THE NORTHERN VIRGINIA MINERAL CLUB INC

The Mineral Newsletter

Meeting: September 25 Time: 7:30 p.m.

Long Branch Nature Center, 625 S. Carlin Springs Rd., Arlington, VA 22204

Sphalerite

on chert breccia

from the Picher area in Oklahoma
(2 by 4 inches)
Photo: Tom Tucker.

Volume 58, No. 7
September 2017
Explore our Website!

September Meeting Program:

Fall Club Auction

In this issue …

Deadline for Submissions

September 20

Please make your submission by the 20th of the month! Submissions received later might go into a later newsletter.

Mineral of the Month
Sphalerite

by Sue Marcus

Sphalerite (zinc sulfide, or ZnS) is relatively common, simple, and collectible, whether by silver pick (money) or self-collecting, even trading.

Chemical Affiliations

By simple, I mean that there are few chemical complications. Admittedly, sphalerite does have several varieties: Marmatite is the iron-rich, usually opaque black variety; cleiophane is the light yellow variety; and ruby blende is the orange to red variety.

In decades of collecting, however, I've come across the term "marmatite" only from mineral dealers and other collectors. Also, sphalerite is most commonly brown or cinnamon-colored, so these special varietal terms aren't used frequently.

If manganese was abundant and available during its formation, sphalerite might grade into alabandite (MnS). If there was sufficient iron, it might have become wurtzite (Zn,Fe)S.

There seems to be some debate about another potential polymorph, matraite (also ZnS). From what I could find, that name was discredited by the International Mineralogical Association in 2006, so matraite is not an approved mineral name or species.

Sphalerite is frequently found with the ore minerals galena (PbS) and chalcopyrite ($CuFeS_2$). They often occur together due to the chemical affinity of their main cations—zinc, lead, and copper.

Sphalerite from Penfield, Monroe County, NY. Photo: Bob Cooke.

Fall is coming!

Northern Virginia Mineral Club members,

Please join your club officers for dinner at the Olive Garden on September 25 at 6 p.m.

Olive Garden, Baileys Cross Roads (across from Skyline Towers), 3548 South Jefferson St. (intersecting Leesburg Pike), Falls Church, VA
Phone: 703-671-7507

Reservations are under Ti Meredith, Vice-President, NVMC. Please RSVP to me at ti.meredith@aol.com.

Etymology

The affinity in geological environments may have led to the naming of sphalerite, for the word is derived from the Greek term for "mistaken" or "treacherous." Miners thought that sphalerite was lead ore (galena) and then found that it lacked the lead they sought.

The name was finally bestowed by Ernst F. Glocker after earlier references to the material as "blende" or "zincum." "Blende" is still a miner's term for sphalerite.

Occurrence and Uses

Sphalerite most commonly occurs in hydrothermal deposits, where heated fluids have percolated through the host rocks and deposited the ore minerals.

Sphalerite is the main ore for zinc; most of this mineral is extracted for industrial use. The United States has 12 zinc mines in 5 states (2016 data, USGS).

Most zinc is used for galvanizing (coating steel or iron to prevent rust). Sphalerite is also an important source of byproduct cadmium, gallium, germanium, and indium.

Personal Connection

Now a digression.

This is a mineral that helped inspire my career in geology. As a kid, I was given a hand-me-down mineral collection, and someone suggested that I contact Dr. Edwin Roedder to identify what was what. I later learned that Dr. Roedder was a very eminent mineralogist. He was the pioneer investigator of fluid inclusions in minerals, discerning that the inclusions held information about the geologic history of the surrounding mineral and rocks.

At the time, however, I was too young to know enough to be awed by Dr. Roedder. Every few weeks, we'd visit his home in Bethesda, MD, and he'd quiz me. Often, if I could identify the specimen, I could keep it! I learned that the specimens were frequently sphalerite from the Tri-State Mining District (Missouri/Kansas/Oklahoma). So I learned to detect and admire many variations of sphalerite.

Localities

Along with specimens from the tristate region, the United States is known for stunning specimens from the Elmwood Mine and similar localities in Tennessee. These sites produce lustrous, sometimes translucent rich-brown-toned well-formed crystals, some with equally beautiful calcite and galena crystals.

Everyone should have a sparkling specimen of midwestern sphalerite in her or his collection. My best collecting trip was led by Barry Remer, with Frank Hissong and me along for comic relief, to a limestone quarry in Danville, KY. For one short day, we collected some very nice fluorite, sphalerite, and calcite specimens—lovely and *heavy!*

The United States doesn't have all the best sphalerite. The Mandan ore fields of Bulgaria produce unusual green sphalerite crystals that can be translucent in the best specimens. Traces of cobalt cause the green color. Peru is the source of many lovely sphalerite specimens, notably rare lustrous red crystals. Similar brilliant specimens have also come from China.

Schalenblende is a rock with bands of massive sphalerite and wurtzite, usually with galena or pyrite. It is sold in attractive polished slabs. Germany, Poland, and other parts of central Europe are the most common sources.

Mindat includes more than 5,300 photos of sphalerite, indicating that this is a photogenic as well as familiar mineral. Many apparently brown sphalerite crystals benefit from strong backlighting when photographed—they may show their reds or yellows.

Schalenblende, Olkusz District, Poland. This 2-inch-high slab of schalenblende probably consists of layers of galena (bottom), sphalerite and wurtzite, and marcasite (top). The marcasite formed last and is slowly disintegrating. Photo: Tom Tucker.

The Franklin–Sterling Hill, NJ, deposits are noted for fluorescent specimens. Before becoming famous mineral-collecting localities, they were huge zinc orebodies that were mined by the New Jersey Zinc Company. The sphalerite found there fluoresces either in blue or in orange-to-yellow colors; some specimens also phosphoresce.

From micros to macros, sphalerite can appeal to everyone, even lapidarists. Bulgaria, China, Peru, and Spain are sources of sphalerite suitable for faceting. Although sphalerite can be styled into jewelry, its relative softness and brittleness make it a poor choice for normal wear. Some faceted stones exhibit a range of hues, for example from yellow to orange-red, making them attractive despite their delicacy.

Technical details:

Chemical formula	ZnS or (Zn,Fe)S
Crystal form	Isometric
Hardness	3.4–5
Specific gravity	3.9–4.1
Color	Brown, black, cinnamon, green, yellow
Streak	White for pure material, browner if material contains more iron
Cleavage	Perfect in at least three directions (depends on source)

Fracture.....Uneven to conchoidal

Luster.....Resinous, adamantine

Fluorescence.....Sometimes. When fluorescent, typically orange, sometimes blue

Sources

Amethyst Galleries. 2014. The mineral sphalerite.
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Gemdat. 2017. Sphalerite.
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Tolcin, A.C. 2017. Zinc. U.S. Geological Survey, Mineral Commodity Summaries. January.
Wikipedia. 2017. Sphalerite.

