



The Mineral Newsletter

Meeting: September 28 Time: 7:30 p.m.

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



Torbernite

Musonoi Mine, Democratic Republic of the Congo

Source: U.S. Geological Survey Photo: Carlin Green.

Deadline for Submissions

September 20

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

Volume 61, No. 7

September 2020

Explore our [website!](#)

September Meeting Program:

Fall Club Auction (tentative)

details on page 5

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Mineral of the Month Torbernite

by Sue Marcus

Our mineral this month is vivid green, radioactive, and a previous Mineral of the Month called torbernite. Torbernite forms platy crystals. When these are translucent, packed together with little matrix showing, they are particularly highly valued by collectors. Torbernite is fairly rare, by which I mean that you can find it for sale if you look, but you are unlikely to find it when field collecting.

In this series of Mineral of the Month columns, we have learned about many minerals named by Abraham Gottlob Werner. Torbernite is another one. Werner named it in 1793 for Swedish chemist and physicist Torbern Olof Bergmann. Bergmann was a leading mineralogist of his era. He was knighted for his work and trained other notable future mineralogists when he was a professor at the University of Uppsala.

Torbernite obtained by us regular collectors (who don't have access to mass spectrometers, X-ray equipment, and other mineralogy laboratory techniques) might have altered to metatorbernite without our being able to tell. The only distinction between the two species is that metatorbernite has less water:

- Torbernite = $\text{Cu}(\text{UO}_2)_2(\text{PO}_4)_2 \cdot 12\text{H}_2\text{O}$
- Metatorbernite = $\text{Cu}(\text{UO}_2)_2(\text{PO}_4)_2 \cdot 8\text{H}_2\text{O}$

In this Mineral of the Month, I'm including both, since most of us can't tell the difference and no one can simply by looking at it. Even transparent crystals can be either mineral species. So when I use the term "torbernite," I also mean metatorbernite unless I specify otherwise.

Both minerals are secondary, forming from the alteration of primary uranium ores (hence the radioactivity). The crystals look almost micaceous---but they are brittle, not flexible. Also, unlike the mica group, they are not rock-forming minerals; instead, they form on the surfaces of their host rocks. One source suggested that most torbernite crystals look like wulfenite in habit---but the torbernite crystals are definitely *green*!

Before we learn more, we need to consider the care of this mineral. Torbernite is more fussy than many minerals we've discussed in this series. It is radioactive, so

Fall is almost here!



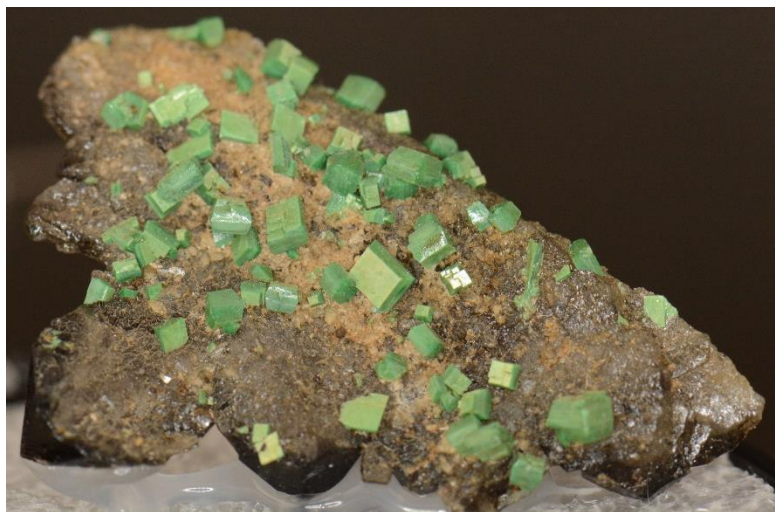
Northern Virginia Mineral Club members,

In-person meeting ...? See President Tom Kim's message below.



Torbernite, Musonoi Mine, Kolwezi Katanga (Shaba), Democratic Republic of Congo. Photo: Bob Cooke.

it should be stored well away from living areas. As noted previously, it also loses water, so it should be stored in tightly closed containers protected from access by those who do not know how to handle radioactive minerals properly. Wash your hands thoroughly after handling these specimens.



Torbernite, Entraygues-sur-Truyere, Aveyron, Occitanie, France. Photo: Bob Cooke.

Some collectors consider any torbernite specimen that has been out of the ground for more than a few years to be its pseudomorph, metatorbernite. The dehydration rate depends on temperature and humidity. Most of us have purchased our specimens from others, who may have also purchased them from others, so we do not know how fresh our specimens might be. Properly, our specimens should probably be labeled metatorbernite—and they *properly* should have been sold to us as such. Enough of that, on to learn together.

The type locality (where the original material described by Werner was found) is Johanngeorgenstadt, Erzgebirgskreis, Saxony, Germany. The same lead/silver mining district was the source of several new mineral species. The district is part of the Ore Mountains (*Erzgebirge*), which was the world's main source of cobalt from the 16th through the 18th centuries and Europe's primary source of silver from 1460 to 1560. Long after torbernite was described, the mines were significant uranium producers in the 19th and 20th centuries. As a collector, it is hard to imagine that anything is left on the dumps.

