



# The Mineral Newsletter

**Next meeting: April 6 Time: 7:30 p.m.**

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



## Vanadinite

ACF Mine, Mibladen, Morocco

Source: Wikipedia.

Photo: Ivar Leidus.

### Deadline for Submissions

April 20

Please make your submission by the 20<sup>th</sup> of the month. Submissions received later might go into a later newsletter.

Volume 66, No. 4

April 2026

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### April Meeting Program:

Spring Club Auction

*Details on page 4.*

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## Mineral of the Month Vanadinite

by Sue Marcus

**Editor's note:** The article is a slightly modified reprint of the original from February 2016. It was the first "mineral of the month" feature by Sue Marcus in this newsletter.

Vanadinite is a showy mineral—just look at the cover photo!

Vanadinite was first reported in Mexico by Professor A.M. del Río in 1801 even before the element vanadium had been discovered. Professor del Río taught chemistry and mineralogy at the School of Mines of Mexico in Zimapán. He tested the new mineral and revealed that it contained an apparently new element that came in different colors, so he named the element panchromo (or panchromium, meaning many colors).

Del Río later changed the name to eritrono (or erythronium, after the Greek word for red). Unfortunately, a French chemist incorrectly discredited del Río's discovery, purporting that the element we now know as vanadium was impure chromium. This went unchallenged for years.

In 1830, a Swedish scientist isolated what became vanadium from Swedish iron ore and named it after the Scandinavian goddess of beauty, Vanadis (better known in Norse mythology as Freya, whose day of the week we now know as Friday).

The type locality where vanadinite was first found is Zimapán, Municipalidad de (municipality of) Zimapán, Hidalgo, Mexico. (Hidalgo is a state in the central part of the country.) Some of us have Mexican vanadinite specimens in our collections. More recently, Morocco has become the source of the world's finest vanadinite specimens (see the cover photo).

Chemically, vanadinite ( $Pb_5[VO_4]_3Cl$ ) forms a solid solution series with mimetite ( $Pb_5[AsO_4]_3Cl$ ) and less often with pyromorphite ( $Pb_5[PO_4]_3Cl$ ). All of these minerals are members of the apatite group. Vanadinite is commonly found with other lead minerals (or molybdates), such as anglesite, cerussite, wulfenite, and mottramite, as well as with mimetite and pyromorphite.

Have you found vanadinite? It is reported from the [Moss Mine](#) in Virginia's Gold/Pyrite Belt near Tabscott in Goochland County, although this is an ob-

# Happy Easter!



### Northern Virginia Mineral Club members,

Our next club meeting will be in person at the Dunn Loring Fire Station, 2148 Gallows Road, on **April 6, 7:30 p.m.**

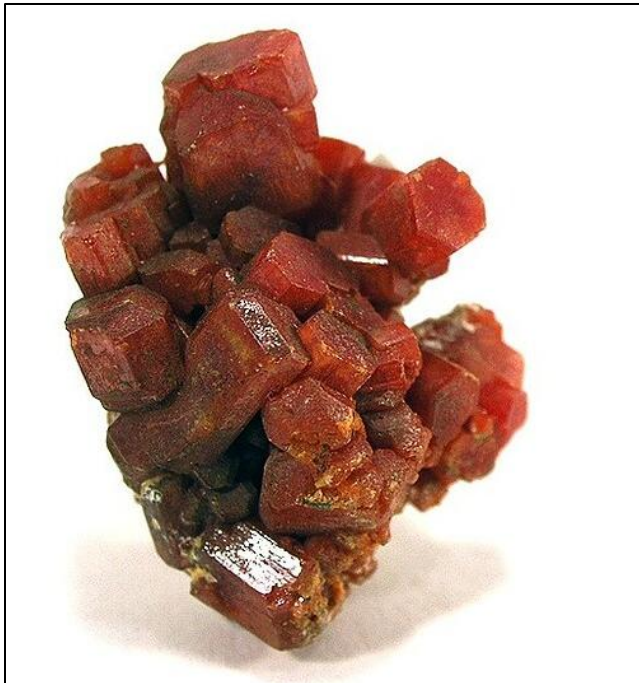
After a brief business meeting, we will hold our Spring Club Auction (see details on page 4), so we won't have a remote option for attendance through Zoom.



*Vanadinite on calcite, Apex Mine, San Carlos, Manuel Benavides Municipality, Chihuahua, Mexico.*

*Source: Mindat; photo: Rob Lavinsky.*

scure locality, at least for vanadinite. Several locations in Arizona are better known, like the Red Cloud Mine (famous for wulfenite) and the Apache Mine. Vanadinite is even reported from the U.S. Army Proving Grounds in La Paz County, AZ (limited collecting opportunities anticipated!).



