THE NORTHERN VIRGINIA MINERAL CLUB INC

The Mineral Newsletter

Next meeting: October 6 Time: 7:30 p.m. (doors open at 7 p.m.)

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



Kyanite

Barra do Salinas, Colonel Murta, Minas Gerais, Brazil

Source: Mindat. Photo: Michael C. Roarke.

Volume 65, No. 8
October 2025
Explore our website!

October Meeting Program:

Fall Club Auction (in person only)

details on page 8

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Mineral of the Month
Kyanite

by Sue Marcus

Editor's note: *The article first appeared in* The Mineral Newsletter *in May 2021.*

Our Mineral of the Month is kyanite, well known to some of us, including those lucky enough to collect specimens. Its name comes from the ancient Greek word *kyaneos*, referring to a dark hue of blue or green—or even brown. Light blue was a different word (*glaukos*) referring to a shade rather than a specific color, so also meaning light green, brown, or yellow.

Kyanite was first described and named by Abraham Gottlieb Werner in 1789. He named it for the blue color for which most specimens are known, taking an ancient word for blue and placing it into a more modern context. An alternative spelling, cyanite—presumably referring to the color cyan—was also used during the 19th and part of the 20th centuries. Cyanite can still be found in some references for the mineral kyanite.

The typical long blades of kyanite crystals give this mineral another name—disthene (two strengths) for the difference in hardness parallel to the length of the blade (6.5–7 on the Mohs scale) and at 90 degrees to the long axis of the blade (4.5–5.5). The physical characteristic of differing hardness in different directions is called anisotropy; kyanite is an anisotropic mineral.

Typically, kyanite is vibrant blue, though crystals can be blue with white zones; rarer forms of red or green kyanite can be translucent and gemmy.

Kyanite forms under high temperatures and pressures. It is usually found in metamorphosed rocks, such as those that were originally siltstones. When the metamorphic rocks erode, fragments of kyanite can mix in with sediments that form sedimentary rocks. This is a good example of the rock cycle: a mineral formed from a sedimentary rock when it was metamorphosed can then be found in a sedimentary rock, which can then be metamorphosed again.

Kyanite is found with staurolite and corundum in metamorphic rocks. Kyanite is the high-pressure form of aluminosilicate (Al_2SiO_5). Two other minerals with the same formula, known as polymorphs, are andalusite, the high-temperature form, and sillimanite, the low-temperature form (there is no low-pressure polymorph).

Happy Halloween!

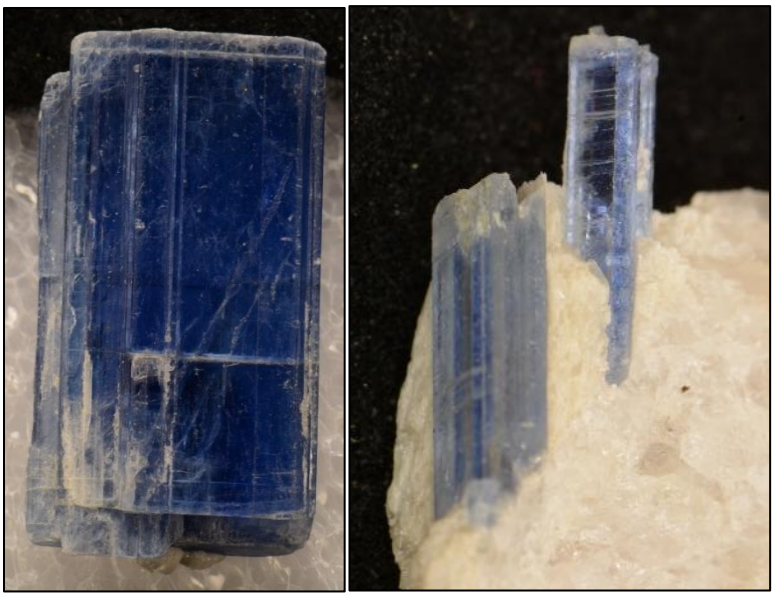
Northern Virginia Mineral Club members,

Our next club meeting will be on **Monday, October 6, 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 8.

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



Kyanite with staurolite, Sponda Alp/Pizzo Forno, Chironico Valley, Ticino, Switzerland. Source: Mindat; photo: Ryan L. Bowling.



Left: Kyanite, Barro do Salinas, Minas Gerais, Brazil. Right: Sponda Alp/Pizzo Forno, Chironico Valley, Switzerland. Photos: Bob Cooke.

Kyanite is not a rare mineral. It is found in metamorphosed rocks in many parts of the world. ***Virginia*** is the main source of kyanite in the United States, the world's leading kyanite producer. So Virginia is the world's top natural kyanite producer and exporter. The Kyanite Mining Corporation extracts kyanite from two pits near Dillwyn, in Buckingham County, VA. Willis Mountain kyanite is relatively pure Al_2SiO_5, giving it a pale blue to white color. Production from this source began in 1922.

Kyanite comprises 10-40 percent of the quartzite in part of the Chopawamsic Formation (early Cambrian in age, about 530–570 million years old). The quartzite was probably squeezed or recrystallized during metamorphosis of felsic and mafic volcanic rocks. Felsic rocks are mostly feldspars and silica (quartz); mafic rocks are darker, heavier, and rich in amphiboles and pyroxenes containing magnesium and iron.

Another Virginia kyanite deposit, at Baker Mountain, is more blue-green than at Willis Mountain, with chromite or iron providing the colorant. Differences in the chemistry of the kyanite and the deposits suggest that the host rocks are from different original sources. Mining began at Baker Mountain in the 1920s; both properties are owned by the Kyanite Mining Corporation.

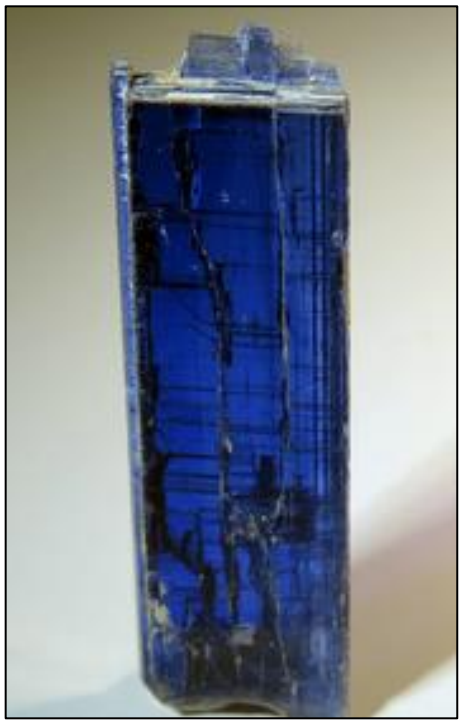
Smaller deposits in ***North Carolina***, including on the Pisgah National Forest, have yielded some zoned and some gemmy crystals along with the more usual crystal aggregates. Spruce Pine, NC, more noted for emeralds, has also been a source of kyanite. In ***Pennsylvania***, kyanite can still be found (though infrequently) at Prospect Park in Delaware County. The Judd's Bridge locality in ***Connecticut*** is old and probably overgrown. It produced specimens with kyanite crystal blades up to about 6 inches long.

Small kyanite occurrences in ***New Mexico*** produced nice specimens, for example from the Petaca District in Rio Arriba County, though photographs may be as difficult to find as recent specimens. Kyanite, with mica and quartz, grew outward from the wallrock into the vein as parallel adjacent crystals. In other parts of the Petaca District, kyanite occurs as a main mineral in schist, as randomly oriented blades and aggregates, and as porphyroblasts in the metamorphic host rocks. Porphyroblasts are larger, commonly euhedral crystals of a mineral within a finer-grained groundmass of metamorphic rock. Curved crystals up to 18 inches long were reported from the Kiowa View II deposit. An economic analysis of this district was conducted in 1960. Tonnage and grade of the kyanite-bearing material were estimated without any drilling to confirm the information. The study identified a deposit but much smaller and lower grade than the Virginia deposit.

Kyanite crystals from ***Brazil*** come in diverse collectible forms. Although I haven't seen all specimens from all localities, the ones from Bahia most impress me. Along with the usual, roughly parallel deep blue bundles, this locality produces gorgeous, unusually translucent single crystals that are light colored, sometimes clear on their outer faces, with a blue stripe in the center. The zoned crystals grow to at least 3 inches, with some having translucent blue or green outer faces,



Kyanite from Willis Mountain, Dillwyn, VA. Photo: Kyanite Mining Corporation.







Far left: *Kyanite, São José da Safira, Minas Gerais, Brazil.*
Left: *Kyanite on quartz, Barro da Salinas, Minas Gerais, Brazil.*
Top: *Kyanite, Sponda Alp/Pizzo Forno, Chironico Valley, Switzerland. Sources: Mindat, photo Edson Ferreira dos Santos (far left); Bob Cooke (left, top).*

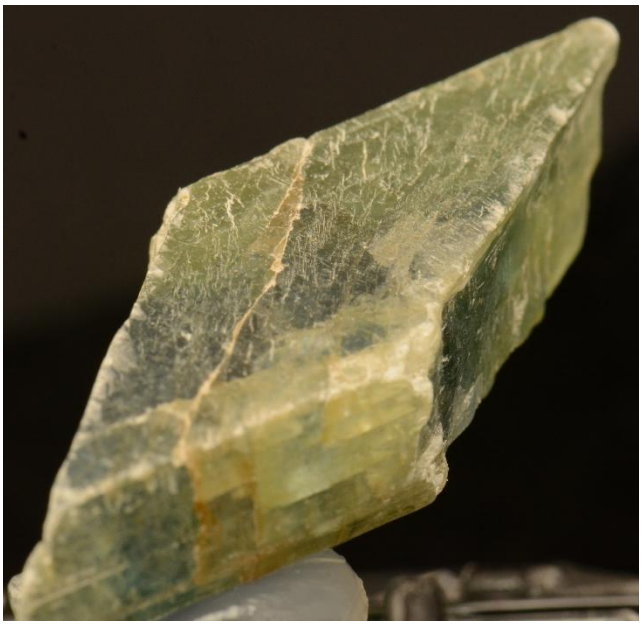
although the center is apparently always blue. I could not determine when these unusual crystals were extracted; but I saw none for sale, and photo publication dates ranged from 2005 to 2018.

Minas Gerais, Brazil, produces many gemstones and lovely crystals of a large variety of minerals from the pegmatite veins there. Sheaves of kyanite crystals are also found in some of these areas, probably in schists that host the pegmatites. Translucent, deep blue kyanite suitable for lapidary work comes from some of these localities. In the Barra do Salina District, crystals reach lengths of up to at least 10 inches, with gemmy ones of up to 4 inches.

