadline for next month's issue. Send material to lybanon@earthlink.net.

The October 5 DMC field trip to the Coon Creek Science Center is closed (limited to 35 participants).

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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As fairly new members, this was our first field trip with MAGS. I have to say we enjoyed the drive since we had never been further west than Hot Springs. It also gave us a chance to become better acquainted with a few other club members. The Lybanons were excellent hosts and our guide, Bob Williams, was very knowledgeable.

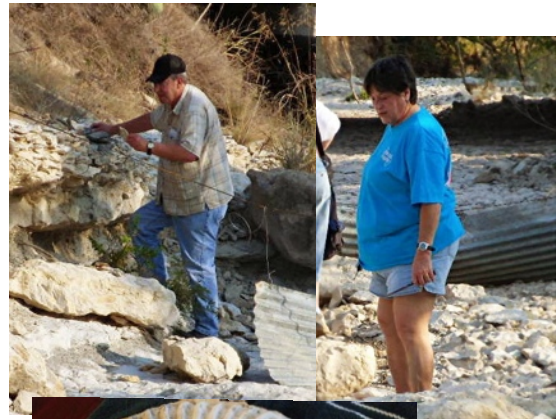
We arrived Friday afternoon and almost immediately had a preview of what was to come. We visited a spot near the hotel to collect some small ammonites before heading off to dinner. Saturday 6am arrived and promised to be a scorcher. We met for breakfast at the local golden arches before heading to our next site which was fun although not as productive. It was definitely an experience crawling under barbed wire. I found muscles I had forgotten along with a couple of good fossil specimens.

Everyone met Sunday morning in the town square before heading to the collection site. It promised to be another hot day, however everyone was excited and looking forward to finding many treasures. After receiving safety instructions from Mr. Williams, we all headed to our cars for the short drive. Upon arrival everyone couldn't get out of their cars fast enough to walk the few feet to the most awesome sight—ammonites everywhere. Some were easy to extract while others took quite a bit of coaxing and a lot of elbow grease. All sizes were there. Some ammonites were more than a foot across and weighed a ton, or so it seemed. We managed to get several to the car to bring home. One in particular was so heavy help from a young MAGS member (Chris) was needed. It wasn't long before the heat drove us back to the motel for a cooling shower and a much needed nap before dinner.

David and I are looking forward to the next MAGS field trip and we will definitely make the Texas trip again. Thanks goes out to our hosts the Lybanons, Mr. Bob Williams, and the Dallas Paleontological Society.—*Belinda Loyd*

*Texas Fossil Marathon
Continued from P. 1*

One from Florida, three from Houston on their first hunt, 17 from the Memphis area, and ? over 20 from DPS. Mostly adults, all acting like kids down in the creek. The heat didn't stop us having a good time. Serious collectors don't back down just because it's 105° in the shade.—*Bob Williams*



ODE to Our TEXAS Trip

Ammonites—Amazing +
Bob, the BEST local leader +
Cool? at 7 AM +
Delightful Daily Dinners +
Exuberant Excavators Every Stop +
Friends—Far (Dallas) and Near (MAGS) +
Lybanons—the LEADERS of the
BEST MAGS trip yet!
A BIG THANK YOU for a GREAT TIME!
The Murrays

Continued, P. 5

Discovery Park of America

Opening November 1, 2013

Editor's Note: The lead article in the August 2013 issue of *MAGS Rockhound News* gives background on Discovery Park of America and a preview of what it will offer.



Sitting in a cornfield in rural northwest Tennessee is the nation's newest attraction. Opening November 1, 2013, Discovery Park of America was founded by local residents Robert and Jenny Kirkland. It's a \$100 million dollar project, offering jobs to hundreds of people for the past 5 years.

From the 120 foot lookout tower, providing a 360 degree view of this rural farmland, to an amazing Starship Theater where guests will 'blast off' into outer space to experience a realistic space voyage experience; there are opportunities to play, learn, and see beyond around every corner. The 50-acre complex boasts an entertaining 'grounds-and-garden' experience, as well as an iconic 100,000 square foot Discovery Center featuring ten learning galleries.

Volunteers from the Obion County community were involved from the start. For example, the Yesterday Committee was instrumental in developing the areas that surround the 1-½ mile sidewalk that winds throughout the grounds. Freedom Square, The Chapel, The Depot, The Settlement, The Barn, and Mill Ridge are all free-standing exhibit areas nestled among a beautiful water feature that flows through the grounds. Sprinkle in four unique garden areas, a shrub-lined maze, a grand pavilion sponsored by the local Rotary Club, and a Great Lawn, and the grounds at Discovery Park rival any garden in the world.