Club Member Rocks and Minerals Auction Coming Up!

September 25 Program

Our September club meeting will feature our Fall Club Auction! Proceeds from the auction go into the Fred Schaefermeyer Scholarship Fund, which supports students in the field of geology.

The meeting will start promptly at 7:30 p.m. (*note:* this is 15 minutes earlier than usual). We will quickly move through the business part of the meeting so we can get to the fun!

Sellers, come early to help set up the room and your items. Each auction item should be described on an individual bid slip (see page 17 for the forms—just print out as many pages as you need). Information on the bid slip should include:

- item number (your initials or other unique code followed by a sequence number);
- description;
- from (locality); and
- starting bid amount (the lowest bid you will accept for sale—if not stated, minimum bid is $1).

Also, use the summary sheet on page 18 to list all of your items for sale so that the Treasurer can record the final sales price and give you your money after the auction.

Bring guests or invite nonmembers who might be interested in rocks and minerals! Although only current club members are allowed to sell, the meeting and auction are open to all.

Please consider volunteering. The auctioneers, accountants, and runners are all volunteers—so help us out here, folks!

Bring small bills, bid early and often, and help us move on to the next item. We need to be out of our meeting room by about 10 p.m.

**** Note Current Club Auction Rules ****

- Any member may offer up to 20 specimens or up to 4 flats for auction.
- Each flat is one auctionable item.
- The club gets 15 percent of the purchase price; the remainder goes to the seller.
- Anyone may donate items to the auction to fully benefit the club (no money goes back to the donor).
- The minimum bid is $1 on any item. The minimum increase is also $1. Bids higher than $20 increase by $5.
- We start with a silent auction to assess interest in each item for sale. So look carefully and start bidding. Items with multiple bids during the silent auction will be brought sooner to the actual (vocal) auction.

Winning bidders must pay for the item promptly, with cash or check.

The Prez Sez

by Bob Cooke

As most of you are aware, I was derelict in the performance of my duties in June: I missed the monthly meeting. I was in Southampton, England, visiting my son and his fiancé and supposedly assisting them in preparations for a December wedding. Yes, you've got that right: I'll most likely miss the December NVMC meeting as well.

I found England a mixed bag for the mineral experience. The famous mines of Cornwall and Devon closed 30 years ago or more. Mineral specimens from those locations were not to be found. Most mineral dealers focused on Internet sales and had no public showroom. One vendor, Crystal Classics, was a possibility, but my timing was off; they were closing down the shop for a couple weeks to attend the second largest mineral event in Europe: the "Mineral & Gem à Sainte-Marie-aux-Mines," held in the small town of Sainte-Marie-aux-Mines in a valley of the Alsace mountains in France.

I also learned that finely ground minerals are a base in many cosmetics. My Internet search for United Kingdom minerals led mainly to cosmetic shops and stores selling quartz and Himalayan halite for their holistic properties. (In fact, BareMinerals is the name of a major UK cosmetics firm.)

The Southampton Mineral and Fossil Society (http://www.sotonminfoss.org.uk/) was a much better experience. Carolyn and I attended their June meeting in the Friends' Meeting House on Ordnance Road. The program, on the Strontian mines and minerals of Scotland, featured a presentation on the geology of the mining area as well as the history of its mines and their current status; of course, the presentation also included a display of minerals from the area. Announcements at the end of the meeting included information on a field collecting trip to the dumps of several closed Cornish mines. I might have to join that club!

But what about upcoming mineral events for our club? The September meeting features the Fall Club Auction, which is always lots of fun. This year, in addition to the auction items provided by club members, we will have a large quantity of donated lapidary slabs. It is probably foolish of me to think we can get any club business done as well, but we do need to appoint a Nomination Committee for next year's officers, contemplate how to pay for new name tags, and plan for the November 18–19 mineral show at George Mason University.

See you in September!

Bob

The National Park That Was Stolen to Death

Thanks to Sue Marcus for the reference!

Fossil Cycad National Monument in South Dakota's Black Hills was once littered with cycad fossils from the late Cretaceous Period. The fossils were so well preserved that researchers could dissect and study them almost as they would a living plant. In 1922, President Warren G. Harding designated a 320-acre part of the area as a national monument.

Unfortunately, the monument was never developed for visitors, so the National Park Service never hired anyone to watch over it. Tourists continued to take pieces of the monument home, so Fossil Cycad gradually lost its reason for being. In 1957, the monument—by then nothing but grass, rocks, and dirt—was officially abolished.

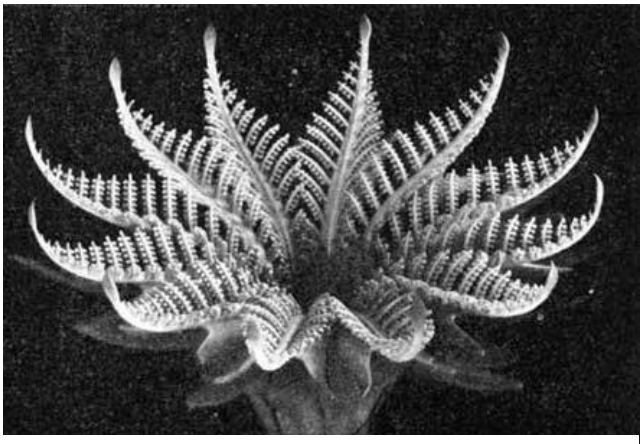
Fossil Cycad is one of the few national monuments ever to lose its historic designation. It has left one legacy, though: Fossil theft is still a big problem in national parks, with more than 700 documented instances since 2007 alone.

The lesson is that fossils are a nonrenewable resource.

To read the full story, click here.

Source

Giaimo, C. 2017. The national park that was stolen to death. Atlas Obscura. 11 July.



A fossilized cycad. Source: National Park Service.

Meeting Minutes
June 26, 2017

by Sue Marcus (filling in for Secretary David MacLean)

Vice-president Ti Meredith called the meeting to order at the Long Branch Nature Center in Arlington, VA. She invited those in attendance to suggest topics for future programs.

Recognitions

President Bob Cooke is traveling. Ti recognized past Presidents Sue Marcus and Barry Remer.

We were graced by several visitors, who introduced themselves and specified their hobby-related interests. We welcomed Joe and Vickie Lujek ("all rocks and minerals"); Jim He ("jade"); Sherry Li ("all gems"); Rebecca Vernier ("everything"); and Emily DeSorrento ("everything, but especially sharks' teeth and other fossils"). (Please pardon the notetaker for any misspellings of names.)

Announcements

Ti distributed a flyer urging people to attend Wildacres. Attendance is down and we want to keep this wonderful resource going.

