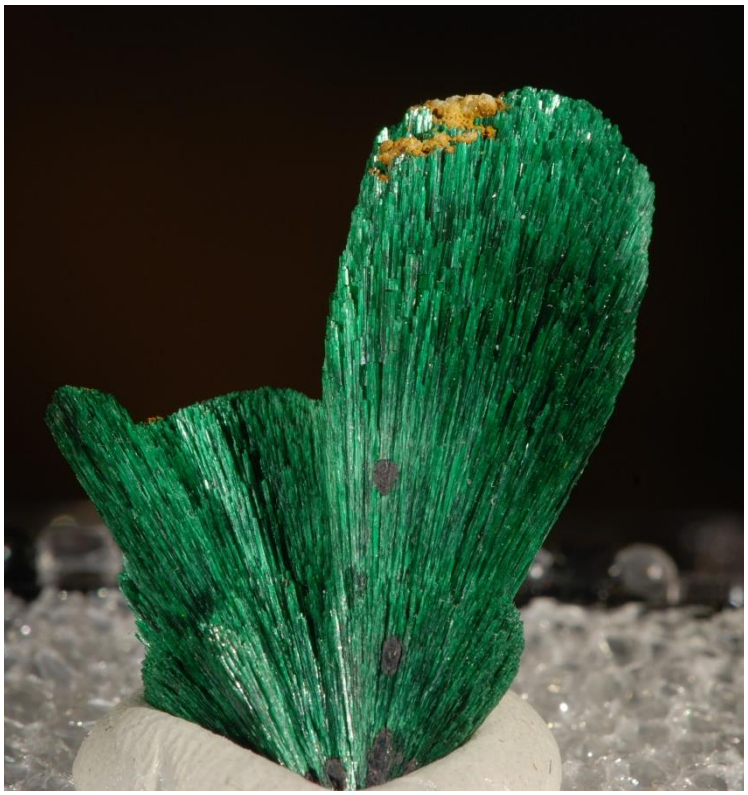
THE NORTHERN VIRGINIA MINERAL CLUB INC

The Mineral Newsletter

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

Long Branch Nature Center, 625 South Carlin Springs Road, Arlington, VA



Malachite

Kerrouchen, Morocco

Photo: Bob Cooke.

Deadline for Submissions

March 20

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

Volume 60, No. 3
March 2018
Explore our website!

March Meeting Program:

Spring Club Auction

details on page 5

In this issue …

Mineral of the Month
Malachite

by Sue Marcus

Malachite green: a color. Malachite jewelry. Malachite as objets d'art, or a room of them, as in the Hermitage in St. Petersburg, Russia. For those of us who treasure it as a collectible mineral, malachite is colorful and accessible, and it can be affordable. Collectors can also spend sky-high amounts for specimens, too. Many of us have had the fun of collecting malachite ourselves.

I can't say that malachite is as old as dirt, though it may be. The name, based on the color of the mallow plant's leaves, was reported by Pliny the Elder in 79 CE (79 AD). Our current spelling has been used since at least 1661.

Malachite has been mined for copper and other uses since prehistoric times. The earliest known copper mining, by Egyptians in what is now Israel's Timna Valley, led to the construction of the Temple of Hathor, the goddess of many things, including protecting miners. These mines were probably active and during the reigns of the biblical kings Solomon and David and may be part of the former's famous mines. There were Neolithic malachite mines in Britain.

Malachite is usually hosted by limestone deposits. It is usually a secondary mineral, occurring when primary copper minerals are attacked by water and air or by fluids not far beneath the surface of copper-rich deposits. Azurite is particularly susceptible to alteration into malachite. These two colorful copper minerals make stunning specimens, especially when there are large azurite crystals altering to malachite. Such specimens are usually priced according to their visual appeal and scarcity—that is, highly priced! This is also true for specimens of pseudomorphs of malachite after azurite, when well-crystalized azurite has been completely replaced by malachite.

Major current sources of malachite specimens include the Democratic Republic of Congo (DCR). The DCR was previously known as Zaire, the location shown on many older labels. Specimens from the DCR are often botryoidal and may form stalactites or stalagmites. These latter shapes can be many inches long, a relatively rare shape in the mineral kingdom. Rather confusingly, the Republic of Congo (Brazzaville) also produces fibrous malachite specimens, though not on the scale of the DRC. Tsumeb, Namibia, has produced stunning azurite crystals; the locality is famous for (among other things) malachite pseudomorphs after azurite. Malachite is also found in Tsumeb as smaller primary crystals, acicular coatings, masses, and balls. Namibia's Emke Mine is another producer of beautiful specimens.

In the past few years, the Milpillas Mine in Sonora, Mexico, has produced beautiful azurite crystals and fewer malachite specimens. From the photos for this

Happy St. Patrick's Day!

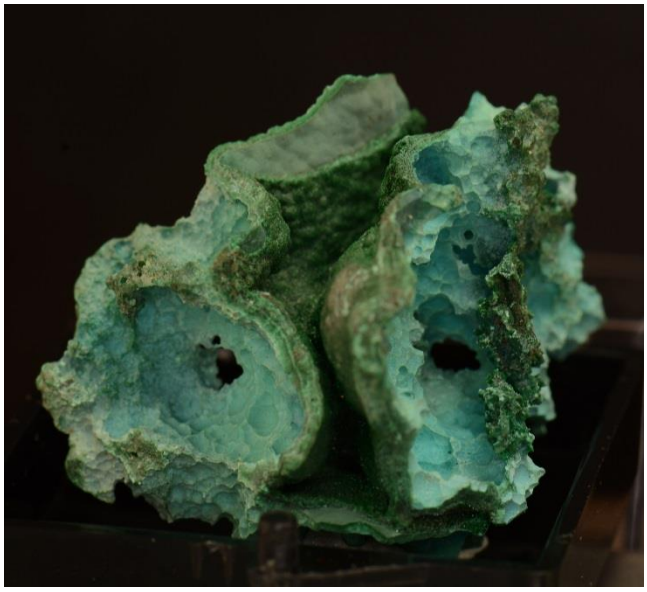
Northern Virginia Mineral Club members,

Please join your club officers for dinner at the Olive Garden on March 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.

Malachite on azurite from Bous Kour, Morocco. Photo: Bob Cooke.



Malachite with chrysocolla, Mashamba West Mine, Kolwezi District, Katanga, Democratic Republic of Congo. Photo: Bob Cooke.

locality on Mindat, the malachite specimens shown rival the ones from Tsumeb. Previously, Mexico had been a source of mostly lower quality malachite specimens from a wealth of copper deposits.

Malachite pseudomorphs after cuprite are another attractive type of pseudomorph specimens. These are best known for the classic old, aptly named Chessy-les-Mines locality near Lyon, France. The mines closed more than a century ago, so specimens are scarce. Malachite pseudomorphs after cuprite have also come from other sites, though infrequently.

Morocco's azurite is better known to collectors than its malachite, though where there's azurite, there's usually malachite. The Moroccan material comes in many forms but is not as spectacular as pieces from other localities.

Oddly, I could find no notable malachite localities in Chile, which is known for copper production. This may be due to the younger age of the Chilean deposits and a dry climate that did not provide the necessary oxidizing conditions.

Rum Jungle and the Burra mines are among the best known of the Australian localities. These mostly produced botryoidal malachite, although rare crystals or pseudomorphs after azurite are reported. Brazil, China, and many other countries have produced collectible specimens of malachite, though not to the extent of the localities noted previously.

The United States has malachite in many places. Former copper mines in Arizona produced the most stellar U.S. specimens. The best of these include malachite pseudomorphs after azurite, with pseudocrystals of 3+ centimeters in size, large botryoidal masses, and lovely fibrous coatings of fine crystals. Bisbee is the most famous of the Arizona localities, although Morenci and other mines also produced specimens. We can even find malachite in Virginia. Local specimens aren't spectacular, yet Mindat shows six specimens from Virginia, including one from Vulcan Quarry in Manassas that was collected and photographed by Robert Simonoff.

In the 18th and 19th centuries, Russian mines in the Ural Mountains provided the czars with copper and with massive malachite for lovely works of art. In the 1830s, more than 70 tons of massive malachite was produced for such uses. Russian artisans developed unparalleled skills in piecing together small bits of malachite to form large objects that appear seamless, as if the malachite was curved from a solid, unbroken mass. Another awe-inspiring use of malachite is the Malachite Room in the Castillo de Chapultepec in Mexico City, which features huge doors of malachite. Grand palaces in other parts of the world are also decorated with large malachite items.