Also in Brazil, near the city of Goiás in Goiás state, blocky and sometimes gemmy kyanite crystals have been discovered. These include one pictured on Mindat and described as blue-green (although it looks green to me, not blue) and therefore more unusual for this species. Emeralds are also reported from the prospects here, but kyanite production does not seem to have been large or to have been reported in readily available English sources after the 1980s.

Our final Brazilian kyanite deposit is another with an unusual color—black or grey, from Ribeirao da Folha in Minas Gerais state. Many (most?) of us would misidentify a specimen if we saw one. It is locally called "witch's broom," an apt description of the appearance of the crystal sheaves. A proposed cause of the color is graphite inclusions. It could be a novelty in any collection—and a fun test specimen for visitors.

The type locality (where a mineral was first found) for kyanite is Pizzo Forno, ***Switzerland***. Kyanite from this



Kyanite, São José de Safira, Minas Gerais, Brazil. Photo: Bob Cooke.




Left: *Kyanite, Ilakaka, Ilhorombe, Madagascar.* **Right:** *Kyanite, Nani, Loliando, Arusha, Tanzania. Photos: Bob Cooke.*

locality occurs with staurolite crystals. The best specimens are translucent blue, long, bladed crystals, with attractively contrasting brown nontwinned staurolite crystals in white quartz or quartzite matrix. In the Alps, kyanite specimens have also come from Mt. Greiner, ***Austria***. To the north, ***Norway*** is home to several small kyanite localities, including one in a roadcut. All of these localities produced attractive blades of blue kyanite. Perhaps the best of these is the Åfjord Formation in the hills north of Nordsandfjorden, Troms og Finnmark, Norway.

Russia is a vast, mineral-rich country, but kyanite specimens are well known only from two locations. Specimens from Borisovskie Sopki, Plast, Chelyabinsk Oblast also provide some novelties. Cabinet-size specimens of blue kyanite contrast with green fuchsite, a variety of muscovite mica, and an unspecified reddish fine-grained mineral, providing a colorful piece to display. Kyanite crystals can be translucent, and some rare ones are "butterfly twins" (joined at the base but flaring into separate individual crystals). Near the Arctic Circle in the Russian Republic of Karelia, Khit Island's dark biotite schists contrast nicely with blue lathes of kyanite, small red garnets (species unknown), and white quartz. The kyanite crystals might be small but can be gemmy in some samples.

Nepal was a surprise and revelation to me. It is a source of stunning deep blue, translucent to transparent kyanite—think of the color of heat-treated tanzanite. Not surprisingly, kyanite from small workings in Daha (Jajarkot) and from the Kali Gandaki River Gorge are used as gemstones. These are also extremely difficult localities to access, with the latter purported to be the deepest gorge in the world due to the high Himalayas. Kyanite from ***Afghanistan*** is similar to what is reported from Nepal, although locations seem harder to pinpoint; many Afghan localities are notoriously vague. Afghan kyanite has an unusual property—it fluoresces! Kyanite has been reported from ***China***, but I have been unable to find information about specimen-producing localities.

Tanzania hosts unusual colors of prehnite. The same is true for kyanite from Tanzania, a unique, beautiful orange! Prospects in the Ngorongoro district were opened for similarly colored spessartine garnets and revealed these unusual kyanite specimens. Twinned crystals take several forms, and most photos show crystals without matrix. A large specimen from this locality appears to be about 2 inches in size. I found several small specimens for sale on internet websites.



Kyanite twin, Nani, Loliando, Arusha, Tanzania. Photo: Bob Cooke.

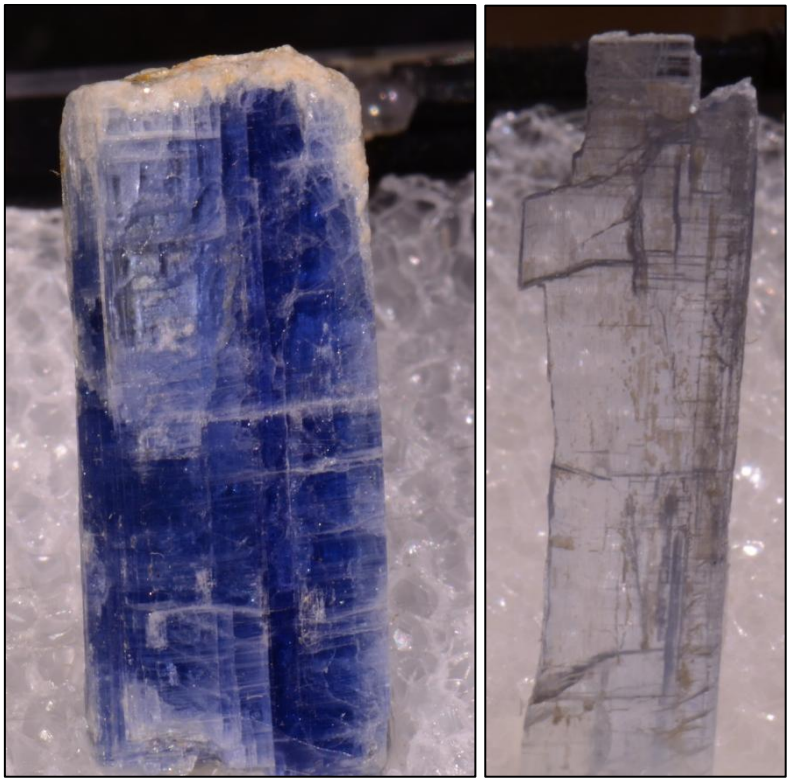
Over in ***Kenya***, kyanite at the Sultan Hamud deposit in the Umba Valley forms single blue crystals up to about 7 inches long. Descriptions of the color of Kenyan kyanites usually call it teal. Very pale blue to white kyanite in radiating aggregates was reported as early as 1925 from the Luisha copper mine in the ***Democratic Republic of Congo*** (then Belgian Congo). Erosion of metamorphic rocks in the Ilakaka region southwest of Isalo National Park in ***Madagascar*** created placer deposits containing sapphires, chrysoberyl, garnets, and kyanite, as well as other minerals.

Fluorescent mineral collectors, do you have kyanite in your collection? I have kyanite in my own, though not the fluorescent kind. Kyanite from Brazil and Nepal might fluorescence red under longwave ultraviolet light and much brighter red under LED longwave. I do not know whether some, most, or all of the material from these localities fluoresces. Kyanite that fluoresces green is reported from Pech, Afghanistan. The Fluomin.org website reports that weakly fluorescing kyanite has been found at the Celo Mines in Burnsville, NC, and at Piestewa Peak (formerly Squaw Peak), AZ. Kyanite from other localities may fluoresce too; check your specimens.

Kyanite forms at high pressure, so it is used in ceramics and other products that must withstand high pressures, like molds for metal products, firebricks, and kiln liners. Kyanite can be calcined or treated with high heat in an oxidizing (vacuum) environment that converts it to mullite, a rare natural mineral. Synthetic mullite is used for familiar products like the ceramic parts of some spark plugs, brake shoes, bathroom ceramic fixtures, and other forms of porcelain.



Kyanite from Nepal, 7.43 carats.
Source: Smithsonian Institution. Photo: Greg Polley.



Left: *Kyanite, Demirci Pass, Anatolia, Turkey.* **Right:** *Kyanite, Barra do Salinas, Minas Gerais, Brazil. Photos: Bob Cooke.*

As a lapidary material, kyanite is tough, and I don't mean simply hard. It is challenging to cut because of its anisotropy (remember—different hardness in different directions). It also splinters.

Kyanite's colors can be lovely. When translucent or transparent and large enough, cut stones are attractive. Beads, cabochons, and faceted stones can be made, but kyanite is more of a novelty than a common gemstone. Faceted stones of up to 20 carats have been reported, as have rare cat's eye kyanite cabochons. Gem-quality kyanite has been found in Brazil, Russia, Kenya, Madagascar, and at the Eldorado Strip Mine in Montana.

I will end with a few words about kyanite in your collection: by all means, include it! Kyanite is affordable: anyone should be able to acquire specimens, even exotic kyanites in rare or even multiple colors—or collect them at Willis Mountain in Virginia. The Kyanite Mining Corporation has opened its property to mineral collectors, and our club has joined recent trips together with other clubs.

You can start with what you can find, in person or using the "silver pick" (money). If you do consider an

internet purchase, *look carefully at the size* of the specimen; I've been disappointed to find the beautiful close-up photographs were accurate but highly magnified. I paid more than I expected for a smaller than expected specimen.

Technical Details

Chemical formula..... Al_2SiO_5

Crystal form..... Triclinic

Hardness ..... 4.5–5.5 parallel to long axis; 6.5–7 on long axis

Density ..... 3.53–3.67 g/cm^3 (measured); 3.67 g/cm^3 (calculated)

Color..... Blue; less commonly white, green, gray; rarely pink, orange, yellow

Streak ..... White

Cleavage ..... 1 perfect on {100}; imperfect on {010}

Fracture ..... Splinters

Luster ..... Pearly, vitreous

Acknowledgment

Mike Morris of the Kyanite Mining Corporation graciously responded promptly to questions and provided photographs of specimens from the Dillwyn site.

Sources

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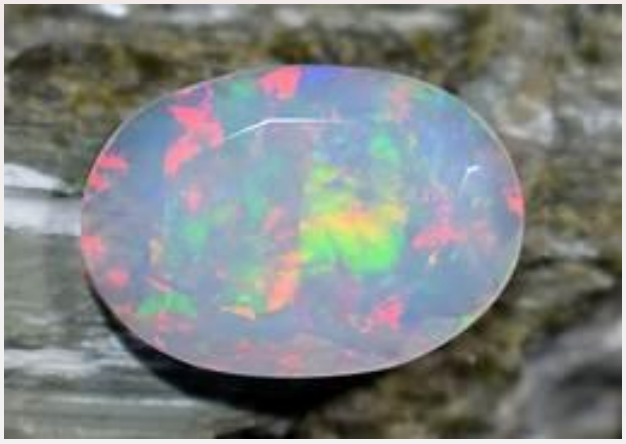
GeoWord of the Day

(from the American Geoscience Institute)

semiprecious stone

Any gemstone other than a precious stone or of lower commercial value than a precious stone. A gemstone may also be regarded as semiprecious because of its comparative abundance, its unfamiliarity to the public, or the whims of fashion. This arbitrary classification is misleading because it does not recognize, for example, that a ruby of poor quality can be far less costly than a fine specimen of jadeite.