Ti also shared some general information about the differences between venomous and other snakes for quick visual reference when field collecting.

Ti reminded everyone to make sure to be on the email list to receive the newsletter if possible. The email version provides color and links to reference sources.

Fossil-Collecting Opportunity

Pat Flavin shared information about a wonderful and unique opportunity for fossil collectors and citizen scientists. Significant fossil whale bones and a partial skeleton have been discovered at the former Martin Marietta Quarry, now called the Carmel Church Quarry. The Virginia Museum of Natural History is excavating the site to recover the most important fossils. They are offering the rare opportunity for volunteers to help them with this dig, by prior arrangements only. The volunteers will be allowed to collect and keep a small plastic bag of common fossils, like sharks' teeth.

Barry Remer reported that, based on his trips to the locality about 25 years ago, the fossils are abundant though very compacted and possibly in poor condition. Pat invited those present to contact her for more information on the prospect of volunteering.

Pat also named two fossil Facebook groups: Megalodon Maniacs and the Calvert Marine Museum's fossil club. Both groups interconnect fossil collectors and are excellent information resources.

Door Prizes

Door prize winners were Walker Cruz, Gigi DeSorrento, Lucylou Li, Sherry Li, Joe Lujek, Rebecca Vernier, and Alan Tan. Thanks to those who shared the winning tickets with some of our guests and newer members.

Program

Alec Brenner then treated us to a fascinating presentation on scientific research, future field work, technowizardry, and growing up collecting minerals.

Alec graciously spoke of what the NVMC had meant to him as he started out as a young collector (well, he's still darned young to many of us!). Then he went off to college and benefited from the club's Fred Schaefermeyer Scholarship Fund.

Now Alec has graduated from California Institute of Technology and is off to Harvard in the fall. He will start a Ph.D. program in a brand-new paleomagnetism lab that he and his mentor, Roger Fu, will be establishing there. Alec explained that the lab will be used to determine the origins of the Earth's magnetic field.

Part of that investigative work involves zircons and the inclusions in zircons. Zircons are very durable, so they contain information about their geologic histories. By studying the zircon crystals and grains and the inclusions in them, geoscientists can deduce

whether the inclusions are primary (formed before or during the zircon formation) or secondary (formed afterward and later incorporated into the zircons).

Using the radioactive-decay rates for uranium to lead (usually ^{238}U to ^{206}Pb), the researchers can determine the age of the zircon-bearing rocks.

Some of the oldest rocks on Earth are in Pilbara and Jack Hills, Western Australia. That's where Alec is going to be doing field work after his talk to us, although before the distribution of this newsletter. The Pilbara Craton is about 3.8 to 2.8 billion years old.

So Alec gets to play with some of the oldest rocks on the planet in a cool place (well, possibly quite hot, actually!) and then return to study them using a quantum diamond microscope at a resolution of 0.5 microns.

We wish Alec all the best and look forward to future updates. And he gave a shoutout of thanks to his mom, who was in the audience, and to his dad for their continuing support.

Adjournment

Ti wished everyone a safe and fruitful summer collecting season. We'll gather again on September 25.

Save the dates!

Field Trip Opportunities
Northern Virginia Community College

NOVA's Annandale campus offers 1-day weekend courses—essentially, field trips—related to our hobby. You can get more information on each of the field trips listed below at the Field Studies in Geology—GOL 135 Website.

Miocene Geology of Calvert Cliffs

September 16, 9 a.m.–7 p.m. (Rain date: September 17.) We will consider the Miocene seas spread across Chesapeake Bay region about 10–20 million years ago. We visit the Calvert Marine Museum collections and study ancient sediments, stratigraphy, and marine environments preserved in the world-famous Calvert Cliffs, collecting fossils along the way. Additional $6 museum fee required.

Geology of Washington, DC, and Monument Stone

September 24, 8 a.m.–5 p.m. (Rain date: October 1). Posttrip meeting: September 30. This walking tour will focus on the geology of our capital and its effect on city design as well as building stone choice and structure. Also covered will be the origin of the diverse rock types used in building, monument, and memorial construction.

Building Stones of the National Mall

October 14, 9 a.m.–6:30 p.m. (Rain date: October 15.) We will visit over 20 National Mall sites, examining the geologic history and architecture of the National Mall and the rocks used to construct the federal buildings and monuments there.

Geology of Holmes Run Gorge

November 18, 9 a.m.–5:30 p.m. Holmes Run Gorge is a canyonlike area less than 2 miles from NOVA in Alexandria. Our instructional day will consist of a 3.5-hour class at the college, followed by a 5-hour geologic tour of the gorge. After the face-to-face activities, you will have 2 weeks to complete a related online assignment.

Bench Tip

Deburring Jump Rings

Brad Smith

When cutting jump rings from large gauge wire for chainmaking, you'll notice that the saw leaves a small burr. An easy way to remove the burrs is to tumble the rings with some fine-cut pyramids. It's best not to tumble for long because it will remove the polished finish from the wire.

No tumbler, no problem: You don't actually need a tumbler. I just put a handful of pyramids in a wide-mouth plastic jar and shake for a bit. You can find these pyramids in the tumble finishing section of most jewelry supply catalogs.

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

Field Trip Report—June 17

Vulcan Quarry, Garrisonville, VA

by Hutch Brown

This was my first trip to a quarry and only my second time ever field-collecting minerals. (My first time was at Morefield Mine in Amelia County, VA, a very different kind of experience.)

The Chopawamsic Terrane

The quarry, owned by the Vulcan Materials Company near Garrisonville, VA, lies in what Avery (1989) has called the Potomac Valley of Virginia and Maryland, the area drained by the estuarine Potomac River. The quarry is just south of Marine Corps Base Quantico and about 2 miles west of Garrisonville (fig. 1).

That places it in the western Piedmont of Virginia, a sequence of rock belts ranging from southwest to northeast. The belts are from terranes that collided with proto-North America about 500–450 million years ago (Fichter and Baedke 1999; Hibbard and others 2016). Terranes are small pieces of crust, usually volcanic islands in the shape of an arc. Driven by tectonic forces, they collide with continents, riding up onto the continental crust in great mountain-building events called orogenies. The mountains gradually erode away, leaving the terrane roots grafted onto the continent as part of the bedrock, often in metamorphic rock formations like those in the Piedmont.

The Vulcan quarry is in a metamorphic formation known as the Garrisonville Mafic Complex (fig. 1). It is bordered to the northwest by a metamorphosed sedimentary melange, the Longa Reservoir Formation. Separating the two formations is the Chopawamsic Thrust Fault, a clue to their common origins.

Chopawamsic is the name for an island arc that was part of the Taconic Orogeny beginning about 500 million years ago. Ahead of the advancing Taconic plate was an ocean trench that filled with sediments, becoming the Longa sedimentary melange. Friction between the colliding plates melted rock deep underground, forcing it toward the surface, where it cooled into sills and dikes of diabase.