Other copper minerals are richer in the metal, though malachite can be mined for copper. Most specimen localities are or were copper mines, although malachite is not the main mineral of mining interest. The main uses of copper in the United States are in construction

Malachite pseudomorph after azurite, New Cornelia Mine, Ajo, Pima County, AZ. Photo: Bob Cooke.

Malachite from Tsumeb Mine, Tsumeb, Oshikoto Region, Namibia. Source: Mindat; photo—Manfred Kampf.

(for copper pipes and so on), for electrical purposes, and in transportation. Copper also goes into brass and bronze alloys. Although the United States produces copper from about 20 mines, we also import copper ore from Chile, Canada, and other countries. Our country is also a copper exporter.

Readily available, easy to work, and known for centuries, malachite was used by ancient people in both Egypt and Central and South America in their death rituals and funerary objects. The ancient Egyptians even referred to the afterlife as a "Field of Malachite."

Malachite is soft and easily ground to powder, so pigments were used by ancient Egyptians in tomb paintings. Using malachite pigments for painting continued into the 17th century in Europe. Malachite is still sold as a pigment for historical restorations.

By the way, malachite green (the color) is named for malachite, even though the pigment of that name does not contain the mineral or even copper!

The mineral has been used in jewelry and objects for centuries. Mixtures of malachite and other copper minerals make lovely stones for jewelry due to the color contrasts of greens and blues (azurite, turquoise, and so on). Translucent malachite crystals are too small to be cut as gemstones, and all other malachite is opaque, so all jewelry is opaque. Malachite is fairly soft, so it is not a stone that will take abrasion or hard use in jewelry.

Modern lapidaries have been informed by modern chemists and others who recognized that malachite dust can be toxic. If you make cabochons or do other lapidary work with malachite, check on what precautions should be used.

Pseudomalachite is a completely different phosphate mineral ($Cu_5(PO_4)_2(OH)_4$ usually occurring as very dark green botryoidal crusts. It is not malachite—just pseudo.

Technical details:

Chemical formula	$Cu_2CO_3(OH)_2$
Crystal form	Monoclinic
Hardness	3.5-4
Specific Gravity	3.6-4
Color	Green, sometimes banded with very dark green
Streak	Green (light)
Cleavage	One perfect; one fair
Fracture	Uneven to subconchoidal
Luster	Vitreous in single crystals; silky when fibrous

Acknowledgments

I would like to acknowledge the helpful review and additions by my husband, Roger Haskins, and supreme editor Hutch Brown for his skillful editing.

Sources

David, A. 2017. Archeologists startled to find remains of pregnant woman buried in Solomon's Mines. Haaretz. November 1.
Gem's Anatomy. 2017. The Malachite Room.
Gemdat. 2019. Malachite.
Geology.com. 2019. Malachite.
Mindat. 2019. Malachite.
Mindat. N.d. Malachite from Arizona.
Mindat. N.d. Malachite from Burra Copper Mine.
Mindat. N.d. Malachite from Milpillas Mine.
Mindat. N.d. Malachite from Virginia.
Mindat. 2019. Pseudomalachite.
Mindat. 2019. Rum Jungle, Australia.
Minerals.net. N.d. The mineral malachite.
O'Connor, W. 2018. Chapultepec, the Mexican castle that drove a Belgian princess to madness and an Austrian archduke to the firing squad. The Daily Beast. May 27.
U.S. Geological Survey. 2017. Mineral commodity summaries: Copper.
Webmineral. 2019. Malachite mineral data.
Wikipedia. 2019. Malachite.
Wikipedia. 2019. Malachite green.
Wikipedia. 2019. Malachite Room, Castillo de Chapultepec.
Wikipedia. 2019. Timna Valley.

Club Member Rocks and Minerals Auction Coming Up!

March 25 Program

Our March 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 22 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, the minimum bid is $2).

Also, use the summary sheet on page 23 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.

Malachite acquired by a lucky buyer at a past NVMC club member auction. Photo: Sheryl Sims.

- 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 $2 on any item. The minimum increase is also $2. 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.

Annual GLMSMC Show Coming Up!

The 55th Annual Gem, Mineral, and Fossil Show, hosted by the Gem, Lapidary, and Mineral Society of Montgomery County, MD, is will be on March 16–17. The hours are Saturday from 10 to 6 and Sunday from 11 to 5. The location is Montgomery County Fairgrounds, Building 6, 16 Chestnut Street, Gaithersburg, MD. There will be over 40 exhibits, activities for kids, and over 20 dealers from around the country. Admission is $6 for adults, kids 11 and under free (discount coupon on show website).

President's Collected Thoughts

by Sue Marcus, President

Welcome to the Club! You know we're inclusive—we include You! We're a mix of interests and experiences, ages and backgrounds, sharing rocks of all types.

Engaging with club activities helps build a network of contacts. Is there a topic or speaker you'd like to hear? Let me know, and maybe help us make the connections so we can make that presentation happen.

Other volunteer opportunities, requiring minimal time, include maintaining our membership rolls, providing refreshments at meetings, and bringing members to the meeting who no longer drive.

Some activities can be done at home, like writing an article for the newsletter. What's your geology-related passion? Check some resources and write it up! Or tell us about a collecting experience. We all love good stories.

Pat Flavin volunteered to check on club T-shirts. She and I will present options at the April meeting. We could have shirts made with a mineral photo. Perhaps we could have a photo contest with the winning image on the shirt. Or we could buy shirts with photos by Jeff Scovil (a professional mineral photographer) and our club name on them.

What do you think? Would you buy one? Buy more as gifts? Would you buy a unique annual show T-shirt?

Also at the last meeting, the club agreed to sponsor a Mindat page. The Vulcan Manassas Quarry is available, as is the Virginia page. We will vote on the members' preference at our March meeting. My recommendation is the Manassas Quarry because it is most specific to our area and they have been very gracious in allowing collecting.

March offers options for more than collecting thoughts. Look for information about our biannual club auction on page 4. You can shrink and enlarge your collection at the same club meeting. And there's the 55th annual Gem, Lapidary, and Mineral Society of Montgomery County's show coming up in Gaithersburg, MD.

See you at our club meeting!

Sue

Meeting Minutes
February 26, 2017

by David MacLean, Secretary

President Sue Marcus called the meeting to order at 7:45 p.m. at the Long Branch Nature Center in Arlington, VA.

Acknowledgments

The minutes of the January 28 meeting were approved as published in *The Mineral Newsletter*. The president recognized past President Barry Remer as well as guests Gerald J. Kobialko and Thomas Van Veen.

Door prize winners included Germaine Bouchard, Jeff Guerber, Kathy Hrechka, Deepak Kenkeremath, Craig Moore, Barry Remer, and Thomas Van Veen.

The display tables held contributions by:

Ken Reynolds ..... Wernerite (fluorescent) from New York, NY; and teralingua calcite from Texas.

Thomas Van Veen ..... Concretion from the Tampa area in Florida.

Germaine Bouchard..... A black rock with numerous brachiopod fragments from Erie, PA; quartz with a few muscovite flakes from weathered schist, collected in South Carolina; and trilobites in shale from the Allegheny National Forest in Pennsylvania.

Pat Flavin..... Hydrozincite, fluorescing blue; willemite, fluorescing green; and calcite, fluorescing red, all from a previous Super Diggg in Sterling Hill, NJ.

New Business

The president has sent letters to the George Mason University, Northern Virginia Community College, and James Madison University geology departments asking for nominees for scholarship awards. JMU has submitted a nomination.

The club has recruited a speaker for April but not for May, June, October, and November. The 2019 spring and fall auctions are, respectively, in March and September.

The board is discussing how to invest NVMC reserve funds for relatively safe higher yields while maintaining cash availability. The club closed its post office

box to save the expense. The club address is now that of Roger Haskins, the treasurer.

Club members discussed designs for T-shirts for wearing on field trips. Members were invited to submit T-shirt designs.

There will be an online survey of member-specific interests in our hobby, such as minerals, fossils, micromounts, and lapidary.

The EFMLS insurance for clubs has added medical insurance for injuries to club members on field trips, in addition to insurance for damage to property and equipment at field trip sites.