Inside Discovery Center you can see the vision of the volunteers come to life, with features like the giant human slide, the earthquake simulator, the starship theater, the tower, and more. Event Director Melissa Caldwell has big plans for Discovery Park. "We plan to have music in the park every other week throughout the summer," Melissa said. "We are hoping to have a couple of big concerts on the lawn, we are discussing car shows, motorcycle shows, maybe even an arts and crafts fair. We are going to give people from all around this region and beyond a reason to keep coming back to Discovery Park."

When it came to hiring a workforce, Mr. Kirkland pulled out all the stops. Local contractor Allen Searcy coordinated the project, but the architect was Lou Sirianni of Verner Johnson, Inc. from Boston, the graphics and design of the galleries was the inspiration of Thinc Design of New York, and the display builder is Maltbie from New Jersey.

It is a big, big story for a small town in rural west Tennessee, located at least 2 hours from a major metropolitan area. "Memphis is 2 hours south, and Nashville is about 2 ½ hours southeast of Union City," President and CEO Jim Rippey said. For more information about Discovery Park of America, including ticket and membership information, visit the website at www.discoveryparkofamerica.com or call (877) 885-5455.



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Texas Fossil Marathon
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There were so many great things about the trip:

- Getting to know fellow MAGS members better! What a great group.
- It was special to get to go with the Dallas group. They are doing some exciting things in Dallas and were very hospitable. I think we should definitely develop our relationship with them.
- The trip was packed with plenty of opportunities to collect and was over way too soon. Our guide, Bob Williams, was fabulous and patient. It was only a marathon trip because of the weather. I can't believe I made it through the heat! Looking back, I can't believe we actually went out in that heat. But I would do it again in a second! Well, maybe we could do with a little less heat.
- Spring Creek (no water) was breathtaking. There were so many ammonites, it was like you could see back in time. We weren't searching for clues, we were walking through a sea of ammonites. The very best part of these kinds of trips is how far away from the day to day routine they carry you. It is rejuvenating. Thank you sooo much for all of the work Matthew and Carol Lybanon put into planning and arranging and coordinating everything.

Thanks again to Bob, and to Polly, the Dallas club's field trip leader. And ...—*Randa Spears*



We visited three ammonite sites. Thank you, land-owners, for allowing us access.



Sand Art

Lori Carter



Not only is sand fun to collect, look at, and share, but it is also fun to use in art. Probably the most obvious examples of sand art are the architectural wonders that pop up along beaches. Sand castles can be as simple as a little moist sand molded with a little plastic pail. With a little careful carving, a basic sand castle can become a fortress worthy of the most regal sand princess. Artists have taken sand castle art to a new level with sand sculpture. Elaborate sculptures are molded, carved, and smoothed to create unbelievably detailed art that will depart with the next tide.



Navajo Sand Painting

In Navajo religion, sand painting is performed in sacred cere-

monies to restore balance and harmony. Various colors of sand and crushed stone are drizzled onto clean sand in special patterns. A patient is seated in the center of the painting which is ultimately erased with a sacred feather to destroy the illness.

Tibetan Buddhist monks construct intricate sand paintings called “mandalas”. The sand is laid down with tiny tubes and funnels and moved with wooden scrapers and pointy sticks until the desired pattern is achieved. The completed mandala is swept away in a carefully coordinated ceremony and the sand is released into the closest body of water to return it to nature and to symbolize the impermanence of life.



Belén de Arena de Playa de Las Canteras, Las Palmas de Gran Canaria, 2006 via Wikimedia

Modern sand paintings are often made with glue or epoxy to preserve the image. Sand painting artist Heidi McGrew uses the natural colors and beauty of sand to create her art, which usually depicts the serenity of nature. She will be teaching a sand art workshop at SandFest as well as performing demos during the conference. To learn more about sand painting and to see more of her work, you can visit her blog at naturalearthcraft.blogspot.com/2011/10/process-of-sand-painting.html.



Layered sand art.

Layers of sand can be used to produce images in bottles. The sand may be compressed or adhesive may be added so the image will retain its design. Sometimes the bottle is heated so the sand adheres to itself. Kits with various bottle shapes and colors of sand are available at craft stores so you can make your own sand bottles.