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



Club Member Auction Coming Up!
October 6 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 29 for the forms—just print out as many pages as you need). Information on the bid slip should include:

- item number (your initials or other unique code followed by a sequence number);
- description;
- from (locality); and
- starting bid amount (the lowest bid you will accept for sale—if not stated, the minimum bid is $2).

Also, use the summary sheet on page 30 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.

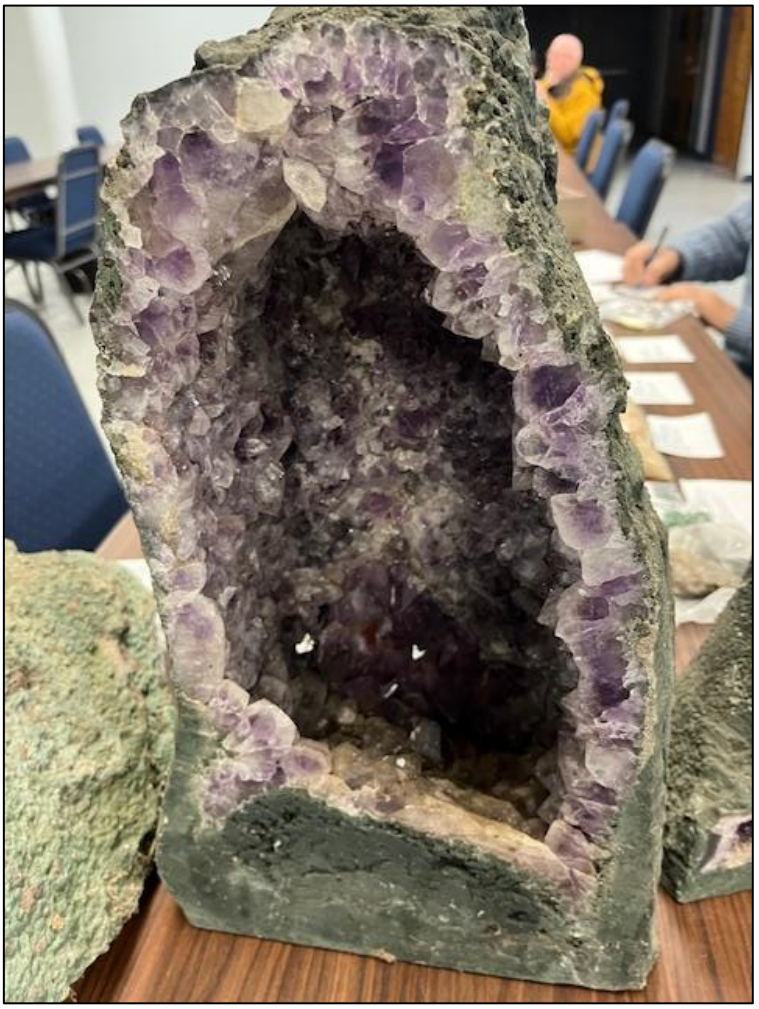
Bring guests or invite nonmembers who might be interested in rocks and minerals! Although only current club members are allowed to sell, the meeting and auction are open to all.

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

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.
- The club gets 15 percent of the purchase price; the remainder goes to the seller



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

- Anyone may donate items to the auction to fully benefit the club (no money goes back to the donor).
- The minimum bid is $2 on any item. The minimum increase is also $2. Bids higher than $20 increase by $5.
- We start with a silent auction to assess interest in each item for sale. So look carefully and start bidding. Items with multiple bids during the silent auction will be brought sooner to the actual (vocal) auction.

Winning bidders must pay for the item promptly at the close of the meeting with cash or check.



Club Meeting Summary
September 1

by Almas Eftekhari, Secretary

President Jason Zeibel opened the meeting by describing the club picnic hosted in August and thanking members for coming. He offered to host the picnic again next year, then reminded members of club officer elections coming up in December. Jason noted that the October meeting for the fall club auction would be in-person only but that the Zoom option would be back for the November and December meetings.

Field Trip Co-Coordinator Katy Johnson announced a trip to Willis Mountain in Virginia for collecting kyanite on September 27. On October 28, the club will host a field trip to Brownie's Beach or Flag Pond in Maryland for collecting sharks' teeth. On November 1, we will travel to Franklin, NJ, the fluorescence capital of the world, to dig at night for fluorescent rocks, with the option to sign up for a tour of the Franklin Mineral Museum.

Field Trip Co-Coordinators Katy and Mickey Johnson coordinated a field trip on August 30 in Alexandria's Dora Kelley Nature Park to explore the geology of Holmes Run Gorge (see the articles on pages 19 and 20). Hutch Brown, who led the geology walk, thanked Katy and Mickey for doing such a great job in setting up these types of events in coordination with master naturalists from Fairfax and Arlington. This cross-pollination has been really great.

Jason reminded club members of the NVMC mineral show coming up in November (see the article on page 13). He said that flyers will be available to distribute in October. We want to maximize attendance, so please let people in your community know—and please sign up to help out at the show. Jason noted that this will be the first year that we won't have many George Mason University students helping out, so we're going to need a lot of club member volunteers beginning with show setup on Friday, November 21, and continuing with admissions table staffing and helping out in the Kids' Activity Room, then with breakdown on Sunday, November 23. We'll discuss logistics at the November club meeting. If you have questions, please reach out to Jason or Tom Taffe, our club show coordinator (their contact information is on page 32).

Vice President Craig Moore thanked Hutch Brown for leading the geology walk, including for preparing a valuable handout for attendees. Craig then introduced the two junior speakers for the night, Celia Zeibel and Linus Koepcke.

Celia's presentation title was "The Geologic Time Periods of Mars." Celia, who has been collecting rocks since she was 5, joined our club in 2015. Talking about the different times scales and time periods on Mars, she described the Crater Density Timescale as recording the number of craters formed over a period of time. She also talked about the Mineral Alteration Timescale. Scientists use both to estimate geologic age. In the Pre-Noachian Period, Mars endured an extremely high rate of meteorite impacts. The planet started to cool down when water vapor condensed into oceans. In the Noachian Period, the largest impact craters formed that are still visible; the planet had lots of volcanos and heavy precipitation. Celia showed pictures of some of the largest volcanoes in the Solar System! During the Hesperian Period, things started turning icy. The slow oxidation of iron-rich rocks gives Mars its reddish color.

Craig next introduced Linus Koepcke, an active member of our club for about 3-1/2 years, who has enjoyed collecting and other field trips. Linus, a rising senior at Oakton High School, said that he was been collecting for as long as he can remember. The title of his presentation was "Beyond the Seven Crystal Systems." Linus did a deep dive into the molecular structure and orientation of crystals, including crystal microstructure. He said that quasicrystals have a predictable internal structure but don't have periodicity; examples are metal alloys.

The first naturally occurring quasicrystalline minerals were recently discovered in a Russian meteorite. Another discovery came from lightning carried by a wire into sand in Nebraska. Amorphous minerals like mercury have no crystal structure but are still classified as minerals because of their chemical and physical properties. The most common amorphous mineral is opal. Some minerals can become amorphous through radioactivity.

Linus's main takeaway: be skeptical of mineral definitions because they can be imprecise.



Hello Fall!

by Jason Zeibel

Welcome to the season of pumpkin spice and cool, crisp mornings! Fall is truly my favorite time of the year. After what is usually a long, hot summer punctuated by stretches of oppressively humid weather, fall provides us with a tangible feeling that things are changing.

In our household, fall is greeted with the breakneck cadence of high school academics and extracurricular activities. The weeks are often bookended with a mix of football games, marching band performances, and Scout campouts—all while trying to master geometry and physics.

Professionally, I have started to do some limited work travel again, and I have some trips coming up to a mix of places, from the mundane to the exemplary. After a week in the middle of nowhere in central Utah, I will be off to the coast of Italy! All this activity comes with the arrival of fall, where changing leaves and changing weather portend rapid and repeated changes in activities. Let's all try to enjoy the changes that come with fall as they race by, lest we look up and the year has concluded without warning!

In September, we were treated to another glimpse of the future of our hobby when we turned the microphone over to two high school students, Celia Zeibel and Linus Koepcke. Celia gave us a lesson on the geological periods of Mars. I bet dozens of folks in the club could name geological time periods here on Earth, but I doubt that any of us knew the Martian equivalents!

Next, Linus had us all questioning what we thought we knew about minerals and crystal forms. We learned that some minerals exist with crystal forms that don't repeat but still tile the volume of space. The degree of order has a gradient, and some minerals occupy an in-between region, having neither a random nor a highly ordered crystal structure. If you missed either of these presentations or any other club business, fear not! Through the magic of tiny transistors, the meeting was recorded! Check it out here.

I'm still hoping to have some of our younger members take advantage of the club's educational travel offer! Any member currently enrolled in an educational program (from elementary school through graduate work) can apply for a grant of up to $400 applied towards travel and/or registration for a national-level geology seminar or show. This could include attending Wildacres or travel to a national show like the annual one in Tucson. Anyone interested in applying should write a paragraph on why they want to go and submit it to the club officers. After attending the event, the student would give a presentation to the club on their experience. This is an amazing opportunity to help defray the cost of one of our hobby's best experiences.

Our field trip team has been putting together another slate of wonderful opportunities to get outside and enjoy mineral collecting in the wild! By the time you read this, the Willis Mountain trip in September will have already happened. It is a challenge to get in there to do some collecting, and certainly a big thank you goes out to our field trip co-chairs, Katy and Mickey Johnson, as well as the fellowship of the Lynchburg club.

Coming up in early November is an opportunity that I really wish that I could take. The club is headed up to Franklin, NJ, to take part in a night dig for fluorescent minerals. That's on my own personal bucket list of collecting trips. Alas, the aforementioned plethora of fall activities will keep our family from making it this time: we have multiple marching band activities on that day.

Nevertheless, you should all join Katy and likely Ken Reynolds as the club heads up to visit one of our area's truly exceptional mineral locations. If you missed Willis Mountain, this would be a great opportunity to take advantage of one of the club's best perks and join us for one of our amazing field trip opportunities!

As club president, I receive regular emails from people in our area who have decided to part with mineral and fossil specimens. Some inherited unwanted minerals, others are downsizing their living footprints. This happened a few times over the summer.

The first one I'll note here is a fossil bed from Morocco (fig. 1). This thing is quite large and has many fossils on it. Another donation is a batch of apophyllite crystals from India (fig. 2). These donations, as well as several others, will make their way to one of our club's biannual auctions or to the annual club auction at our November show.