The Taconic Orogeny lifted the Longa sedimentary melange onto the continental shelf, along with the neighboring diabase. Geologists map the Garrisonville formation as intrusive plutonic rock that formed

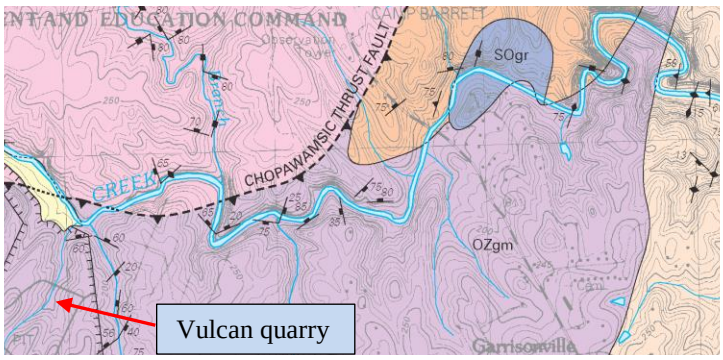


Figure 1—*Detail from a geologic map showing the site of the Vulcan quarry (border with tick marks) near Garrisonville, VA. The Chopawamsic Thrust Fault separates the Chopawamsic Terrane from the Potomac Terrane to the north, including the Longa sedimentary melange (pink, upper left). Purple (***OZgm***) is the Garrisonville Mafic Complex. Source: Mixon and others (2005).*

during or before the Taconic Orogeny—hence its designation as **OZgm** ("O" for Ordovician and "Z" for Proterozoic, reflecting uncertainty about its age). Today, the Garrisonville is at the northern end of the Chopawamsic Terrane (Hibbard and others 2016).

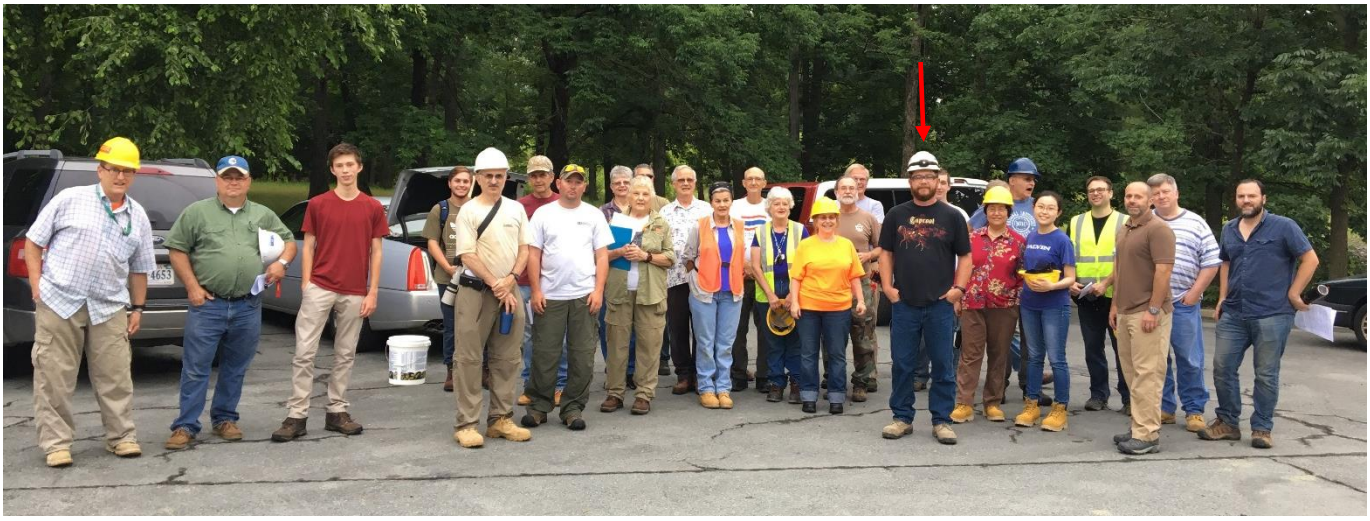
The Garrisonville rock was transported to its current location much later, upthrust behind the Longa formation along the Chopawamsic fault by the Alleghanian Orogeny (320–280 million years ago). In the process, it was metamorphosed into metagabbro containing "mafic rocks" (rocks rich in magnesium and iron, named for the symbols Ma and Fe), including amphibolite, hornblendite, pyroxenite, and websterite (Hibbard and others 2016; Mixon and others 2005).

During the bedrock's original formation as diabase, the cooling magma left cavities filled with minerals. In the course of subsequent orogenies and transport, upwelling superheated fluids washed in more minerals, creating veins and pockets of crystals in cavities. The crystals are what rockhounds are after in this and other quarries in our area.

Good Conditions

The Gem, Lapidary, and Mineral Society of Montgomery County in Maryland organized the trip and invited others to join. My son Alex (18) and I arrived bright and early on a Saturday morning. About 30 members of several different clubs in our area gathered in the parking lot, chatting and signing waivers.

The quarry representative, relaxed and friendly, assembled the group at about 8 a.m. for a short safety briefing. Then we loaded into our cars and followed



The Vulcan Materials Company representative (arrow) gathered field trip participants for a safety briefing in the Vulcan quarry parking lot. Photo: Yang Ran.

the representative in a caravan down to the bottom of the quarry. After parking, we started scrambling through rocks and boulders looking for collectibles.

The quarry produces crushed rock. The first step is to blast the metagabbro from the quarry walls, and Vulcan had just done some blasting. The blasted rock, ranging in size from shards to boulders, was piled in berms 6–8 feet high in preparation for transportation to the crushing facilities. The quarry was giving us an opportunity to go through the berms first.

Conditions were good. The sky was overcast, and the weather, though humid, was not particularly hot. It had rained the night before, clearing away the dust and making the rock easier to inspect.

Hard Work

Alex and I had no idea what to look for, so we winged it. We searched a relatively small area (along a transect of maybe 30 yards), climbing through the rocks and boulders while looking for anything interesting. I overturned rocks, broke up rocks, and broke off pieces of rock, discovering that my rock hammer worked remarkably well. I had little need for my chisels.

For me, it was hard work! The berms were much like scree on a mountainside, and climbing through scree without tripping or turning an ankle takes a lot of concentration and effort. By the time I was through, my swinging arm was sore, my eyes were stinging with sweat, and my goggles were constantly fogging up (*note to self*: get the open-sided kind next time).

Finding Minerals—Not So Easy!

The gray metagabbro had plenty of veins of massive white quartz. Harder to find were other kinds of minerals.