We'll stay in Europe to look at localities. Along with localities in Germany's Ore Mountains, France, Portugal, Italy, and the United Kingdom have all produced torbernite specimens. France has low-grade uranium deposits, although the small Margabal Mine in the Occitanie Region has been the source of world-class torbernite specimens. Discoveries of beautiful, unusual forms, with pagodalike stacks of crystals as well as sheafs and branches, were brought out by collectors in

1997, 2009, and 2014; specimens range up to about 9.5 cm (3.5 in) in size, with individual crystals up to 1 cm (0.4 in).

[Vimianzo, Spain](#), is the source of unusual metatorbernite crystals. Some show color zoning, and the crystal morphology is described as, “first- and second-order dipyrramids, truncated by pinacoidal faces;” in nontechnical terms, they look more barrel-shaped than platy. The centers are relatively translucent while the rims are opaque. One micromount from this mine appears to be [aqua](#), a highly unusual color for torbernite, though I cannot tell whether this is an artifact of photography. The Italian Piedmont has minor occurrences of torbernite, mostly of interest to micromounters.

[Cornwall](#), in southwestern England, is famous for tin minerals as well as a wealth of rarities. A few mines also produced nice, relatively large torbernite specimens up to 8.9 cm (3.5 in) in the largest dimension. These specimens are metatorbernite by now. The best show waxy luster on the curved crystal surfaces, more micaceous in appearance than torbernite from other localities. Some of these old mines containing radioactive minerals, dumps, and waste piles have been filled and leveled for sports fields and buildings.

The world's finest torbernite crystals probably come from the copper/uranium belt in the Democratic Republic of Congo (DRC). The DRC was formerly named Zaire and many specimens still bear labels with Zaire as the country of origin. (The Republic of Congo is a separate, neighboring country.) The [Musonoi Mine](#) in the Kolwezi mining district of the DRC is the best



Torbernite, Viseu District, Portugal. Photo: Bob Cooke.



Torbernite, Musonoi Mine, Kolwezi Katanga (Shaba) Democratic Republic of Congo. Photo: Bob Cooke.

producer of beautiful macrotorbernite specimens. Superb specimens have transparent, platy, emerald green bladed crystals. Matrix coverage can be up to 21 cm (8.3 in). You can scroll through the Mindat photos or look at pricey dealers for some of these beauties. One Mindat photo shows a piece with crystals up to 2 cm (0.8 in) in size. Museums have specimens from the Musonoi Mine on display in their collections.

Micromounters, never fear, there are stellar microtorbernite delights from the DRC for your collections too, no doubt at more affordable prices. Some specimens, particularly micros, show pleasing color contrast between the green torbernite and orange-yellow kasolite.

Many collectors assume that opaque “torbernitelike” specimens from known torbernite localities and older torbernite specimens are really metatorbernite. This leads me to the Mindat conundrum. Mindat separates the “galleries” (or files) of photos by mineral species. The galleries for torbernite and metatorbernite specimens, particularly from the Shinkolobwe Mine in the [Katanga mining district](#) of the DRC, include some descriptions of specimens that seem to be based on opacity of the mineral or the length of time since mining,

with no specific criteria for being in one gallery or the other; the file placement of the image is based simply on the submitter’s description. I encourage readers to look at these lovely images without judgment about which mineral they are viewing—just gawk.

I raised the conundrum because [one image](#) is described as torbernite *on* metatorbernite. Recall that torbernite usually dehydrates to metatorbernite, so it would be highly unusual in a geological context to have the dehydrated form beneath the hydrated form. Maybe there were originally two forms of metatorbernite or the description is incorrect; or perhaps this unusual specimen is due to changed geologic conditions.

The [Central African Copperbelt](#) is a folded series of metamorphosed arkose and calcareous shales, primarily in Zambia but extending into the DRC. The host rocks of dolomitic shales and dolomitic siltstones at the Musonoi Mine were emplaced about 590 million to 520 million years ago, then folded by tectonic forces into gently dipping beds. The more copper-rich zones are mined in Zambia. The DRC is much richer in cobalt and uranium, along with some copper. Small, nicely crystallized torbernite (now metatorbernite) specimens have been recovered from the [Nchanga Mine](#) in Zambia’s Copperbelt Province, though they are not of the same high quality as the DRC specimens from the Musonoi and Shinkolobwe Mines.

The United States is not a significant source of torbernite specimens. Perhaps you will be the lucky rockhound to change that historical note. Currently, I found references to and photos of torbernite from the Spruce Pine area in North Carolina and Beaver County



Torbernite, Shaba, Democratic Republic of Congo. Photo: Bob Cooke.

in Utah. Micromounters or locality collectors would be most interested in these specimens.

Torbernite is not a mineral for all collectors. Not all of us want a lovely specimen hidden away in a box, to be handled very carefully. It is fragile, with the crystals breaking easily. And it is expensive: better quality specimens cost upwards of \$125, with a top-end dealer offering a museum-quality piece from the Shinkolobwe Mine for \$6,000. However, \$2,400 will get you a nice but opaque specimen from France.

