



The Mineral Newsletter

Next meeting: October 5 Time: 7:30 p.m. (doors open at 7 p.m.)

Dunn Loring Fire Station, 2148 Gallows Road, Dunn Loring, VA



Prehnite

Southbury, Connecticut

Source: Wikipedia. Photo: Ivar Leidus.

Volume 66, No. 8

October 2026

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October Meeting Program:

Fall Club Auction (in person only)

details on page 7

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Deadline for Submissions

November 20

Please submit to the [editor](#) by the 20th of the month. Submissions received later might go into a later newsletter.



Mineral of the Month Prehnite

by Sue Marcus

Editor's note: The article, lightly edited here, first appeared in The Mineral Newsletter in April 2021.

Prehnite (pronounced PREN-ite) is our Mineral of the Month for October. Some of us have found it in Virginia, and more of us can seek it on field collecting trips to come. Although prehnite is relatively common, we will learn some little-known facts about this mineral.

The first prehnite to be described as a mineral came from South Africa. Abraham Gottlob Werner, who named many minerals, named this one in 1788 for Colonel Hendrik von Prehn, a commander of Dutch forces in South Africa's Cape Colony. Prehn found the original specimens near his post at the Cape of Good Hope in 1774. Prehn was a mineral collector, and he brought the unknown material with him when he returned to Europe. Prehnite is purportedly the first mineral named for a person and the first to be described from South Africa.

Although prehnite is not a zeolite, it is commonly associated with the group of zeolite minerals. Prehnite forms in mafic rocks—rocks like diabase or basalt that are dark because they are rich in minerals bearing manganese and iron (“ma” for manganese and “fic” for iron, which has the symbol Fe).

Prehnite occurs in a couple of different geologic environments, one of which is much more interesting to collectors. That's when it forms in the amygdules (gas bubbles that later filled with minerals) in mafic rocks. Zeolites also form in this setting, so prehnite specimens can have zeolite minerals with them. Amygdaloidal rocks (basalts) are common worldwide, so it's impossible to mention every prehnite locality or even all that have produced nice specimens.

The other geologic environment for the occurrence of prehnite is in low-grade metamorphic settings. Under these geologic conditions, prehnite seldom forms specimens of interest to collectors. It is an important mineral geologically in these settings because it is characteristic for the temperature and pressure conditions under which it and the rock around it formed, thus giving geologists information about the geologic history of the area.

Happy Halloween!



Northern Virginia Mineral Club members:

Our next club meeting will be on **Monday, October 5, 7:30 p.m.**, at our usual meeting place, the Dunn Loring Fire Station. We will hold our Fall Club Auction; see program details on page 7.

(Note: We will not meet beforehand for dinner.)



Prehnite, O&G Southbury Quarry, Southbury, New Haven County, CT. Photo: Bob Cooke.

Botryoidal (grapelike) mounds or crusts of compacted radial crystals are the most common form of prehnite; the specimens shown above and on the cover are botryoidal. Single crystals or crystals with distinguishable faces are rare; needles and blades are more common.

Let's start with a rare locality where single crystals of prehnite have been found, the famous Jeffrey Mine in Asbestos, Quebec, **Canada**. I found well-crystalized prehnite specimens from this locality for sale online for \$1,450, although I also found a specimen listed for slightly more than \$100.

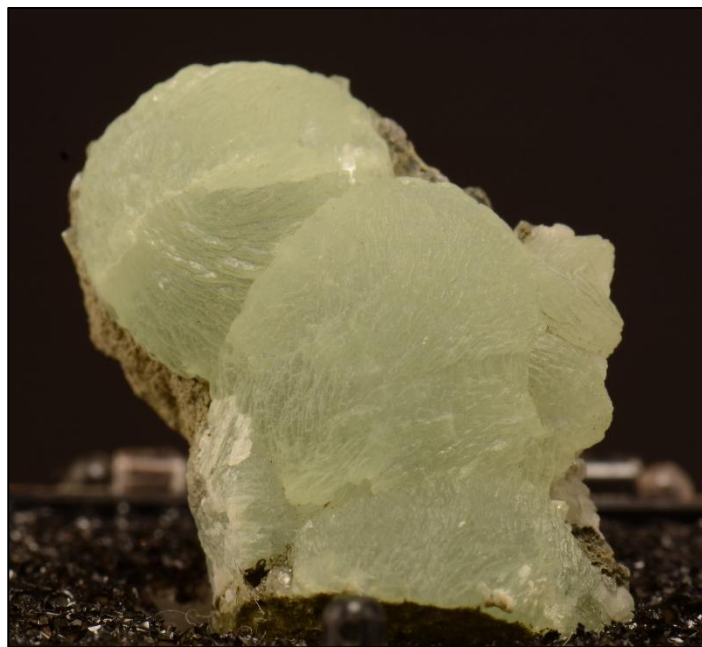


*Rare prehnite crystals, Jeffrey Mine, Asbestos, Quebec, Canada.
Photo: Bob Cooke.*

The first discovery of prehnite in North America may have been in Southbury, **Connecticut**, where botryoidal prehnite was noted along roadsides. Later, in local quarries, nice green plates of up to more than 9 inches were found. Prehnite also occurs here as clear botryoidal coatings attractively covering other minerals. It also forms epimorphs after calcite, datolite, or analcine. (An epimorph grows when one mineral coats another mineral, which then dissolves, leaving a shell or cast that gives clues as to what it was.) Mindat shows a pretty white bowtie of prehnite, micromount in size.

Quarries in the Southbury area sound like the ones near us. Mined for traprock, they were open to collecting until someone violated the rules—or else the companies decided that it was easier not to permit collecting. Some people might still be able to enter with special permission. The latest collecting date I saw for specimens from Southbury was 2008.

Staying in North America, we'll move to another classic prehnite locality, this one in Paterson, **New Jersey**. Spheres and aggregates of spheres, stalactitic forms, and epimorphs after anhydrite were collected from several deposits and quarries. Colors range from almost white to yellow-green through many shades of green. The Upper New Street Quarry was active from 1893 to 1925, although specimens were found when houses were built there in the 1980s, and beautiful, lustrous pieces were found at least as late as 2013.



***Top:** Prehnite, Prospect Park Quarry, Paterson, NJ.
Bottom: Prehnite with babingtonite, Roncari Quarry,
East Granby, Hartford County, CT. Photo: Bob Cooke.*

Now we get to the prehnite in **Virginia**. Fine botryoidal prehnite has been found at the Bull Run, Centreville, Chantilly, and Manassas quarries. Some of us have been lucky enough to collect at all or some of these sites. Sadly, most local quarries had closed to collecting by about 2020, with the notable exception of Vulcan's Manassas Quarry. That quarry, as with all the quarries in this area, excavates traprock, an informal name used for impermeable rock that can be crushed for road building and construction purposes.

Unfortunately, the Manassas Quarry had not cut through a zone of prehnite or zeolites (such as apophyllite) in more than a year before closing to public access by February 2020. Although club members and others were able to collect in the quarry when it was open, the last main mineral of collectible interest was stellerite. I'm unaware of beautiful prehnite specimens being brought out of any of the local quarries in more than a decade.

The other quarries in our area—the Chantilly Crushed Stone Quarry (also called the Virginia Crushed Stone Quarry) on the north side of U.S. Route 50 near South Riding; the Bull Run Quarry (Luck Stone Bull Run Plant) near Carpathian; and the Centreville Quarry (confusingly called the Fairfax Quarry by Mindat)—have not allowed collecting in decades, although they were once noted for lovely prehnite and apophyllite specimens. I was told that collecting was not allowed for liability reasons. However, because the Manassas Quarry allows collecting trips by Scouts and even by my senior ladies Ret Hat group, that seems like an easy way to just say no.

By the way, my Ret Hatters were thrilled to go deep into the quarry, a first for everyone but me, and take home a rock! Some people who have belonged to the club for a while might recall club auctions where flats of prehnite and apophyllite were bid up and sold for more than \$100 per flat. Let's hope that we get into the



Prehnite on fluorapatite, O&G Southbury Quarry, Southbury, New Haven County, CT. Photo: Bob Cooke.

Manassas Quarry again and they hit a streak of nice prehnite for us.

The Keweenaw Peninsula in **Michigan** has zeolites in the amygdules of the ancient basalts there (1.1 billion years old). Botryoidal green prehnite occurs, although the unique type of prehnite from this area is the massive pink variety; informally called patricianite, it can look like thomsonite. Clear and yellow botryoidal prehnite has been found in these basalts too.

Spain is not the first thought when we consider prehnite localities, though that is why you read these columns and why I write them. The Ofcarsa Quarry in Carchelejo, Spain, has produced some lovely specimens, including rosettes of prehnite crystal blades. These blades form contorted balls, like a glob that was stretched, then knotted in on itself. Specimens range from almost white to deeper green, and the best are translucent. The quarry might now be closed, with many specimens extracted in 2002–06.

Prehnite is associated with zeolites, and where is the world's most famous locality for those minerals? The Deccan Traps (or Flood Basalts) in **India** are world renowned for zeolites—and prehnite. In the Indian locations, prehnite is not as abundant as other minerals. It most often forms pseudomorphs (maybe epimorphs),



Prehnite, O&G Southbury Quarry, Southbury, New Haven County, CT. Photo: Bob Cooke.



*Prehnite on epidote, Kayes Region, Mali.
Photo: Bob Cooke.*

reportedly after laumontite, in elongated, light green jackstraws.

China is a large country hosting many minerals, including prehnite. At the Hongquizhen Quarry in Sichuan Province, lustrous green prehnite balls contrast nicely with much smaller chrysocolla spheres. Less common are specimens that show needlelike prehnite crystals; others have associated epidote. Collectible botryoidal prehnite with babingtonite occurs in Qiaojia County, Yunnan Province, China.

