Southern Maryland Rock and Mineral Club

Rock Talk

March, 2018

Next Meeting:
March 27, 2018@7:00 PM

Program
TBD
Gary and Cindy Lohman

Refreshments
Gary and Cindy Lohman
Clearwater Nature Center, 11000 Thrift Road, Clinton, MD.

In this issue:

Announcement for Club Members from Glenda Jordan from the Clearwater Nature Center:

With the switch to ParksDirect, all of our club memberships are now sold starting from the actual date of purchase. There are no longer any "partial term" memberships due to having memberships run a strict Jan 1 – Dec 31 term with people purchasing a membership after July 1 getting a pro-rated discount.

For example, a person buys a membership on February 1, 2018. That membership will expire on February 1, 2019. They can renew their membership at any time before that expiration date (no longer are we locked into having to wait until after Dec. 1 as before). The renewal will simply add on an additional year from the original expiration date.

Since there is no longer any annoying pro-ration amounts involved with the membership term period, it makes it easy for existing members to just mail us a check for the full amount to renew if they don't want to drive to the center to renew in person.

SMRMC Adult 18+ : $15 Resident; $20 Non-Resident

SMRMC Youth (8-17) : $10 Resident; $13 Non-Resident

Lapidary Adult 18+ : $20 Resident; $26 Non-Resident

Basket Bunch Youth/Adult 13+ : $25 Resident; $33 Non-Resident

Checks made out to : M-NCPPC / Clearwater Nature Center (either is fine)

Address:
Clearwater Nature Center
Attn: Glenda Jordan
11000 Thrift Road
Clinton, MD 20735

FEBRUARY MINUTES

Submitted by Dave Lines

DATE: Meeting called to order on February 27, 2018 at 7:18 p.m. by President, Sondra Fielder.

VISITORS/NEW MEMBERS: Skerkow family – Asher, Emily, Noah and Isaac --- were members last Fall for Willis Mtn kyanite trip --- renewing dues tonight; Pam from the Lapidary Club just visiting; John Walker from Hollywood, MD is joining Club because he will retire in June and likes rocks.

MEMBERSHIP: Joe, Membership Chairman. 24 members present at meeting. FYI in 2018, so far we now have 45 members who have paid dues.

NEWSLETTER: Tim Foard, Editor -- no issues; everyone received their newsletter.

MEETING MINUTES: Dave, Secretary --- Minutes for January meeting approved.

TREASURER: Dave, Treasurer Treasury in good shape.

FIELD TRIPS: Dave, Field Trips Chairman

A. Recent past trips --- (1) Feb 17, 2018 --- Purse State Park trip for fossils – 7 members and 1 Canadian guest attended. Had excellent conditions --- extra low tide and clear, calm water. Noteworthy finds: 4 crocodile teeth.

B. Upcoming trips----

(1) March 24, 2018 --- Chestnut Ridge, Virginia for quartz crystals. Trip info sheet was emailed --- 23 members have signed up so far. I invited 2 other clubs --- We will have to limit their participation so we will have a maximum of 30 people.

(2) Possible TBD field trip to Vulcan Manassas Quarry (for prehnite and zeolite minerals) in April depending on weather.

(3) May 5, 2018 --- Primitive Technology Weekend at Willow Grove Nature Center (Baltimore County) , Cromwell Valley Park, 2002 Cromwell Rd., Parkville, MD 21234 --- Contact Kirk Dreier phone = (410) 887-2503; email = kdreier@baltimorecountymd.gov . Highlight events: 1:00 p.m. --- atlatls – history and demonstrations; 2:00 p.m. --- Ground Stone Tools and flint knapping; 7:00 p.m. --- presentation re "Artifacts --- Why are they found where they are found?"

(4) Long range planning: Definite (put it on your calendar now): we will do a club trip to Mount Ida, Arkansas on Oct 12-13, 2018 for the 31st Championship Quartz Crystal Dig". We will rent a large house near Mt. Ida for 1 week. Dig Registration starts June 1st -- $75 per person. Sign-up sheet started now.