Just for safety, let's make it clear: do not use torbernite for lapidary or jewelry purposes. Radioactivity and wearables don't mix.

Technical Details

Chemical formulaTorbernite: $\text{Cu}(\text{UO}_2)_2(\text{PO}_4)_2 \cdot 12\text{H}_2\text{O}$; metatorbernite: $\text{Cu}(\text{UO}_2)_2(\text{PO}_4)_2 \cdot 8\text{H}_2\text{O}$

Crystal form.....Tetragonal

Hardness2–2.5

Specific gravity3.22

ColorShades of green, usually bright, from emerald and lime to forest green

StreakLight green

Cleavage: 1 perfect; 1 distinct,

Fracture: Brittle

Luster.....Vitreous (best specimens), greasy, pearly (cleavages), dull (when dehydrated)

Radioactive

Acknowledgments

As the old-like-me song says, “I get by with a little help from my friends.” For this article, Bob Cooke noticed several areas of confusion that I hope have now been clarified. Thanks, Bob for bringing them to my attention—shows you are reading as well as providing the splendid images from your collection. And, as always, kudos to our amazing editor, Hutch Brown, who makes something out of the strings of words that I provide, along with creating our marvelous, readable newsletters.

References

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Club Member Rocks and Minerals Auction Coming Up (Hopefully)!

September 28 Program

Our September club meeting—if we can manage to meet in person—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. (15 minutes earlier than usual). We will move through the business part of the meeting, then get to the fun!

Sellers normally use individual bid slips to describe auction items (see page 15 for the forms). 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).

Sellers also normally use the summary sheet on page 16 to list all items for sale so that the Treasurer can record the final sales price and give sellers their money after the auction. Depending on any arrangements we might make for remote sales, we might or might not use the bid slips and summary sheet.

Guests or nonmembers who might be interested in rocks and minerals are invited to join the fun. Although only current club members are allowed to sell, the

meeting and auction are open to all. We might need volunteer auctioneers, so please consider helping out.

**** 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 \$2 on any item. The minimum increase is also \$2. Bids higher than \$20 increase by \$5.
- We normally start with a silent auction to assess interest in each item for sale.

Bring small bills—remember, we're a small club! Personal checks are accepted but no credit cards.

If holding an in-person auction turns out to be too difficult, we will arrange for the following remote program and let everyone know by email. ↗

A Road Trip to Bisbee and Douglas, AZ (February 2020)

by Mike Kaas

Editor's note: *If we cannot meet in person in September at the Long Branch Nature Center for our annual Fall Club Auction (which remains to be seen), then we will hold another remote meeting. In that case, NVMC member Mike Kaas will give a presentation on his Arizona mineral inspecting and collecting trip in 2020.*

Every collector has heard of and probably seen some of the spectacular specimens from James Douglas's famous Copper Queen Mine in Bisbee, AZ. The Smithsonian Natural History Museum in Washington, DC, has his personal collection.

During the 2020 mineral show in Tucson, AZ, Pat and I, along with our friends Mike and Susan Canty from Tucson, decided to visit Bisbee; retake the tour of the Queen Mine (an extension of the Copper Queen); and also visit Douglas, AZ, where the Phelps-Dodge smelter served its many mines, from Jerome, to Morenci, to

Bisbee. We also wanted to take some up-to-date photos for the Mining History Association website. This presentation is essentially a slide show of that trip.

We will look at many of the historic sites in and around Bisbee from the heyday of mining. Many of the historic mine buildings and headframes were preserved when Phelps-Dodge merged with Freeport-MacMoran Copper and Gold in 2007. We will join Doug Graham, Manager/Curator of the Queen Mine Tour, and see how authentic square-set mine timbering has recently been used at two underground shaft locations. Then we will climb up into one of the stopes, where copper ore was actually mined.

We will drive down to Douglas, on the U.S./Mexican border. The site of a huge smelting complex has been reclaimed, but several examples of locomotives and railroad cars from the mines and plants are on display in a park. We will visit the historic railroad terminal that was the hub of several rail lines in the Southwest. Then we will take a look inside the posh Gadsden Hotel, which hosted mining dignitaries and celebrities for several decades.

Finally, we will return to Bisbee for a quick tour of the Mining Museum, including its collection of Bisbee minerals. ↗

President's Collected Thoughts

by Tom Kim

On Saturday, August 21, 2021, we had our annual summer get-together at my house. Not all of us could make it, but those of us who could were happy to see each other's familiar faces and catch up with our lives or even come to recognize anew what fascinating, lovely people we have in our club. It did rain halfway through, but we managed to all fit comfortably in the cool and misty screen porch. How nice to see each other—in person!—chatting and chewing without masks in the summer breeze.

Occasionally, the topic of conversation turned—as it naturally always does these days—to COVID. Certainly for me, it's the one topic that's been ever top-of-





NVMC club members at the annual club summer get-together, this one hosted by President Tom Kim.

mind throughout this year as it pertains to NVMC. Here, I will lay out a few thoughts about how the pandemic is affecting executive decisions about club activities and gatherings.