An African locality known best for prehnite with associated epidote is the Kayes Region of **Mali**. Spheres of translucent pea green prehnite with linear, dark green (almost black) glossy epidote form aesthetic specimens with contrasting shades and textures. Specimens are available online for about \$5 and up, although one with nice spheres and contrasting epidote can cost closer to \$50.

Moving to **Tanzania**, where many collectors and gem lovers think of beautiful tanzanite (a variety of zoisite) or tsavorite garnets, we will focus on prehnite from the Merelani Hills. The deposits in these hills host a rare color for garnet (green) in rare, gem-quality specimens. Zoisite is usually opaque green or brown; here, it is transparent yellow or deep violet-blue (sometimes heat treated). Prehnite from Merelani also comes in unusual colors, whether yellow or blue; both colors come

in well-crystallized specimens. The original sedimentary rocks included limestone and carbon-rich mudstones containing barium, zinc, nickel, and (most notably) vanadium. Prehnite formed after high-grade metamorphism followed by lower grade metamorphism. The elements in the original sediments, combined with the later availability of water from metamorphic events, might have contributed to the unusual colors in the Merelani deposits. Whatever the geologic cause, the result, for those who seek prehnite crystals, is another source with color choices.

The N'Chwaning II Mine, part of the Kalahari Manganese Fields of **South Africa**, is a famous locality for a variety of beautifully crystalized minerals, like gemmy scalenohedral (pointy), deep red rhodochrosite crystals. It is also the only known place where *orange* prehnite has been discovered. Although I've collected minerals for 6 decades, I'd never heard of nor seen orange prehnite until I began research for this article. Apparently, the whole "pocket" (amygdule?) was only about 1.5 feet long. It was found and mined out in 2000. The color of prehnite at the N'Chwaning II Mine is probably due to the presence of manganese in the mineralizing fluids in higher-than-normal concentrations.

Australian prehnite, from Wave Hill Station, is usually found as massive "nodules," which might be eroded amygdules. The prehnite here, when translucent, can be carved or used in jewelry. Rarely, well-formed needlelike crystals were recovered in nodules



*Prehnite on calcite, Bombay, Maharashtra, India.
Photo: Bob Cooke.*

that might have had a hard outer rim, perhaps of chalcedony, protecting the delicate crystals within the open interior.

Prehnite is an unusual gemstone. Although it is faceted and can be carved, it is usually translucent, not transparent. Jewelers and buyers prefer transparent gems. Most of the cut stones appear chartreuse to me. Cabochons, beads, small carved pieces, and faceted stones are readily available, some with interesting inclusions. As a novelty, a bowl 10.5 by 8.0 centimeters (4.1×3.1 in) in size was offered for sale on Etsy.

Prehnite comes in many unusual forms. A collector specializing in prehnite alone could amass a diverse collection from around the world.

Technical Details

Chemical formula	$\text{Ca}_2\text{Al}(\text{AlSi}_3\text{O}_{10})(\text{OH})_2$
Crystal form	Orthorhombic
Hardness	6–6.5
Density.....	2.8–2.95 g/cm ³ (measured); 2.9 g/cm ³ (Calculated)
Color.....	Usually shades of green; mostly commonly pastel green; also yellow-green, yellow, white, blue
Streak.....	White
Cleavage	1 good on {001}
Fracture.....	Uneven
Luster.....	Pearly, vitreous

Sources

Cairncross, B.; Tsikos, H.; Harris, C. 2000. [Prehnite from the Kalahari manganese field, South Africa, and its possible implications](#). South African Journal of Geology 103: 231–236.

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Mindat. N.d. [D-Block Mine, Merelani Hills](#).

Mindat. N.d. [Djouga diggings, Mali](#).

Mindat. N.d. [Fairfax Co., Virginia, USA](#).

Mindat. N.d. [Fairfax Quarry](#).

Mindat. N.d. [Hongquizhen Quarry, China](#).



*Prehnite, Djouga Bufaulabe Circle, Kayes Region, Mali.
Photo: Bob Cooke.*

Mindat. N.d. [Houghton County, MI](#).

Mindat. N.d. [Kayes Region, Mali](#).

Mindat. N.d. [Merelani Hills, Tanzania](#).

Mindat. N.d. [N'Chwaning II Mine, South Africa](#).

Mindat. N.d. [O&G Southbury Quarry](#).

Mindat. N.d. [Ofcarsa Quarry, Spain](#).

Mindat. N.d. [Qiaojia County, China](#).

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Olivier, B. 2006. The geology and petrology of the Merelani tanzanite deposit, NE Tanzania. University of Stellenbosch. Ph.D. Diss. 453 p.

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Club Member Auction Coming Up! October 5 Program



Our October 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.

Sellers should come early to set up. The meeting will start promptly at

7:30 p.m. 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 28 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, ***please use the summary sheet*** on page 29 to list all of your items for sale so that the club 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!

We hope to accept payment by cash, check, credit card, Apple Pay, Google Wallet, and Paypal. If paying in cash, bring small bills. Bid early and often, and help us move on to the next item. We end promptly at 9 p.m. with unsold items returned to the owner.

**** 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.



Amethyst geode acquired by a lucky buyer at the 2025 Spring Club Auction. Photo: Hutch Brown.

- 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, above \$100 by \$20.
- 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 at the close of the meeting with cash or check. ➤



Club Meeting Summary September 7 (Labor Day)

by Almas Eftekhari, Secretary

President Jason Zeibel called the meeting to order on Zoom only (it being Labor Day and our regular meeting place closed).

After newcomers to our club introduced themselves, Jason spoke a bit about our annual club picnic in August—generously hosted by Jason and his family—which was a lot of fun!

The club's new lapidary equipment was showcased at the picnic (see page 13 for photos). The equipment will be able to be signed out by club members once liability forms are sorted out. We also have possible acquisition of a couple more machines in the works. Hopefully, they will be functional by early next year.

Lots of people at the picnic expressed interest in faceting. We might consider arranging a field trip related to faceting in the coming year—stay tuned for future announcements.

If you want to have a name tag made for you, email Jason at the address shown on the last page of this newsletter or let us know in person at the October meeting, which will feature our fall club auction (see page 7).

If you are missing club emails, then reach out to Jason and let him know.

Our club Youth Coordinators, Celia Zeibel and Maria Nopo, have set up a new IG account for the club. A new Youth Coordinator position will be available during the coming academic year. Students who are not seniors can apply. Let Jason know if interested.

Katy Johnson, our Field Trip Co-Coordinator, announced upcoming field trips (see the article on page 17).

Vice President Jennifer Grimes invited speakers by Zoom. Gulia Stronkin, who lives in Bangkok, spoke about job market differences between Bangkok and New York in relation to predictions for good gem investments. Another of Jennifer's gemologist friends, Deanna Wakim, spoke about her job as a gemstone buyer for Brilliant Earth. She listed the trending stones she is focusing on and talked about her experiences at this year's Tucson mineral shows. 📌

Save the Date Desautels Micromount Symposium

The Baltimore Mineral Society

70th Paul Desautels Memorial
Micromount Symposium

October 9-11, 2026

Natural History Society of Maryland, 6908 Belair Rd,
Baltimore, MD 21206

Friday, October 9

- 7 p.m. Registration, coffee, and treats
- 8 p.m. Fellowship with other micromounters;
short talks and slide shows

Saturday, October 10

- 9 a.m. Symposium opens: trading, giveaway tables,
mineral sales
- 10 a.m. Silent auction
- 12 noon Light lunch (provided)
- 2 p.m. Voice auction
- 3 p.m. **Micromounters' Hall of Fame induction**
Conducted by Quintin Wight, Manfred Seitz, and
Alan Pribula

Announcement of next year's honorees

A Life Without Minerals: Possible but Lacking in Substance

Presented by Manfred Seitz

- 5 p.m. Dinner (at local restaurants on your own)
- 7:30 p.m. **I'm Not Going to Become a Micro-
mounter and Other Lies I've Told Myself**

Presented by Alan Pribula

- 9 p.m. Adjournment

Sunday, October 11

- 9 a.m. Trading, giveaways, conversation
- 12 noon Symposium concludes

Questions? Mike Seeds (mseeds@fandm.edu)

Symposium Chair



President's Message

by Jason Zeibel

Greetings, NVMC, and welcome to fall! This is a time of rapid change as the days get shorter and the weather gets cooler. For our family, this is the heart of high school marching band season. We are committed every weekend be-

tween now and the NVMC show in November. It's very hectic but a touch bittersweet because Celia is a senior this year. So our family is trying to enjoy it, even though it is very time consuming.

Annual Club Picnic

In terms of club activities, the season started off right with a huge picnic and rock swap in late August. We unfortunately had to delay the picnic a week due to bad weather. But in the end, the new date greeted us with picture-perfect weather for our event. It was a pleasure to host it, and over 50 people showed up. We swapped plenty of stories and swapped a lot of rocks and minerals as well.

The picnic also saw the debut of our club's newly refurbished rock saws! Thanks to the generosity of a donor, we have a suite of saws that will soon be available for checkout. A huge shoutout go to Noah and Xavi for taking on the task of getting the saws up and running again, including upgrading some 50-plus-year-old electrical cables. Noah and Xavi started cutting rocks near the beginning of the party, and 4 hours later the saws were still running. Several folks got a chance to try their hand at it, including Jason K. and some of the younger members. (For those who missed it, check out the photos on page 13.)

Upcoming Club Activities

We kicked off the fall meetings with our Labor Day Zoom meeting. It was great to hear from many of our members on what they did over the summer. In addition, we had a couple of awesome guest speakers arranged by our Vice President, Jennifer Grimes. We got to hear about lagoon tourmaline and the amazing new stuff coming to market now in Bangkok, Thailand. The best part was that the speaker was literally in Bangkok! The wonders of our connected world continue to demonstrate themselves.