Figure 1—*Donated Moroccan fossil bed (name tag for scale). Photo: Jason Zeibel.*

A few business items of note. The October meeting will be our biannual club auction! Any club member in good standing is welcome to come and sell their mineral or fossil treasures (look for details on page 8).

I do want to emphasize that keeping the auction manageable means having a time cutoff. The last auction lot will be put up at 9 p.m. We have the meeting hall for a limited time, and it is also a school night; so bid often, and if something that you really want to go home with has not hit the auction block, please advocate for it. We will open the meeting hall by 7 p.m., with the auction starting not long after 7:30. So come early, bring your wallet, and enjoy a good time of spirited competition for some beautiful specimens.

Another item of interest is that our annual club show is rapidly approaching (see the article on page 13). Assuming that construction times go as planned, we will have space for 5-6 more exhibits at the show this year, so please consider signing up to put on an exhibit!

At our November meeting, we will devote time to going through the logistics of what is needed and the various roles that we will need filled by club volunteers. In anticipation, we have a Signup Genius site you can use to already volunteer! Check it out here.

I continue to encourage volunteering for club officer positions for 2026. Please give it serious consideration. As the club grows, we have to spread out the duties and



Figure 2—*Donated apophyllite specimens from India (name tag for scale). Photos: Jason Zeibel.*

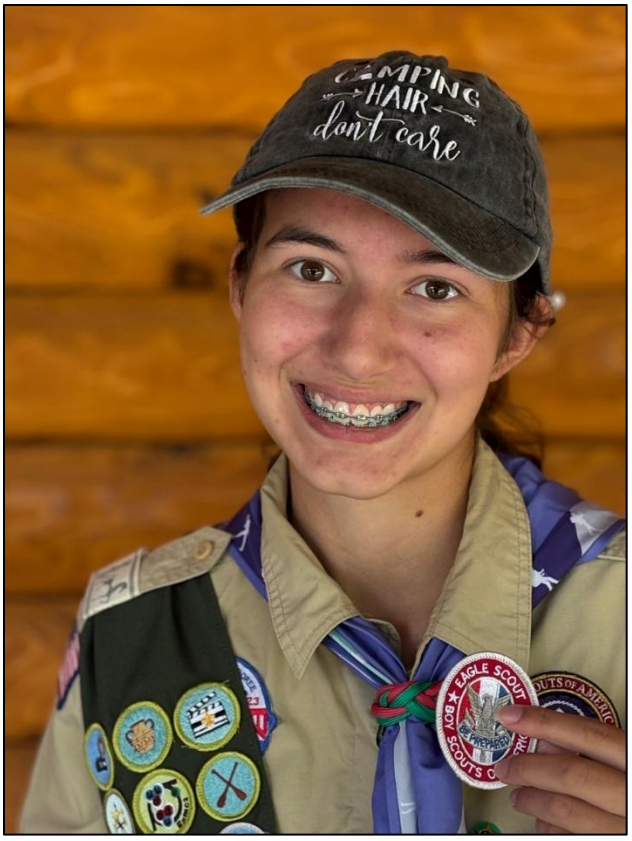
responsibilities as we move forward. Please come talk to me or send me an email if you are at all interested in being an officer in 2026, elected or otherwise. Current club officer positions are shown on page 32; up for election in December are president, vice president, secretary, and treasurer (the other positions are unelected). The officers are nice folks, and the workload is not onerous when spread among enough volunteers.

Finally, I want to end on a note of congratulations. Club member Celia Zeibel passed her board of review for her Eagle Scout rank within Scouting America. This is the culmination of 5 years of hard work. As her dad, I'm obviously quite proud.

However, as a club we should all appreciate the fact that when Celia was asked to "teach something" to the assembled board of senior adults, she chose to teach them about the geological time scales on Mars! I'm quite certain that none of these adults knew anything about Martain geology before Celia came in, so mission accomplished! Whether you prefer your Martian geology in terms of the crater density or mineral alteration timescale, rest assured that there is an Eagle Scout in the club you can discuss it with! So, next time you head off to Mars, don't forget your rock hammer.

In the meantime, get outside and enjoy the changes that fall brings while looking up at Mars and digging for fluorescents with NVMC at the Franklin night dig!

Jason





Celia Zeibel after passing her Eagle Scout board of review and becoming an Eagle Scout, joined below for the ceremony by her family. Photo: Jason Zeibel.



Club Show Coming Up!

November 22-23, 2025

by Tom Taaffe, Show Chair

The NVMC is holding our 33rd Annual Gem, Mineral, and Fossil Show this fall at George Mason University (GMU) in Fairfax, VA. The show will be on November 22-23 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; we introduce a new GMU liaison in the person of Dr. Jules Goldspiel, an assistant professor in the department.

Show hours will be from 10 a.m. to 6 p.m. on Saturday, November 22, and from 10 a.m. to 4 p.m. on Sunday, November 23. 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!!

Staffing the Show

We will use **Signup Genius** to recruit volunteers and assign show tasks. Please go ahead and sign up here! What follows are ways that NVMC members can help with this year's show.

First, we need more than four club volunteers to help with **Friday night setup** on November 21. It starts with volunteers bringing items from the club's storage unit to GMU's Johnson Center. Volunteers help set up the Kids' Activity Room and perform other tasks, such as helping to assemble exhibit cases. Volunteers are also needed to put directional signs around campus to point showgoers to designated show parking in GMU's Lot A. Other volunteers help dealers at the loading dock unload their goods, a process that needs to go smoothly.

You can also volunteer to help during actual show hours on **Saturday and Sunday**. For example, we always need volunteers for the **Kids' Activity Room**.





Scenes from our annual club show in November 2023. All photos: Tom Taaffe.

This job entails administering quizzes and rock-related puzzles, and awarding free specimens to kids who earn them. It also includes fielding questions and helping 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. Feel free to 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@novamineral.club.

When the show ends on Sunday, we will need volunteers to help with **teardown**. We need volunteers to help pack up the Kids' Activity Room and gather all

the club 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

We typically announce and award door prizes to both kids and adults every hour of the show on Saturday and twice more early on Sunday morning. (Door prize drawings end after Sunday's Silent Auction begins.) We depend on club member contributions for both door prizes and 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 rockcllctr@gmail.com.

Exhibit Cases

Club President Jason Zeibel is hoping that our 2025 show can accommodate a few more exhibits. If you are interested in designing and providing an exhibit, please contact Jason at president@novamineralclub.org or Tom Taaffe at rockcllctr@gmail.com and let us know of your interest and what your subject matter would be.

2025 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
- Arrowwood Minerals, Dick & Mary Ertel, Lexington, VA
- Bob Farrar, Bowie, MD
- Alan's Quality Minerals, Mount Laurel, NJ
- The Garnet Group, Casper Voogt, Sterling, VA
- Geosol Imports, Rob Evans, Hawley, PA
- Hartstein Fossils, Gene Hartstein, Newark, DE
- 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
- The Prospector Shop, Marianne Cannon, Gibsonia, PA
- Stone Soul Crystals, Jere Myers & Lee Anne Myers, Queenstown, MD
- Ken Rock, Rock's Rocks & Minerals, Oakton, VA



33rd 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 22 & 23, 2025

Place: Dewberry Hall, Johnson Center
George Mason University - Fairfax Campus
GPS: https://novamineralclub.org/showparking
(Takes you to GMU's Lot A)

Hours: Saturday 10am-6pm, Sunday 10am-4pm

Admission: Adults: $6, Seniors (65+): $4, Teens (13-17): $3
Children 12 & under, accompanied by adult are FREE
GMU Students, Faculty & Staff w/valid ID are FREE
Scouts in uniform are FREE

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

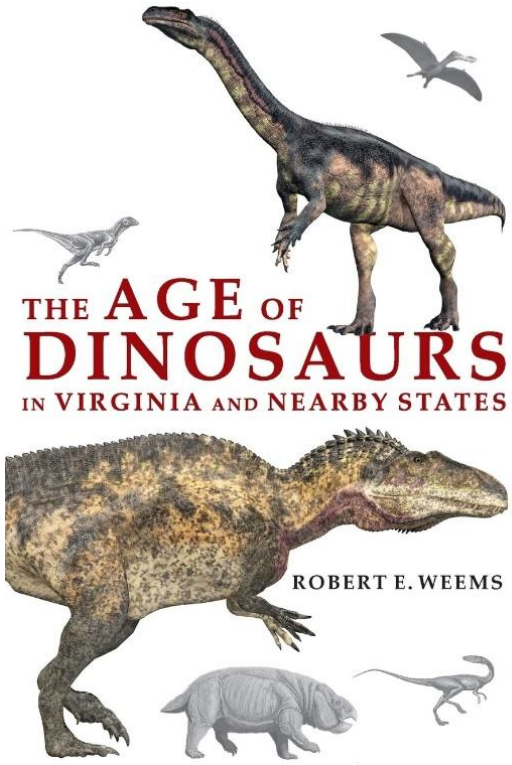
Features: Demonstrations, Exhibits, Kids Activities, and Door Prizes.
Mini-mines for children to dig in and get free fossils and minerals.
SILENT AUCTION on SUNDAY
Approximately 20 Dealers with Gems, Minerals & Fossils for sale.

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

Book on Dinosaurs in Virginia

Rob Weems, *The Age of Dinosaurs in Virginia and Nearby States* (2022)

Editor's note: *Sue Marcus mentioned this book by a retired USGS geologist as of potential interest to club members. The description here is adapted from Amazon.*



Although the fossil dinosaur deposits of the western United States are justly famous and widely appreciated, the fossil deposits of the eastern United States have received much less publicity. *The Age of Dinosaurs in Virginia and Nearby States* provides a detailed guide to the little-known history of the age of dinosaurs from the perspective of the mid-Atlantic states. The book focuses mainly on Virginia, but it also covers the age of dinosaurs in North Carolina, Maryland, Delaware, southern Pennsylvania, and southern New Jersey. It offers a more comprehensive view of the age of dinosaurs in the mid-Atlantic region than any other.

Minerals and Type Localities: What States Have the Most?

In June of this year, the Mineralogical Society of the District of Columbia (thank you, John Weidner!) circulated the latest newsletter of a Pennsylvania-based organization called the Leidy Microscopical Society. The missive included lists of mineral species and type localities compiled by the society's president, Eric Brosius. He compiled the lists based on Mindat information, in turn based on official type locality designations by the International Mineral Association's Commission on New Minerals and Mineral Names.