Photographing sand is another expression of sand art. To be truly appreciated, sand must be magnified. A loupe is great in the field and to view one’s collection, but photographs are a wonderful way to see and share sand. I take pictures with a point and shoot camera in macro mode. This works reasonably well and is a simple way to photograph sand. Other people use microscopes fitted with camera adapters. This method of photography is called “photomicrography” and the resulting images are called “photomicrographs” rather than “microphotographs” which would be very tiny photographs.

Sand art at SandFest will include a community sand painting, a hands-on workshop to make sand painting ornaments, sand bottle activities for children, and a special exhibit of photomicrographs *Continued, P. 8*

A New Pleistocene Landscape



Today it is possible to see a Pleistocene landscape—not an artist’s conception, but the real thing. No, you don’t need to build a time machine. You just need to go to the Oostvaardersplassen, in the Netherlands province of Flevoland. In 1918 the Dutch Parliament passed a law to turn part of the IJsselmeer Bay into land. In 1932 the bay was closed by a huge dam that separated it from the sea. Other dams were built and millions of cubic meters of water were pumped away. A visionary scientist decided—and got authorization—to re-create a Pleistocene landscape on part of the new land, and got embroiled in a scientific controversy in the process.

The Oostvaardersplassen is the world’s most visible example of Pleistocene rewilding, reintroducing the megafauna that man wiped out as he spread across the globe. There is a rewilding park in Siberia, with Yakutian horses, wisent, wapitis and muskox, but hopes to reintroduce America’s

megafauna have got no further than releasing some large Mexican tortoises in a ranch owned by Ted Turner.

The Oostvaardersplassen was reclaimed from the sea in the 1960s and intended for use as an industrial estate, but in the gloom of the 1970s it lay vacant. The idea of reintroducing Pleistocene fauna came from Frans Vera, a government scientist. He got hold of some Heck cattle, a German attempt under the patronage of Hermann Göring to recreate the Aurochs (the ancestor of domestic cattle; the last one died in 1627 in the first documented case of species extinction) by breeding primitive cattle from zoos. From Poland he imported Konik ponies, said to be descended from tarpans, the last of Europe’s wild horses.

The population of horses and deer exploded: at the peak there were 1,200 horses. With so much grazing the trees died, and the area turned into grassland and

marsh. To Vera, that offered support for his theory that pre-human Europe was not covered in forests, as has been widely assumed, but was primarily grassland. Sea eagles started to breed in the Oostvaardersplassen in 2006, and have since spread beyond its borders.

This illustrates the scientific controversy: how open were European primeval forests? There are two competing hypotheses: the high-forest and the wood-pasture hypotheses. The prevailing view among ecologists is that in its pre-agrarian state Europe was heavily forested—the high-forest hypothesis. An analysis of ancient pollen seems to support that theory. But Vera argues that, precisely because they ate so much grass, the aurochs and the wisents skewed the pollen record. He thinks that the continent was more of a parklike landscape, with large expanses of open meadow, kept this way by large herds of herbivores. This is the wood-pasture hypothesis. The debate continues.

As the herbivore populations in the Oostvaardersplassen grew, food supplies became thinner, and so did the animals. Animal welfare is a big issue in the Netherlands; Partij voor der Dieren (Party for the Animals) holds two seats in the House of Representatives and one in the Senate. A video clip of a starving red deer calf shown on prime-time television didn’t help. “There was an uproar,” says Hans Breeveld, the park’s warden. “People were asking how this could happen in a civilised society.”

The Oostvaardersplassen has twice been investi- *Continued, P. 8*

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A New Pleistocene Landscape gated by government committees. These days its managers are required to undertake “early reactive culling”—a polite phrase for shooting animals before they starve to death. The political pressure has lessened, partly because starvation brought herbivore numbers down sharply, but plans to expand the reserve have been put on hold.

In one of the world’s most densely populated regions, Amsterdam now has a wilderness beside it that looks like a bit of African savannah, with herds of grazing herbivores and flocks of birds wheeling above them. Its scientific value is limited by the absence of the large predators that in the Pleistocene era would have kept herbivore numbers down. They would help settle the debate about whether ancient Europe was grassy or forested.

You can see videos of Oostvaardersplassen online:

www.youtube.com/watch?v=Ra32Wr4uCHE
vimeo.com/70690923

Sand Art of sand by key-
Continued from P. 6 note speaker

Dr. Robert B. Simmons of the Biology Imaging Core Laboratory of Georgia State University. For more information about SandFest, please see the website at

www.iscs.sigmabookstore.com.