Club president Jason Zeibel and family hosted the 2026 NVMC picnic in late August. All photos: Jason Zeibel.

Very unfortunately for me and the club, I had a brief Internet hiccup at the start of the meeting and did not realize that it killed the recording of the meeting. So those of us that got to hear the presentations were very lucky, and now we must find a time to invite them back to hear more. To the rest of you who missed out and can't see the video, my apologies—but take our word for it, we saw some pretty stones.

As fall gets underway, don't forget about our club's upcoming trip to the Savage Stone quarry in Maryland on October 10. This should be an easy drive for everyone, so sign up soon if you haven't already so long as there is still space. Just a reminder that you must have your dues currently paid to attend field trips.

Summit Bechtel Reserve

I want to look back on a fun geology-themed event with my daughters in the second half of July. As regular readers of my column will remember, both my girls have spent many years in the Scouting America Program (formerly known as Boy Scouts of America (BSA)). Celia is an Eagle Scout and Lyra is very close.

We had the opportunity to attend the National Scout Jamboree this summer. This is like the Olympics for Scouting, traditionally held every 4 years. The last few Jamborees have been held at the Summit Bechtel Reserve near Glen Jean, WV, right next to the New River. I have written previously about the geology of the New



Above: Jason with daughters Celia and Lyra at the 2026 National Scout Jamboree in Glen Jean, WV (above). **Left:** Lyra at a hands-on display for the Mining in Society Merit Badge display.



The land on which the Summit sits became accessible in 1873 upon completion of the C&O Railway line through the New River Gorge. That opened the area to an enormous growth of mining activities, and of course with that came miners. In most miner camps, most of the semilevel land was taken up by mine facilities, businesses, railroads, or housing. Miners, being industrious and self-sufficient folk, needed a place to be able to grow gardens to feed their families. The plateau above the New River Gorge was relatively flat and ideal for gardens because much of its timber had been cut for mine construction. The area therefore became known as “[Garden Ground](#).”

In 1880, coal baron Thomas McKell purchased 25,000 acres of land around the Garden Ground plateau, including all the land that today is now the Summit Bechtel Reserve. Large-scale strip mining took place in the vicinity, with the area around [Mount Jack](#) (the high point in the Summit) being mined in the 1950s-

River in this column, so I won't again. I would like to mention the more recent history of the Summit.

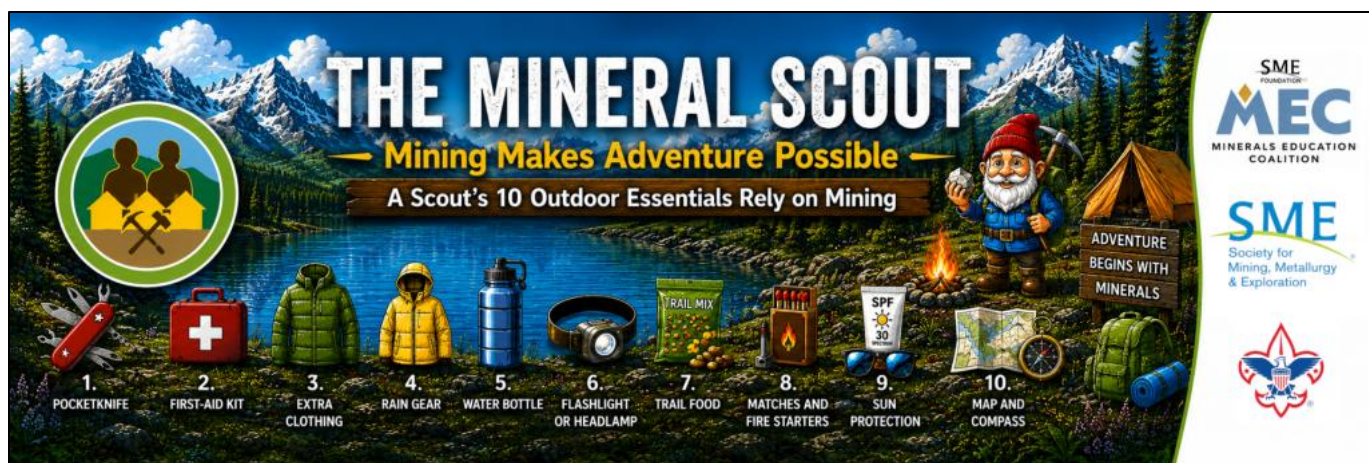


Figure 1—Poster showing how all of the "10 outdoor essentials" for Scouts come from mining.

60s. Most coal seams reachable by strip mining in the Summit had played out by the end of the 1960s. The remnants of long-abandoned surface mines created wide flat areas in a series of benches, effectively pre-grading and excavating the property and allowing for many of the roads and infrastructure on the property to begin construction through manageable earth moving.

In 2009, BSA purchased about 10,600 acres of Garden Ground for the Summit Bechtel Reserve. Since then, thousands of Scouts have hiked up Mount Jack to learn the history of the area. The Summit is now home to one of the four National Scouting America high adventure bases. It hosted its first National Jamboree in 2013 and also hosts regular high adventure activities such as rock climbing, whitewater rafting, hiking, and ziplines throughout the year.

Once the Scouts had purchased the land for the Summit and land reclamation began, they pushed to build on its history and link to the mining industry. In 2015, a new merit badge was created—Mining in Society. It focuses on how the mining industry contributes to things Scouts use in their activities (fig. 1).

Celia earned the merit badge during the last National Jamboree in 2023, and Lyra also earned it last July. The staff had several large tents with exhibits on the mining history of the Summit and on the link between mining and all the stuff we use in our everyday lives. This theme should sound familiar to anyone who has visited the Minerals in Context exhibit at our annual NVMC show. If you want to hear more about the Summit and Mining in Society merit badge, the staff put

together a wonderful 5-minute YouTube video that is available [here](#).

Donated Books

Once again, I am happy to report that we have received a rash of donations to the club of both minerals and books. The minerals will be used for this month's club auction, for the show auction in November, and for door prizes.

But I want to highlight the books, each of which is on the mineral resources of Virginia (fig. 2). What interested me was that one was a book by R.V. Dietrich from 1990 and the other was by Thomas Leonard Watson from 1907! I was amazed how detailed the 1907 edition was, with maps, drawings, photographs, chemical compositions, and elegant descriptions of mining sites. The 1990 version, however, read more like an encyclopedia—useful, but without the attention to detail and care that was clearly evident in the older edition. These will both be around at upcoming meetings and likely up for auction at the annual show.

Upcoming Club Show

I want to remind folks that our show will feature 10 cases for exhibitors. Several of you have asked me for one. I encourage folks to email me to confirm (and so that you are not relying on my memory!).

My guess is that we have three to four cases unspoken for. Consider putting in an exhibit! There will be a prize for the winning case this year, with judging by our sponsor at George Mason. If all goes well, there will also be a separate UV case that won't be part of the judging but that members can use to display a few