PROGRAMS: Carole, Carole, Programs Chairman --- Tonight's program is "Fossil Insects of the Eocene Kishenehn Formation in NW Montana" by Dr. Dale Greenwalt of the Natural History Museum of the Smithsonian Institution. Snacks tonight by Bill Curtin --- thank you!.

Upcoming programs: March = Gary and Cindy Lohman will give March program (subject to be determined). March snacks also by Gary and Cindy Lohman

WEBSITE: Bob, Webmaster – no issues; website has changed some; less detail.

OLD BUSINESS: A. EFMLS Dues Dave paid EFMLS dues of $85.75 ($1.75 per member for 49 members as of Dec 31, 2017) and Dave reimbursed by Michael. Issue of "Future on-time paying of EFMLS dues" was tabled.

Club T-shirts --- short sleeves, safety yellow-green color, with black club logo on front left pocket --- Cost $12.50 each ---- club treasury will pay $5.00 per shirt -- $250 total --- toward the cost of the shirts. Tina passed around a sign-up sheet to get names and shirt sizes.

NEW BUSINESS: none

ADJOURNED: Business Meeting adjourned at 8:00 p.m.

Upcoming Shows and Events: 2018

April 7 – 8: 45th Annual Mineral, Gem, Jewelry & Fossil show sponsored by the New Haven Mineral Club. Amity Regional Middle School, 1—Ohman Ave; Orange, CT. Info: www.newhavenmineralclub.org

April 7 – 8: Tar Heel Mineral Club annual show and EFMLS/AFMS Convention. Info: www.amfedd.org/show2018.htm

April 14: 14th Annual Earl & Malvina Packared Rock, Gem & Mineral Show sponsored by the Southeastern New Hampshire Mineral Club. Dover Veterans Community Center, 156 Back River Rd, Dover, NH. Info: Brian: 207-710-6254 or cshore108@yahoo.com

April 14-15: 20th Annual North Jersey Gem, Mineral & Fossil Show sponsored by the No. Jersey Mineralogical Society. Midland Park High School, 250 Prospect St; Midland Park, NJ.

April 14-15: 35th Annual Gem, Mineral & Jewelry Show sponsored by the Maine Mineralogical & Geological Society. St. Joseph's College, 278 Whites Bridge Rd; Standish, ME. Info: www.mainemineralclub.org

Rocks, Minerals, and Fossils in the News

3-D Virtual Tour Through Rock Unlocks Fossil Mystery

Jackson Schroeder

https://www.tun.com/blog/3d-virtual-tour-rock-fossil-mystery/

A team of geoscientists at Princeton University has developed a method to create three-dimensional digital images of deconstructed rock samples that can be viewed from any angle. Algorithms, developed by the team, allow the computer to segment the images without human bias.

Close to five years ago Adam Maloof, an associate professor of geoscience, collaborated with SITU Studio to develop The Princeton Grinding Imaging and Reconstruction Instrument, known as GIRI, which enables scientists to see what rocks look like on the inside.

Now, Maloof and Akshay Mehra, a doctoral student and co-author of the study, are using GIRI to dissect rocks and minerals and study fossils.The full paper was recently published in Proceedings of the National Academy of Sciences.

The team recently used GIRI to disprove the common belief that Cloudina, a thin-shelled creature that lived all over the world 545 million years ago, were reef builders. In fact, they proved that Cloudina fossils were transported from other areas and had little to do with reef building.

“I thought going in we would learn all sorts about this amazing first biomineralizer and first reef builder, but Cloudina turned out to be more like a reef dweller,” Maloof said in a statement.

Many fossils, including that of Cloudina, had previously been resistant to detailed studying because traditional X-ray and CT scan machines can’t pick up on the density contrast between the fossils and the surrounding mineral.

“The reasons X-rays work, or even MRIs work, is because our bones have a different density than our skin and blood vessels,” said Mehra. “Since there is no difference between a fossil and the matrix in which it is in in some of these rocks, you can’t tell anything apart using an X-ray machine. It would just come back as a white return.”