Next month will be all about SandFest!



Snowy Trail, Dolly Sods Wilderness in Winter, 2013, 9”x12”
by Heidi McGrew

August Board Minutes

Neville Mayfield for Carol Lybanon

Members present: W. C. MCDaniel, Paul Sides, Mike Baldwin, Bonnie Cooper, Ron Brister, Charles Hill, Neville Mayfield.

Paul Sides brought donuts, which prevented grouchiness.

Secretary: The July minutes were approved.

Treasurer: Board was advised that the 2011 tax form had been filed with the IRS..

Membership: Only one renewal and a couple of updates to the roster.

Field Trips (W. C.):

- The Pink Palace visit was attended by 42 members.
- Aug 10th: Visit to W. C.'s house, 10AM-1PM, cookies and lemonade, and some free rocks.
- Sept: TX trip for ammonites, etc. Contact Lybanons for details.
- Sept 28th trip to Coon Creek is canceled.
- Oct 12th: Visit to Hedger Bros. Gravel pit near Jonesboro, AR.
- Nov 16th: Geode trip to Ledbetter's, plus maybe some other nearby locations TBA.
- Jan 3-5: Trip to MO for druzy quartz.
- Feb: Maybe trip to Leslie, AR, for fossils.
- Mar: We host DMC field trip.
- Misc: W. C. will check on slag sources in W. TN.

Adult Programs (Ron Brister):

- Sept: Guy Weaver will discuss TN iron furnaces.
- Oct: Paul Sides will discuss Crowley's Ridge.

Library (Ron Brister): No report.

Archeology Group: Ron Brister got his reimbursement. The group met last month, and will meet again in Aug.

Junior Program: Sept will be on fluorescent rocks.

Show: The last Show Committee meeting for the 2013 show was held on July 8th. Matthew Lybanon, the show treasurer, may still be waiting for a refund from the Agricenter.

Website: Mike Baldwin reported that new material has been posted on the MAGS website. MAGS has also been listed on two other websites that show that “National MAGS Day” is Sept 29th. A picnic will be held Sept 29th at Chucalissa to celebrate this holiday. He reported on the major sources of “hits” on our website, indicating that MAGS has an international presence and following in several countries. He was asked to provide this fascinating information as a regular addition to the web report at board meetings.

OLD BUSINESS: None.

NEW BUSINESS:

- W. C. presented suggestions for updating the description of the Show Chairman's position in the bylaws, as well as a general list of necessary show organizing activities. Some of these activities might be better handled by delegating them to several Assistant Show Chairmen, since the *Continued, P. 9*

August Board Minutes show has significantly expanded in size and complexity over the years.

- ▶ W. C. also suggested that we arrange a more formal monthly auction at our meetings, as well as a similarly more formal member display (with a specified theme) with judging of the adult displays rather than voting, as is now the case. Ribbons or prizes could be awarded, such as "MAGS Bucks" which could be used in lieu of U. S. currency for most MAGS items and events.
- ▶ W. C. proposed that MAGS subsidize the expense of visiting locations (not including collecting sites) that charge more than typical per-person charges for entry.
- ▶ W. C. displayed some valuable thumbnail boxed specimens (obtained from a deceased AR collector's estate) from the Cooper storage trailer, and will get them appraised so that we might determine an appropriate use for them.

August Meeting Minutes

Carol Lybanon

The MAGS Membership Meeting was held at Shady Grove Presbyterian Church on August 9. The meeting was called to order at 7:40 P. M. This meeting was the indoor picnic and no official minutes were taken.

BUSINESS: President Paul Sides called on a few committee heads to give reports.

Bylaws Change

The MAGS board has approved a change in the bylaws for the position of the Show Chair. The approval process for the proposed changes require them to be presented at the next Membership Meeting, which will be October 11, and voted on at the November 8 Membership Meeting. The

changes require a 2/3 approval of members present at the November meeting. Below is a summary of the changes followed by a copy of the current bylaws and proposed bylaw changes.

Summary

The changes essentially consolidate several functions and responsibilities, expand the structure of the Show Committee, and specify the calendar term of the Show Chair.