Announcements

The Delaware Mineralogical Society Show was announced for March 2–3.

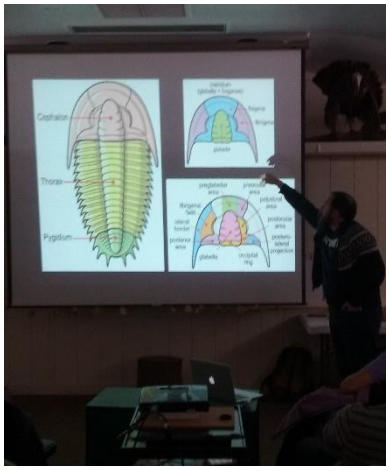
The Micromineralogists of the National Capital Area are holding their 46th Annual Atlantic Micromounters' Conference on April 5–6 (see the announcement on page 8). At the MNCA meeting on February 27, Kathy Hrechka planned to show her updated collection of snowflake photos.

The spring NVMC club member auction will begin at 7:30 p.m. on March 25. Setup begins at 7 p.m.

The Super Diggg at Franklin and Sterling Hill, NJ, is scheduled for Saturday 27 (see the announcement on page 10).

Program

Casper Voogt delivered a program on trilobites at this link: https://tinyurl.com/trilobites-presentation.



Casper Voogt's presentation about trilobites at the February NVMC meeting featured slides and samples for club members to admire and handle. Photos: Ti Meredith.

Writing Tip of the Month

Get your facts first, and then you can distort them as much as you please.

Mark Twain

NVMC Reminiscences

by Barbara Sky

Editor's note: *Barbara Sky is a longstanding NVMC member. Now living in Ballwin, MO, she served as club show chair from 1986 to 1990 and club vice-president in 1995.*

Thinking back, the first things I remember back in the day with the Northern Virginia Mineral Club were problems.

Like the vice-president who requested a program about fossils from the federation but didn't know how to pronounce the species names in the accompanying script. And the club members who had requested the program but weren't there to hear it because they were attending a meeting to prepare for a multiclub field trip.

The next couple of problems I remember were my own, and they also involved fossils. I loaned a self-collected specimen to the nature center for an exhibit, and when the exhibit was dismantled, my specimen wasn't there. (It had not been in a locked case but rather in an open alcove that has since been remodeled.)

Next came an exhibit that the club's fossil study group was putting on at a federation show. One member of our group made the labels and didn't know the rules about what should be underlined. As a result, we lost half of our labeling points in the competition and any hope of a score of 90-plus (needed for a trophy).

The club had both a fossil study group and a mineral study group back then!

The good thing about "the good old days" was the club members themselves. I made lasting friends but regret that few are left.

I still come for the annual show since I helped with planning the very first one. I attended a board meeting where the first show was discussed and made some suggestions. The club president said, "You're on the show committee!"

Save the Dates!

Annual Atlantic Micromounters' Conference Coming Up

The Micromineralogists of the National Capital Area are holding their 46th Annual Atlantic Micromounters' Conference on April 5–6. Come enjoy mineral dealers, a micromineral auction, mineral giveaways, and more!

The featured speaker is Dr. Robert J. Lauf, whose three presentations are titled:

1. "Electron Microscopy: The Final Frontier of Magnification,"
2. "Mineralogy of Uranium and Thorium," and
3. "Orthosilicates."

Dr. Lauf holds a Ph.D. in Metallurgical Engineering from the University of Illinois. His scientific career includes over 20 years at Oak Ridge National Laboratory, where he conducted research on topics ranging from nuclear fuel, coal byproducts, materials synthesis, microwave processing, sensors, optical materials, and biomineralization. He has been granted 50 U.S. patents for his inventions, many of which have become successful industrial products. He is now a registered patent agent and technology consultant. He has published numerous books on mineralogy.

Dr. Michael Pabst will also speak on "Rare Earth Minerals." Mike is a retired professor of biochemistry who has collected minerals all his life. He is treasurer of the Micromineralogists of the National Capital Area and president of the Shenandoah Valley Gem and Mineral Society. He writes a monthly column on microminerals for *The Mineral Mite*, newsletter of MNCA. His mineral photography has gradually improved over the years, allowing the creation of PowerPoint talks with some pretty photos. He has a long-term interest in minerals containing rare-earth elements, like cerium and lanthanum and their neighboring elements on the periodic table, including scandium, yttrium, and uranium.

The conference will be at the Holiday Inn, 6055 Richmond Highway, Alexandria, VA. Details are posted on the club website at http://www.dcmicrominerals.org/.

Mindat Urals Adventure!

Editor's note: *Thanks to Casper Voogt for the reference!*

Sign up soon! ***Spaces fill up fast!*** Here's the link: https://adventures.mindat.org.

Bench Tip: Bezel Closer

Brad Smith

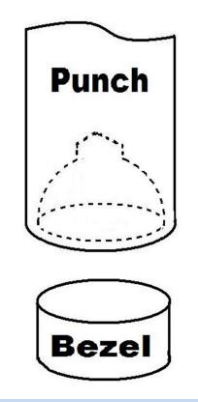
A bezel closer is a steel punch that makes quick work out of pushing the metal down over a round stone and burnishing it. The working end is a concave cavity that fits over your bezel or prong setting and is pushed and twisted to capture the stone. Sets can be purchased but are expensive and contain many sizes you will probably never use. If all you need is one or two sizes, here's how you can make them yourself.

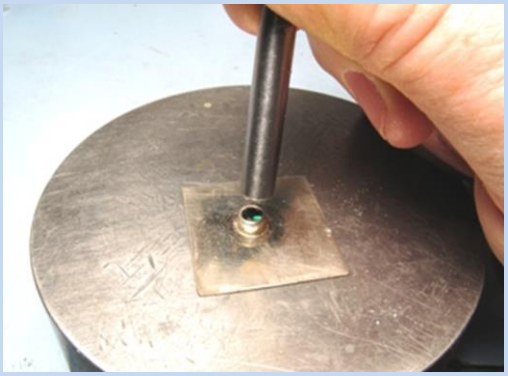
Find a good-quality round steel rod a little larger in diameter than your bezel cup or prong setting. Cut a 5-inch length. File both ends flat. Locate the center of one end, center punch a divot, and drill a small pilot hole about 5 millimeters deep. Remember to use a little oil as lubricant when cutting steel.

Select a ball bur a bit smaller than the steel rod but slightly larger than the bezel. Enlarge the pilot hole to a full hemispherical cavity. Test for proper fit with your bezel. The bezel should first contact the cavity about a third of the way in. When the size is correct, polish the cavity using Zam on a length of chopstick in your flexshaft. If the tool is not polished, it will leave scratches on your bezel or prongs.

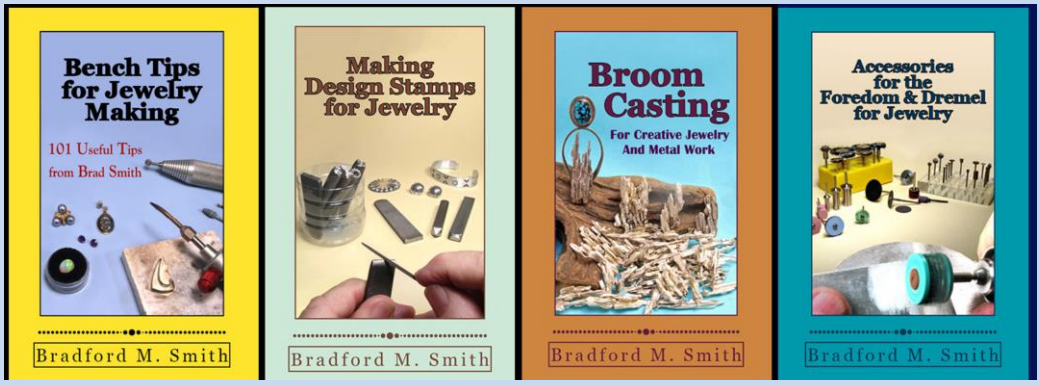
When using the tool, the first step is to capture the stone correctly. I usually work by hand and push the punch straight down over the bezel or prongs. This causes the metal to start bending over the stone. Next, I inspect with a lens to be sure the stone is staying level. I repeat this until the stone is seated on its bearing and can't move anymore.

Next, you want to force the metal down onto the stone uniformly all the way around. Although this can be done by hand, I often gently tap the punch with a hammer. Finally, burnish the bezel by twisting the punch around.