Alex Brown inside the quarry next to a berm of metagabbro recently blasted from the quarry wall. Photo: Hutch Brown.

Beforehand, while we were still waiting in the parking lot, Dave Hennessey showed off one of his finds from 2 weeks earlier in the Vulcan quarry in Manassas. It was a wonderful pocket of prehnite crystals on diabase just lying on the ground waiting for him.

No such luck for us. We found nothing remarkable, not even after all that hard work.

We did find bits of both pyrite and chalcopyrite that stood out well against the dark metagabbro. In fact, our hammer blows often produced the rotten-egg smell of sulfur, attesting to large quantities of pyrite (iron sulfide) in the iron-rich mafic rock.

We found a few small pockets of tiny gray crystals that we couldn't identify. We also found an attractive blue-gray rock in a vein of either quartz or feldspar, maybe even moonstone (which is feldspar of two intermingled varieties, orthoclase and albite).

Others might have found much more. People gradually trickled out before closing time at noon, and we didn't manage to see what anyone else had collected before we left ourselves.

Overall, it was a fascinating and memorable experience. I might do it again—but maybe next time at a different quarry.

Acknowledgments

Thanks to Dave Hennessey, Sue Marcus, and Tom Tucker for reviewing and vastly improving the article. The author is responsible for any errors.

Sources

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From the Vulcan quarry. ***Top****—chalcopyrite on coarse-grained metagabbro;* ***middle****—pocket of unknown microcrystals, with tiny specks of pyrite on lower right;* ***bottom****—possible moonstone (feldspar).*
Photos: Hutch Brown.

Mixon, R.B.; Pavlides, L.; Horton, Jr., J.W.; Powars, D.S.; Schindler, J.S. 2005. Geologic map of the Stafford Quadrangle, Stafford County, Virginia. Sci. Invest. Map 2841. Reston, VA: U.S. Geological Survey.

Humor

So You Wanna Be a Geologist!

by Neill H. Ridgley

Editor's note: *The piece is abridged and adapted from* The Professional Geologist *(periodical of the American Institute of Professional Geologists), January/February 2005. Thanks to Sue Marcus for the reference!*

As a longtime minerals explorationist, I would not be doing my duty unless I clued potential successors in. Consider this chronological career resume, and ask yourself if you really want a career in geology!

Be prepared to … graduate during one of the frequent mining industry recessions and make hundreds of contacts trying to find a job.

Be prepared to … be seriously unemployed.

Be prepared to … take a long-term assignment in a foreign country at substandard wages (because you just graduated) and try living on their equivalent of food stamps.

Be prepared to … live in an apartment on a cobblestone street used for practicing repairs on public utilities (gas, electricity, water) by a steady stream of pick-wielding laborers.

Be prepared to … want to work so badly you agree to a mapping project in western Arizona in July, August, and September.

Be prepared to … get shot at when you overstake some lapsed mining claims and the former tenant learns of your staking program through town gossip and decides to "rectify" the situation.

Be prepared to … use a private security company to enforce your claim rights, only to have the security company suggest to the tenant that he, too, needs their help.

Be prepared to … have to mulch, by hand, a mile-long bulldozer trail in a temperate rainforest with 200 bales of straw, with the first passage of the dozer and every time thereafter.

Be prepared to … get lost while trying to find your way through the rainforest on 45-degree slopes overgrown with rhododendron on the north-facing slopes and briar patches on the south, where the only lines of access are ridgetops and creek bottoms.

Be prepared to … get stung while taking a long looping traverse through the rainforest and inadvertently kicking a log brimming with yellowjackets. See if you can outrun the yellowjackets.

Be prepared to … try and act your way out of a confrontation with a black bear after you mistakenly take your dogs on a mapping expedition in the woods.

Be prepared to … take a federal bureaucrat on an inspection tour and have him ask (1) whether any animals live in the forest, and (2) how the deer get up and down the steep hills.

Be prepared to … explain to a public scoping session that your company did not order the state highway department to build a new road through the Appalachians just to create fresh roadcuts.

Be prepared to … try jogging near the I–40 overpass in Grants, NM, and have the local law stop you to ask what you are doing. When told it is jogging, they ask, "What's that?"

Be prepared to … be told by your employer that it is a waste of money to rent a backhoe to dig mudpits since the geologists could do them as well by hand.

Be prepared to … take petroleum source rock cuttings from a deep, expensive well and package them in canning jars in ordinary cardboard boxes for shipment to an analytical lab because the guy you work for thinks that sealed paint cans cost too much.

Be prepared to … be told that every geologist on a drilling project should be able to make do with one mechanical pencil ("pencils do not grow on trees").

Be prepared to … be told that the minable reserves in a dipping limestone bed cannot be calculated unless drillholes are oriented perpendicular to bedding.

Be prepared to … be told that faults do not curve.

Be prepared to … be told that there are probably no more overthrusts to be found in north-central Nevada.

Be prepared to … talk your way out of a new job by trashing your old employer, who happens to be a golfing buddy of your potential new employer.

Be prepared to … want to work so badly that you offer to cut your daily tent-camping-based rate from $100 to $75.

Be prepared to … be seriously unemployed (again).

Oh, yes, I forgot to mention: Be prepared to … have the time of your life! I would not have missed it for anything!

Iron, Iron Everywhere

by Clay Williams

Editor's note: *The piece is adapted from* Livermore Lithogram *(newsletter of the Livermore Valley Lithophiles, Livermore, CA), July 2008, p. 5. It came from* Petroglyphs *(March 2008) via* Rollin-Rock *(July 2008).*

Just look at any sedimentary, igneous, or metamorphic formation, and there is a good chance that it will be stained red by iron. So it is no surprise that iron is the fourth most common element and, next to aluminum, the most pervasive metal in the Earth's crust. In fact, iron accounts for about 35 percent of the planet's entire weight due to its iron–nickel core.

Iron is thought to be the tenth most abundant element in the universe, so the Earth has a disproportionate amount of this element. We are fortunate to have such large iron reserves, because iron is a vital resource. Life as we know it requires a supplement of iron.

Iron has also proven very useful. The most extensive modern use of iron is in steel and its alloys in cars, ships, buildings, and other structures and vehicles. Iron and its alloys have also been used in plate armor. In ships, two successful early examples, the Monitor and the Merrimac, gave birth to the term ironclad.

The Old English name for this metal was *isœrn* (related to Old High German *isarn* and modern German *Eisen*); by 1386, Chaucer was calling it *iren*. The chemical symbol for iron, Fe, comes from the Latin *ferrum*.

The name for iron's most widely known alloy, steel, comes from proto-Germanic *stakhla* ("to stand fast"). This became *stahle* in Old English (closely related to *Stahl* in German today).