The commission has been designating new minerals since 1987. Many familiar minerals going back to antiquity are not listed for type locality: quartz and feldspar, for example, have no type localities, nor do diamond, corundum, topaz, and many other minerals.

Nevertheless, for what it's worth, here are some of the results. (Note that Virginia is in the top ten for valid minerals.)

Valid Type Localities: Top 10 States

1. California (158)
2. Utah (129)
3. Arizona (112)
4. Colorado (102)
5. New Jersey (92)
6. Nevada (55)
7. South Dakota (30)
8. New Mexico (23)
9. Montana (20)
10. New Hampshire (19)

Valid Minerals: Top 10 States

1. California (1,106)
2. Arizona (955)
3. Nevada (971)
4. Colorado (894)
5. Utah (886)
6. New Mexico (739)
7. Montana (540)
8. New Jersey (494)
9. Washington (458)
10. Virginia (432)

Save the Date
Desautels Micromount Symposium

The Baltimore Mineral Society

69th Paul Desautels Memorial Micromount Symposium

October 17-19, 2025

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

Friday, October 17

7 p.m. Registration, coffee, and treats

8 p.m. Fellowship with other micromounters and informal programs given by participants

Short talks and slide shows to be announced

Saturday, October 18

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, Ron Gibbs, and Dr. David Roe

Announcement of next year's honorees

Favorite Minerals from 50 Years of Collecting

Presented by Ron Gibbs

5 p.m. Dinner (at local restaurants on your own)

7:30 p.m. **Mineral Rings: A Personal Fascination**

Presented by Frank Ruehlicke

Sunday, October 19

9 a.m. Trading, giveaways, conversation

11 a.m. **Backyard Tales of Discovery: The Pursuit of Microminerals Across Devon, which Revealed 500 Years of Chemistry**

Presented by Dr. David Roe

12 noon Symposium concludes

Luminescent Strontianite From the Holston River Quarry, Virginia

by Calvin Harris

Editor's note: *The author, a member of the Midwest Chapter of Friends of Mineralogy, frequently contributes articles for publication and thought this one might interest NVMC members.*

Few mineralogists have described the luminescence of strontianite from the Holston River Quarry under various wavelengths of ultraviolet (UV) light. This article helps to fill the knowledge gap by describing the fluorescence and phosphorescence of Holston River strontianite under shortwave (254 nm), midwave (312 nm), and longwave (351 nm and 370 nm) UV light.

Mineral Source

The Holston River Quarry is located along Interstate 81 in southwestern Virginia, near Dublin in Pulaski County (at 37.08867 N, -80.66070 W). The quarry is situated within the Holston Formation, a stratigraphic unit of middle-Ordovician limestone (the Ordovician Period was about 443-487 million years ago). As part of the Chickamauga Group of sedimentary rocks, the Holston Formation overlies the Lenoir Limestone Group and underlies the Chapman Ridge sandstone within the Chickamauga Group.

The Salem Stone Corporation mines the quarry for crushed limestone used for aggregate. Aside from strontianite, mineral collectors can find strontium-rich calcite and celestine in the quarry.

Mineral Description

For this test, I selected two specimens from my study collection of fluorescent minerals acquired through purchases on the Internet. The strontianite on each specimen is mostly a thin layer of opaque acicular crystals and minor amounts of translucent rhombic bipyramidal crystals. The crystals are white, no larger than 0.2 inches (0.5 cm), and situated on a tan-colored limestone matrix. A 7×-45× zoom binocular microscope was used to identify the crystal forms.

Test Procedures

Four UV lamps with different wavelengths were used in a dark room. Each one was placed 3-4 inches (7.6-10.2 cm) away from the specimens to observe fluorescence and 2-3 inches (5.1-7.6 cm) away to observe phosphorescence.

A 10-second exposure time was enough to produce phosphorescence for meaningful evaluation. I examined phosphorescence before fluorescence to eliminate the need for eye adjustment in the dark. The manufacturer of the lamps and the portable battery that powered them was UVSYSTEMS, INC., based in Renten, WA.

Results

Tables 1 and 2 show the results by UV wavelength for fluorescence and phosphorescence for each specimen. Figure 1 shows the appearance of specimen A under daylight and its fluorescence under UV light.

Observations and Notes

Although the specimens produced slightly different results, both showed considerable reduction in intensity and duration under longwave UV. Also, a color shift toward the red section of the visible light spectrum occurred with longer wavelengths.

With respect to luminosity, midwave (312 nm) radiation generated the brightest fluorescence. The lowest phosphorescence occurred with longwave (370 nm) radiation.

The colors of fluorescence and phosphorescence can be attributed to trace amounts of the uranyl $(UO_2)^{+2}$ radical and rare-earth elements such as europium ion (Eu^{+2}), dysprosium ion (Dy^{+3}), and others. Strontianite has a broad band spectrum, suggesting that organic complexes might cause the luminosity. This is consistent with results from other carbonate minerals that exhibit fluorescence and phosphorescence.

Selected Sources

Barmarin, G. 2009-10. Strontianite. Luminescent minerals database: search on spectral data.

Mindat. No date. Holston River Quarry, Dublin, Pulaski County, VA.

Mindat. No date. Strontianite.

Pough, F.H. 1960. A field guide to rocks and minerals. Boston, MA: Houghton Mifflin Company: 166.

Salem Stone Corp. No date. Holston River Quarry.

Table 1—Specimen A (ch2024145fl), fluorescence and phosphorescence by wavelength.

Wavelength	Fluorescence	Phosphorescence
Shortwave (254 nm)	Moderate to bright intensity, powder-blue color.	Bright intensity, powder-blue color, 9-second duration.
Midwave (312 nm)	Bright intensity, muted lime-green color.	Bright intensity, lime-green color, 10-second duration.
Longwave (351 nm)	Moderate to bright intensity, cream color.	Low intensity, cream color, 6-second duration.
Longwave (370 nm)	Similar to longwave (351 nm), but slightly brighter.	Similar to longwave (351 nm).

Table 2—Specimen B (ch2024082fl), fluorescence and phosphorescence by wavelength.

Wavelength	Fluorescence	Phosphorescence
Shortwave (254 nm)	Moderate intensity, powder-blue color.	Moderate intensity, lime-green color, 9-second duration.
Midwave (312 nm)	Moderate to bright intensity, white with blue tint.	Moderate to low intensity, lime-green color, 6-second duration.
Longwave (351 nm)	Moderate to low intensity, cream color.	Very low intensity, forest-green color, 4-second duration.
Longwave (370 nm)	Similar to longwave (351 nm).	Extremely low intensity, forest-green color, 2-second duration.

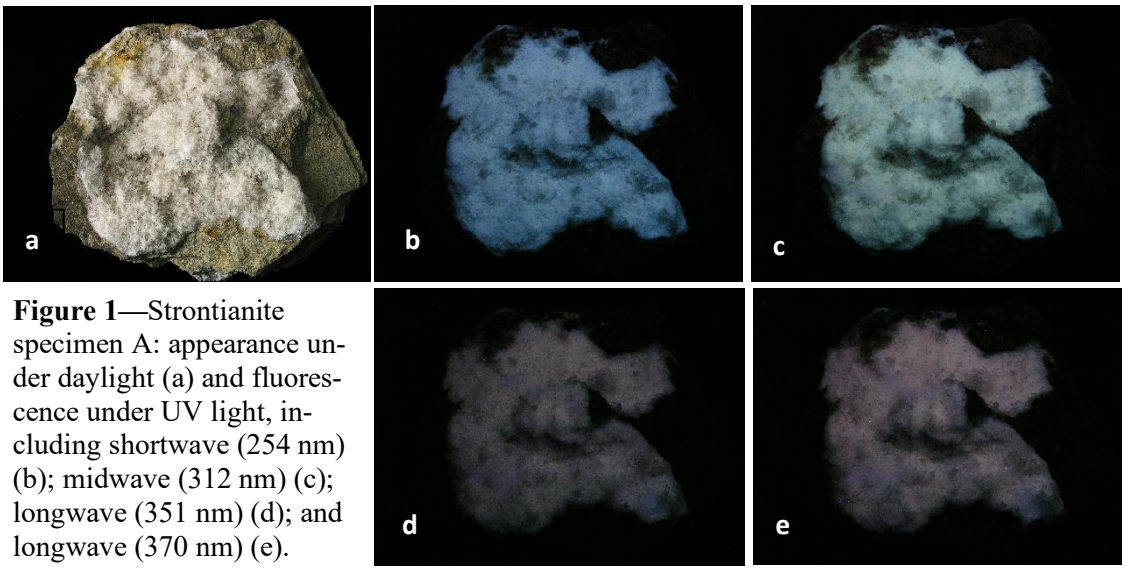


Figure 1—Strontianite specimen A: appearance under daylight (a) and fluorescence under UV light, including shortwave (254 nm) (b); midwave (312 nm) (c); longwave (351 nm) (d); and longwave (370 nm) (e).

August Field Trip

Holmes Run Gorge

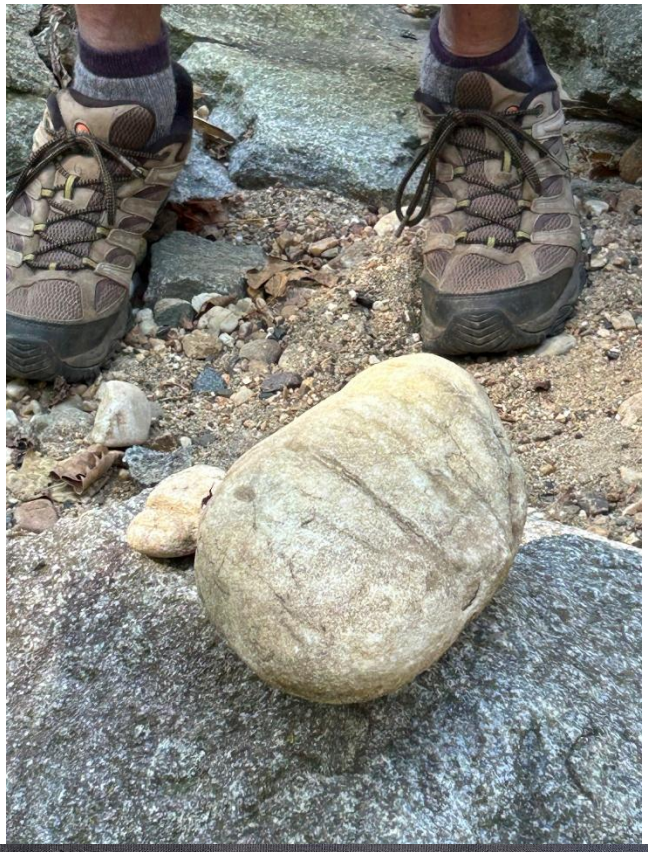
by Katy and Mickey Johnson, Field Trip Co-Chairs

On Saturday, August 30, NVMC's very own Hutch Brown led 24 people on a fabulous geologic journey along Holmes Run in Alexandria and Fairfax.