First, I think it's important to consider this public health crisis with humility and awe. I try to keep informed about relevant developments in science, treatments, and policy, but I am not an epidemiologist. Fortunately, our current age affords us with a robust community of scientific research and accountability, which generally gives reliable guidance about things like viral spread. In the face of overwhelming information and high anxiety, I think it's worth staying grounded in our faith in established scientific or science-informed institutions. In other words, let's put a high premium on what experts like professional epidemiologists have to say.

However, we should also recognize this is a scientific and medical phenomenon happening within the complex context of our particular society, history, psychology, economics, and so on. Although we need to be clear about empirical realities, probabilities, and risks, we also need to consider how the facts will affect our now very complicated personal lives and relationships. That is to say, we need to equally engage both rational

thought and empathy. Listening is as important as analyzing.

Finally, the situation is ever evolving. The Delta variant has taught us that the virus can sometimes mutate faster than we, as a society, can adapt. We need to stay flexible and agile, which takes an extra measure of attentiveness, gentility, and grace. Some announcements might need to be made—or revised—in the last minute. Some commitments might even need to be broken or renegotiated. We'll do what it takes to sustain the club without endangering our members.

Right now, we're weighing whether to have an in-person meeting in September, how to hold an auction (whether virtually or in person), and what to do about our November show. I think there's a good chance we can resume in-person meetings if the Long Branch Nature Center is available ... but only if we require mask wearing, in accordance with CDC recommendations.

Please let me know what your comfort level is with these options. And please look out for our email announcements to get the most timely updates about club events. 🙏

Tom

Field Trip Opportunities

Northern Virginia Community College Geology Field Trips

NOVA's Annandale campus offers 1-day weekend courses—essentially, field trips with some in-class instruction—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](#).

Note: The events are planned for the coronavirus pandemic with masks and social distancing. However, the organizers might decide to cancel, so please check the website before going. You need to register anyway.

Building Stones of the National Mall

October 16, 10 a.m.–6 p.m. Trip considers several 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. The face-to-face component is contingent upon the status of COVID at the time of the class and D.C.'s policy on public gathering. Refer to the NOVA website for current masking and social distancing policies.

Geology of Holmes Run Gorge, VA

November 6, 8 a.m. to 5 p.m. Holmes Run Gorge is a picturesque, canyonlike area in Alexandria, VA. Our instructional day will consist of a 4-hour class at Northern Virginia Community College in Alexandria, followed by a 4-hour geologic tour of the gorge. The face-to-face day is contingent upon the status of COVID at the time of the class and whether Holmes Run parklands are open. Students and faculty will be required to wear masks that cover nose and mouth and practice social distancing according to the guidelines at the time of the class. After the face-to-face activities, you will have 10 days to complete a set of related online assignments. ↗



Constantino (Dino) Psomopoulos from the Paraiba Mine in Brazil proudly wearing his NVMC club shirt.

Dino was kind enough to deliver an outstanding remote presentation on tourmaline from the Paraiba Mine at the May 2021 club meeting. He sent thanks for the shirt to NVMC Vice President Sue Marcus.

Hydrothermal Chimneys Discovered on Seafloor Off Washington

by Mindy Weisberger

Editor's note: The article is from LiveScience (May 1, 2020).

In the dark ocean depths off the coast of the Pacific Northwest, a magical fairyland of towering spires and hydrothermal chimneys sprouts from the seafloor, a stunning new underwater map reveals.

These towers belch superheated liquid warmed by magma deep inside Earth.

The field of hydrothermal chimneys stretches along the ocean bottom on the Juan de Fuca Ridge to the northwest of coastal Washington state, in an area known as the Endeavor Segment. ... [Read more.](#)

EFMLS Schism

by Hutch Brown

The Eastern Federation of Mineral and Lapidary Societies (EFMLS) is a regional umbrella group for clubs like ours. It is supposed to support our interests, such as providing the club insurance needed for field trips. Like our club, the EFMLS has bylaws, elected officers, a [website](#), and a [newsletter](#).

Since last year, the EFMLS has been in seeming chaos compounded by the confusion caused by the coronavirus pandemic. One group of federation officers seems to be pitted against another, with legal action taken. I say “seems” because nothing is very clear.

Here’s what little I can make of it:

- The EFMLS president obtained historical files containing information about federation bylaws that conflicted with existing bylaws.
- The president appointed a committee to revise the bylaws based on the new information. The committee did so.
- Ignoring the revised bylaws, a group of federation officers and managers proceeded with already planned elections for club officers.
- The EFMLS president refused to recognize the election or its outcome.
- The EFMLS board of directors, according to the [July 2021 EFMLS newsletter](#), decided on “the removal and the preclusion of future service in the EFMLS management” of 12 EFMLS leaders, including NVMC member Matt Charsky and EFMLS newsletter editor Mary Bateman.

Can anyone explain what the conflict is all about and what is going on? As editor of our club’s newsletter, I would gladly publish an explanation! ↗.

Denver Shows Update: Special Report

The 2021 Denver shows are ON! The Denver Mineral, Fossil, and Gem Shows are a smaller, more manageable version of the stellar Tucson shows. (Last year’s Denver shows were canceled.)