Iron is one of three metal elements that are strongly magnetic. Besides iron, this group includes nickel and cobalt. The magnetic iron–nickel core of our planet is the reason why a compass works. Magnetic storage in computers is generally made possible through iron compounds.

On Earth, iron is mainly found in minerals such as hematite, magnetite, and pyrite. However, some native metal is also found in the basalts of Greenland and Germany. In addition, iron is associated with nickel in the gold placers of British Columbia, New Zealand, and Oregon.

Trigonal hematite (iron oxide) from Ibitiara, Minas Gerais, Brazil. Hematite is an important source of iron. Source: Wikipedia.

An extraterrestrial source of iron is iron–nickel meteorites, which occasionally have some cobalt in them. In fact, meteorites were the source of the first iron used by people.

People first smelted iron from meteorite ores sometime around 2000 BC. The first users were a little-known group that passed its knowledge on to the Hittites in the Middle East.

The Hittites were the first to be renowned for the manufacture and use of iron implements. The use of iron in weaponry is often given as the reason for the end of the Bronze Age, but in reality it probably just boiled down to the degradation of tin trade routes (tin was required to make bronze).

Casting iron, a step up from the old heat-and-pound method of iron forming, was first done by the Chinese around 550 BC. The technology did not make its way to Europe until the Middle Ages.

Steel was first made, probably by accident, in the early years of smelting. But a process for mass-producing steel, though devised in the 1600s, would not be widely used until the Industrial Revolution.

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Smithsonian Museum of Natural History
Gems Hall—Exhibit Update

Editor's note: *The article is adapted from a flier from the Smithsonian. Thanks to Sue Marcus for the reference!*

Removed for a special exhibit (to return in January 2018) are the Marie Antionette Earrings, Marie Louise Diadem, Napoleon Necklace, and Maximilian Emerald Ring. Replacing them are three new items.

The Post Diamond Tiara

Created in about 1840, the tiara has a design of flower petals and leaves. They are pavé set with 1,198 old-mine-cut and rose-cut diamonds.

At the time, tiaras were of less classical design, often with naturalistic motifs, in this case with bejeweled branches of leaves and flowers. In the mid-1800s, the wild rose and daisy were popular. This tiara, believed to have been made in France, is a beautiful example of a garland of wild roses.

As common in early Victorian jewelry, this tiara is made of silver and gold. It is fashioned *en tremblant*—the flowers are mounted on trembler springs so that every movement enhances the brilliance and sparkle of the diamonds.

A tiara is a kind of crown, a semicircular band of metal set with gems, worn by women on formal occasions. The Post Diamond Tiara once belonged to a British noble, the Rt. Hon. Lord Methuen R.A. Marjorie Merriweather Post purchased it at auction for the Smithsonian in 1970. It was accompanied by a pair of matching floral spray brooches.

The Mystery Diamond Necklace

The Mystery Diamond Necklace was gifted to the Smithsonian by Mrs. Lillian Turner in 1998. The "mystery" of the necklace is the illusion that the diamond is larger than it actually is. The pear-shaped rose-cut diamond is mounted in a closed-back yellow gold pendant setting. The diamond has a flat bottom that is foil backed, giving the diamond the illusion of pavilion (or bottom) facets. The Mystery Diamond has the appearance of a 50-carat diamond, even though it is estimated to be only 10 carats.

The Clagett Bracelet

The magnificent Art Deco platinum-and-enamel bracelet contains 626 diamonds, 73 emeralds, 48 sapphires, 20 rubies, and 4 citrines. The bracelet was made by French jeweler Geoffroy et Eisenmann for Vever in Paris between 1923 and 1925. It showcases a landscape with enameled figures of a hunter on horseback and another on foot hunting a lion, styled after a Persian miniature.

The diamonds are old European and single cuts. The round rubies form flower heads; the buff-top marquise-shaped leaves are made of emeralds and citrine; and a "river" of buff-top blue sapphires flows through the landscape. The hunters and the lion are enameled in colors of orange, green, blue, black, and brown.

This bracelet from Vever was featured in the catalogue for the International Exposition of Modern Industrial and Decorative Arts in Paris in 1925 and won the grand prize. The term "Art Deco" comes from the words "Arts Decoratifs" from this exposition.

The Art Deco period (1920–1935) produced dazzling jewelry dramatically different from previous jewelry, shifting from the soft colors and flowing lines of the Art Nouveau and Edwardian periods to bold bright colors and straight lines. New geometric cuts for gems complimented the symmetry and streamlined look of Art Deco jewelry.

Safety Matters
Seeing the Light?

by Ellery Borow, AFMS Safety Chair

Editor's note: *The article is adapted from* A.F.M.S. Newsletter *(February 2017), p. 1.*

If you are seeing the light—the ultraviolet light, that is—there might be a problem. Many of the shows I visit offer a display/exhibit/darkened booth highlighting the amazing effects of ultraviolet-reactive minerals for show patrons to see.

Although many ultraviolet exhibits I have seen offer sufficient safeguards for the public, some could be better.

In your exhibit, are folks given sufficient eye protection and bare-skin protection? Is enough attention paid to reflective surfaces? Are the lights angled well enough to illuminate the minerals while keeping the ultraviolet rays out of patrons' eyes?

Even short-term exposure to ultraviolet light can be harmful. For example, imagine people in a boat enjoying a day of deepsea fishing. All have on baseball caps with visors, but the ones who failed to wear the right amount of sunscreen will be quite sunburned at the end of the day, right up to where their caps touched their foreheads.

How is that possible? How can the sun reach under people's visors? In a word—reflections. The ocean isn't flat; it has waves, and the waves reflect ultraviolet light onto people's faces, even in the shade.

The same can happen on a smaller scale in a show's ultraviolet-minerals booth. Ultraviolet light can reflect from mineral surfaces onto the bare skin and into the unprotected eyes of show patrons and club members tending the booth. In most cases, the exposure will be minimal, but not necessarily for those who spend extended amounts of time in the booth.

To reduce exposure to ultraviolet light, you might:

- wear eye protection for extended viewing or working in the vicinity of ultraviolet light;
- wear sunscreen on exposed skin;
- minimize reflective surfaces from display materials or the minerals themselves;
- angle ultraviolet lights so that no one—especially small children—can kneel down and look up into the lamp housing or bulbs;
- offer protective eyewear to patrons who wish to use it, even for short-term exposure to ultraviolet light; and
- take periodic breaks from being under strong ultraviolet illumination.

I encourage shows to offer exhibits of ultraviolet rocks and minerals because such displays are always great attractions. But I also encourage you to offer enough protections and safeguards.

As always, I hope you safely see the light—your safety matters!