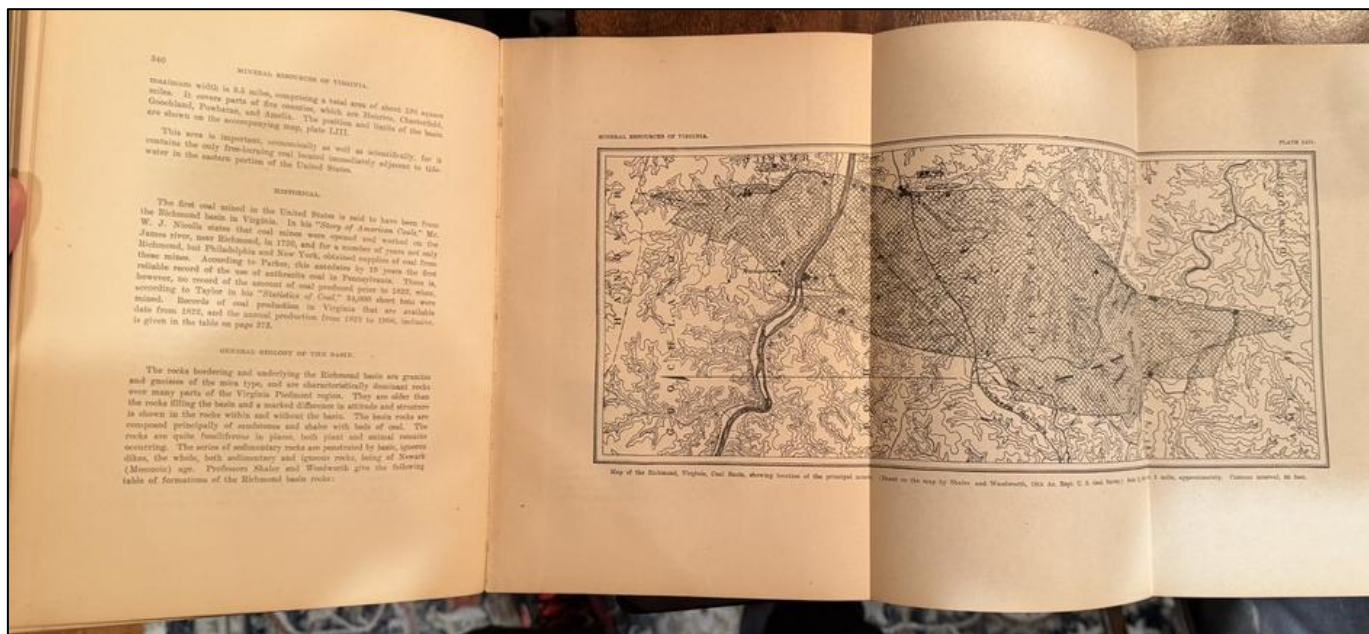


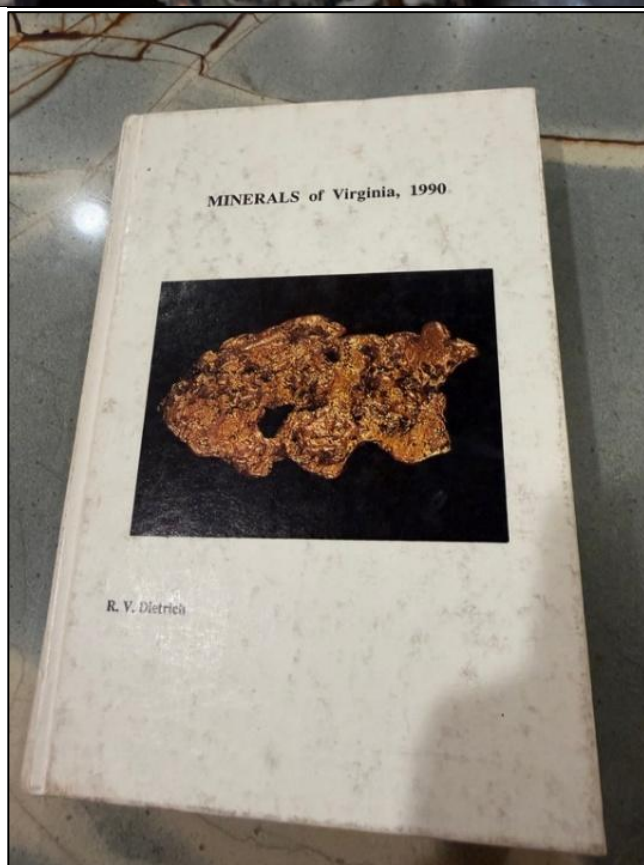
Figure 2—Books donated to NVMC, both cataloguing the minerals of Virginia, include one from 1907 by Thomas Leonard Watson (above) and one from 1990 by R.V. Dietrich (right).

of their favorite fluorescing minerals. If you are interested, reach out to me so that we can make sure we have enough space for everyone who wants to exhibit a few specimens.

October Meeting

At our October meeting, we will be taking orders for name tags (\$15). We will hopefully also be taking orders for hoodies! I'm looking forward to having lots of NVMC-branded swag! Keep in mind that October is also our club's fall auction. Any current dues-paying member can auction items, but you have to fill out auction sheets and bring them with you (see pages 28-29). We plan on being able to take cash, check, and credit—so you have no excuse not to spend a lot! The club will bring pizza and sodas, and bidding will start right after a short business meeting. Bidding ends promptly at 9 p.m., so if you want something brought up for auction, let the auctioneer know!

Jason





Cutting Rocks at the NVMC Annual Club Picnic





Club Show Coming Up! November 21-22, 2026

by Tom Taaffe, Show Chair

The NVMC is holding our 34th Annual Gem, Mineral, and Fossil Show this fall at George Mason University (GMU) in Fairfax, VA. The show will be on November 21-22 and take place in Dewberry Hall, Johnson Center Building, on

GMU's Fairfax campus. This event has ongoing sponsorship by GMU's Department of Atmospheric, Oceanic and Earth Sciences through our GMU liaison, Dr. Jules Goldspiel, an assistant professor in the department.

Show hours will be from 10 a.m. to 6 p.m. on Saturday, November 21, and from 10 a.m. to 4 p.m. on Sunday, November 22. Admission will be \$6 for adults, \$4 for seniors (65-plus years old), and \$3 for teens (13-17 years old). Admission is free for children 12 and under who are accompanied by a parent. Admission is free for GMU students, faculty, and staff with ID. Scouts in uniform get free admission as well.

Show volunteers needed!!

Parking at the Show

Friday Show Setup. Dealers will arrive on Friday, November 20, to set up for the show, as will club volunteers to help out. Parking in GMU lot A will be free for both groups, but you will need to register beforehand using a QR code (link). When the show draws closer, we will make the link available. Stay tuned!

Saturday/Sunday Show Attendance. Whether you volunteer to help out or simply attend as a club member, you can park for free in GMU lot A on Saturday and Sunday. Simply scan the QR code on our show flyer on page 16, then enter your license plate number and email address. You can do so any time between now and the club show.

Staffing the Show

We will use [Signup Genius](#) to recruit volunteers and assign show tasks. All volunteer positions are shown if you click on the link above—please sign up early and for as many positions as you can manage!



Scene from our annual club show in November 2023.

Photo: Tom Taaffe.

What follows are ways in which club members can help with this year's show.

This year, we will have earlier access to the GMU Johnson Center for **show setup on Friday afternoon**, which will help everyone involved. We will need a group of volunteers to bring items from the club's storage unit to the Johnson Center. We also need lots of volunteers for the actual setup. Jason Zeibel will likely lead a team in assembling and positioning the club exhibit cases. John Weidner will need lots of help in setting up the Kids' Activity Room. Club volunteers will also be needed to help dealers and exhibitors unload their goods at the loading dock and bring them in. Other chores include placing directional signs on campus, setting up the admission tables, assembling the club's banner, and more.

You can also volunteer to help during actual show hours on **Saturday and Sunday**. We always need volunteers for the **Kids' Activity Room** to administer quizzes and rock-related puzzles and award specimens to kids who earn them. Volunteers field questions and help with mineral and fossil identification. The Kids' Activity Room can get a little crazy at times, but it's lots of fun and very worthwhile. Contact John Weidner at jfweidner@gmail.com if you have questions.

We always need volunteer help at the **admissions table**. If several club members take a shift or two, it makes the process less chaotic and more efficient. If you are interested in helping and have questions, please let Roger Haskins know at treasurer@novaminal.club.

When the show ends on Sunday, we will need volunteers to help with **teardown**. We specifically need volunteers to help pack up the Kids' Activity Room and gather all the club's equipment and gear. This includes disassembling exhibit cases and club banners and retrieving campus directional signs. We will need many helping hands and several vehicles to bring it all back to our nearby storage unit.

Donating Specimens for Kids

You can further contribute to the show by donating mineral and fossil specimens for our kids' mines in the Kids' Activity Room. The specimens should be suitable for children, nothing too big or small (1-3 inches in size and about 1-4 ounces in weight). The specimens should be somewhat interesting and somewhat attractive and hopefully have some educational value. No junk please!

Donated specimens should not be toxic, sharp, splintery, or otherwise dangerous. They would also be best in their natural unpolished state. Specimens from nearby localities are great choices, such as prehnite, amazonite, amethyst, and garnet.

Specimens for Door Prizes/Silent Auction

Once per hour during the show on Saturday and twice more on Sunday morning, we announce and award door prizes. (Door prize drawings come to an end before Sunday's Silent Auction.) We depend on club member donations to add variety to door prize offerings and to the Silent Auction.

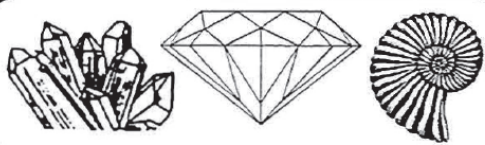
If you have specimens to donate that are suitable for either purpose, please bring them to an in-person club meeting (at the Dunn Loring Fire Station) and hand them directly to a club officer. If that is impractical, please contact one of the two club members who will be organizing the Silent Auction and door prizes, Craig Moore at crrocks77@icloud.com or Jeff Guerber at jeff@guerber.net. You can also contact Show Chair Tom Taaffe at rockellctr@gmail.com.

Exhibit Cases

Club President Jason Zeibel hopes to accommodate a few more club member exhibits at our show this year. If you are interested in designing and displaying an exhibit, please contact Jason at president@novamineral-club.org or Tom Taaffe at rockellctr@gmail.com and let us know what your subject matter would be. ↗

2026 Gem, Mineral, and Fossil Show: Participating Dealers

- R and L Minerals, Ron & Linda Tonucci, Waldorf, MD
- Jon Feigin, Old Bridge, NJ
- Crystal Luxe Lighting, Aldeane Josephs, Bethesda, MD
- Bob Farrar, Bowie, MD
- Alan's Quality Minerals, Mount Laurel, NJ
- The Garnet Group, Casper Voogt, Sterling, VA
- Dave Hennessey, Woodbridge, VA
- Ken Reynolds, Herndon, VA
- KBT Minerals & Fossils, Tom Taaffe, Vienna, VA
- The Mineral House, Tom & Pam Kottyan, Bucyrus, OH
- Broken Back Minerals, Eric Meier, Wilmington, DE
- Andy Dietz, Ashland, VA
- Stone Soul Crystals, Jere Myers & Lee Anne Myers, Queenstown, MD
- Ken Rock, Rock's Rocks & Minerals, Oakton, VA
- Frank M. Smith II, Smith & Sons Fine Minerals, Roanoke, VA



34th Annual GEM, MINERAL AND FOSSIL SHOW

Presented by The Northern Virginia Mineral Club, Inc. | www.novamineralclub.org/show

Sponsored by the Dept. of Atmospheric, Oceanic and Earth Sciences at GMU

Date: November 21 & 22, 2026
Place: Dewberry Hall, Johnson Center
George Mason University - Fairfax Campus
GPS: www.bit.ly/3fBZfh8 (takes you to GMU's Lot A)
Hours: Saturday 10am-6pm, Sunday 10am-4pm
Admission: Adults: \$6, Seniors (65+): \$5, Teens (13-17): \$4
Children 12 & under, accompanied by adult are FREE
GMU Students & Faculty w/valid ID are FREE.
Scouts in uniform are FREE.