Scientists have failed to figure out what fossils look like in 3D for a long time.
When they're embedded in rock, it's hard to get them out, Maloof said in a statement. "People did serial sections just like this way back then — but perhaps not at this scale — where they would grind away a little rock, draw it, grind a little more, draw it. … It can be incredibly time-consuming."

GIRI speeds up the process, eliminates human error, and lessens destruction of the rocks and fossils. GIRI can cut slices of rock smaller than a one percent of a millimeter. Each slice in a rock takes about 90 seconds to cut and image, so a typical inch-thick sample takes about a day and a half to grind and image.

The technology can create a 3D sample of any solid object no matter the density contrast, and because GIRI takes a high-resolution photograph of every slice, viewers always see the rock itself, not only the density contrasts.
"The beauty of having a physical image is that we are seeing a real response. We are seeing color and texture," said Mehra.

Despite all of the advantages, the researchers recognize that their technique is still destructive. "[T]hat's the disadvantage," Maloof said in a statement. "But what's so nice is that you get to see photographs and make direct observations: That's what's been so life-changing to me: I love that it's not a model. You can just see it. On any given slice, if you find something great, you can just find the slice and say, 'What did it look like?' …We're on a virtual tour inside, rather than looking at waveforms and trying to interpret them."

Image: Akshay Mehra and Adam Maloof, Princeton University Department of Geosciences

Since GIRI was first developed years ago, the scientists have made multiple physical improvements to the machine. They have redesigned and replaced the camera housing and the mechanism for cleaning and preparing the rocks for photographs, and they've installed monitors that record the temperature and humidity during the time each photograph is taken.

In addition to the physical improvements to the machine, there have been steps taken to improve the running and analyzing software used in GIRI. Maloof credits Akshay with designing machine-learning solutions that enable the control computer to send and receive signals from the grinder, verify image capture, and trigger the shutter.

"From the ground up, Akshay has designed machine-learning solutions to make the process of image segmentation automated and reliable," Maloof said in a statement. "He has developed techniques that ultimately will be important for any tomographic applications, including X-ray CT. Akshay also has developed ways to make quantitative measurements in the reconstructed 3D

volumes. You'd be surprised how much 3D modeling out there only leads to visualization and qualitative interpretation, whereas Akshay actually measures the size, shape and 3D orientation of these critters."

Mehra believes that GIRI could be a widespread tool used in paleontology and geology."In paleontology and geology, one thing that is missing is the application of machine learning or AI to identify features of interest," said Mehra. "We have noticed that paleontology students will go out and often times get an X-ray or CT scan of an object and spend a year or two hand-tracing out the layers and identifying different pieces."

"There are two issues with that," he continued. "One is that it is time-consuming, and the other is that you're relying on an individual to make a decision about whether this grey or this color represents one thing or the other."

If there is a trained professional who is interested in testing a sample using GIRI, he or she can take a slice or two from the entire sample and highlight a few areas to depict what the bone, fossil, or rock materials may look like. That information is then fed into the network, which is designed to take in the image information and make decisions on what each color in a slice might look like.
"This allows the segmentation to be done by a machine, with some input from human beings, and that removes a degree of bias," said Mehra.

GIRI technology has already caught the eye of scientists all over the world. Paleontologists have reached out to Maloof and Mehra to ask for virtual tours through all kinds of specimen, including shelled creatures, land creatures, fish, and dinosaur bones. Planetary scientists are interested in GIRI because dissecting tiny grains called chondrules could give insight into how planets are formed. Battery makers and engineers are interested in testing reservoir rocks for carbon sequestration, and want to grind graphite batteries to evaluate 3D structures of the porosity in the carbon."There's really no limit to the contributions GIRI can make," Maloof said in a statement. "This represents five years of work. It's the only instrument in the world like it."