NVMC members were joined by Fairfax and Arlington master naturalists, as well as by Patrice Gribble-Fetter, the environmental educator for the Jerome "Buddie" Ford Nature Center, where our journey began. Within a relatively short distance, hiking from Dora Kelley Nature Park in Alexandria to just below the Lake Barcroft dam in Fairfax, we encountered four distinct bedrock formations, including (in sequence from south to north) Occoquan granite, Indian Run sedimentary melange, muscovite monzogranite, and Falls Church tonalite. (For more on the bedrock types, see the article on page 20.)

Thank you, Whitney (from Friends of Holmes Run), for inviting us! If you are interested in helping keep the watershed clean from litter and invasive plants—or if you are interested in volunteering to help with programs for youth at the nature center—please reach out to us at fieldtrips@novamineralclub.org and we will get you plugged in.









The Rocks Beneath Our Feet

Geology of Holmes Run Gorge, Part 1: The Rocks

by Hutch Brown

On August 30, about a dozen NVMC members participated in a geology walk in part of the gorge formed by Holmes Run (see the article on page 19). A gorge is a U-shaped valley with steep sides and a relatively wide floodplain. By contrast, the usual valley is V-shaped, with tapering sides and a narrower floodplain.

Main Bedrock Types

Holmes Run (fig. 1), part of Alexandria's Cameron Run watershed, cuts a gorge through the Piedmont bedrock before crossing under I-395 and becoming Cameron Run on the flat Coastal Plain. The northern part of the gorge is drowned by Lake Barcroft behind its dam at Columbia Pike. Below the dam, Holmes Run flows southward over two main rock types.

Just below the dam is Indian Run sedimentary melange (fig. 2, top), a fine-grained metamorphic rock rich in quartz and feldspars. The bedrock is medium gray in color until broken with a rock hammer, when it appears light gray from sparkling muscovite mica. On gravel bars, the weathering rock darkens before crumbling relatively quickly into sands and silts. Indian Run sedimentary melange originated from mixed sediments on the floor of an ancient ocean half a billion years ago, becoming up to 10,000 feet thick.

To the south is Occoquan granite, a coarse-grained igneous rock (fig. 2, bottom) (technically, a monzogranite—see the QAPF diagram). Occoquan granite has visible crystals up to the size of tiny gravel (fig. 2, bottom). It is about 29-42 percent quartz, along with lesser amounts of alkali and plagioclase feldspars. The granite also has small amounts of biotite and muscovite micas, along with trace amounts of greenish epidote.

Occoquan granite forms a vast batholith stretching southwest from Alexandria through Fairfax to the Occoquan Reservoir (hence the name) and beyond. Batholiths form from huge chambers of magma rising from Earth's interior into its rocky crust; the magma cools and hardens underground into coarse-grained igneous rocks like granite. According to isotopic dating, the Occoquan Batholith originated about 484 million years ago. The batholith intruded the sedimentary seafloor rock that became Indian Run sedimentary melange.



Figure 1—*Holmes Run below Dora Kelley Nature Park in Alexandria. The stream here forms a pool between rapids. The exposed bedrock is Indian Run sedimentary melange, one of the main metamorphic rock formations in northern Virginia. All photos: Hutch Brown.*



Figure 2—***Top:*** *Indian Run sedimentary melange along Holmes Run.* ***Bottom:*** *Occoquan granite pieces (wet from rain); the large piece is pink, the small piece the usual gray color. You can see flecks of gray quartz, white plagioclase, pinkish orthoclase, and black biotite.*

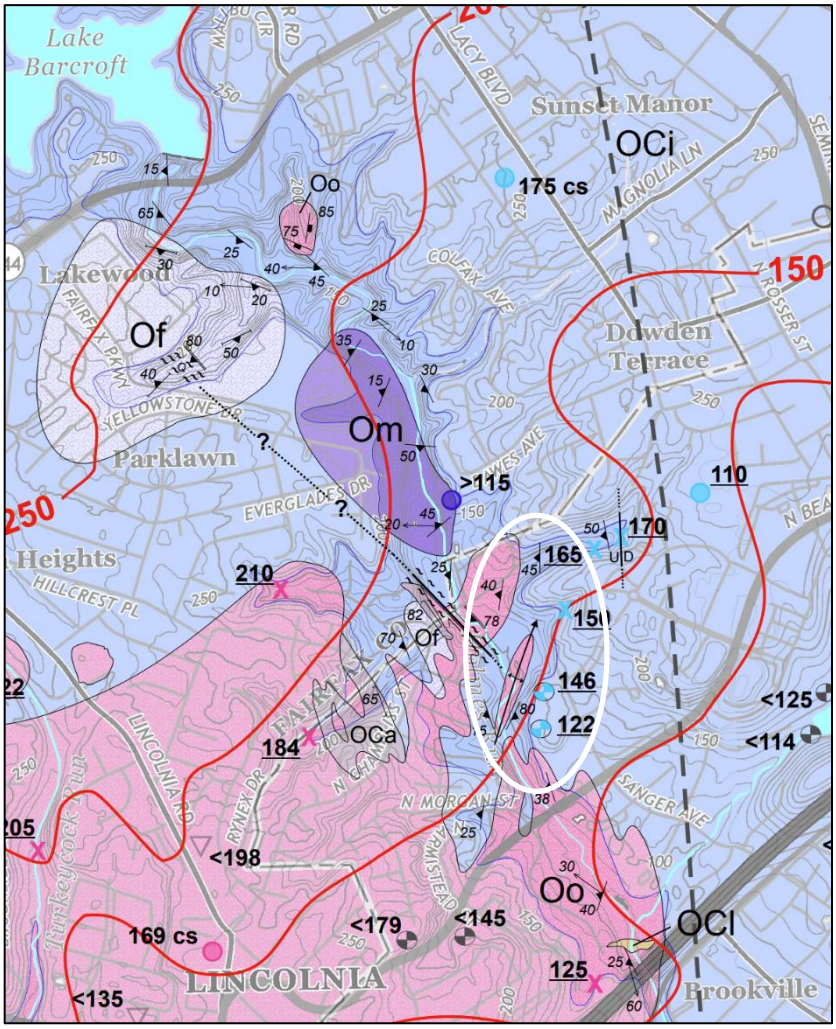


Figure 3—*Detail of a geologic map showing Holmes Run Gorge (along the blue line of Holmes Run) from Lake Barcroft (upper left) to I-395 (dark diagonal, lower right). Fifty-acre Dora Kelley Nature Park lies in the gorge within the white oval. For each rock type, darker shades show bedrock exposures.* **OCi** *(blue) = Indian Run sedimentary melange;* **Oo** *(pink) = Occoquan granite;* **Of** *(mauve) = Falls Church tonalite;* **Om** *(purple) = muscovite monzogranite;* **OCa** *(light gray) = Accotink schist. Source: Fleming (2015a).*

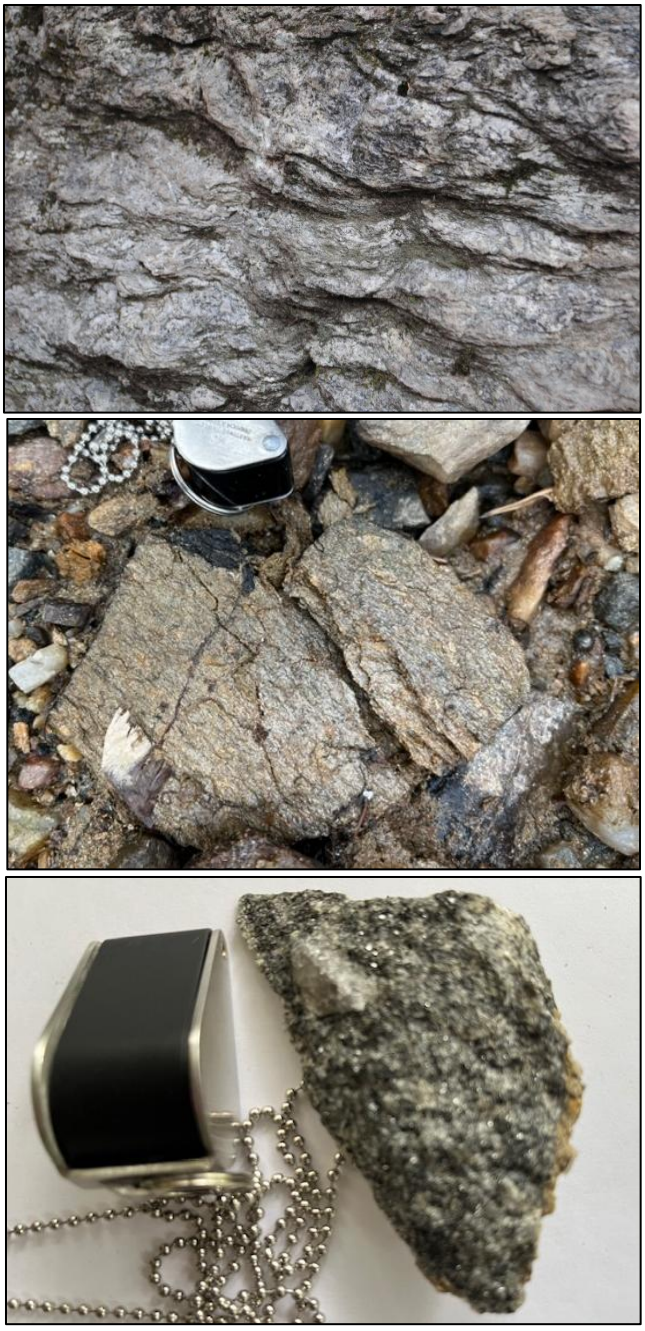


Figure 4—*Mather Gorge schist (top) and Accotink schist (center) compared to a piece broken off from a Holmes Run Gorge outcrop (bottom) identified by the local nature trail guide as muscovite schist. The "schist" lacks characteristic schist features, such as a mica sheen and foliation (orientation of crystals into parallel planes), features evident in both types of actual schist (top/center). The "muscovite schist" outcrop appears to be Indian Run sedimentary melange rather than schist.*

The nature trail guide for Dora Kelley Nature Park (fig. 3, white oval) shows a purported outcrop of schist not shown on the geologic map (fig. 3). Figure 4 compares two kinds of actual schist in our area (Mather Gorge schist and Accotink schist) to a piece of the Holmes Run "schist" broken off with a rock hammer (fig. 4, bottom). The "schist" lacks typical schist features (fig. 4, top/center), such as a mica sheen and foliation (orientation of the crystals into parallel planes). Instead of schist, the rock appears to be Indian Run sedimentary melange, consistent with the map (fig. 3, **OCi**, blue).