Vanadinite, Old Yuma Mine, Armole Mining District, Pima County, Arizona. Source: Mindat; photo: Rob Lavinsky.

The flashiest, most spectacular specimens of vanadinite have been mined in Morocco. *The Mineral Record* produced several full-color editions on the Moroccan mines, some featuring vanadinite and others featuring sites where vanadinite is found with other stellar minerals. The Moroccan vanadinites are unusually attractive because perfect orange-red vanadinite crystals are sprinkled on a matrix of white barite crystals or on black manganese oxides; either condition shows a superb color contrast.

You can buy vanadinite specimens for relatively small sums (\$15), although you can also pay as much as you want for specimens of great size or with large, perfect crystals.

Vanadium, the economically important material in vanadinite, is combined with titanium in aerospace engines. It is also combined with gallium to make superconducting magnets. In addition, vanadium pentoxide is used in ceramics and in producing sulfuric acid.

Most vanadium is a byproduct or coproduct from titaniferous sands, phosphate mines, and other geologic sources. Recycled materials and foreign sources meet most U.S. needs. ↗



Vanadinite, Touissit, Touissit-Bou Beker Mining District, Jerada Province, Morocco. Source: Mindat; photo: Rob Lavinsky.

### Technical Details

- Crystal form ..... hexagonal
- Hardness..... 2.5–3
- Density..... 6.88 g/cm<sup>3</sup> (measured); 6.95 g/cm<sup>3</sup> (calculated)
- Color ..... brown, red, orange, yellow; less frequently pale yellow, white, or colorless
- Streak ..... white to light yellow
- Cleavage..... none
- Fracture ..... irregular
- Luster ..... resinous, subadamantine

### Sources

- Mindat. 2016. [Vanadinite](#).
- The Mineral Record* 44(3) (May–June 2013).
- Chemicool. 2016. [Vanadium element facts](#).
- U.S. Geological Survey. 2015. [Mineral commodity summaries](#). Reston, VA: USGS.
- Wikipedia. 2015. [Vanadinite](#).

## Club Member Rocks and Minerals Auction Coming Up! April 6 Program



Our April club meeting will feature our spring 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—we should be open by 7 p.m.

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 25 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 (lowest bid you will accept for sale—if not stated, the minimum bid is \$2).

Also, use the summary sheet on page 26 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.

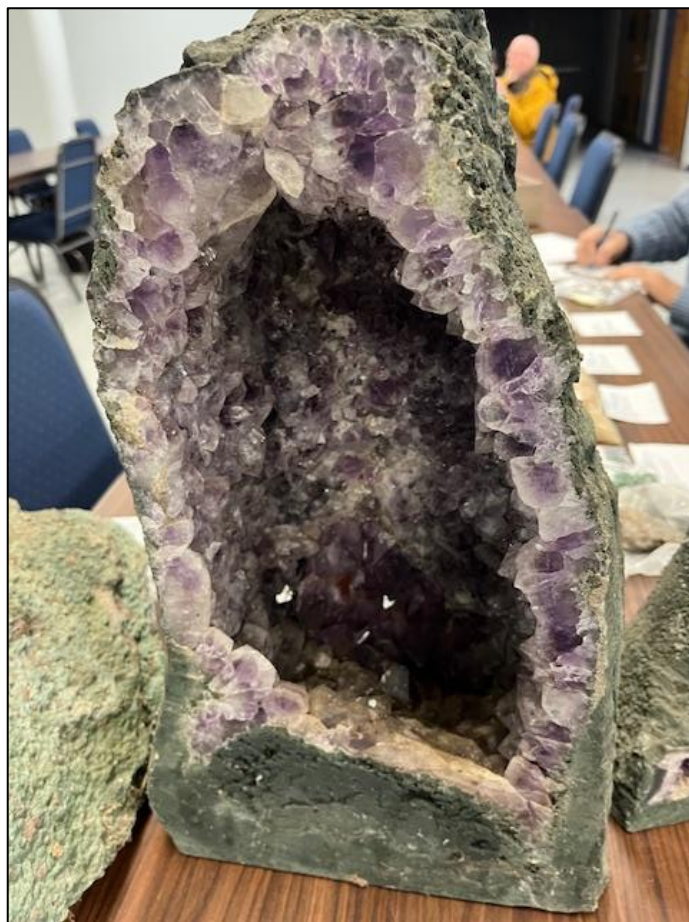
Bring guests or invite nonmembers who might be interested in rocks and minerals! Although only current club members are allowed to sell, the meeting and auction are open to all.

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.