September 16–19, 2021: The Main Denver Show and the Fine Mineral Show (combined) will be held at the

Convention Center downtown. Tickets \$10. Information [here](#).

September 18–21: [Sparkle & Joy](#) at the Sheraton, downtown Denver. Maybe only gems & jewelry?

September 10–19: The [Denver Coliseum Mineral, Fossil & Gem Show](#) at the National Western Complex, the Events Center. Free.

September 10–12: [MinCollect Show](#) at Doubletree by Hilton, 3203 Quebec St. (seems like there’s a show at the hotel).

September 10–18: [Colorado Mineral and Fossil Fall Show](#) at Crowne Plaza Denver Airport Convention Center, 15500 E 40th Ave.

September 10–13: [Just Minerals Show](#), Denver Airport Marriott at Gateway Park. ↗.

These 208 Minerals Exist Solely Due to Humans

by Mindy Weisberger

Editor’s note: The article is from LiveScience (March 6, 2017).

Over centuries, humans have left a widening imprint on this planet, marked by a growing need for natural resources and by the rapid expansion of agriculture and infrastructure.

And a new study has found that one of the hallmarks of this footprint is the appearance of 208 species of minerals that exist solely due to human activity.

These minerals represent nearly 4 percent of the 5,200 mineral species recognized by the International Mineralogical Association, and most can be attributed—directly or indirectly—to mining in locations around the world, forming as a direct result of their rocky environment’s uniquely human-made conditions. ... [Read more.](#)

*Simonkolleite found on a copper mining artifact in the Rowley Mine, Maricopa County, AZ.
Photo: RRUFF.*



How the Earth's Tumultuous History Gave the Mid-Atlantic Its Beloved Destinations

by Walter Nicklin

Editor's note: The article is adapted from the Washington Post, June 12, 2021. Thanks to Sue Marcus for the reference!

The 9-1/2-mile loop trail to the top of Old Rag Mountain and back is Shenandoah National Park's most popular hike in Virginia, according to the National Park Service.

The steep climb is challenging—scrambling over and squeezing between boulders in several places. But once you've conquered the Old Rag summit (elevation 3,284 feet), take a moment to feel the rough surface of the weathered granite.

It emerged as molten rock from under the Earth's surface a bit over 1 billion years old, which is about when primitive, multicellular organisms—the origins of life as we've come to know it—first appeared. As Earth's powerful tectonic plates pressed together, the magma slowly ascended and crystallized into the Old Rag granite of today.

It was the result of the first of two mountain-building events that resulted in today's Blue Ridge—the Grenville Orogeny of 1 billion years ago. And now it rests atop mountains formed by a much later event—the Alleghanian Orogeny, which occurred about 300 million years ago, giving witness to the planet's many epochs.

But we're getting ahead of ourselves. About 600 million years ago, the same tectonic plates that created the Old Rag granite started pulling apart. The thinning, flattening crust created a shallow rift that filled with water, which geologists call the Iapetus Ocean.

Water meant marine life, with calcium-rich shells and skeletons. Their sedimentary remains formed the building blocks of limestone and other soluble rocks. As these rocks dissolved, caves and caverns were carved out over an enormous length of time, forming the Shenandoah Valley caverns.

The valley, named for the river, separates the Blue Ridge from the main Appalachian chain. Of the seven caverns open to the public and readily accessible from Interstate Highway 81, Luray Caverns is the largest. Among its attractions is a "Stalacpipe Organ," played



View from the top of Old Rag, with fall color. Photo: Hutch Brown.

on a regular organ but whose organ pipes are stalactites wired with small rubber mallets spread over 3-1/2 underground acres.

About 300 million years ago, tectonic plates again squeezed together, this time to create a supercontinent called Pangaea.

The name derives from the ancient Greek *pan* ("all") and *Gaia* ("Mother Earth"). You can see today on any world map how Africa and the Americas once fit together as if pieces of a giant jigsaw puzzle.

But today's most visible on-the-ground evidence of the colliding land masses are the mountain ranges running from Georgia to Maine that arose during the Alleghanian Orogeny.

Here in the mid-Atlantic, we have the Blue Ridge Mountains, which pushed the Old Rag granite upward, so it sits atop the mountain today. They get their name from their hazy blue appearance when seen from a distance.

While we know them as weathered, sculpted and rounded, the Blue Ridge at creation had elevations and topography like today's Alps and Rockies. Along their now-soft spine runs the 469-mile Blue Ridge Parkway, offering spectacular scenery as it links Virginia's Shenandoah National Park and North Carolina's Great Smoky Mountains National Park.

The Atlantic Ocean came into being when Pangaea split apart, and the rainfall spilling off the Appalachians rushed downhill, helping to fill the new sea. These rivers carried sediments from the ever-shrinking

mountains to be deposited in what would become part of the Atlantic coastal plain.

Virginians call this area the Tidewater region because of the tides' effect on the low-lying land. The mid-Atlantic's summer beach destinations wouldn't exist without this coastal plain.