SECTION VIII

It shall be the duty of the Show Chairman:

- A. To be in charge of activities of arranging the annual show.
- B. To appoint a committee to assist in the preparation of the show.
- C. To secure a suitable place to have a show.
- D. To determine the date of the show after conferring with the Board of Directors.
- E. To provide a preliminary estimate of the cost of the show and present it to the Board of Directors at which time the Board of Directors will allocate the monies needed from the Show Fund Bank Account.
- F. To make a report of progress at regular intervals to the Board of Directors.
- G. To submit a written report within one month of the closing of the show to the Board of Directors, itemizing all monies received from tickets, spaces rented, advertisers, etc., and all monies disbursed for advertising, rent, printing, etc., with all profits put in the show account.
- H. To perform all duties of the office.

Jewelry Bench Tips by *Brad Smith*

JUST SAY NO TO OPTIVISORS

During his annual vision-check, a jeweler friend of mine wondered why not have his reading glasses made with bifocals that would magnify the same as the Optivisors. So he asked the ophthalmologist if he could add around +2.00 diopters into bifocals.

The doctor checked with his supervisor and came back all excited. They all agreed that it was a great idea and even gave him a special device to measure how far he holds a jewelry piece from his eye, to get the focal distance exactly right. So if all goes well, no more sweaty, bulky optivisors! Anyone else tried this?

.....
MANDRELS



Straight rod mandrels have a multitude of uses in helping to bend sheet and wire. Frequently we choose a round rod for winding jump rings. Common sources for different sized rods are knitting needles, wooden dowels and clothes hangers. Metal rods can also be found in hardware stores and hobby shops.

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2013
41ST ANNUAL
CENTRAL ARKANSAS
GEM AND MINERAL
SHOW

OCTOBER 5TH & 6TH, 2013
Saturday & Sunday
9 AM – 5 PM

JACKSONVILLE COMMUNITY CENTER
5 MUNICIPAL DRIVE
JACKSONVILLE, ARKANSAS
(HWY 67/167 EXIT 9 MAIN STREET)

MINERALS – FOSSILS- BEADS
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www.centralarrockhound.org

FOR INFORMATION CONTACT
TOM SHARP SHOW CHAIRMAN at 501-379-8653 thom61847@yahoo.com

NATIONAL
ARCHAEOLOGY DAY



SATURDAY, OCTOBER 19TH, 11:00AM - 4:00PM

SCHEDULE OF EVENTS

11:00 AM: SPEAR THROWING AND
EXCAVATION TRENCH TOUR



1:00 PM: FAMILY DAY PROGRAMMING
Music Program and Pottery Craft

2:30 PM: SPEAR THROWING AND
EXCAVATION TRENCH TOUR

ACTIVITIES ARE INCLUDED IN
REGULAR ADMISSION PRICES:

\$5.00 Adults (12-59)
\$3.00 Senior Citizens (60+)
\$3.00 Children (4-11)
\$4.00 AAA Members

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Jewelry Bench Tips But to get the
Continued from P. 9 right "look" in
chain maile de-
signs, you must have just the right
size mandrel, and often they are
not easy to find. Jewelry catalogs
sell selections of straight rod man-
drels for \$50 or more, but my
choice is from Harbor Freight.
They have a set of 28 sizes, from 3/
32 inch to 1/2 inch, for under ten
bucks. It's called a Transfer Punch
Set. The catalog number is #3577,
and the price is \$9.95 Plus, look
for the 20% off coupon on any one
item in their advertising circular.
That cuts your cost to around
eight bucks. I've bought four of
these over the last couple years.

www.harborfreight.com

More BenchTips by Brad

Smith are at [facebook.com/
BenchTips/](https://facebook.com/BenchTips/) or see the book *Bench
Tips for Jewelry Making* on Amazon.

Research Note: Friction

Everyone learns the basics of
friction in high-school physics
classes: the friction force experi-
enced by a sliding object is pro-
portional to the normal force that
an object exerts on a surface. Re-
markably, this extremely simple
and empirical relation, known as
Amontons' Law, is still often used
in creating the most technologi-
cally sophisticated machines and
devices, even though friction is
known to vary with a large number
of other parameters not captured
in this relation.

Recent research by two scien-

tists at the University of Pennsyl-
vania, that investigated the fric-
tion force at atomic length scales,
provides some new insights, in-
cluding some phenomena never
seen before. They think that a
better understanding of friction
will benefit applications ranging
from **the study of geological
faults** to the prediction of wear in
automobile components or mi-
croelectromechanical systems.

Ref: Egberts, P. and Carpick, R.
W., Viewpoint: Friction at the
Atomic Scale, Physics **6**, 102 (2013)
| DOI: 10.1103/Physics.6.102 (pub-
lished September 18, 2013).