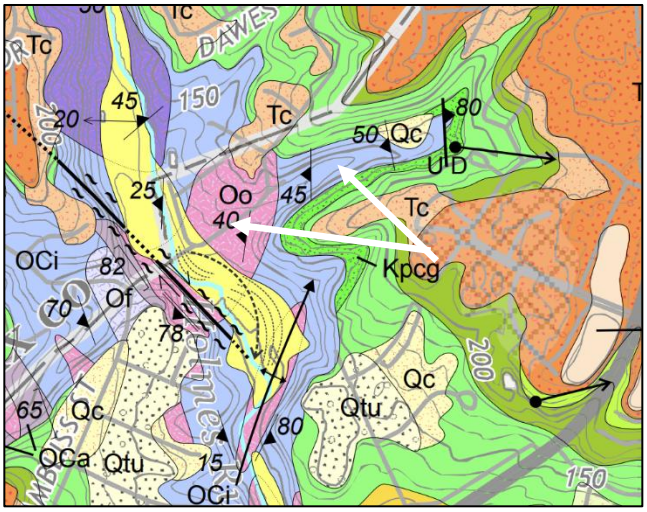


Figure 5—*Detail from a geologic map showing a small side stream (arrows) on the northern edge of Dora Kelley Nature Park. The stream flows over Indian Run sedimentary melange (***OCi***, blue), then crosses onto Occoquan granite (***Oo***, pink) before reaching alluvium (yellow) and joining Holmes Run (blue line). Exposures of the Potomac Formation (***Kpcg***, green) line the edges of the Indian Run rock. Farther uphill, the Potomac Formation is covered by Tertiary terraces (***Tc***, orange). Source: Fleming (2015b).*



Figure 6—*Indian Run sedimentary melange (left) and Occoquan granite (right) on a gravel bar along a tributary of Holmes Run. Eroding pieces of Indian Run sedimentary melange typically darken as they weather and crumble into mineral soils (sands and silts). Note the light-colored quartz cobble around the bedrock specimens.*

The northern end of Dora Kelley Nature Park is bordered by a small creek that feeds Holmes Run (fig. 5, arrows). The stream flows over an exposure of Indian Run sedimentary melange to the northeast, then passes onto Occoquan granite to the southwest before joining Holmes Run. Stormwaters carry eroded pieces of both rock types downstream and deposit them onto the stream's gravel bars, sometimes side by side (fig. 6).

A geologic map shows sediments covering much of the bedrock in Holmes Run Gorge (fig. 5). Overlying the Indian Run rock are Potomac Formation sediments (fig. 5, **Kpcg**, green), which ancient rivers laid down about 140-100 million years ago. The Potomac Formation is in turn covered by Neogene sediments from the so-called Tertiary terraces (fig. 5, **Tc**, orange), which are up to 23 million years old. Both sediment types comprise tightly packed soils, often mixed with pebbles and rounded river rocks; they are dense and hard to pick apart, but they are not solid rock.

Figure 7 shows Potomac Formation sediments covering bedrock along the small stream bordering Dora Kelley Nature Park. The badly degraded bedrock has become so soft that it can be easily penetrated with the pick end of a rock hammer. The bedrock is—or will soon become—saprolite, which looks like rock but has the consistency of clay and can be so saturated with water that it is perpetually damp.



Figure 7—*Rain-soaked Potomac Formation (tightly packed clays, silts, sands, pebbles, and rounded river rocks) exposed by erosion along the northern edge of Doris Kelley Nature Park. The bedrock underneath (where the rock hammer is) has become so soft through weathering that it resembles saprolite.*

Quartz in the Gorge

Much of the cobble on gravel bars in Holmes Run Gorge is light-colored quartz (fig. 8, top, arrows). Quartz resists erosion much better than either igneous or metamorphic rock, partly because it is a single mineral (silicon dioxide, or SiO_2) rather than a rock (a mineral composite). Quartz is also relatively hard, with a hardness of 7 on the 10-point Mohs hardness scale, and it is the second most common mineral on Earth (after feldspar). Quartz erodes only slowly, and the bedrock in Holmes Run Gorge, whether igneous or metamorphic, is rich in quartz.

Tectonic events such as an orogeny (the collision of tectonic plates to form mountains) place the bedrock under enormous pressure. When pressures and temperatures get high enough, the rock recrystallizes as metamorphic rock (or as a higher grade of metamorphic rock). When that happens—or when magma bodies cool deep underground into igneous rock—quartz is one of the last minerals to crystallize because its melting point is so low. In the process, quartz-rich hydrothermal fluids circulate through the cooling rock, filling cavities; sufficiently cooled, silica precipitates out as veins and lenses of solid quartz (fig. 8, center). Some quartz veins and lenses are so large that weathering breaks off quartz boulders, which are common in Holmes Run Gorge (fig. 8, bottom).

All of this helps to explain why you see so much solid quartz in Holmes Run Gorge, whether on gravel bars (fig. 8, top); in bedrock veins and lenses (fig. 8, center); or as half-buried boulders (fig. 8, bottom). The same goes for other landscapes across our area: all have lots of quartz.

Other Bedrock Types

The geologic map in figure 3 shows two additional bedrock types in Holmes Run Gorge. Both lie between Lake Barcroft and Dora Kelley Nature Park, and both can be approached on the paved trail along the stream, either from the park itself or from a parking lot off Columbia Pike to the north (right below the Lake Barcroft dam).

A short distance south of the dam is an exposure of igneous rock called tonalite (fig. 3, **Of**, mauve), pronounced TONE-uh-lite (figs. 9, 10). Like Occoquan granite, Falls Church tonalite formed from a magma body (this one called a pluton) rising from deep underground to intrude ancient seafloor sediments. The Falls



Figure 8—*Quartz in various hues in Holmes Run Gorge.* ***Top:*** *Light-colored quartz (arrows) in the alluvium of a small tributary of Holmes Run (the black rock is Indian Run sedimentary melange, which darkens as it weathers in the cobble).* ***Center:*** *Quartz vein in Indian Run sedimentary melange.* ***Bottom:*** *White quartz boulder along the nature trail in Dora Kelley Nature Park.*



Figure 9—*Falls Church tonalite (left) from an exposure a short distance below the Lake Barcroft dam compared to Occoquan granite (right) found downstream along the trail in Holmes Run Gorge. The granite is coarser in grain and has pink orthoclase crystals that the tonalite lacks in the same abundance. Crystals of gray quartz, white plagioclase, and black biotite are visible in both, as are sparkling bits of muscovite.*

Church Pluton is about the same age as the Occoquan Batholith but much smaller. As the name suggests, the pluton underlies much of the Falls Church area, with small outliers to the south in Holmes Run Gorge (fig. 3, **Of**, mauve).

Tonalite is closely related to granite (see the QAPF diagram), with the same high proportion of quartz and lesser amounts of feldspar but with much more plagioclase than alkali feldspar. Like Occoquan granite, Falls Church tonalite is mostly medium gray in color (fig. 9, left), but it is finer in grain and has far less orthoclase, which can give the granite a pinkish hue (fig. 9, right). You don't find much pink in tonalite, but plentiful hornblende (an amphibole) and biotite mica can color the rock dark gray (fig. 10).

Farther south, just north of Dora Kelley Nature Park, is a brownish-gray bedrock shown on the geologic map as muscovite monzogranite (fig. 3, **Om**, purple). Occoquan granite is also a monzogranite, but muscovite monzogranite, broken with a rock hammer, is lighter in color and finer in texture than the granite due to high



Figure 10—*Falls Church tonalite, dark gray in color due to abundant hornblende and biotite in the rock.*