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



Save the dates!

Field Trip Opportunities

Super Diggg 2019

This year, the NVMC is cosponsoring the annual Super Diggg for fluorescent rocks in the old mine dumps near Franklin and Sterling Hill, NJ. The event is on April 27 from 9 a.m. to 11 p.m. (see the flyer). To attend, you must contact Field Trip Chair Steven Parker at stevenlparker@gmail.com.

NVMC is Co-Sponsoring

Super Diggg™

2019

9AM - 11PM April 27th

Event Schedule: http://events.superdiggg.com/

Tools, Safety Glasses and UV lights will be available for purchase at the Franklin Museum.

Provided:
· Restroom facilities
· Electricity (in darkroom)
· Off-road parking area
NO AGE RESTRICTION THIS YEAR !

Bring all safety equipment:
Gloves, steel toe boots, eye protection

Local hotels/motels fill up quickly, so if you are staying in the area overnight be sure to reserve early.

Pre-Register For Super Diggg: Coming Soon, Check next newsletter
Pre-Register for Premium Spots: Coming Soon, Check next newsletter

YOU MUST RSVP WITH STEVEN PARKER: FIELDTRIPS@NOVAMINERALCLUB.ORG
IN ORDER TO USE THE CLUB INSURANCE FOR SUPER DIGGG

http://sterlinghillsuperdig.org/

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 at the Field Studies in Geology—GOL 135 website.

Building Stones of the National Mall

March 30, 9 a.m.–7 p.m. Led by Dr. Ken Rasmussen. Visit over 20 National Mall sites, examining the geologic history and architecture and the rocks used to construct the federal buildings and monuments there.

Thoroughfare Gap, Virginia

April 6, 9 a.m.–5 p.m. Led by Dr. Callan Bentley. The area where Broad Run transects the Bull Run Mountains west of Haymarket, VA, showcases rocks of the Blue Ridge geologic province, in particular the metamorphosed Cambrian-aged Chilhowee Group sedimentary package. The trip will involve rigorous hiking, with students providing their own transportation to the site.

Paleozoic Geology of Virginia/ West Virginia

April 13, 9 a.m.–7 p.m. Led by Dr. Ken Rasmussen. This field trip will let you explore the geology of western Virginia and West Virginia, considering ancient depositional settings (tropical marine reefs, lagoons, shelves, deep basins, and terrestrial flood plains) and fossils, as well as later deformation (faulting and folding) associated with the Valley and Ridge Province.

Audubon Naturalist Society

The ANS offers classes and nature programs, including short field trips. You can get more information and register at the ANS website.

Rockin' on the Mall

March 10, 1–4 p.m. The cost of this field trip, led by Joe Marx, is $36 for nonmembers. Many structures that border the National Mall wear the bedrock of other localities. We will meet at the 7th & Maryland SW entrance to the L'Enfant Plaza Metro station and do a 2-mile loop around the eastern end of the Mall. We will discuss the rock in various facades, fountains, and walls. Limestone, often with fossils visible, is the most common, but we will also see granite, gneiss, marble, and sandstone. The trip leader will supply amusing historical anecdotes.

National Building Museum Minerals Booth: A February Success!

Editor's note: *Club members joined other volunteers for the National Building Museum's annual Discover "E" Family Day ("E" for Engineering) on February 16, where they staffed the AIME Minerals Booth. (AIME stands for American Institute of Mining, Metallurgical, and Petroleum Engineers.) Club member Mike Kaas sent the thank you note posted here.*

To Kathy Hrechka, John Lucas, John Padan, Sue Marcus, Roger Haskins, Jim McNeal, and Pat Kaas,

You all made the "Mining for Minerals" activity at the AIME booth at the National Building Museum a huge success. In the 6 years of this wonderful STEM event, I can't remember ever having such long lines and so many kids … plus their parents. The kids seemed to be having great fun right up to closing time.

As usual, the museum's spectacular space was packed, with practically every square foot of floor space occupied by visitors and kids either working on projects, waiting in lines, or just relaxing and having a picnic lunch. I'm sure that we got our message that "minerals matter" across to almost everyone with whom we interacted. Hopefully, many have followed our suggestion to find the minerals in their own homes.

Thanks so much for volunteering!

Mike

Top: Mike and Pat Kaas.
Right: John Padan with kids.
All photos: Mike Kaas.

Top: Roger Haskins and Jim McNeal with kids.
Center: John Lucas with kids.
Bottom: Sue Marcus with parents.

Rock and Gem Buying Techniques

Buying Lapidary Materials--Slabs

by Joe Iannucci

Editor's note: *This series of articles from 1989–90 is reprinted in the* Livermore Lithogram *(newsletter of the Livermore Lithophiles, Livermore, CA). This article is adapted from the October 2018 issue.*

In many of the shows we all attend, lapidary materials are in great abundance. This makes buying easier and more difficult at the same time. Prices may vary between dealers for no apparent reason, and the profusion of varieties may be staggering.

The easiest material to buy is in the form of slabs since little guesswork is involved and no slabbing will be required. So we'll start here.

The first question to ask yourself is, "Why would I need this slab?" Think about what it will be used in; whom it might be for; and, even better, what setting it will be used in.

Color is important in two ways: contrast with the setting and quality of the stone's color itself. Many people say that you should never buy a slab "wet" (damp from the bins of water that they are displayed in). I disagree. Although it is very important to dry the slab and inspect it for cracks hidden by the water, the only way to see the true color when polished is to see it wet! So inspect it wet and dry before you buy.

Make sure the slab has sufficient thickness to make the cabochons you are planning and that the slab has been cut with its flat sides parallel. Pattern is very important in most cut stones, so look for good patterns in the slab; if there are fractures in the slab, that's okay if they won't interfere with the patterns you're looking for.

If possible, ask the dealer for the collecting location of the material so that you can label the stone in a case, tell your friends where it came from, or get more (even collecting it yourself) from that locality if it turns out especially well.

One final tip: sometimes the dealer will have a polished piece so that you can see how well the material will polish. The dealer might also give you cutting and polishing suggestions and tips.

Next: If you need a lot of material or want to cut your own slabs, you'll need rough chunks. We'll talk about buying them next.

Matt Charsky auctioning a slab of agate at one of the biannual NVMC club member auctions. (Sue Marcus in the background.) Photo: Sheryl Sims.

GeoWord of the Day

(from the American Geoscience Institute)

convolution

(a) The process of producing convolute bedding; the state of being convoluted. (b) A structure produced by convolution, such as a small-scale but intricate fold. (c) Convolute bedding.

(from the *Glossary of Geology*, 5th edition, revised)

Explorers Map 200th Mile of Jewel Cave

by Seth Tupper

Editor's note: *The article is adapted from the* Rapid City Journal *(Rapid City, SD), December 18, 2018. Thanks to Sue Marcus for the reference!*

Six volunteer cavers were greeted like returning astronauts Monday night after they emerged from mapping the 200th mile of Jewel Cave and reported the discovery of a stalagmite that could be the cave's largest.

About 50 people were on hand at Jewel Cave National Monument for a potluck and a celebration of the mapping milestone. The greeting party included 94-year-old Jan Conn, who pioneered the exploration and mapping of the cave with her late husband, Herb, during a 22-year period beginning in 1959.

Tuesday, Jan Conn said it was gratifying to see a new generation of cavers reach the 200-mile mark, and she predicted more milestones to come.

"We were afraid that when we quit the exploration, it would stop," Conn said. "But I think the exploration has enough momentum now that nobody can stop it."

The six cavers who participated in the most recent mapping expedition spent 3 days in the cave from Saturday to Monday. They descended roughly 730 feet below ground and surveyed 3,100 feet of previously unmapped portions of the cave, where nobody had previously set foot.

Jewel Cave, which is 12 miles west of Custer in the Black Hills, remains ranked as the third longest cave system in the world by mapped miles, behind Mammoth Cave in Kentucky (about 400 miles) and the Sistema Sac Actun/Sistema Dos Ojos cave system in Mexico (about 215 miles). Another Black Hills site, Wind Cave, is seventh on the list.

Adam Weaver is one of the cavers who participated in the mapping of Jewel Cave's 200th mile. Like others on the trip, he has been exploring the cave for many years and is proud to be continuing the project pioneered decades ago by the Conns, who got their start in caving with geologist Dwight Deal.