Notes From the President
Pointers for Club Shows

by Dave Korzendorfer, EFMLS President

Editor's note: *The article is adapted and abridged from* EFMLS News *(February 2017), pp. 2–3.*

In the January 2017 issue of the *EFMLS News*, I promised a list of ideas for helping clubs grow. We are still compiling the list, but here is one idea—creating a "high-energy" environment at your annual club show. For example, you might:

- Set up an active area for kids.
- Offer games, free samples, and perhaps a Treasure Hunt.
- Tailor the Treasure Hunt to encourage kids to find answers in the exhibits as well as at dealer booths or the club table.
- Have a club table where people can get information about your club.
- Staff your club table with members who are outgoing and enjoy sharing information. Have information on your club activities, copies of bulletins, and membership applications.
- Appoint a greeter at your check-in table or the door to welcome people to the show.

The Rocks Beneath Our Feet

Lake Drummond: Meteoric Origins?

by Hutch Brown

Editor's note: *This is the third in a series of articles on the origins of Virginia's Lake Drummond. The first, on the area's geology, is in the April 2017 newsletter. The second, on the possibility that a wildland fire formed Lake Drummond, is in the June 2017 newsletter.*

Virginia's Lake Drummond, located in the Great Dismal Swamp on the Coastal Plain of Virginia, is nearly circular in shape. It has the general appearance of a crater left by a meteor strike, such as Meteor Crater near Flagstaff, AZ (fig. 1).

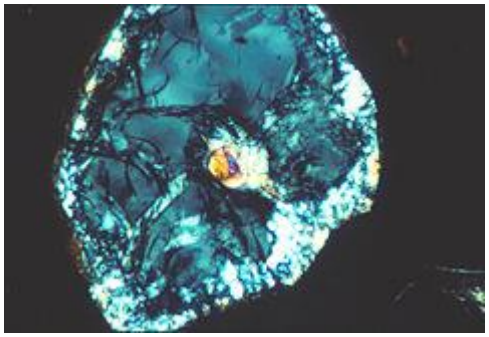
Could a meteor strike have formed Lake Drummond?

Meteor Crater

Arizona's Meteor Crater is huge—about 550 feet deep and three-quarters of a mile across. In the early 20th century, before it got its name, the crater launched a controversy. Some people theorized that a projectile from outer space (what scientists call a bolide—an asteroid or a comet) slammed into the Earth there, burying itself underground. From iron-rich fragments remaining in the crater, a would-be entrepreneur deduced that the bolide was solid iron. He bought the crater, hoping to mine the iron ore.

But he could find no buried mass of iron ore to mine—or to confirm the meteor theory. So scientists offered an alternative explanation for the crater: an explosion of steam from underground due to volcanic processes. After all, northern Arizona has a well-known record of past volcanism.

Then, in 1960, an analysis of shocked sandstone from the site yielded coesite, a polymorph of quartz (both are silicon dioxide). Coesite forms in the Earth's interior at ultrahigh temperatures and pressures, but it is highly unstable when exposed to the atmosphere and soon turns into quartz. The coesite in the shocked sandstone was embedded in its grains and thereby protected from exposure to the atmosphere. It could only have come from the tremendous impact of a bolide at the Earth's surface. The meteor theory was confirmed, and the crater acquired its current name.



Coesite grain in cross-section (light border = quartz; colored inclusion = pyroxene). A polymorph of quartz, coesite forms under ultrahigh heat and pressure. Its presence can indicate a major meteor strike. Source: Wikipedia.

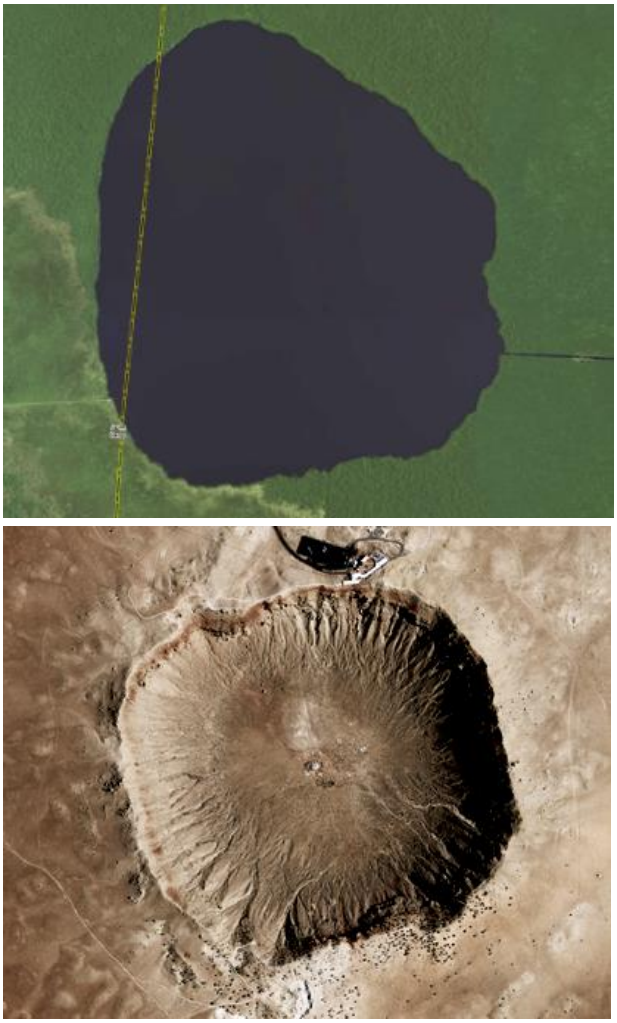


Figure 1—*Lake Drummond in the Great Dismal Swamp on the Coastal Plain in southern Virginia (top) and Meteor Crater near Flagstaff, AZ (bottom). Sources: Top—U.S. Geological Survey. Bottom: NASA Earth Observatory.*

Could something similar have happened in Virginia?

Chesapeake Bay Impact Crater

Actually, it did.

About 35 million years ago, a huge bolide—2 to 3 miles across—slammed into the Earth near what is now the mouth of the Chesapeake Bay (fig. 2). At the time, the area was covered by the Atlantic Ocean, which reached all the way to the Fall Line in our area.