The secrets of garnet reveal source of water to fuel powerful volcanoes and earthquakes

by Mary L. Martialay, Rensselaer Polytechnic Institute

https://phys.org/news/2018-03-secrets-garnet-reveal-source-fuel.html

Credit: Rensselaer Polytechnic Institute

Among geologists who study powerful earthquakes and volcanoes, there is a mystery: as one of Earth's tectonic plates slides beneath another in a subduction zone, water is

squeezed from certain minerals, lubricating earthquakes and fueling volcanoes in hot spots like the Pacific Ocean "Ring of Fire." But equations that predict where the forces of subduction wring water from stone consistently point to locations far from the site of actual cataclysms.

By applying a new spectroscopy technique to garnet containing fragments of quartz, metamorphic petrologist Frank Spear of Rensselaer Polytechnic Institute thinks he's solved the puzzle. His early research shows that the equations are incomplete, lacking the significant variable of "overstepping," the additional energy needed to initiate a process, in this case, the decomposition of water-bearing minerals.

"The real culprit in powerful volcanoes and earthquakes is water, but scientists have been unable to determine where that water comes from," said Spear, a professor and head of the Rensselaer Department of Earth and Environmental Sciences. "Conventional thermodynamic equations predict that water is released at too shallow a depth to occur at the known locations of volcanoes and earthquakes. But when you factor in the overstepping we've discovered, the locations coincide. The idea of overstepping is an enormous paradigm shift."His research is supported by a three-year $419,247 grant from the National Science Foundation.

As one tectonic plate is pushed beneath another in a subduction zone, sediments and minerals are carried deep into the Earth, with pressure and temperature mounting with increasing depth. Early in the process liquid water is squeezed from the pore spaces between rocks, but many minerals - such as micas, serpentines, and chlorites - contain water as part of their mineral structure. Chlorite, for example, contains about 10 percent water by weight. When water-bearing minerals finally succumb to increased temperature and pressure, they release water. The water acts as a lubricant in the fault zone created between two plates, reducing the strain on the fault and allowing the plates to slide past one another, producing an earthquake. Subduction zones produce some of the world's biggest and most destructive earthquakes; the largest magnitude earthquake yet recorded - a magnitude 9.5 earthquake in 1960 near Valdivia, Chile - occurred in a subduction zone. The water also acts as a flux on surrounding rock, depressing the melting temperature of rock, which melts into magma that rises to the surface and erupts as a volcano.

At the point at which the water is released, it creates clues Spear tracked back to its origin. New minerals form in the metamorphosing crust, including garnet, which is produced by the breakdown of water-bearing chlorite. The garnet forms under pressure, and sometimes, as it does so, it traps fragments of surrounding minerals in its grip, fragments that retain a record of the pressure under which the garnet formed. Spear found such garnets, which formed around tiny fragments of quartz, on an island in the Greek Cyclades.

In his lab, Spear and his graduate students used Raman spectroscopy - commonly used in chemistry to identify molecular composition of a sample - to examine the

quartz embedded in the garnet. In Raman spectroscopy, laser light is shined onto a sample, and the energy of the photons is shifted up or down based on the interactions between the light and the sample. The difference between the frequency of the outgoing and returning light provides a definitive structure signature.

Quartz at ambient pressure produces a well-known signature. But the peak of the signature from the quartz in the Cyclades samples was shifted to a higher value, indicating the pressure on the grain. Because the Raman signal shift of quartz has been carefully calibrated, Spear was able to use it to determine the pressure, and therefore the depth and temperature, at which the garnet crystallized around the quartz.

"What we discovered when we did this is that the garnet forms not at the shallow depth where the thermodynamic calculations predicted, but much deeper down, near the origin of volcanoes and earthquakes," said Spear.

The finding also indicates that the garnet doesn't crystalize at equilibrium, as is the basis of thermodynamic calculations predicting that process. That, said Spear, "was a total surprise." While initiation of most processes requires activation energy - or overstepping - to some extent, researchers always assumed that the activation energy to initiate nucleation of garnet would be trivial. But the results suggest significant overstepping of 50 to 70 degrees Celsius.