Perhaps the most defining geological feature for early European settlers in the mid-Atlantic was the Fall Line, which separates the Atlantic Coastal Plain from the Piedmont.

From the Italian *Piemonte*, meaning "foothills," this gently rolling landscape is all that remains of once-mighty parts of the Appalachian chain. Ocean-going ships could easily navigate the rivers' tidal stretches but could go no farther than the falls or rapids they encountered upstream.

That explains why many of the region's early cities and commercial hubs are located where they are: Richmond on the Fall Line of the James River; Fredericksburg on the Rappahannock's Fall Line; Georgetown and Alexandria downstream from the Potomac Great Falls; Philadelphia on the Fall Line of the Schuylkill; and Wilmington, DE, on the Fall Line of the Brandywine.

Today, tourists are attracted by their colonial charm. Upstream, above the Fall Line, lies the Piedmont,

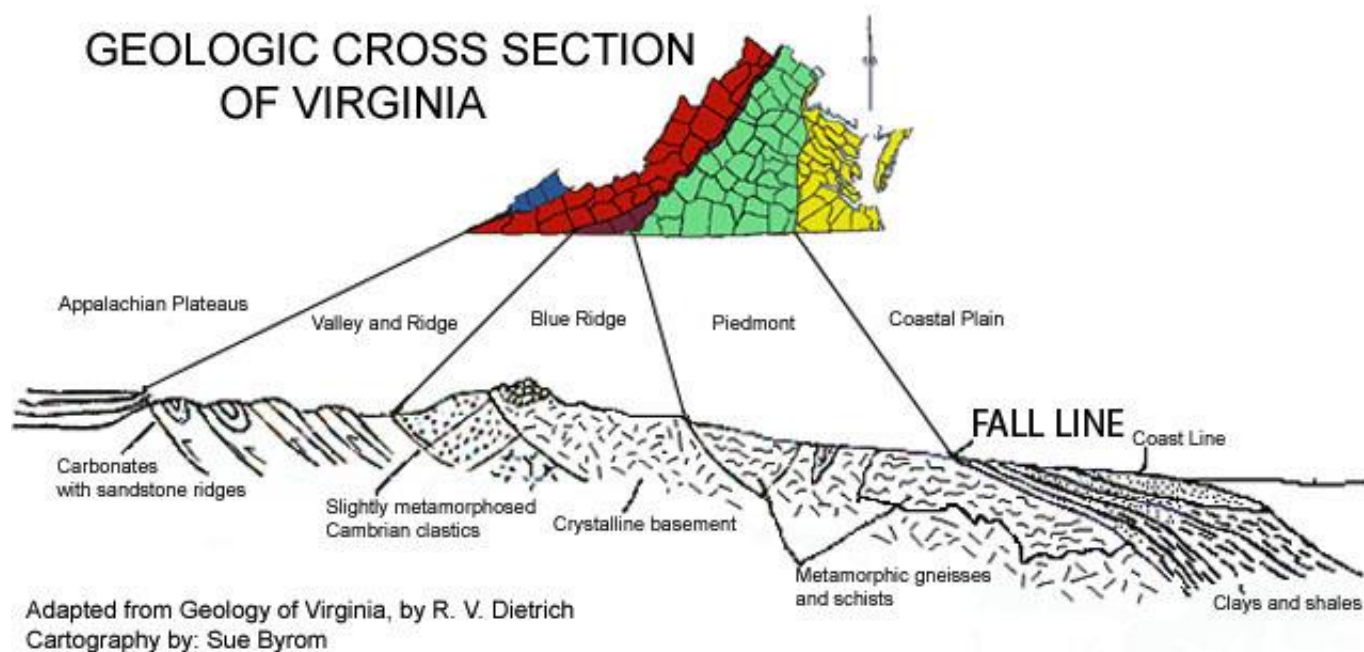
which draws vacationers attracted by bucolic destinations and wineries.

Looking east from the top of Old Rag (or any Blue Ridge summit), you will see a few especially tall hills rising like lonely sentinels above the surrounding farmland. These are called monadnocks—after the eponymous mountain in New Hampshire—consisting of more erosion-resistant rock than their gently sloping, less elevated neighboring hills.

What comprises the mid-Atlantic region can be open to debate, but perhaps the most geographically correct way of thinking about it is as the Chesapeake Bay watershed. The tiniest West Virginia tributary of the Shenandoah or Potomac eventually finds its way to the bay, as does all that flows into Pennsylvania's Susquehanna River. (Usually considered part of the mid-Atlantic, Delaware uniquely has its very own bay.)

And of all the region's major geological features, the Chesapeake is the newest—and a case study in climate change. The bay didn't exist 10,000 years ago. Instead, the waters there were not of an expansive estuary but of a river—the Susquehanna—in its final stretch before flowing into the Atlantic. The Potomac, Rappahannock, and James Rivers were all Susquehanna tributaries.

This was during the last Ice Age. But when the glaciers melted, the sea level rose to flood and completely



cover what had been the lower Susquehanna River Valley. It's easy enough to visualize what happened when you study a map of the Chesapeake watershed.