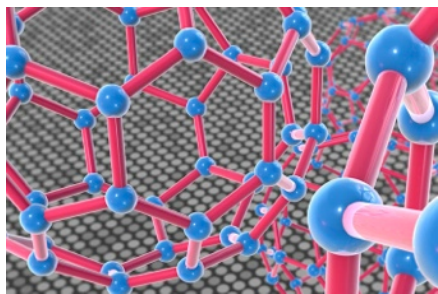
2014 Show Committee

WANTED: New ideas and
new team members. Call James
Butchko at (901) 743-0058.

New Form Of Carbon

A new form of carbon that is hard enough to indent diamond has been created by a team of researchers from the U. S. and China. The new material, known as ordered amorphous carbon clusters (OACC), is structurally unique in having both crystalline and disordered elements. Created by a team led by Lin Wang of the Carnegie Institution for Science, the material was made by subjecting solvated carbon-60 molecules to phenomenal pressures more than 300,000 times that of the atmosphere.

Until now, all forms of carbon have been classified as either crystalline—built from repeating atomic units—or amorphous, that is, lacking the long-range structural order seen in crystals. As a crystalline material composed of amorphous clusters, OACC is the first hybridized carbon structure ever seen that is part amorphous and part crystalline.



To make the new form of carbon, the researchers started with molecules of carbon-60—highly organized spherical cages that resemble footballs because they are built from pentagonal and hexagonal rings of carbon. Wang and colleagues then inserted molecules of an organic solvent, m-xylene, between the balls, before com-

Hospitality Hosts for October

The Dunns

Mary Klug

Host needed for November.

Contact Carol at (901) 757-2144.

pressing the material to immense pressures of more than 32 GPa. The spherical carbon cages were found to have broken and collapsed in on themselves to become amorphous carbon clusters that remained locked in their places in a lattice by the solvent molecules.

"The solvent molecules play a crucial role," explains Wang. "For pure carbon-60, when the carbon cages collapse, the entire crystal turns amorphous. But in this material, because there are some solvent molecules there, even when the carbon cages collapse, they don't move around."

But what really astounded Wang and colleagues was when they squeezed the new form of carbon to pressures of up to 60 GPa between the tips of a pair of diamonds in a diamond-anvil cell. They found that the diamonds—the hardest material in nature—had actually been indented by their sample.

Molecular simulations backed up what the researchers found in the lab, namely that when pressures of up to 30 GPa are applied and removed, the carbon cages bounce back to their original crystalline shape. But with pressures of more than 32 GPa, the material undergoes a permanent transformation, with the bonds in the carbon-60 cages breaking and reforming. When the researchers

heated the OACC to drive off the solvent, its long-range order disappeared and it was reduced to its collapsed disordered building blocks, thus further confirming the crucial role of the solvent in providing OACC's periodicity.

One potential advantage of the new material is that it is made at room temperature. But whether it could be economically competitive with synthetic diamond, which is created at temperatures of about 1500°C, remains to be seen. Nevertheless, the researchers believe that OACC could have a range of potential mechanical, electronic and electrochemical uses.

For now, Wang and his team are continuing to test OACC's properties and probe the atomic structure of its collapsed carbon clusters, as well as investigating what materials can be fabricated with alternative solvent molecules at high pressure.

Ref: Wang, L., et al, Science 17 August 2012: Vol. 337 no. 6096 pp. 825-828 DOI: 10.1126/science.1220522



*Ammonite
cast
and
mold*



Field Trips Are Worth The Effort



We found more than ammonites during the Texas Fossil Marathon. On the upper left is a *Ptychodus whipplei* tooth. Soon you will be able to see much bigger versions of the field trip pictures on the MAGS website.

Thanks to David & Belinda Loyd, Matthew and Carol Lybanon, Neville Mayfield, Marc Mueller, David & Lenora Murray, and Alan and Debbie Schaeffer for contributing photos of the Texas Fossil Marathon.

The photo on the right shows an echinoid (*Hemiaster*).



Calendar

October 3, 2013

Board Meeting, St. Francis Hospital, Library, 6:30 P.M.

October 5 & 6, 2013

Central Arkansas Gem and Mineral Show, Jacksonville, Arkansas

October 11, 2013

Membership Meeting, Shady Grove Presbyterian Church, 7:30 P.M.

October 12, 2013

MAGS Field Trip (gravel pit near Jonesboro, Arkansas)

October 19, 2013

National Archaeology Day Celebration, C. H. Nash Museum at Chucalissa

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