To explain the appeal of subterranean adventure, Weaver made a celestial comparison.

Calcite spar crystals in Jewel Cave, Black Hills, SD. Calcite crystals cover many of the walls, giving the cave its name. Source: Wikipedia; photo: Dave Bunnell.

"We're mapping passageways, and if the passageway ends and there's no more passageways off it, then we may go down and make the map of it, and nobody will ever go there again," Weaver said.

"There'll be some sediment and you'll put a footprint in it, and it's kind of like the moon," he continued, "because there's no weather, and that footprint is just there in the sediment and no one ever sees it, and it's there until maybe 10,000 years go by and the cave air eventually blows it away."

Continuing on that theme, another of the expedition's cavers, Christopher Pelczarski, said Jewel Cave is one of the most remote and isolated places a person can experience—perhaps even more isolated, in at least one respect, than space. Unlike astronauts, who can communicate with people on earth, cavers on expeditions deep into Jewel Cave are incommunicado with the world above.

"If we were 12 hours into the cave, to receive any kind of message, somebody would have to walk through the cave and crawl through the cave and squeeze through the cave, and do this multimile obstacle course and literally hand us a piece of paper with the message on it, or tell us," Pelczarski said.

Pelczarski and Weaver are from the Black Hills, as are two of the other members of the expedition, Rene Ohms and Dan Austin. Stan Allison is from Colorado, and Garrett Jorgensen is from New Mexico.

During the expedition, the cavers discovered a giant stalagmite, which they described as possibly the largest ever seen in the cave. It measures roughly 7 feet in height and 5 feet in diameter. The cavers took to calling it "Girth Brooks," but the official name will be determined by officials with Jewel Cave National Monument.

Further trips to map more miles of Jewel Cave and make more discoveries are already in the works.

"The potential for exploration in this cave is almost unlimited," Weaver said. "The only thing that will limit it will be the limit of human endurance."

AFMS News

Having Fun With Juniors: It's in the Cards!

by Jim Brace-Thompson, Juniors Program Chair

Editor's note: *The article is adapted from* AFMS Newsletter *(December 2018/January 2019), p. 2.*

While on family vacation trips, during rainy days at summer camp, or late at night in college dorm rooms, card games are always fun. With a standard deck of playing cards, you can enjoy any number of games, whether as complex as bridge or as simple as "pig."

When seeking a simple and fun diversion for your club's kids, consider card games. You can use a standard deck—or any number of decks with a rock-and-gem theme that you can find online or in gift shops of natural history museums.

For instance, in recent months I've purchased decks of standard playing cards embellished with special photos and background information. Three decks that I have readily at hand are "Agates of Lake Superior," "Gem & Mineral Rummy" (from the Smithsonian Institution), and "Discover Volcanoes & Earthquakes." Each is both a standard deck of playing cards and a font of Earth science information.

Use such cards to play fun games while teaching your juniors and pebble pups about our hobby. The cards I have in these special decks contain tidbits of information to learn from. Step it up a bit to offer gems, minerals, and fossils as special prizes for each round of whatever game you choose to play, and your kids are sure to learn while having fun!

Safety Message

Foot Matters

by Bob Green, SFMS Safety Chair

Editor's note: *The article is adapted from* EFMLS Newsletter *(January 2014), p. 6.*

This month, we will discuss footwear and safety.

I work for a large engineering, procurement, and construction firm. Several years ago, our Greenville, SC, office had attained 40 million effort hours without a lost-time accident.

Then, in a span of 3 months, we had multiple incidents that snapped the record. All of these were related to slips, trips, and falls, mostly associated with inappropriate footwear.

The biggest offender was "flipflops." These were not the ones you wear at the beach but rather adorned with do-dads to look less like flip-flops. Some even had slight heels. Anyway, several folks got to spend time at home recovering from falls because of their fashion statement.

I've noticed more folks wearing such footwear, and if you are traveling, you should be view it somewhat skeptically. Footwear like this will not let you hasten away from danger, and it is not friendly in the long term to your feet because it does not adequately support your feet.

Are flipflops appropriate for the beach? Very definitely. For cutting your grass? Only if you have someone else do it.

Several years ago, I met a young man who had lost a couple of toes because his foot had accidentally slipped under his mower. He was wearing tennis shoes. He was mowing on a slope, and the grass was wet.

During my senior year in high school, a good friend was playing with his hunting knife. He had a large block of wood on his desk, and he was throwing his hunting knife at the block with his foot next to it. He was seeing how close he could come to his shoe.

Well, something distracted him and he hit his foot. He screamed, and I was expecting to see a major cut. Luckily, the knife went between his big toe and the toe next to it. Not even a scratch, just a good laugh.

If you spend much time on your feet, you appreciate good and appropriate shoes. Wearing shoes without

socks was a fashion statement when I went to college, but it was not healthy for your feet. Taking care of your feet is critical to your health. If you contract athlete's foot, take care of it immediately. If you get blisters, treat them appropriately.

One of my favorite TV programs is Les Stroud's survival program. On a couple of is shows, he has gotten blisters and used various methods of treating them. In every case, he views treating his blisters as extremely important to his survival. Now, hopefully we are not in a survival situation, but these incidents must be carefully treated.

Folks suffering from diabetes or circulation issues know that any type of foot injury is not to be taken lightly. And we all know that chopping wood in inappropriate footwear is not a good idea. An axe can be extremely unfriendly to your feet. I always wear steel-toe boots when I chop or split wood. I am reasonably adept with an axe or a wedge and sledge, but I am also realistic about the potential for injury if I am not careful. The same goes for yardwork. Handling the lawn mower is usually straightforward, but if your yard is sloped, you must protect against a slip that could result in a very uncomfortable trip to the doctor.

I suffer from gout. One of my gout attacks unfortunately coincided with a snowfall. I missed one day of work, but the next day, I wore my waders into the office and then put on my "gout shoes." So I understand all about dealing with foot pain.

My first attack came in 1986. I pulled on my toe and thought I had dislocated it. All I did was make a bad situation worse, but I am smarter now.

I wish all of you good foot health. Take care of your feet and they will take care of you!

Blue Mountain Anticline
Juniata County, PA

by Stuart O. Reese

Editor's note: *Adapted from Pennsylvania Department of Conservation and Natural Resources, Bureau of Topographic and Geological Survey, Outstanding Geologic Feature of Pennsylvania (Trail of Geology, 16–076.0, 2016). Thanks to Germaine Broussard for the reference!*

A cross-section through the Blue Mountain anticline (Juniata County, lat: 40.60976, lon: -77.43957; Mifflintown 7.5-minute quadrangle) is visible in an impressive roadcut at the eastern portion of the Lewistown Narrows along U.S. Route 22/322. The roadcut exposed the tip or nose of a complex asymmetrical fold, which plunges northeast. *Read more.*

The Rocks Beneath Our Feet

Santorini, Greece: Volcanic History

by Hutch Brown

Editor's note: *This is the second in a series of articles on Santorini. The first is in the February 2019 issue.*

In August 2018, I visited Santorini, one of hundreds of Greek islands in the Aegean Sea. I had never been to Greece before and knew nothing about its geology. I had vaguely assumed that its bedrock was volcanic, having heard stories about earthquakes and volcanoes in Italy and Turkey.

I was wrong. Only some of the Aegean islands are volcanic in origin; most are made up of metamorphic rock. The islands are part of a plateau that was folded and uplifted by the same tectonic forces that raised the Alps about 60 million years ago. The plateau is now submerged in the Aegean Sea, so Crete and the islands to the north are metamorphic mountaintops.

Santorini is too—in part (fig. 1). Southwestern Santorini has metamorphic bedrock like marble and phyllite, exposed on the island's highest point, Profitis Ilias. The metamorphic bedrock on Santorini (the gray in figure 1) was part of the original, much smaller island.

But the rest of the island complex is obviously volcanic in origin (fig. 1). Three islands (Santorini, Therasia, and tiny Aspronisi) are remnant volcano walls surrounding a volcanic caldera. Two small islands (Palea Kameni and Nea Kameni) formed relatively recently from lava spewing from vents on the sunken caldera floor. On the two biggest islands, the tuffs, shields, and other rocks and landforms indicate a complex volcanic history, all centered around the caldera.

So what is Santorini's story?