*Specimen acquired by a lucky buyer at the spring 2025 NVMC club member auction.*

- The club gets 15 percent of the purchase price; the remainder goes to the seller
- Anyone may donate items to the auction to fully benefit the club (no money goes back to the donor).
- The minimum bid is \$2 on any item. The minimum increase is also \$2. Bids higher than \$20 increase by \$5.
- We start with a silent auction to assess interest in each item for sale. So look carefully and start bidding. Items with multiple bids during the silent auction will be brought sooner to the actual (vocal) auction.

Winning bidders must pay for the item promptly at the close of the meeting with cash or check, although we're working on taking credit cards and can take Venmo if necessary.. ↗

## Meeting Summary March 2 Club Meeting

by *Almas Eftekhari, Secretary*

**P**resident Jason Zeibel opened the meeting by welcoming visitors, including Jeff Suter from Gainesville, VA, who started collecting with his friend and longtime club member, Ken Reynolds, about a year ago and never looked back! He's a huge fan of collecting fluorescent minerals and has already accumulated hundreds of pounds in his collection. Jason also welcomed Javier Argueta, a new club member who wants to connect to his Guatemalan heritage through crystals. He would like to do lapidary work with jade, part of his heritage values.

Jason reminded club members to vote on club hoodie designs in the google document that would be sent out. He also reminded folks about the biannual club auction coming up at the April meeting (see page 4) and that you must be a dues-paying club member to go on club field trips.

Field Trip Co-Chair Katy Johnson announced upcoming trips, including a geology walk on March 14 at Lake Fairfax Park and collecting trips on April 11 to Mineral Hill, MD; on May 3 to the Texas Quarry in Cockeysville, MD; and on June 13 to the National Limestone and Mount Pleasant Mills Quarries. She encouraged junior club members to join in.

Our youth coordinators have set up the club's new Instagram page. Folks announced upcoming mineral shows in Montgomery County and Wilmington, DE.

Jason brought back souvenirs from the Tucson show, including some cool fluorescent rocks from Japan. He encouraged junior club members to take advantage of the club's \$250 scholarship for attending a hobby-related event and reporting back to the club on it. Two junior presentations coming up at the March meeting were, in part, thanks to this scholarship.

Jason announced that Noah Khan has volunteered to be our lapidary equipment manager. He will work with Noah to identify the equipment and arrange for club members to check it out from club storage.

The junior presentations for the evening started with Celia Zeibel, a junior at Thomas Jefferson High School who plans on becoming a planetary geologist at NASA. Her presentation was on her trip this year to the annual Tucson show.

Celia loved seeing fluorescent minerals at the main show in Tucson. Some of her other favorites were the Lego, videogame, and Jade Bunny displays. She also went to other shows and saw fossil displays with giant turtles and meteorite Nike shoes!

The family hiked up the University of Arizona's A-mountain before visiting the Kino Gem and Mineral Show, which featured piles of rocks. Another show featured a huge amethyst bench! Celia also visited the University of Arizona to check out some of its facilities, including its mineral museum, where she saw a display of crystals that looked like a rug.

Our next speaker was Maria Nopo, a junior at Bethesda Chevy Chase High School. She spoke about putting on a mineral display for the Young Mineral Collectors of the Tucson Gem and Mineral Society.

Maria has been to the annual Tucson event before, which features about 50 shows in different places at various times. She started her trip with a classic Tucson slurpee at a restaurant called Eegee's! She showed pictures of herself setting up her display and the ribbon she received for being an exhibitor. She also showed exhibits by others, along with the ribbon she won for 2<sup>nd</sup> place in the junior competition!

Jason commented that our own November club show will hold a competition for best showcase this year.

Our final speaker was Mickey Johnson, who spoke about hazardous minerals. Mickey is our field trip co-coordinator as well as a sophomore and "band and mineral nerd" at Fairfax High School.

Mickey began his talk by giving some general safety rules for collecting hazardous minerals, then discussed various minerals that are considered hazardous, including malachite, galena, azurite, cinnabar, and more. You should not handle them while breathing in deeply and without washing your hands afterwards. It's mainly the dosage that determines how toxic the minerals are, and it varies by mineral how sick you can get.

Jason ended the meeting by encouraging more junior members to give presentations for Juniors Night at our March 2027 meeting.

Jason also said that he will bring pizza and drinks for members to enjoy at our spring club auction at our April meeting. ↗

## President's Message

by Jason Zeibel

**G**reetings, NVMC, and welcome to April! It is hard to believe that it is already April, even as I was typing that. Even though I feel like the first part of 2026 has flown by, I know it is going to get worse. Traditionally, April, with its warmer weather and longer days, is the point on our family's annual calendar when the pace of activities accelerates.