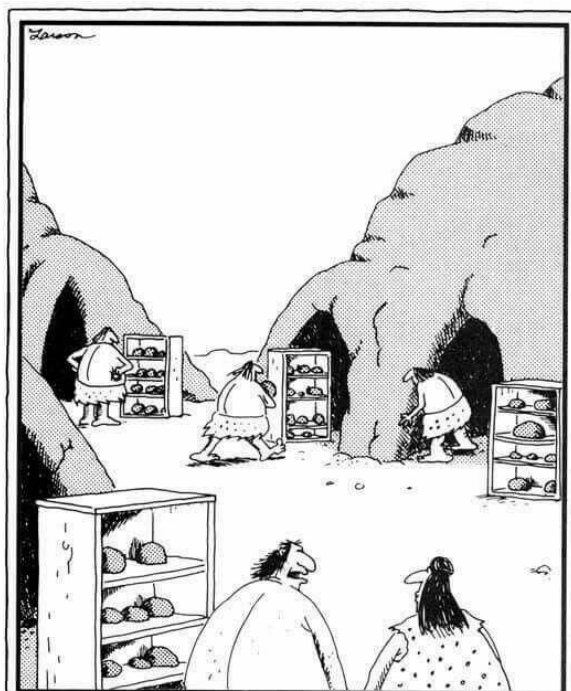


Scan This Code to Register for
Free Parking Permit in Lot A

Features: Demonstrations, Exhibits, Kids Activities, and Door Prizes.
Mini-mines for children to dig in and get free fossils and minerals.
SILENT AUCTION on SUNDAY
Approximately 20 Dealers with Gems, Minerals & Fossils for sale.

\$1 OFF
Adult admission
with this card
(applies to all adults &
seniors in your group)

Enter Lot A @ Mattaponi River Lane off Patriot Circle
Look for our Courtesy Shuttle & Designated Walking Path to Mineral Show



"You know, I used to like this hobby. ... But shoot! Seems like everybody's got a rock collection."

Field Trips

Field Trip Limits Explained

by Katy and Mickey Johnson, Field Trip Co-Chairs

Many factors can go into setting participation limits for a field trip or geology walk. Sometimes the limit is set by the host. Sometimes we have multiple leaders, sometimes only one, which can also constrain the number of participants.

We discuss the number of participants with those leading the field trip or geology walk at the very earliest stages of planning. Limits are determined before the field trip information is sent to club leaders and then on to the general club membership.

Another reason for limiting the number of participants can be the quality of the experience, especially for site tours or geology walks. With too many people in attendance, it is very hard for everyone to hear and participate. Safety and liability are also at the top of the list of factors determining the number of participants.

Ultimately, we limit attendance to the number of participants we are comfortable with managing, together with event leaders, in order to ensure safety and quality.

We hope this helps to explain why we set participation limits: our intent is not to set limits per se but rather to ensure that we can continue to deliver fair and equal opportunities to attend both safe and high-quality field trips and other events. In a perfect world we could take everyone with us on every field trip. Unfortunately that is not the case.

Keep an eye out for emails from Jason Zeibel on upcoming field trips and other events. Have your dues paid, and complete the form right away. Definitely get on the wait list; we add from the wait list whenever at all possible.

And if you really want to increase your chances of attending every trip, join the club's leadership. Those who make the club work get advanced access to the signup forms.

Our **next field trip** is to Savage Stone quarry in Maryland. Upcoming trips we are currently working on scheduling: a Potomac Marble Walk, the Montour Fossil Preserve, and the Gold Mining Camp Museum. ↗



Fewer Yellowstone Earthquakes

by Michael Poland

Editor's note: The article is from Idaho Capital Sun, 20 June 2024. Thanks to Sue Marcus for the reference!

Every year since 2017, the Yellowstone Volcano Observatory has summarized yearly geological activity—earthquakes, ground deformation, geyser eruptions, and so forth—and research efforts and findings in a series of annual reports. In these products, you can find information about the numbers of seismic swarms in a given year, the progress made on geologic mapping and dating of Yellowstone deposits, and even the thermal emissions from Yellowstone National Park as detected by satellites.

We're pleased to announce that the 2023 annual report has just been published and is now freely available online [here](#). As is traditional, the summary highlights monitoring data collected over the course of the year. For instance, there were 1,623 earthquakes located in the region in 2023, the largest of which was M3.7. This number of earthquakes was down from the 2,429 that were located in 2022 and the 2,773 that occurred in 2021.

In 2023, there were 24 [earthquake swarms](#), which are groupings of earthquakes that are clustered together in both space and time. The most significant swarm of the year occurred a few miles to the southeast of West Yellowstone, MT, in mid-March and included 138 located events. ... [Read more](#). ↗

Geology of the Willis Mountain Kyanite Deposit

by Roger Haskins

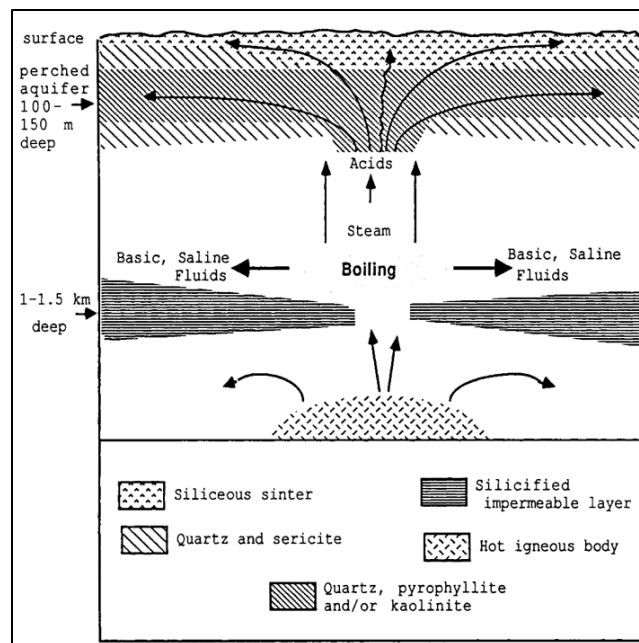
The Willis Mountain kyanite deposit in Buckingham County, VA, is an exceptionally large alumina-rich deposit. Willis Mountain, the most prominent topographic feature in the county, is the world's largest known commercial kyanite deposit, currently providing 45 percent of the world's kyanite production. Production commenced in 1948 and continues in two areas on the property, Willis Mountain and East Ridge. The deposit is about 2,000 meters (6,600 ft) long, 180 meters (590 ft wide), and 12 to 15 meters (39-49 ft) thick. The material is removed by strip mining and processed for market onsite. Mindat gives a combined resource of about 45 million metric tonnes (50 million t) of material at Willis Mountain and East Ridge.

The kyanite deposits resulted from a combination of processes that included original deposition of clastic and volcanoclastic sediments and subsequent alteration by metamorphism and later hydrothermal fluids.

The oldest formation in the vicinity is the Chandler Formation. The Chandler is overlain by the mafic to felsic metavolcanics of the Chopawamsic Formation and then unconformably overlain by the Arvonian Formation of various metasedimentary units. In northeastern Virginia, the Chopawamsic is 600 to 1,000 meters (2,000-3,300 ft) thick. The Chopawamsic Formation has been estimated to be 530-579 million years old (early Cambrian in age) and has been interpreted as representing volcanism within an island arc sequence.

The Arvonian Formation consists of a basal unit of quartz mica conglomerate and quartz mica schist with layers of micaceous quartzite. The next unit upwards is a quartzite, which is overlain by a garnet-mica-graphite schist. The basal unit contains the kyanite schists and conglomerates at Willis Mountain. The Arvonian Formation is middle to late Ordovician in age, based upon abundant fossils in its type area. The entire package of rocks was metamorphosed during the Taconic Orogeny (first uplift of the Appalachian Mountains) to amphibolite-grade peak conditions of 6.5 kbar (18-20 kilometers (11-12 mi) depth—1 bar equals 1 atmosphere of pressure) and 600 °C.

During the Taconic mountain-building event, aluminous clays were metamorphosed into kyanite schists.



Schematic diagram of the formation of the Willis Mountain deposit. Boiling divides the fluid into acidic vapor and alkaline liquid phases. Where hydrothermal fluids reach the surface, hot springs, fumaroles, and mud pots occur.

Source: Cochrane (1986).

The kyanite schists still contain the primary sedimentation features of cross-bedding, graded bedding, and stream channels. At Willis Mountain, kyanite constitutes up to 30 percent of the rock volume, occurring as stringers and lenses in the schist. After metamorphism, volcanic activity introduced hot and acidic fluids flowing through the area around Willis Mountain, converting the kyanite schist to its present form. ↗

Sources

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- Conley, J.F.; Marr, J.D., Jr. 1980. Evidence for the correlation of the kyanite quartzites of Willis and Woods Mountains with the Arvonian Formation. In: Contributions to Virginia geology IV. Virginia Div. of Mineral Res. Pub. 27: 1-11.
- Marr, J.D., Jr. 1990. Geology of the kyanite deposits at Willis Mountain, Virginia. In: Proceedings of the 26th Forum on the Geology of Industrial Minerals; 14-18 May 1990. Paul Sweet, ed. Virginia Div. of Mineral Res. Pub. 119: 129-134.

Fluorescent and Phosphorescent Aragonite From the Pachacayo Mine, Junin, Peru

by Calvin Harris

This paper describes the fluorescence and phosphorescence of multiple specimens of aragonite (CaCO_3) from the Pachacayo Mine, Junin, Peru. The effects are caused by shortwave (254 nm), midwave (312 nm), and two types of longwave (351 nm and 370 nm) radiation.

Site Setting

The Pachacayo Mine is a low-temperature hydrothermal site with karst features. It is located in the central Peruvian Andes at about 11° South, 76° West near the town of Huancayo within the Junín Department. It is well known for aragonite specimens that respond to ultraviolet radiation.

Mineral Description

Seventeen specimens were examined, ranging from cabinet to large cabinet in size. Their daylight colors are a combination of white and brown, as well as individual colors of white, brown, and tan with botryoidal (grapelike) forms. All specimens were purchased through internet sales.