The largest estuary in North America, the bay is known for its beauty and bounty. Blue crabs and oysters are culinary delights. Its mix of fresh, brackish, and salt water—together with mostly moderate winds and temperatures—makes it a magnet for sailors and fishermen. For history lovers, upstream from where the James River enters the bay is the site of the first permanent English settlement in the New World, Jamestown.

Climate change may have brought the Chesapeake Bay into being, but now human-caused climate change endangers it in both the short and the long terms. Efforts are underway to mitigate the effects of rising water on islands in the bay and the cities and towns along it.

But it's difficult to envision what climate change means for the future. Will the entire coastal plain, together with its Fall Line cities, inevitably be flooded? With the equally low-lying Delmarva Peninsula underwater, will the Chesapeake Bay itself cease to exist, subsumed by the Atlantic?

Will the ocean reach the mountains? With or without us, the mid-Atlantic's suspenseful geological narrative will continue. ↗



Notes on the Geology

by Hutch Brown, Editor

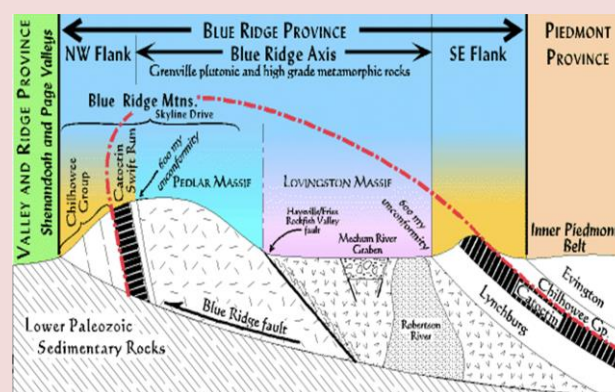
Our area shows evidence of not just two orogenies (mountain-building events) but four. Erosion of the Taconic Mountains, pushed up about 450 million years ago, laid down the material that later became most of the sedimentary rock in the mid-Atlantic region (though not the limestone).

The later Alleghanian Orogeny pushed the sediments westward, folding them and compressing them into rock. In the process, it formed the Valley and Ridge Province west of the Blue Ridge.

The Blue Ridge Mountains are actually the western edge of a huge anticline (an upturned fold 20 miles across) formed by the Alleghanian Orogeny from ancient basalts as well as offshore sands and muds, along with the underlying Grenville granite. Heat and pressure during Alleghanian mountain building transformed the overlying layers into metamorphic rock, such as metabasalt and quartzite. The underlying Old Rag granite was at the base of the ancient Alleghanian Mountain chain, not at the top.

As the mountains weathered away, erosion breached the anticline. The only remaining evidence of the overlying layers is on the outer edges of the Blue Ridge Province. There, you can find Catoctin greenstone (metabasalt), for example, and Weverton quartzite (metamorphosed sandstone).

The granite hills in between are slowly rebounding after the overlying mountains eroded away, one reason for Old Rag's prominence today.



(Graphic from Professor Callan Bentley)



AFMS Code of Ethics



A large measure of the enjoyment of our hobby consists of collecting in the field. For that reason, the members are proud to endorse the following:

1. I will respect both private and public property and will do no collecting on privately owned land without permission from the owner.
2. I will keep informed of all laws, regulations, or rules governing collecting on public lands and will observe them.
3. I will, to the best of my ability, ascertain the boundary lines of property on which I plan to collect.
4. I will use no firearms or blasting material in collecting areas.
5. I will cause no willful damage to property of any kind, such as fences, signs, buildings, etc.
6. I will leave all gates as found.
7. I will build fires only in designated or safe places and will be certain they are completely extinguished before leaving the area.
8. I will discard no burning material—matches, cigarettes, etc.
9. I will fill all excavation holes that might be dangerous to livestock.
10. I will not contaminate wells, creeks, or other water supplies.
11. I will cause no willful damage to collecting material and will take home only what I can reasonably use.
12. I will practice conservation and undertake to utilize fully and well the materials I have collected and will recycle my surplus for the pleasure and benefit of others.
13. I will support the rockhound project H.E.L.P. (Help Eliminate Litter Please) and will leave all collecting areas devoid of litter, regardless of how found.
14. I will cooperate with field trip leaders and those in designated authority in all collecting areas.
15. I will report to my club or federation officers, the Bureau of Land Management, or other authorities any deposit of petrified wood or other materials on public lands that should be protected for the enjoyment of future generations or for public educational and scientific purposes.
16. I will appreciate and protect our heritage of natural resources.
17. I will observe the Golden Rule, will use good outdoor manners, and will at all times conduct myself in a manner that will add to the stature and public image of rockhounds everywhere.

The Bittersweet Apophyllite

by Larry Rush

Editor's note: The article is adapted from EFMLS Forward (July/August 2021), p. 3. The author is a founder of the Shoreline Mineral Club, Guilford, CT.

When I moved to Connecticut in the early 1960s, I met a retired physician, Henry Ferris, a member of the New Haven Mineral Club, who was also interested in minerals, and we became collecting friends. Henry was a quiet, dignified gentleman with a strong scientific mind who appreciated the marvelous aspects of crystals and mineralogy.