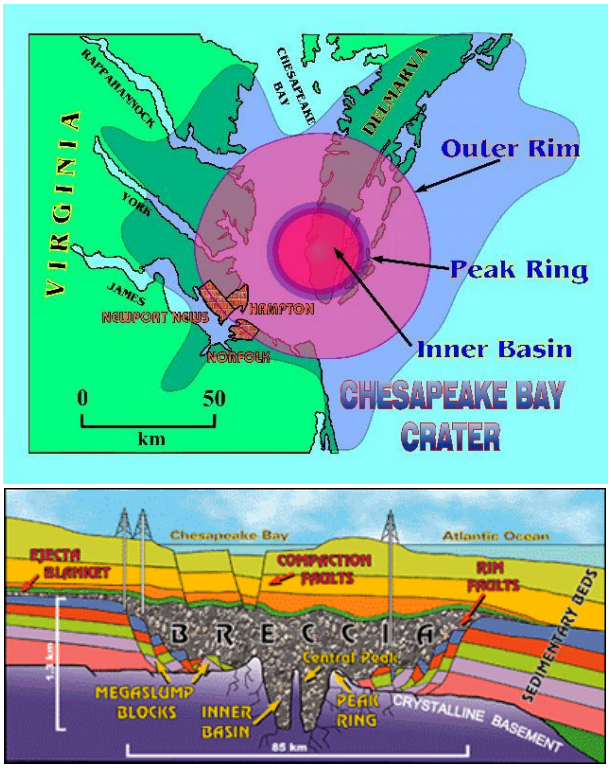


Figure 2—*Top:* *Location of the impact crater at the mouth of Chesapeake Bay, showing the rings and the extent of the rubble blanket (the blue blob).* ***Bottom:*** *Cross-section of the Chesapeake Bay impact crater, showing its main features. Sources: Poag (1998, 2013).*

The impact left a crater surrounded by a "peak ring" of shattered rock about 24 miles across (fig. 2).

The sedimentary walls of the crater slumped in, widening the opening and forming a ring trough with an outer edge of collapsed blocks and faults. The slump blocks were covered with rubble from the impact, known as breccia, which extended for dozens of miles in all directions, forming a huge rubble bed.

The outer rim of the crater is about 53 miles across and almost a mile deep (fig. 2). It covers an area twice the size of Rhode Island and nearly as deep as the Grand Canyon.

Could the hole in the Great Dismal Swamp have been due to the same event? The Chesapeake bolide would have been breaking up as it entered the Earth's atmosphere. Did a fragment slam into what is now the Great Dismal Swamp, leaving a crater? Did the hole then fill with water when the swamp began to form about 11,000 to 12,000 years ago?

Or did another meteor strike create Lake Drummond?

Dubious Explanation

Nobody knows for sure, but an astrophysical explanation for Lake Drummond does not seem likely.

Aside from its roughly circular shape, the lake bears no semblance to a crater. Though a high point in the swamp, it seems to lack the prominent rim of shattered rock that craters typically have (figs. 1, 2).

Moreover, it seems too shallow for a crater. About 2-1/2 miles across, Lake Drummond is no more than 6 to 7 feet deep. By contrast, Meteor Crater in Arizona, with less than a third of Lake Drummond's diameter, is more than 500 feet deep.

To be sure, submerged craters tend to fill in with marine sediments (fig. 2). It took a serendipitous borehole in 1983 to discover the Chesapeake Bay impact crater. And the area of Lake Drummond has been undersea multiple times in the past 35 million years.

Yet scientists have recovered few meteoric rocks in the area. Moreover, they have found no sign of a meteor strike, such as shocked quartz or coesite, in the sediments under the Great Dismal Swamp.

So another explanation is probably needed for the origins of Lake Drummond. Interestingly, similar shallow basins are scattered across the mid-Atlantic Coastal Plain. Could they have a common origin?

Next: Did Lake Drummond form together with other depressions across the Atlantic seaboard?

Acknowledgment

The author thanks NVMC member Sue Marcus for reviewing and improving the article. Any errors are the author's alone.

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AUCTION BID SLIP
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September 2017—Upcoming Events in Our Area/Region (see details below)

Sun	Mon	Tue	Wed	Thu	Fri	Sat
					1	2
3	4 **Labor Day**	5	6 MSDC mtg, Washington, DC	7	8	9
10	11 GLMSMC mtg, Rockville, MD	12	13	14	15	16 **NOVA field trip** Shows: PA, NY
17 Shows: Harrisburg, PA; Poughkeepsie, NY	18	19	20	21	22 **Fall begins** Show: W. Friendship, MD	23 Show: W. Friendship, MD
24 **NOVA field trip**	25 **NVMC mtg, Arlington, VA**	26	27 MNCA mtg, Arlington, VA	28	30	

Event Details

6: Washington, DC—Monthly meeting; Mineralogical Society of the District of Columbia; 1st Wednesday of the month, 7:45–10; Smithsonian Natural History Museum, Constitution Avenue lobby.

11: Rockville, MD—Monthly meeting; Gem, Lapidary, and Mineral Society of Montgomery County; 2nd Monday of the month, 7:30–10; Rockville Senior Center, 1150 Carnation Dr.

16: Calvert Cliffs—Geology field trip; 9–7; NOVA; info, reg: GOL 135 Website.

16–17: Harrisburg, PA—Gem, Mineral & Jewelry Show; Central PA Rock & Mineral Club; Zembo Shrine, Third & Division Sts; contact: Betsy Oberheim, aoberheim3@comcast.net.

16–17: Poughkeepsie, NY—49th Annual Gem & Mineral Show & Sale; Mid-Hudson Valley Gem & Mineral Society; Gold's Gym and Family Sports Center, 258 Titusville Rd; info: Carolyn Reynard sunstone33@verizon.net.

22–23: West Friendship, MD—53rd Annual Atlantic Coast Gem, Mineral, Jewelry & Fossil Show; Gem Cutters Guild of Baltimore; Howard Co. Fairgrounds; info: gemcuttersguild.com.

24: Washington, DC—Geology field trip; 8–5; NOVA; info, reg: GOL 135 Website.

25: Arlington, VA—Monthly meeting; Northern Virginia Mineral Club; 4th Monday of the month, 7:30–10; Long Branch Nature Center, 625 S Carlin Springs Rd.

27: Arlington, VA—Monthly meeting; Microminералogists of the National Capital Area; 4th Wednesday of the month, 7:45–10; Long Branch Nature Center, 625 S Carlin Springs Rd.

Flat offered for sale at the 2016 NVMC Fall Club Auction. Photo: Sheryl Sims.

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hutchbrown41@gmail.com

Visitors are always welcome at our club meetings!

RENEW YOUR MEMBERSHIP!

SEND YOUR DUES TO:
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PO Box 9851, Alexandria, VA 22304

OR

Bring your dues to the next meeting.

Purpose: To encourage interest in and learning about geology, mineralogy, lapidary arts, and related sciences. The club is a member of the Eastern Federation of Mineralogical and Lapidary Societies (EFMLS) and the American Federation of Mineralogical Societies (AFMS).

You may reprint materials in this newsletter.

Dues: Due by January 1 of each year; $15 individual, $20 family, $6 junior (under 16, sponsored by an adult member).

Meetings: At 7:45 p.m. on the fourth Monday of each month (except May and December)* at **Long Branch Nature Center**, 625 Carlin Springs Road, Arlington, VA 22204. (No meeting in July or August.)

**Changes are announced in the newsletter; we follow the snow schedule of Arlington County schools.*