Tectonic Setting

Santorini is one of a string of volcanic islands in the southern Aegean Sea known as the South Aegean Island Arc (fig. 2). The African tectonic plate is moving northward at a rate of about 2 inches per year. The African Plate is heavier than the Aegean Sea Plate (a subplate of the much larger Eurasian Plate), so it dives under the lighter plate in a process that geologists call subduction. Subduction generates enormous heat and pressure, melting the descending rock. Plumes of magma rise to the surface, forming a line of volcanic islands in the shape of an arc (fig. 2).

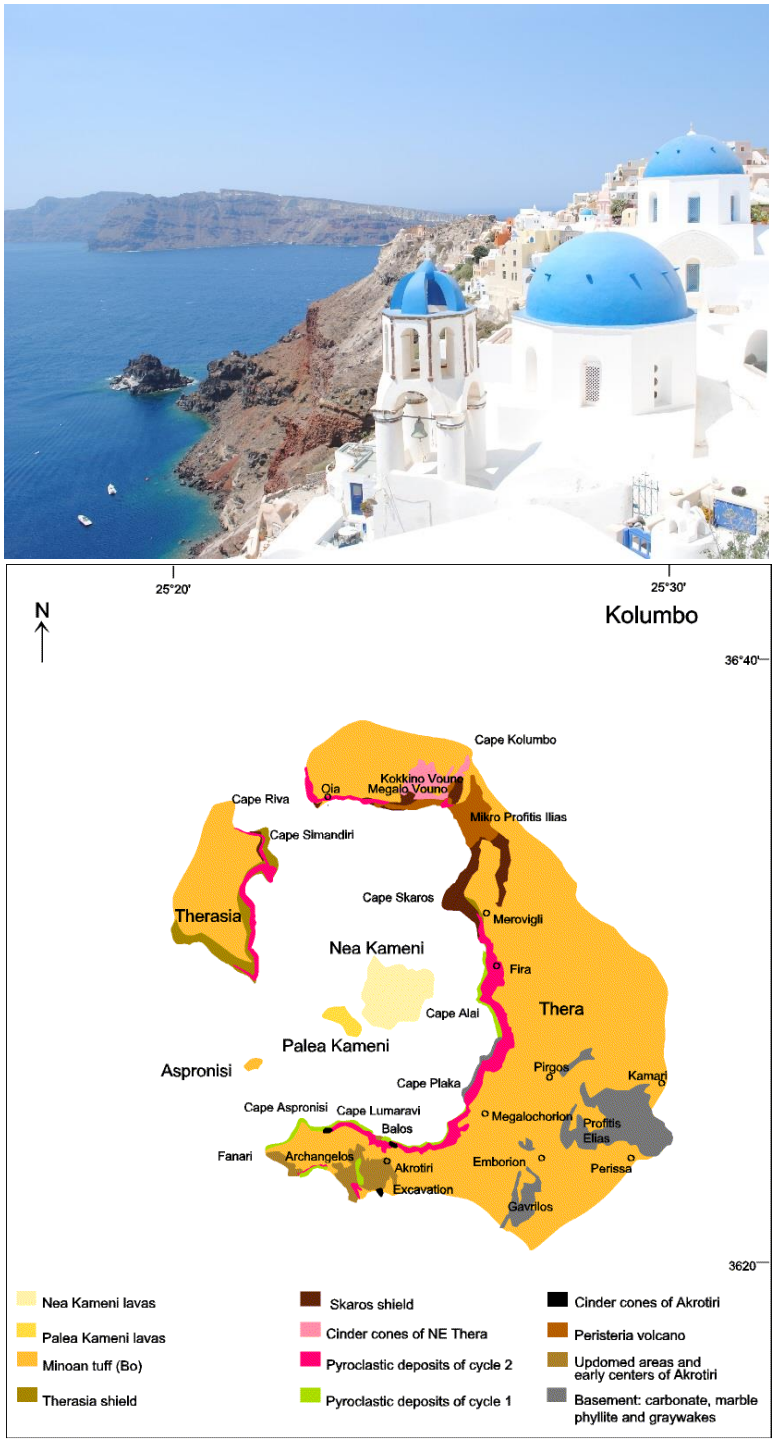
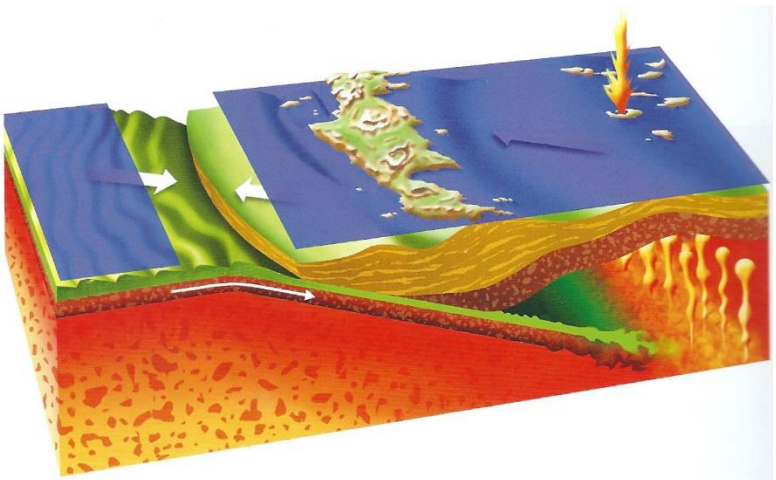


Figure 1—*The town of Oia (pronounced "EE-uh," top) on Santorini features whitewashed homes, blue chapel domes, and fantastic views of an ancient caldera. In the background, volcanic tuff in various hues on the island of Therasia (in the distance) and on Santorini itself attests to multiple eruptions. A simplified geologic map of the Santorini caldera (bottom) shows three remnant islands following a major eruption and caldera collapse, along with two new islands created by lava flows from a vent in the caldera. Photo: Hutch Brown; map: Pfeiffer (2004).*



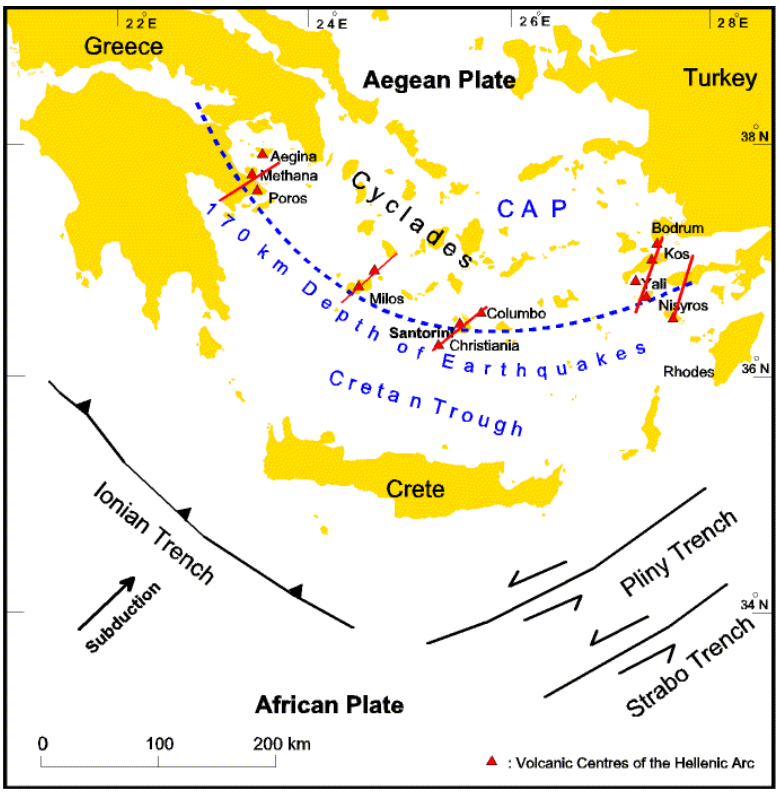


Figure 2—*Top:* *The heavier African Plate (left) dives under the lighter Aegean Sea Plate. A deep-sea trench forms at the leading edge of subduction south of Crete (center). As the African plate descends, it grinds against the overlying Aegean Sea Plate. The heat and pressure steadily mount until the rock starts to melt, rising as magma to the surface well north of Crete.* ***Right:*** *The rising magma erupts as lava, creating a line of volcanic islands in the shape of an arc (blue dotted line). The deep-sea trench southwest of Crete is called the Ionian Trench. Sources: CretanBeaches (2018), Pfeiffer (2004).*

About 2 million years ago, the angle of the descending rock train took the African Plate under the island of Crete (fig. 2, top), diving ever deeper toward the viscous magma underneath, with temperatures gradually rising. Finally, the descending rock reached a point more than a hundred miles north of Crete where the pressure and heat melted the rock (fig. 2, top). A zone of weakness in the Earth's overlying crust allowed the magma to rise to the surface, forming the South Aegean Island Arc (fig. 2, right, dotted blue line).