Test Procedures

The procedures allow collectors to carefully observe fluorescence and phosphorescence in the field and under controlled conditions. The procedures can be easily repeated and provide consistent results. Ultraviolet lamps, manufactured by UVSYSTEMS, INC., based in Renton, WA, were placed 3-4 inches away from the specimens to observe fluorescence and 2-3 inches away to observe phosphorescence. A 10-second exposure time provided meaningful observation.

Results

Tables 1-4 show the results by UV wavelength for fluorescence and phosphorescence for each of four specimens (A-D). Figure 1 shows the appearance of specimen A under daylight and its fluorescence under UV light.

Observations and Notes

The results provide additional information regarding the luminescent characteristics of aragonite from the

Pachacayo Mine that mineral collectors will likely encounter themselves.

Generally, all wave lengths produced fluorescence intensities that were either bright or moderate-bright. Also, the wave lengths produced colors that were variations of blue. In a very few cases, a variation of yellow was observed when longwave radiation was applied.

Phosphorescence intensity varied from bright to moderate-bright, but longwave lengths showed lower intensity. In addition, colors tended to be a variation of green, but a tendency toward gray was observed with longwave lengths. Duration times were as high as 9 seconds and as low as 3 seconds with longwave radiation.

The white areas of the specimens provided the brightest luminosity compared to areas that are brown and similar colors.

Organic activators such as fulvic acid and humic acids likely played a significant role in causing the luminosity of these specimens due to the relatively muted colors they produced compared to saturated colors generated by inorganic activators. Studies by Y.Y. Shopov have shown that luminosity in aragonite and other carbonates can be attributed to organic acids and other organic substances; however, admixtures of elements such as manganese and rare earth elements such as samarium may also play a role. ↗

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- Fossilera. N.d. (no date). [Aragonite—Mineral and crystal guide](#).
- Fossilera. N.d. [3.6" cave calcite \(aragonite\) formation—Peru](#).
- Mindat. N.d. [Pachacayo Mine, Junín, Peru](#).
- Shopov, Y.Y. 2005. Activators of luminescence of speleothems—organic versus inorganic. University Center for Space Research and Technologies, University of Sofia, Bulgaria. Abstract book, XIVth International Congress of Speleology. Athens-Kalamos, Greece.
- Shopov, Y.Y. 2003. Luminescence of speleothems. *Acta Geologica* 80: 95-104.

Table 1—Specimen A, fluorescence and phosphorescence by wavelength.

Wavelength	Fluorescence	Phosphorescence
Shortwave (254 nm)	Moderate-bright intensity, white with blue-green tint.	Bright intensity, blue-green color, 6-second duration.
Midwave (312 nm)	Bright intensity, white with blue-green tint.	Bright intensity, white with blue-green tint, 7-second duration.
Longwave (351 nm)	Moderate-bright intensity, blue with green tint.	Moderate-low intensity, blue-green color, 6-second duration.
Longwave (370 nm)	Bright intensity, white with blue-green tint.	Bright intensity, white with blue-green tint, 5-second duration.

Table 2—Specimen B, fluorescence and phosphorescence by wavelength.

Wavelength	Fluorescence	Phosphorescence
Shortwave (254 nm)	Bright intensity, blue-green color.	Bright intensity, lime-green color, 7-second duration.
Midwave (312 nm)	Bright intensity, lime-green color.	Bright intensity, lime-green color, 9-second duration.
Longwave (351 nm)	Moderate-bright intensity, blue-green color.	Moderate-bright intensity, lime-green color, 7-second duration.
Longwave (370 nm)	Bright intensity, white with blue-green tint.	Moderate intensity, lime-green color, 7-second duration.

Table 3—Specimen C, fluorescence and phosphorescence by wavelength.

Wavelength	Fluorescence	Phosphorescence
Shortwave (254 nm)	Bright intensity, green-blue color.	Bright intensity, lime-green color, 8-second duration.
Midwave (312 nm)	Bright intensity, green-blue color.	Bright intensity, lime-green color, 8-second duration.
Longwave (351 nm)	Bright intensity, green-blue color.	Moderate-bright intensity, lime-green color, 6-second duration.
Longwave (370 nm)	Bright intensity, green-blue color.	Moderate-bright intensity, white/light gray color, 6-second duration.

Table 4—Specimen D, fluorescence and phosphorescence by wavelength.

Wavelength	Fluorescence	Phosphorescence
Shortwave (254 nm)	Moderate-bright intensity, sky-blue color.	Moderate-bright intensity, sky-blue color, 7-second duration.
Midwave (312 nm)	Moderate-bright intensity, powder-blue color.	Moderate intensity, blue-green color, 8-second duration.
Longwave (351 nm)	Moderate-bright intensity, powder-blue color.	Low intensity, sky-blue color, 6-second duration.
Longwave (370 nm)	Moderate-bright intensity, powder-blue color.	Low intensity, sky-blue color, 5-second duration.

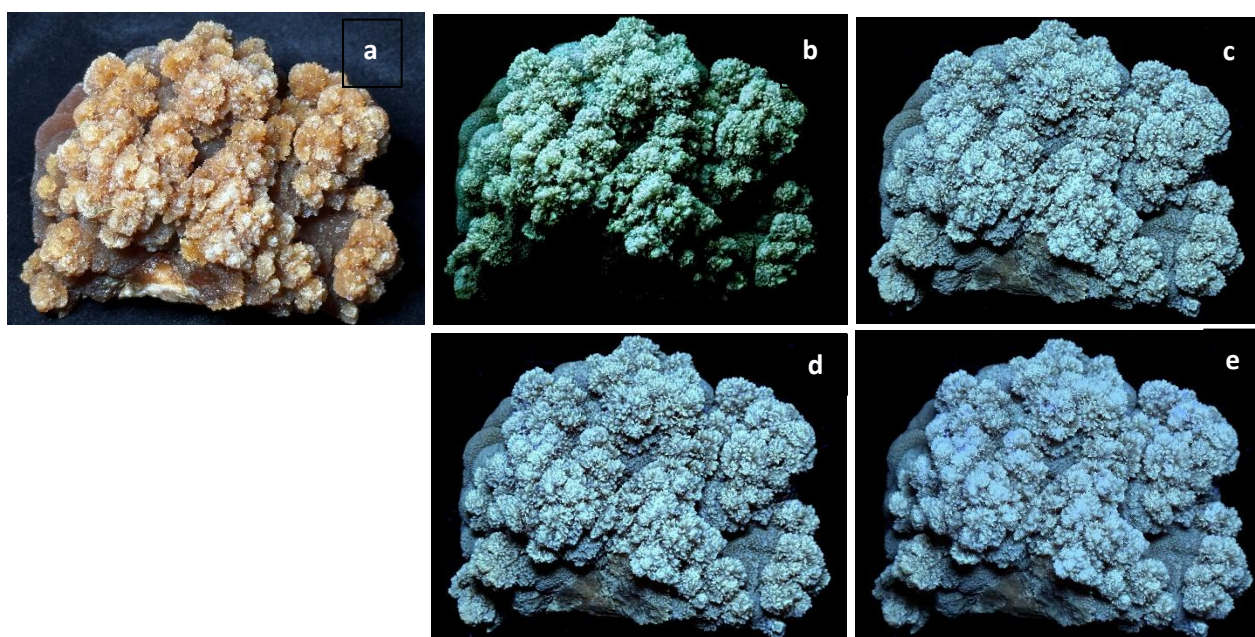


Figure 1—Aragonite specimen A: appearance under daylight (a) and fluorescence under UV light, including shortwave (254 nm) (b); midwave (312 nm) (c); longwave (351 nm) (d); and longwave (370 nm) (e).



The Rocks Beneath Our Feet **Geology Along Quantico Creek, VA**

by Hutch Brown

On July 30, my wife Kathy and I drove to [Prince William Forest Park](#) in Prince William County, VA, to take a [self-guided geology walk](#) created by the National Park Service (NPS), which manages the park. I found out about the opportunity from NVMC Field Trip Co-Coordinator Katy Johnson. Katy discovered a page on the park's website describing the geology walk in detail, with stops, photos, and descriptions. The park has supplemented the online version with signs and interpretive placards in the field (fig. 1, top).

Katy was considering using the NPS geology walk as the basis for an NVMC field trip. I'd been to the park on family hikes in years past and volunteered to check out its feasibility for a club geology walk in late summer or fall. Here's what I found.

Getting There

The park is adjacent to the Quantico military base in Prince William County, and I dimly recalled a sign for the park marking the turnoff from I-95. We hoped to take advantage of light traffic on a late weekday morning, yet it took us more than an hour to get there from Arlington, mainly due to traffic snarls before the Occoquan bridge, where the Interstate narrows.

Part of the delay came from following an online app called Waze. The park is huge, about 13,000 acres in size, with multiple access points for unimproved park roads as well as campgrounds and rental cabins. Waze led us astray long before we reached the highway sign for the turnoff. I wish we'd skipped the app and followed the park's own online directions, which take you to the visitor center, the best place to start.

At the visitor center, we picked up a good map of the park. (If you have a parks pass, the map and entry are free—if not, it's \$20.) The rangers knew nothing about a self-guided geology walk, but they told us that parking lot E (where the walk begins) was closed for construction. They had no idea when it would reopen, but NPS has lost a quarter of its staff since early 2025, and the President's budget for fiscal year 2027 contained another [25 percent in NPS cuts](#). Much of the remaining NPS funding has been siphoned off from roads, trails, and public safety for beautification projects in Washington, DC, so lot E might be indefinitely closed.



Figure 1—Stops on the self-guided geology walk in Prince William Forest Park. **Top:** A sign shows the beginning of the trail at parking lot E. **Bottom:** The trail leads to Quantico Creek and a series of rock outcrops with small waterfalls. (Note the uptilted outcrop behind the gravel bar (arrow).) All photos: Hutch Brown.