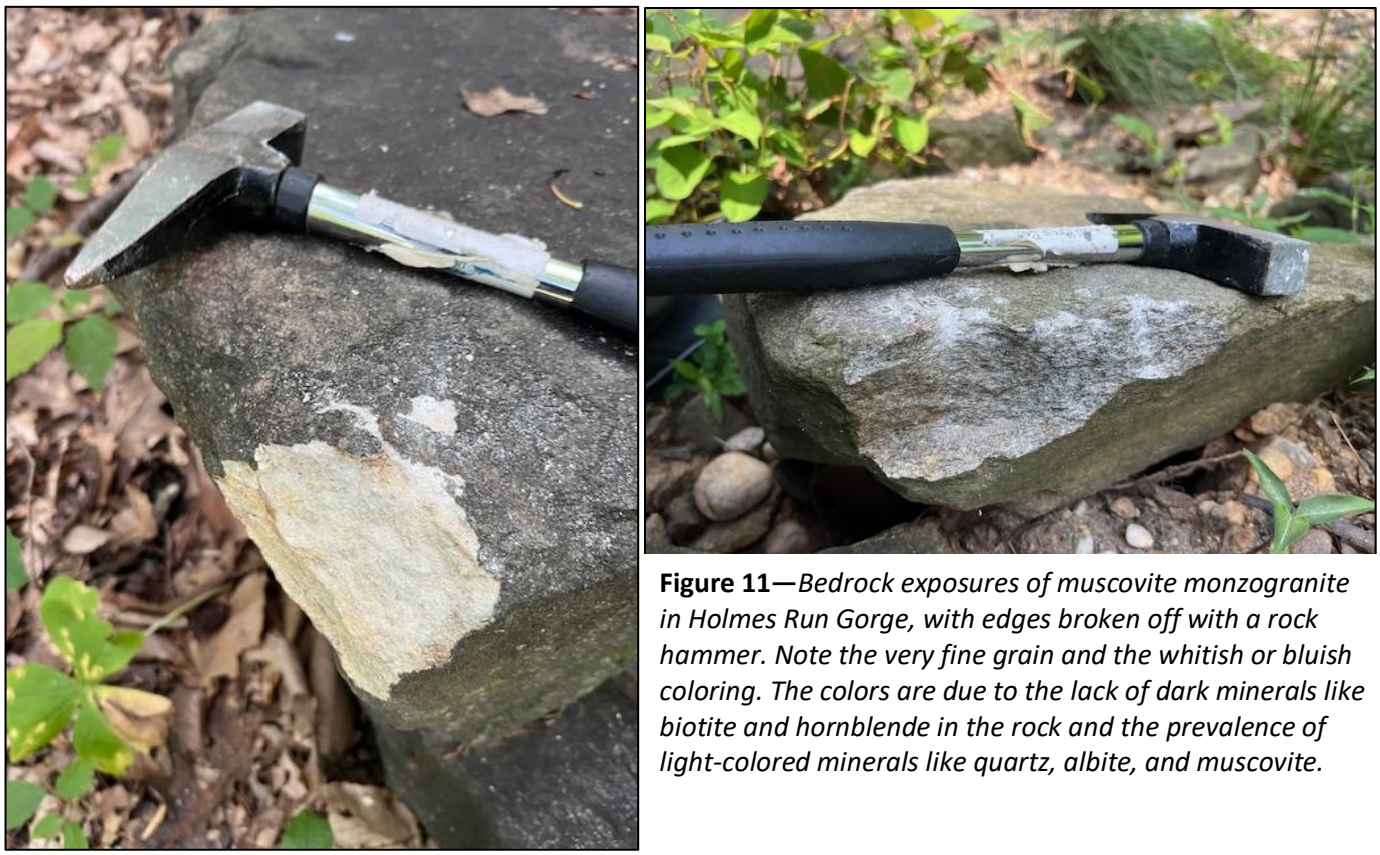


Figure 11—*Bedrock exposures of muscovite monzogranite in Holmes Run Gorge, with edges broken off with a rock hammer. Note the very fine grain and the whitish or bluish coloring. The colors are due to the lack of dark minerals like biotite and hornblende in the rock and the prevalence of light-colored minerals like quartz, albite, and muscovite.*

proportions of muscovite mica and albite (a white feldspar) in the rock (fig. 11), probably in connection with other feldspars, such as orthoclase, microcline, and labradorite. Most exposures are almost chalky in appearance; others are bluish or pinkish. The grain is much finer than in tonalite, but a loupe shows tiny grains of gray quartz and white muscovite mica.

Falls Church tonalite and Occoquan granite are sometimes described as related intrusive suites of igneous rock. By contrast, muscovite monzogranite is so different in texture and composition (without dark minerals) that it might have a somewhat different tectonic history. It might have originated in a magma plume that intruded Indian Run sedimentary melange under different conditions than the granite and tonalite and then cooled faster at shallower depths, resulting in a much finer-grained igneous rock.

Holmes Run Alluvium

Holmes Run is a sizable stream by the time it reaches Dora Kelley Nature Park, with a wide band of alluvium (fig. 5, yellow), both in the stream and on adjoining gravel bars. Stream managers have tried to protect streambanks from erosion by lining some of them with boulders called riprap (sometimes sourced from diabase quarries in our area). The riprap is gray in color and distinctively sharp-edged. But weathering can break off pieces and mix them into the native alluvium, which also contains pieces of brick, concrete, and other building materials from uphill construction sites and structures in the gorge. All this can confuse anyone searching the alluvium for native rocks.

Before the creek was dammed upstream to form Lake Barcroft, its branches flowed over metamorphic rock types that include Accotink schist and Lake Barcroft metasandstone. Moreover, a side stream just west of Holmes Run Gorge flows over a small exposure of Accotink schist (fig. 3, **OCa**, light gray). I found a small piece of what appeared to be schist (with its characteristic mica sheen) in the Holmes Run alluvium. However, metamorphic rocks like schist tend to weather quickly on gravel bars, soon crumbling into sands and silts and vanishing from the alluvium. Igneous rocks on gravel bars also tend to weather away relatively quickly, so igneous and metamorphic rocks are fairly minor components of the Holmes Run alluvium.

Other rock types in the alluvium (in addition to plentiful quartz in various hues) come from the Potomac



Figure 12—*Quartz and sedimentary rocks like sandstone and siltstone dominate the alluvium in Holmes Run Gorge. You can also find scattered pieces of igneous rock and dark-colored Indian Run sedimentary melange on gravel bars.*

Formation and Tertiary terraces uphill (figs. 5, 7). Their Cretaceous and Neogene sediments include rounded rocks laid down by rivers up to 140 million years ago. The rocks came from sources as far away as Bull Run Mountain, about 50 miles to the west.

Accordingly, the Holmes Run alluvium is a rich compendium of rock types from across our area, including sedimentary as well as igneous and metamorphic rocks (fig. 12). The sedimentary rocks originated in Culpeper Basin, one of the so-called Triassic basins that resulted from continental rifting as the Atlantic Ocean began to open about 230 million years ago. Culpeper



Figure 13—*Skolithos trace fossils in the alluvium of Holmes Run Gorge. The fossils are marked by parallel lines in the rock.*

Basin, made up entirely of sedimentary rock, starts in northwestern Fairfax County and extends westward all the way to Bull Run Mountain.

You can also find fossils in Holmes Run Gorge. Figure 13 shows trace fossils in Antietam quartzite from the Blue Ridge Province far to the west. Deposited by ancient rivers, the fossiliferous quartzite eroded out of Cretaceous and Neogene sediments in Holmes Run Gorge and washed into the alluvium.

This particular fossil type is called *Skolithos linearis* (perhaps from Greek *skolex*, "worm," and *lithos*, "rock," and from Latin *linearis*, "in lines"). Samuel S. Haldeman was the geologist who first described and named the fossil in 1840.

The parallel skolithos lines were left by wormlike animals that burrowed into offshore sands more than half a billion years ago. Over time, the sands hardened into sandstone. The Alleghanian Orogeny, a mountain-building event that took place about 320-280 million years ago, metamorphosed the sandstone into Antietam quartzite; but the quartzite is so poorly consolidated that some geologists call it quartzose sandstone.

In any case, this buff-colored rock is famous for its linear trace fossils (fig. 13), and the sediments covering the bedrock in our area contain billions of them. You can easily find them in and along Holmes Run, Four Mile Run, and other streams that flow through Cretaceous and Neogene sediments in our area. (An article on skolithos fossils in our area is in the June 2025 issue of this newsletter.)

The Upshot

The main bedrock types in Holmes Run Gorge are metamorphic and igneous—Indian Run sedimentary melange and Occoquan granite. You can find outcrops of both in and along Holmes Run, along with outcrops of two smaller bedrock types—Falls Church tonalite and muscovite monzogranite. Weathering has broken off pieces of all four bedrock types, which you can find in the Holmes Run alluvium (fig. 14). However, metamorphic and igneous rocks on gravel bars erode relatively quickly, crumbling into sands and silts and vanishing from the alluvium.

Quartz is abundant in Holmes Run Gorge, whether in the alluvium, as loose pieces on the ground ranging from pebbles to boulders, or in the bedrock itself as veins and lenses. Quartz is much more resistant to erosion than is the bedrock, which accounts for its abundance in the Holmes Run alluvium.

Some of the quartz you see in Holmes Run Gorge has eroded out of the Potomac Formation and Tertiary terraces, which are full of pebbles and rounded river rocks, including quartz. The Cretaceous and Neogene sediments also contain sandstones, siltstones, quartzites, and other rocks (mostly sedimentary) laid down by ancient rivers, with sources ranging westward into the Blue Ridge Province. Together with quartz, sedimentary rocks from Culpeper Basin dominate the alluvium in Holmes Run Gorge.

Next: *How did the bedrock types in Holmes Run Gorge get there? What's their tectonic backstory?*



Figure 14—*Crumbling pieces of Occoquan granite (arrows) in the Holmes Run alluvium, along with pieces of grayish and whitish quartz (upper right). The pinkish rock is probably muscovite monzogranite rich in orthoclase feldspar.*

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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

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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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AUCTION BID SLIP

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

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SUMMARY SHEET FOR AUCTION ITEMS SUBMITTED BY_____

Initials	Item #	Description	Minimum bid	Final sale price
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	3			
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	7			
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	10			
	11			
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	19			
	20			

October 2025—Upcoming Events in Our Area/Region (see details below)

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

Event Details

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

3-5: 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; $8 adults, 16 and under free; info: Ellen White, 757-641-2124, Ellen.White@TreasuresOfTheEarth.com.

4: Waldorf, MD—Annual show; Southern MD Rock and Mineral Club; Old Waldorf School, 3074 Crain Hwy; Sat 9-4; $3 adults, 12 and under free; info: Kenny Jameson, 240-412-9409, pandkrocks@gmail.com.

4: Macungie, PA—Autumn Mineralfest 2025, Mineral, Fossil-Gem Show, Pennsylvania Earth Sciences Ass'n; Macungie Memorial Park, 50 N Poplar St; Sat 8:30-3; info: https://www.mineralfest.com/mineralfest.pdf.

6: Dunn Loring, VA—Northern Virginia Mineral Club; https://www.novamineralclub.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, 6908 Belair Rd; details on p. 16.

18-19: Mt Bethel, PA—Annual Mount Bethel Gem, Mineral, Meteorite Show; Mt Bethel Firehouse, 2341 Rt 611; Sat 9-5, Sun 9-4.

22: Burke, VA—Micromineralogists of the National Capital Area; http://www.dcmicrominerals.org/.

25: Fairless Hills, PA—Ultraviolation 2025, Rock and Mineral Club of Lower Bucks County; First United Methodist Church, 840 Trenton Rd; Sat 9-4; info: Lee McIlvaine, 215-713-8020, uvgeologist@yahoo.com.

25-26: Freeport, NY—Freeport Gem and Mineral Show; Freeport Recreation Ctr, 130 E Merrick Rd; Sat 10-5, Sun 10-4:30; info: kaleidoscopegemshows.com.

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:
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 club member).

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2025 Club Officers

President: Jason Zeibel
president@novamineralclub.org
Vice President: Craig Moore
vicepresident@novamineralclub.org
Secretary: Almas Eftekhari
secretary@novamineralclub.org
Treasurer: Roger Haskins
treasurer@novamineralclub.org
AV Coordinator: Jake Broughton
cjbrot10@gmail.com
Editor: Hutch Brown
editor@novamineralclub.org
Field Trip Co-Chairs: Katy/Mickey Johnson
fieldtrips@novamineralclub.org
Greeter/Door Prizes: Vacant
Historian: Kathy Hrechka
historian@novamineralclub.org
Show Chair: Tom Taaffe
show@novamineralclub.org
Tech Support: Tom Burke
tech@novamineralclub.org
Webmaster: Casper Voogt
webmaster@novamineralclub.org

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

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

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