The direction of subduction of the African Plate is from the southwest to the northeast (fig. 2, right). The tectonic faults along the Aegean seafloor near the South Aegean Island Arc have the same orientation (fig. 2, right, arrows)—from southwest to northeast.

Figure 3 shows two lines of volcanic vents under the Santorini caldera, also oriented from southwest to northeast. The Columbos Line runs through the northern part of the caldera and crosses the Oia (pronounced "ee-uh") peninsula, which has several vents. The Kameni Line runs through the middle of the caldera, with vents that created the relatively recent lava domes of Palea Kameni (dating to 197 BC) and Nea Kameni (dating to 1707 AD).

View of the Santorini caldera from Megalo Vouno, the highest point on Santorini's northern rim. The hill was formed by volcanic eruptions on the Columbos Line of vents (note the boulder on the right, magma ejected from an explosion). In the background atop another high point are whitewashed vacation homes—and a well-preserved cinder cone to the right, on the Kameni Line of vents. The lava shield of Nea Kameni island is visible in the distance on the right. In the foreground are the author's wife and daughter. Photo: Hutch Brown.

Initial Volcanic Activity

Figure 3 shows the original metamorphic island (in gray) and the younger rock formations (in orange) that make up most of the island complex today. Most of the younger rock is volcanic in origin (fig. 1), but some of it, especially on the Akrotiri peninsula in the south, is uplifted sedimentary rock from the ancient seafloor.

Akrotiri is where the first volcanic activity began. Santorini, folded and uplifted 60 million years ago as part of an ancient plateau, saw no tectonic activity after sinking into the Aegean Sea to form a mountaintop island. Small and quiet, made up of inert metamorphic rock, Santorini took on a new life about 2 million years ago as the South Aegean Island Arc began to form.

Santorini was located directly over the rising magma, and a dome of seafloor emerged from the sea just a few miles west of the original island. From about 2 million to 500,000 years ago, a new island formed where Akrotiri is today (fig. 3).

The vents on Akrotiri alternated between lava flows and pyroclastic eruptions that sent gases and hot ash into the atmosphere. The upthrust areas on the Akrotiri peninsula, worn by hundreds of thousands of years of erosion, now form steep hills.

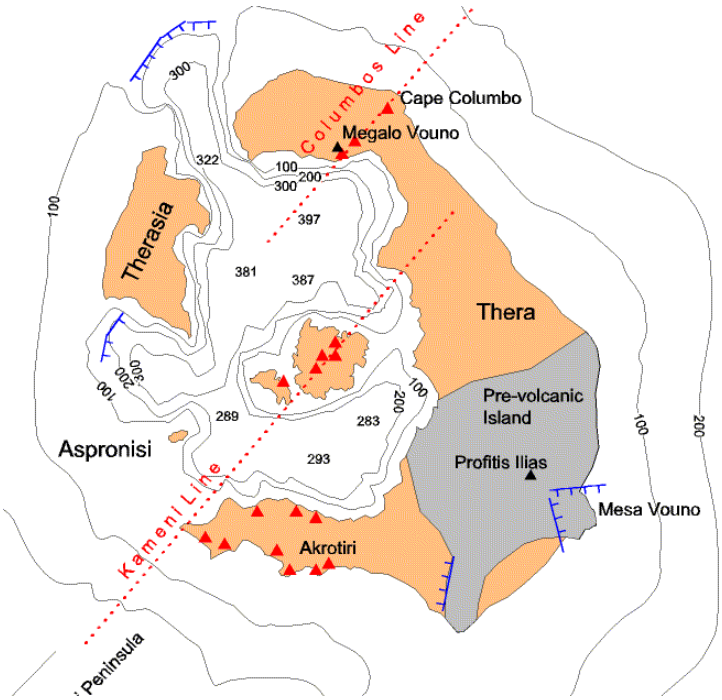


Figure 3—*Tectonic faults and vents in the area of the Santorini caldera align with the direction of tectonic plate subduction (from southwest to northeast). The island's original metamorphic bedrock is shown in gray. Vents align with two fault lines—the Kameni Line and the Columbos Line. The oldest vents are on the Akrotiri peninsula; the newest are inside the caldera on the islands of Palea Kameni and Nea Kameni. Source: Pfeiffer (2004).*

Akrotiri harbor, Santorini. The island's oldest volcanic rocks, about 2 million years old, are near here. Note the alternating patterns of lava flows (gray andesite) and ash deposits (reddish tuff). Photo: Hutch Brown.

Most volcanic rocks on Santorini are what geologists call dacite and andesite. Worldwide, the types of lava range from rhyolite, to andesite, to basalt, depending on their mineral content.

Rhyolite has the highest proportion of felsic rock ("fel" for feldspar and "Si" for the silicon in quartz). It tends to be light in color. Pumice is a light-colored frothy felsic rock that floats on water.

Basalt has the highest proportion of mafic rock (calcium, iron, and magnesium oxides—"ma" for magnesium, and "Fe" for iron). It is dark in color.

Dacite is intermediate between rhyolite and andesite, so the proportion of felsic minerals in most of Santorini's volcanic rock is relatively high. Scoria is a frothy form of andesite or basalt that is common on Santorini. Red or gray in color, it does not float.

Figure 4—*Red Beach on Santorini's Akrotiri peninsula. The badly eroded scoria cinder cone (arrow) is marked by a jumble of boulders at its base. Source: Fabbro (2010).*

You can see eroded remnants of scoria cinder cones along the coast of Akrotiri (such as at Red Beach, fig. 4). The cones probably formed in connection with volcanic eruptions on the Oia peninsula.

Later Volcanic Activity

530,000–430,000 years ago: A large volcano called Peristeria formed in the northern part of what is now the caldera, along the Columbos Line of vents (fig. 3). Figure 1 shows the location of its remnants in high points on the Oia peninsula (Megalo Vouno and Mikro Profitis Ilias). The cinder cones on the Akrotiri peninsula probably erupted at about the same time.

350,000–250,000 years ago: A massive volcano called Thera grew in the center of the caldera. Its lava shield united the remnants of the Peristeria volcano in the north with Akrotiri in the south and the central metamorphic core island, creating a single compact island.

First eruptive cycle: From about 360,000 to 180,000 years ago, the Thera volcano went through a cycle of explosive eruptions, with lava and ash deposits ranging from mafic in the beginning of the period to rhyodacitic pumice toward the end. The light green in figure 1 shows the location of the corresponding pyroclastic flows in Akrotiri and in central Santorini near the administrative town of Fira; today, they are exposed near Fira as light-colored tuffs in the lower cliffs. At the end of the cycle, the caldera collapsed.

Second eruptive cycle: From about 180,000 years ago to about 1600 BC, the caldera went through a second round of explosive eruptions and caldera collapse. The pink in figure 1 shows the location of the corresponding pyroclastic deposits. The deposits range from the rim of Therasia in the east to most of the rim of Santorini in the west and from the Oia peninsula in the north to the Akrotiri peninsula in the south.

During this period of volcanic activity, several lava shields grew over the northern caldera. Each was destroyed by major eruptions, leading to caldera collapse at least three times during the cycle.

One lava shield, known as the Skaros volcano, grew in the northern part of the caldera about 60,000 years ago. Figure 1 shows remnants of the shield in dark brown, and a well-defined remnant of the ancient volcano forms a cape north of Fira (fig. 5). The Skaros lava flows are plainly visible in the nearby caldera walls.

Minoan Eruption

The most recent cycle of shield formation, pyroclastic eruptions, and caldera collapse might be happening today. The Nea Kameni lava shield (fig. 1), only 3 centuries old, has rapidly grown across much of the central caldera.

The last major eruption and caldera collapse occurred in about 1600 BC. The impacts reached across the Aegean Sea and are thought to have destroyed an entire culture while inspiring a lasting legend.