The initial research, published in a series of papers beginning in 2014, was based on three samples from a single site on Sifnos. The new funding will support a broader investigation using 10 to 20 samples taken from five separate locations, to determine whether the findings were "a quirk, or a universal truth." Spear is also working on developing calculations - and a new "maximum driving force method" - that will incorporate observed overstepping to yield more accurate predictions.

Spear's research fulfills The New Polytechnic, an emerging paradigm for higher education which recognizes that global challenges and opportunities are so great they cannot be adequately addressed by even the most talented person working alone. Rensselaer serves as a crossroads for collaboration—working with partners across disciplines, sectors, and geographic regions—to address complex global challenges, using the most advanced tools and technologies, many of which are developed at Rensselaer. Research at Rensselaer addresses some of the world's most pressing technological challenges—from energy security and sustainable development to biotechnology and human health. The New Polytechnic is transformative in the global impact of research, in its innovative pedagogy, and in the lives of students at Rensselaer.

Odessa Wood on “John Wolf” Memorial Trip

Article by Dave Lines; photos by Tim Smith and Dave Lines

We met at the “Park and Ride” lot in Middletown, Delaware at 10:00 a.m. on Saturday March 17th, 2018. It was the John Wolf Memorial Trip --- held twice a year to commemorate a beloved deceased member of

the Calvert Marine Museum Fossil club. About 50 people participated from Maryland, Delaware, Pennsylvania, New Jersey, Virginia and Washington, D.C. We had 8 of our members ---- Katie and her parents Steve and Cynthia, Tim S., John B., Cindy, Gary and Dave --- from the Southern Maryland Rock and Mineral Club.

After a briefing from our host and leader Bob Ertman, we caravanned to a farm field southeast of Odessa. The weather was a chilly 43 degrees and windy. The field was a very large corn field --- over a mile across---- which had been harvested last fall. As soon as we arrived, people began to spread out into the fields in search of petrified wood. But the challenge for everyone was the corn stalk stubble which, together with weeds, literally covered the ground --- 10% (or less) of the ground was visible.

Despite the challenges, we immediately began finding bits and pieces of petrified wood --- cypress which most of the local clubs believe is from the Cretaceous epoch (66 to 150 million years ago), but some folks counter that it is from the Miocene (5 to 23 million years ago). Most seem to agree that it was eroded from its original location and redeposited during the Pleistocene epoch (from 12,000 years to 2.6 million years ago). At any rate, it seems to be spread over an area about 2 or 3 miles long. According to local rockhounds, recent construction sites have found this same petrified wood as deep as ten (10) feet below the surface. It seems to be plentiful enough that everyone can find some with persistence.

John, Tim and I searched an area of the cornfield basically about 300 yards from where our vehicles were parked along the farm lane. Finding the specimens of petrified wood is fun and certainly rewarding. Most of the pieces were square or rectangular in shape, and, although similar in color to the cornstalks, were fairly easy to spot. Even if a small portion of a specimen was visible, it was entirely possible for the specimen to be a much larger piece. We found several which were mostly buried under the dirt. We spent about 3 hours searching over much of the field area and probably found a hundred pieces between us.

A funny story: During my search for petrified wood, I picked up a piece of REAL wood about 10 inches long and about 3 inches in diameter. It looked very much like petrified wood --- same coloration, similar grain --- so when John (and later Tim) asked to see what I had found, I simply let them look into my bucket where this chunk of real wood was laying across the rest of my finds. Both John and Tim were totally fooled by the "fake" chunk. So I left the chunk of fake petrified wood "decoy" on the hood of Tim's truck to see if anyone else fell for it.