At one point early in our friendship, he showed me an apophyllite specimen that his son had acquired for him while traveling in Brazil. Though not a “world-class” piece, it was very nice, with two well-formed lustrous 3-cm crystals sitting in a hand-sized chunk of matrix. It was appealing enough for me to make a light-hearted attempt at humor by suggesting that I would be happy to trade him some locally collected poor quartz crystals for it. In typical fashion, he didn’t ridicule this joke but just smiled and made some innocuous answer.

But these silly little remarks became the basis of a humorous tease that went on for some 25 years. Whenever we were together, one of us would always make a witty proposal about the apophyllite. It might be a dry comment about trading an old car; the best piece in my collection; or free lawn mowing for life.

These sly exchanges sometimes consisted of only a few words, a quick reference, or even a look or wink at the right time. We always expected the other to be planning some new complicated scheme related to my getting the coveted apophyllite. Our wives were never sure what was going on with these oblique maneuverings and probably thought we were both a little crazed (maybe we were), especially when the phone would ring at some odd hour and it would be Henry, wanting to spring some new insane swap scheme on me. We did our best (though not always successfully) to come up with clever plots, springing them by surprise. We used the telephone, greeting cards and telegrams, notes in a bottle—anything we could to keep the plot interesting. Obviously, we never wanted to make the trade, only to keep the tease going.



Apophyllite from Brazil, subject of the article.

Henry died while on a trip in the 1980s, and a short time later, I learned that he had included the apophyllite in his will. In his typical soft-spoken, dignified manner, he had left the piece to me.

The almost constant light-hearted teasing of the past 25 years had come to its end, along with the life of my friend. He had managed to get the last joke in.

The apophyllite now sits in a prominent position in my collection. Whenever I look at it, I remember Henry and our long-term joke, and I realize that sometimes it is just those kind of silly interplays between people that help make true, long-lasting friendships.

I know that I won’t part with this specimen in my lifetime; it has just too much of a bittersweet memory attached to it. ↗

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

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.*

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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

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			
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	17			
	18			
	19			
	20			

Prospecting for Beer

While metal detecting for silver in Cobalt, ON, we got into a real hot spot through pure luck and a little skill. Because we left obvious signs of digging, anyone following us would know that something had been found there. It was a very hot summer day, and I downed several cans of American beer. (I am still waiting for the buzz.) I carefully buried these where we had been digging, and next time we went there, several cans were neatly lined up on the ground. ... You snooze, you lose.

Source: <https://www.mindat.org/forum.php?read,6,404256,405217>

September 2021—Upcoming Events in Our Area/Region (see details below)

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			1 MSDC mtg, Washington, DC	2	3	4
5	6 Labor Day	7	8	9	10	11
12	13 GLMSMC mtg, Rock- ville, MD	14	15	16 Denver Shows	17 Denver Shows	18 Denver Shows
19 Denver Shows	20	21	22 MNCA mtg, Arlington, VA Fall begins	23	24	25
26	27 NVMC mtg, Arlington, VA	28	29	30		

Event Details

- 1: Washington, DC**—Mineralogical Society of the District of Columbia; meetings via Zoom until further notice; <http://www.mineralogicalsocietyofdc.org/>.
- 13: Rockville, MD**—Gem, Lapidary, and Mineral Society of Montgomery County; meetings via Zoom until further notice; <https://www.glmsmc.com/>.
- 16–19: Denver Shows**—see page 9.
- 22: Arlington, VA**—Micromineralogists of the National Capital Area; meetings via Zoom until further notice; <http://www.dcmicrominerals.org/>.
- 27: Arlington, VA**—Northern Virginia Mineral Club; meetings via Zoom until further notice; <https://www.novamineralclub.org/>.

Disclaimer

All meetings are tentative during the coronavirus pandemic, and club meetings might well be remote. Check the website for each organization for more information.



*Torbernite, Mashamba West Mine, Kolwezi, Katanga, Democratic Republic of Congo.
Source: Wikipedia; photo: Rob Lavinsky.*

The Northern Virginia Mineral Club

Visitors are always welcome at our club
meetings!

PLEASE VISIT OUR WEBSITE AT:

<http://www.novamineralclub>

Please send your newsletter articles to:

Hutch Brown, editor
4814 3rd Street North
Arlington, VA 22203
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;
\$20 individual, \$25 family, \$6 junior (under 16, sponsored by an adult member).

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2021 Club Officers

President: Tom Kim
president@novamineral.club
Vice President: Sue Marcus
vicepresident@novamineral.club
Secretary: David MacLean
secretary@novamineral.club
Treasurer: Roger Haskins
treasurer@novamineral.club
Communication: Vacant
Editor: Hutch Brown
editor@novamineral.club
Field Trip Chair: Vacant
Greeter/Door Prizes: Ti Meredith
greeter@novamineral.club
Historian: Kathy Hrechka
historian@novamineral.club
Show Chair: Tom Taaffe
show@novamineral.club
Tech Support: Tom Burke
tech@novamineral.club
Webmaster: Casper Voogt
webmaster@novamineral.club

Club 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.*

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