Next: The Minoan eruption and the legend of Atlantis.

Figure 5—*Remnant of the Skaros volcano on Santorini (center). The volcano formed a shield across much of the Santorini caldera about 60,000 years ago before a massive eruption destroyed it and collapsed the caldera. Layers of the Skaros lava shield are visible in adjacent caldera walls south of the remnant (arrows). Photo: Hutch Brown.*

Sources (for article on previous pages)

CretanBeaches. 2018. How Crete was formed.
Fabbro, G. 2010. Santorini, an explosive history written in the cliffs. Science 2.0. Blog, 8 December.
Nauingreece. 2014. Cinder cones and the volcanic complex of Santorini—past, present, and future.
Pfeiffer, T. 2004. Geology of Santorini. Volcano Discovery.
Plummer, C.C.; McGeary, D. 1996. Physical geology with interactive plate tectonics. Dubuque, IA: Wm. C. Brown Publishers.
Wikipedia. 2018. Aegean Sea Plate.

Book Review

National Volcanic Threat Assessment

John W. Ewert, Angela K. Diefenbach, and David W. Ramsey. 2018 Update to the U.S. Geological Survey National Volcanic Threat Assessment. Scient. Investig. Rep. 2018–5140. Reston, VA: U.S. Department of the Interior, U.S. Geological Survey. 40 p.

Editor's note: *Thanks to Sue Marcus for the reference!*

This 2018 update by USGS of the last assessment in 2005 assesses the risk to people and infrastructure from volcanic eruptions in the United States. It includes volcanoes around the Pacific Rim, from California to the Marianas Islands.

The assessment ranks volcanoes by degree of risk, from very high (such as Mount Hood in Oregon) to very low (such as the Zuni-Bandera volcanic field in New Mexico). It discusses all the volcanoes and volcanic fields by region.

It will come as no surprise that the highest risk volcanoes in the United States are Kilauea (Hawaii), Mount St. Helens, and Mount Ranier (both in Washington).

You can download the study here.

Humor

The Incredible Shrinking River

Editor's note: *Mark Twain knew that massive engineering projects had changed the Mississippi River within his lifetime, but he liked to tease geologists.*

In the space of one hundred and seventy-six years the Lower Mississippi has shortened itself two hundred and forty-two miles. That is an average of a trifle over one mile and a third per year.

Therefore, any calm person, who is not blind or idiotic, can see that in the Old Oolitic Silurian Period, just a million years ago next November, the Lower Mississippi River was upwards of one million three hundred thousand miles long, and stuck out over the Gulf of Mexico like a fishing-rod.

And by the same token any person can see that seven hundred and forty-two years from now the Lower Mississippi will be only a mile and three-quarters long, and Cairo and New Orleans will have joined their streets together, and be plodding comfortably along under a single mayor and a mutual board of aldermen.

There is something fascinating about science. One gets such wholesale returns of conjecture out of such a trifling investment of fact.

–Mark Twain, *Life on the Mississippi* (1883)

GeoWord of the Day

(from the American Geoscience Institute)

vanalite

A bright yellow-orange monoclinic mineral with the chemical formula $NaAl_8V_{10}O_{38}•30(H_2O)$.

(from the *Glossary of Geology*, ·5th edition, revised)

March 2019—Upcoming Events of Interest in Our Area/Region (see details below)

Sun	Mon	Tue	Wed	Thu	Fri	Sat
					1	2 Show: Wilmington, DE
3 Show: Wilmington, DE	4	5	6 MSDC mtg, Washington, DC	7	8	9
10 **Daylight savings time begins** **ANS field trip**	11 GLMSMC mtg, Rockville, MD	12	13	14	15	16 GLMSMC show
17 **St. Patrick's Day** GLMSMC show	18	19	20 **Spring begins**	21	22 Show: Hickory, NC	23 Shows: NC, PA
24 Shows: NC, PA	25 **NVMC mtg, Arlington, VA**	26	27 MNCA mtg, Arlington, VA	28	29	30 **NOVA field trip** Shows: PA, NJ
31 Shows: PA, NJ						

Event Details

2–3: Wilmington, DE—Annual show; Delaware Mineralogical Society; Double Tree by Hilton, 4727 Concord Pike (Rt 202); Sat 10–5, Sun 11–5; adults $6, seniors $5, kids 12–16 $4, under 12 free with adult; info: www.delminsociety.net or Elaine Kipp, 410-392-6826, kippekipp@msn.com.

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

10: Rockin' on the Mall—Audubon Naturalist Society field trip; 1–4; info, reg: ANS website.

11: Rockville, MD—Monthly meeting; Gem, Lapidary, and Mineral Society of Montgomery County; 7:30–10; Rockville Senior Center, 1150 Carnation Drive.

16–17: Gaithersburg, MD—Annual show; GLMSMC; Sat 10–6, Sun 11–5; Montgomery Co Fairgrounds, Bldg 6, 16 Chestnut St; $6 adults, kids 11 and under free.

23–24: Wysox, PA—Annual show; Che-Hanna Rock & Mineral Club; Wysox Vol. Fire Co. Social Hall, 111 Lake Rd; Sat 9–5, Sun 10–4; info: www.chehannrocks.com.

23–24: Hickory, NC—Annual show; Catawba Valley Gem and Mineral Club; Hickory Metro Convention Center, 1960 13th Ave Dr SE; Fri 9–6, Sat 9–6, Sun 10–5; $5 admission, under 12 free, Scouts in uniform free; info: Dean Russell, 828-303-1448, www.cvgmc.com.

25: Arlington, VA—Monthly meeting; Northern Virginia Mineral Club; 7:45–10; Long Branch Nature Center, 625 S Carlin Springs Rd.

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

30: Building Stones of the National Mall—Northern Virginia Community College field trip; 9–7; info, reg: NOVA website.

30–31: Plymouth Meeting, PA—Mineral Treasures and Fossils Fair; Philadelphia Mineralogical Society/Delaware Valley Paleontological Society; Lu Lu Temple, 5140 Butler Pike; Sat 10–5, Sun 10–4; $5 adults, $1 kids under 12; info: www.philamineralsociety.org.

30–31: Midland Park, NJ—Annual show; North Jersey Mineralogical Society; Midland Park High School, 250 Prospect St; Sat 10–5, Sun 10–4; $5 adult, $4 seniors, under 12 free; info: www.nojms.webs.com.

AUCTION BID SLIP

ITEM # ______________________________
DESCRIPTION__________________________
FROM ________________________________
Starting bid amount:___________________
Bidders: You need to bid on this item if you want it to be auctioned! Place bid below.
NAME/BID

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NAME/BID

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AUCTION BID SLIP

ITEM # ______________________________
DESCRIPTION__________________________
FROM ________________________________
Starting bid amount:___________________
Bidders: You need to bid on this item if you want it to be auctioned! Place bid below.
NAME/BID

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SUMMARY SHEET FOR AUCTION ITEMS SUBMITTED BY_____

Initials	Item #	Description	Minimum bid	Final sale price
	1			
	2			
	3			
	4			
	5			
	6			
	7			
	8			
	9			
	10			
	11			
	12			
	13			
	14			
	15			
	16			
	17			
	18			
	19			
	20			

Hutch Brown, Editor
4814 N. 3rd Street
Arlington, VA 22203

THE NORTHERN VIRGINIA MINERAL CLUB INC
Crystals are the flowers of the Mineral Kingdom

2019 Club Officers

President: Sue Marcus
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Vice-President: Ti Meredith
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Greeter/Door Prizes: Ti Meredith
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Photographer: Amanda Parker
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Show Chair: Tom Taaffe
rockcllctr@gmail.com
Webmaster: Casper Voogt
casper.voogt@plethoradesign.com

Mineral of the Month: Malachite

PLEASE VISIT OUR WEBSITE AT:

http://www.novamineralclub.org

The Northern Virginia Mineral Club

Visitors are always welcome at our club meetings!

Please send your newsletter articles to:
hutchbrown41@gmail.com

RENEW YOUR MEMBERSHIP!

SEND YOUR DUES TO:
Roger Haskins, Treasurer, NVMC
4411 Marsala Glen Way, Fairfax, VA 22033-3136

OR

Bring your dues to the next meeting.

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

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—at http://www.amfed.org/efmls) and the American Federation of Mineralogical Societies (AFMS—at http://www.amfed.org).

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. (No meeting in July or August.)

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