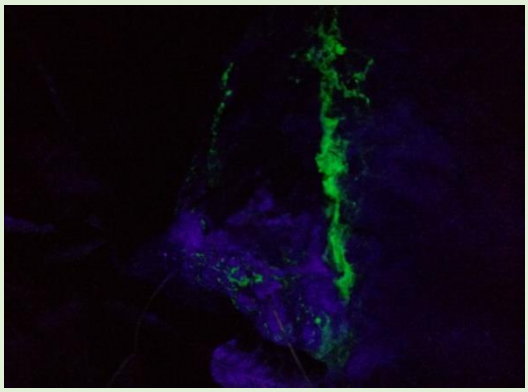
Later in the afternoon, we crossed the highway and looked for specimens on the surface of a grass-covered field. Again, we were successful in locating many interesting and attractive specimens. We talked with Gary and Cindy later in the day and their experience was similar. In fact, Cindy found a nice arrowhead made of yellow jasper and Gary reported that he saw another person who found a "fluted" jasper point (which meant it was much older).

Oh --- that chunk of wood we left on the hood of the truck? It was GONE when we returned. I wish I had had a trail camera to record the events when someone took it. ☺

Overall, it was another fun trip and certainly a productive one for us.

Member's Finds

During a glow-hounding excursion (more in the April Rock Talk) in Howard County, I found this pegmatite giving off a bright green florescence under shortwave (254 nm) ultraviolet light. The bottom photo is the same specimen seen under visible light. The green florescence is due to the presence of uranyl ions (UO_2^{+2}). Photos by Tim Foard.



Collected any interesting specimens? Send a photo or two to the editor at bmorebugman@yahoo.com for inclusion in the next issue of Rock Talk.

The Gem Lapidary and Mineral Society of Montgomery County

We're having an AUCTION!

A vast quantity of material from the estate of a long time collection -- **many museum quality mineral specimens** as well as large and small cabinet sized from all over the world, including some closed locations. Some specimens are still in their originally wrapping.

Open to all – members and non-members, dealers. Please join us.

When: Saturday April 14
9:00am auction preview
10:00am live auction starts 3:00pm live auction ends
note: payment to be made in cash

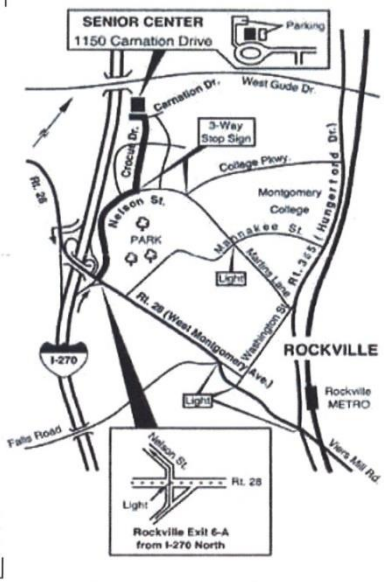
Where: Rockville Senior Center
1150 Carnation Drive, Rockville MD 20850

A sampling of the material includes:

a) Calcites, Barite and Flourites from Tennessee;
b) Flourite from New Mexico;
c) Sweetwater and Elmwood, Tennessee Calcites;
d) Zeolites from India,
e) Calcites and Flourites from around the world;
f) Selenite from Mexico and Canada,
g) Fine quality minerals from Morocco, US, China and Spain,
h) Pyrite from Peru;
i) Amethyst Cathedrals;
j) too many others to list

For additional information and pictures of some of the material to be auctioned please see the GLMSMC website at GLMSMC.COM

There will also be a display case showing a sampling of the specimens at our annual show on March 17-18 at the Montgomery County Maryland Fairgrounds




Print me for $1.00 off! Print me for $1.00 off! Print me for $1.00 off! Print me for $1.00 off!
Patuxent Lapidary Guild, Inc. Annual Gem, Fossil, Mineral and Jewelry Show April 22nd, 2017 10am to 5pm Earleigh Hts VFC
Rte 2 Severna Park , MD 21146
Admission $6.00, children under 10 and Veterans Free
$1.00 discount with this coupon
Print me for $1.00 off! Print me for $1.00 off! Print me for $1.00 off! Print me for $1.00 off!

The Southern Maryland Rock and Mineral Club

Meetings take place on the 4th Tuesday of each month at 7:00pm

Clearwater Nature Center, 11000 Thrift Road, Clinton, MD.

For More information, call:

(301) 297-4575

We're on the web:

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