Longish Hike

The closest parking is on Turkey Run Ridge, where more park buildings stand. We easily found the ample parking lot there by following the map. The hike to lot E added a mile round trip, including an uphill climb on return. From lot E, the trail takes you down to Quantico Creek (fig. 1, bottom), with another uphill climb on return. Upon reaching Quantico Creek, you head downstream for more than a mile to an old pyrite mine site. From there, the Pyrite Mine Loop takes you on trails and a dirt road. You can keep going up a side stream, but we turned back for a total of about 5 miles out and back. The trails were in good condition and wide enough to keep ticks from being a major worry.

Main Rock Types

Figure 2 shows details from a USGS geologic map, including the features I hoped to see along Quantico Creek (the blue line running from northwest to southeast). We started out near the black line with teeth, which shows a major thrust fault called the Chopawamsic (pronounced chop-uh-WHAM-sick).

The Chopawamsic Thrust Fault stems from the collision of proto-Africa with proto-North America in a great mountain-building event about 320-280 million years ago known to geologists as the Alleghanian Orogeny (Fichter and Baedke 1999). The orogeny broke off pieces of pre-existing metamorphic bedrock and carried them inland on great, nearly horizontal thrust faults, finally pushing them up to where we find them in the Piedmont today.

The inset in figure 2 is a detail from a cross-section of the geologic map. The Alleghanian Orogeny pushed the Harpers (pink, **Cch**) and Chopawamsick (red, **Ocf**) Formations up over another bedrock type called the Lunga Reservoir Formation (**Clr**, orange). All three bedrock types are metamorphic, and all three lie along Quantico Creek within Prince William Forest Park (fig. 2). With any luck, I hoped to see all three.

I thought we might also see sedimentary rocks from Culpeper Basin in the alluvium along Quantico Creek (yellow on the map). The creek itself is too small to transport much sedimentary rock from Culpeper Basin (which lies off the geologic map detail to the west). But the map shows Potomac Formation sediments (green, **Kp**) overlying parts of the metamorphic bedrock within the park. The sediments were brought in by ancient rivers from Culpeper Basin and points west. I thought that the Quantico Creek alluvium might contain sandstones, siltstones, mudstones, and so forth eroded from nearby Potomac Formation sediments—maybe even skolithos trace fossils in Antietam quartzite. Such finds are abundant in the alluvium adjacent to the Potomac Formation in Arlington and Alexandria.

Volcanic Bedrock

We found the first geology walk placard at the head of the trail leading down to Quantico Creek (fig. 3). The second placard, several hundred yards down the trail, described the Fall Line. Together, the two placards told us what we would find at Quantico Creek: a series of volcanic bedrock outcrops and small waterfalls reaching about half a mile downstream. This stretch of outcrops and riffles is called Quantico Cascades.

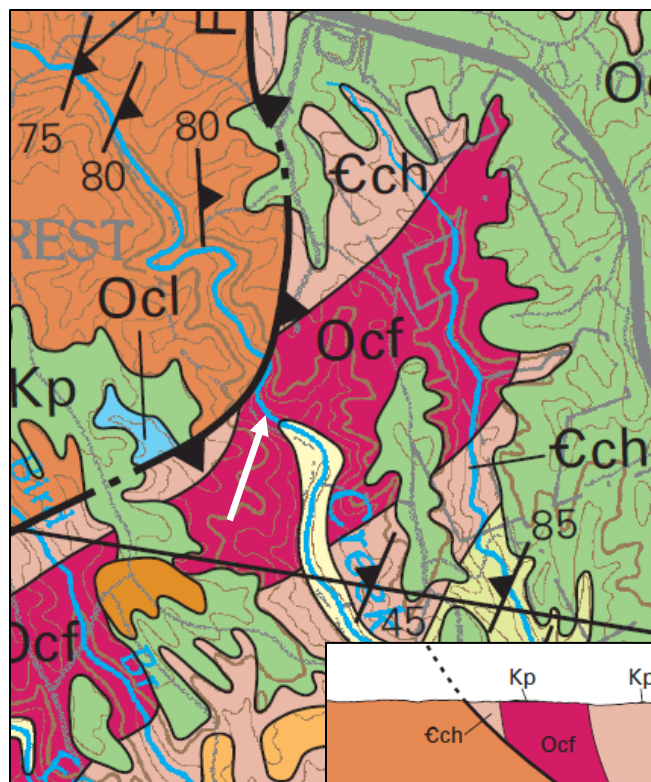


Figure 2—Details from a geologic map showing part of Quantico Creek (arrow) and bedrock types in Prince William Forest Park. The main bedrock types shown are the Lunga Reservoir Formation (**Clr**, orange), Harpers Formation (**Cch**, pink), and Chopawamsick Formation (**Ocf**, red). Overlying sediments (clays, silts, sands, and cobble) constitute the Potomac Formation (**Kp**, green). **C** = Cambrian, **O** = Ordovician, **K** = Cretaceous. Source: Lyttle and others (2017).

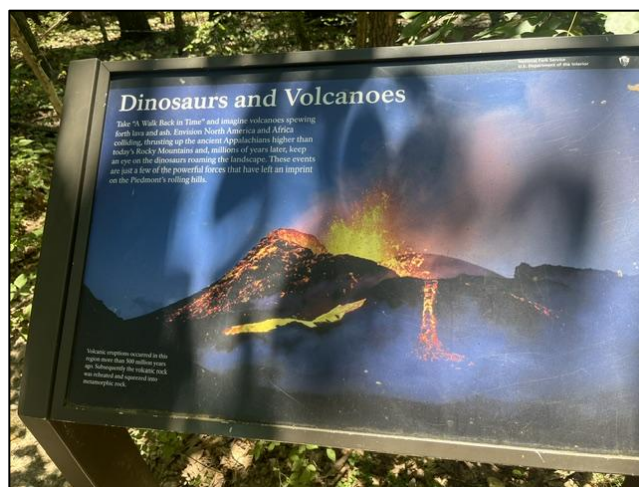


Figure 3—Placard at the start of the geology walk in Prince William Forest Park. The suggestion that the geology in the park stems from volcanic eruptions witnessed by dinosaurs is misleading.

The first placard (fig. 3) suggests a bedrock derived from volcanic eruptions witnessed by dinosaurs. The geologic map does describe the Chopawamsic Formation (fig. 3, **Ocf**, red) as originating from lava flows and volcanic ash deposits (Lyttle and others 2017). But dinosaurs first appeared about 233 million years ago during the Triassic Period, whereas the Chopawamsic bedrock is much older. It originated during the collision of proto-North America with what geologists call the Taconian (or Taconic) Terrane, an arc (curved line) of volcanic islands in the Iapetus Ocean, predecessor of the Atlantic. The resulting Taconian Orogeny took place about 474-450 million years ago (Bentley 2020), long before any dinosaurs. The orogeny raised mountains as high as the Alps are today.

Figure 4 shows the bedrock we saw exposed by Quantico Creek. Light gray and very fine grained, the rock appeared to me to stem from evenly layered sediments (fig. 4, top), presumably ash from volcanic eruptions. The light gray color comes from a predominance of quartz and feldspar in the rock's mineral makeup. Intense heat and pressure from the Taconian Orogeny altered the volcanic tuff into metamorphic rock laced with veins and lenses of quartz ranging in color from white to pink and orange. The rock is sharply uptilted.

Quantico Cascades (fig. 4, bottom) corresponds to what the second placard calls the Fall Line. However, the Fall Line here (and elsewhere) isn't a line but rather a series of riffles and falls across a zone of bedrock exposures that extends well downstream before the creek flattens out as it approaches the Coastal Plain.

Moreover, Quantico Creek doesn't drop from harder onto softer rock, as the placard claims: every outcrop we saw along Quantico Creek looked to me like the same metatuff (metamorphosed tuff). Nowhere on our hike did we see any other type of bedrock; I saw nothing resembling rock from either the Harpers (fig. 3, **Cch**, pink) or the Lunga Reservoir (fig. 3, **Clr**, orange) Formation anywhere near the trail.

I also looked in vain for Potomac Formation sediments on a large gravel bar along Quantico Creek. I saw little but quartz and fragments of the metatuff bedrock, with quartz predominating because it is so erosion resistant. The paucity of Potomac Formation sediments in the alluvium suggests that the Potomac Formation extends barely, if at all, into the Piedmont part of the Quantico Creek watershed. Of course, the Potomac Formation predominates on the adjacent Coastal Plain to the southeast (fig. 3, **Kp**, green).



Figure 4—Metamorphic bedrock exposed by Quantico Creek in the Quantico Cascades—a series of bedrock exposures with small waterfalls across the Fall Line zone for the creek.

Stop 1 Puzzle

Curiously, the spot where we first reached Quantico Creek was stop 2 on the geology walk, not stop 1. Stop 1 is shown on the [geology walk map](#) as a good distance upstream, at a dam for one of several ponds on upper Quantico Creek, this one called Lake 4. In the 1930s, the Civilian Conservation Corps built the dams as part of the infrastructure for newly established Prince William Forest Park. The intent was to control stormwater runoff from badly eroded former farmland and to create small lakes for recreational purposes.

The [geology walk map](#) shows stop 1 as off limits without a camping permit for the campground near Lake 4. No trail leads to stop 1 as part of the geology walk. At the visitor center, the park ranger suggested bushwack-

ing up to the dam along the creek to see the bedrock at Lake 4. At stop 2, we did see a deer trail heading upstream, but we ruled it out as a haven for ticks.

The NPS [geology walk map](#) describes the bedrock at stop 1 (Lake 4) as Precambrian schist from the Wissahickon Formation. But the USGS geologic map from 2017 shows no Wissahickon Formation anywhere in Virginia (Lyttle and others 2017). The NPS map seems to reflect a partially superseded USGS study from 50-plus years ago (Southwick and others 1971). The Wissahickon Formation is now limited on USGS geologic maps to Pennsylvania, Delaware, and New Jersey.

The 2017 geologic map suggests that the bedrock at stop 1 is part of the Lunga Reservoir Formation (fig. 2, **Clr**, orange), specifically a metamorphic rock called metadiamictite. Metadiamictite stemmed from sediments on an ancient seafloor, part of the forearc basin and trench for the Taconian Terrane as it approached proto-North America during the late Cambrian Period. The seafloor collided with the continent first, sliding up onto the continental margin, followed by the volcanic islands. Uplifted by the collision, both helped to form the ancient Taconian Mountains, long since gone.

Pyrite Mine

From stop 2, we followed the trail downstream to the site of the defunct [Cabin Branch Pyrite Mine](#), where we saw ruins of old mine buildings (fig. 5). A nearby bridge takes you across the creek to a boardwalk through an extensive site of old mine tailings (fig. 6), a ruined landscape still recovering after reclamation began in 1994. The forest here is young and sparse, mainly trees like Virginia pine that like disturbed sites.

Pyrite is iron disulfide (FeS_2). Where did the pyrite come from and what was it used for?

During the Taconian Orogeny, rising magma intruded the bedrock, bringing up metals from Earth's mantle, including gold and iron. Tremendous heat and pressure caused superheated hydrofluids—water with dissolved minerals—to circulate through the altered bedrock, filling cracks and other voids. Pyrite formed from iron and sulfur in the hydrofluids, precipitating out of the cooling fluids together with gold and quartz in a broad band of metamorphic bedrock types reaching from near Great Falls south into Virginia's Appomattox County. Geologists call this band of metamorphic rock the Gold/Pyrite Belt. Discovered in the 1800s, it produced gold and pyrite mines in many parts of the Virginia Piedmont into the 20th century.

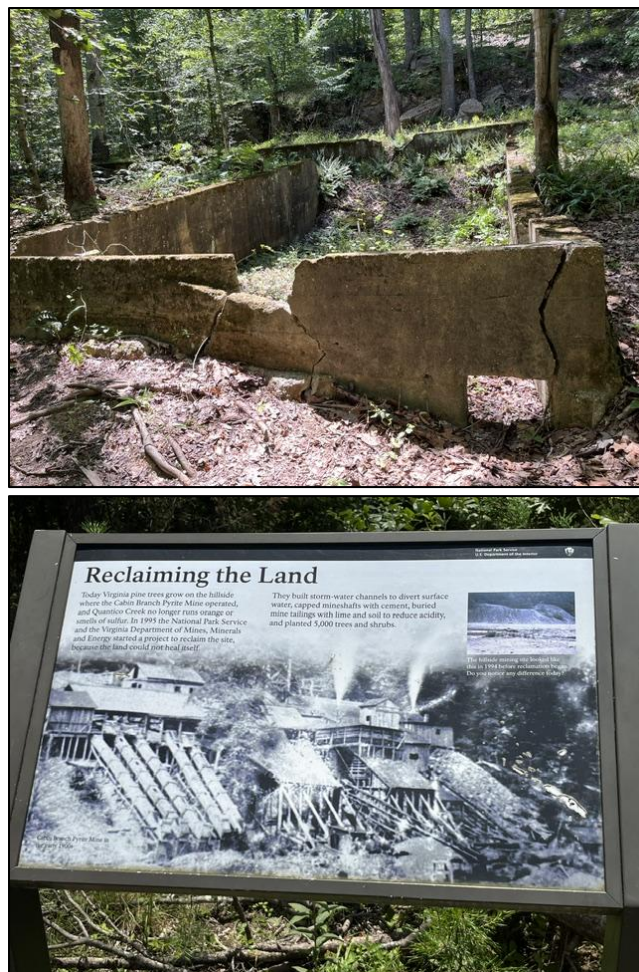


Figure 5—The remains of a building for the old pyrite mine in Prince William Forest Park (top) and a park placard describing sulfur pollution from the mine and recovery efforts beginning in 1994 (bottom).



Figure 6—Site of the pyrite mine tailings (the sign says Pyrite Mine Overlook). The trees here are young and sparse, still struggling to grow in the damaged soils.

In our immediate area, the Gold/Pyrite Belt reaches from Pimmit Run in Fairfax westward to Difficult Run. Gold panning within this area supplied jewelry stores in Georgetown for years. A gold mine operated in the early 1900s near Scotts Run and another near Bullneck Run. On the Maryland side of Great Falls National Park, where Civil War soldiers first discovered gold, the Gold Mine Trail connects old mine sites.

The Quantico area lies within the Gold/Pyrite Belt, and both gold and pyrite were discovered here in the late 1800s. The [Greenwood Gold Mine](#) operated for a few years until closing in 1907. The [Cabin Branch Pyrite Mine](#) was more successful, operating from 1889 to 1920. The sulfur it produced was used in soap, bleach, textiles, and other products.

But the mine left a legacy of pollution: Quantico Creek reportedly ran orange and reeked of sulfur, with acid levels so high that not much could live in the stream. It took a massive recovery effort to restore the area.

The Upshot

We enjoyed our 5-mile hike, taking advantage of excellent sit spots along a lovely burbling stream in a wildland setting. We saw or heard interesting birds like scarlet tanager, white-eyed vireo, and great blue heron, and I spotted plenty of good-sized sunfish in Quantico Creek, a sign of stream recovery.

But as a geology walk, our trip was disappointing. It took a relatively long time to get there by car and more time to walk down to just a few points of interest, with considerable uphill climbs on return (not for everyone). We saw only one bedrock type and nothing of interest in the alluvium. With the exception of the pyrite mine stops, the NPS placards along the way were either misleading—based on outdated science or misinformation—or of little interest. (For example, one placard points out that Quantico Creek erodes the bedrock—so what? The story of Quantico Creek erosion might be interesting, but what is it?)

The NPS [geology walk map](#) indicates a stop 9 near the bridge to the boardwalk leading to the pyrite mine overlook (fig. 6). At stop 9, you can supposedly find mine tailings containing pyrite along a small side stream near the boardwalk. But stop 9 is not marked along the boardwalk, and we didn't see anything like the online photo for stop 9. Moreover, the vegetation in most places along the boardwalk was so thick and potentially full of ticks that we weren't tempted to bushwack in search of any mine tailings.

At the foot of Pyrite Mine Road (part of the Pyrite Mine Loop, which isn't worth it), the self-guided geology walk continues up South Fork Quantico Creek, with stops shown on the [geology walk map](#) in letters rather than numbers. At stop F, the map shows "greenstone," presumably metamorphosed basalt from the Taconian Orogeny, part of the Chopawamsic Formation. That would have been a second bedrock type to see, but it would have added another mile or so to an already longish hike, so we demurred.

A winter trip after ticks are gone might open up new possibilities for the geology walk: bushwacking up to Lake 4 to see metadiamicite bedrock and bushwhacking from the boardwalk to find pyrite mine tailings in brookside alluvium. You could also continue up South Fork Quantico Creek to see the Chopawamsic greenstone (presumably metabasalt). But all that would prolong the walk to 6-7 miles out and back.

If you want to make the trip on your own, I advise getting the excellent NPS trail map at the visitor center and parking at the lot on Turkey Run Ridge (assuming that lot E is still closed). Then hike down to Quantico Cascades, which is really nice and has good bedrock exposures. If you continue on to the pyrite mine site, I recommend crossing the bridge near the mine building ruins (fig. 5, top) and taking the boardwalk to the pyrite mine overlook (fig. 6). Then turn back, for a total hike of about 4 miles. ↗

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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.

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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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.

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			
	14			
	15			
	16			
	17			
	18			
	19			
	20			

October 2026—Upcoming Events in Our Area/Region (see details below)

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1	2 Show: VA Beach	3 Shows: VA Beach; Macungie, PA
4 Show: VA Beach	5 NVMC mtg: Fall Club Auction	6	7 MSDC mtg, Washington, DC	8	9	10
11	12 Columbus Day GLMSMC mtg	13	14	15	16	17
18	19 MNCA mtg?	20	21 MNCA mtg?	22	23	24
25	26	27	28	29	30	31 Halloween

Event Details

2-4: Virginia Beach, VA—Show and sale, Treasures of the Earth; Virginia Beach Convention Ctr, 1000 19th St; Fri 12-6, Sat 10-5, Sun 10-5; \$10 gen'l admission; info: <https://treasuresoftheearth.com>.

3: Macungie, PA—Annual show; Pennsylvania Earth Sciences Ass'n; Macungie Memorial Park, 50 N Poplar St; Sat 8:30-3; admission free; info: Pete Stoeckel, minvamp@yahoo.com.

5: Dunn Loring, VA—Northern Virginia Mineral Club; <https://www.novamineralclub.org/>.

7: Washington, DC—Mineralogical Society of the District of Columbia; <http://www.mineralogicalsocietyofdc.org/>

13: Rockville, MD—Gem, Lapidary, and Mineral Society of Montgomery County; <https://www.glmsmc.com/>.

17-19: Baltimore, MD—Desautels Micromount Symposium, Baltimore Mineral Society; Natural History Society of Maryland; details on p. 8.

20? 22?: Burke, VA—Micromineralogists of the National Capital Area (meeting date varies based on room availability); <http://www.dcmicrominerals.org/>.



Emerald-cut prehnite. Source: Wikipedia; photo: Yaxx.

The Northern Virginia Mineral Club, Inc.

Visitors are always welcome at our club meetings!

EXPLORE OUR [WEBSITE](#)! FIND US ON [FACEBOOK](#)!

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>).

Please send your newsletter articles to:

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Arlington, VA 22203
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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 club member).

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Youth Coordinators: Maria Nopo, Celia Zeibel

Meetings: At 7:30 p.m. on the first Monday of each month at the Dunn Loring Fire Station, 2148 Gallows Road, Dunn Loring, VA.* (No meeting in July or August.)

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

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