Certainly, it feels that way for our club. We have been fortunate to add quite a few new members in the last few months. You can feel the influx of new excitement and energy at our activities. We have filled up our field trips, complete with wait lists, and new members are stepping up and volunteering to help out with much-needed tasks.

April's meeting brings the first of our two biannual auctions (see page 4). With all the new folks around, I am sure there will be some spirited bidding and competition for specimens this month. Please plan to bring some specimens looking for new homes because I'm sure there will be some willing takers!

I'd like to take a moment to spotlight my daughter Celia's college decision process. Since many of us are decades removed from the college application experience, I want to make a few observations from the perspective of a parent.

The application process is nothing like what I went through in the early 1990s. The constantly connected, overly shared world we live in has given rise to the "influencer." Any influencer with a sufficient following has an outsized impact on just about every aspect of teenage life, including college admissions. Universities have seen application numbers skyrocket by being spotlighted by trendy, popular voices on popular social media platforms.

College applications have also moved to a process called the "common app"—a single application that can be submitted to many universities simply by checking a box. Schools that once received 10,000 applications each year now may see 100,000. Therefore, it feels like there is a lot more competition. Into this maelstrom the youth of today are charging ahead.

With that in mind, I took Celia to her first official college visits in the last month, beginning with Geor-



*Celia Zeibel visiting the Alfie Norville Gem and Mineral Museum at the University of Arizona.*

*All photos: Jason Zeibel.*

gia Tech and the University of Georgia (UGA). UGA has a geology program, so we naturally stopped by. UGA has about 60 undergraduate geology majors, with over a dozen labs and field programs in Argentina, Venezuela, Antarctica, and all over the United States. We toured several labs and took in extensive displays—as well as visiting Sanford Stadium, where UGA plays a little football.

The next stop was during our family trip to the Tucson Gem and Mineral show in February. After taking in the show, we arranged for a tour of several labs and departments at the University of Arizona.

The Wyant School of Optical Sciences is one of the world's leading places of study for optics and optomechanics. They also support a facility that they understatedly call the "mirror lab." The Richard F. Caris mirror lab is located under the stands at the football



*The University of Arizona's Alfie Norville museum has one of the only publicly displayed samples of the Asteroid Benu, brought back to Earth by the OSIRIS-REx mission.*

stadium for the university. There, they fabricate the largest telescope mirrors in the world, including honeycomb glass structures over 8 meters (25 ft) in diameter that are accurate to the nanometer scale. Almost every large telescope on Earth (or above it) has mirrors made here.

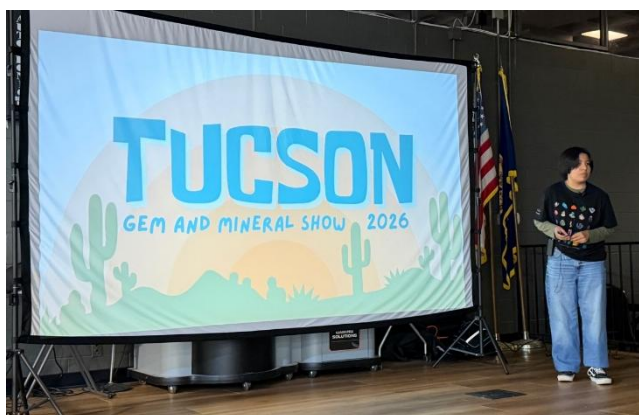
We also toured the geology and astronomy departments at the University of Arizona because the U of A is one of the only universities in the world that offers a degree in planetary geology (the study of geological processes on other worlds).

In addition, we hiked up the "A" Mountain, located in Sentinel Park in Tucson. On one side of the hill, students painted the rocks in a giant "A" formation in the early 20<sup>th</sup> century. The park is popular with students and local residents for hiking, picnicking, and just hanging out.

In addition to visiting the academic parts of the University of Arizona, we took in the Alfie Norville Gem and Mineral Museum in downtown Tucson. This museum, run and managed by the University of Arizona's geology department, has a collection that rivals that of the Smithsonian Institution's Natural History Museum. Perhaps not unexpectedly, there was a very extensive section on the nearby copper mining activities, including the Bisbee Mine.

One thing that especially impressed me was the meteorite display. In addition to the standard array of impressive Earth fall samples, the museum received a small sample from the recently-returned-to-Earth OSIRIS-REx mission to the Asteroid Benu. These are the only asteroid samples on Earth that are not meteorites, so they were never heated to the melting point by their interaction with the atmosphere. These samples are truly the oldest, most pristine rocks on Earth. The University of Arizona led the OSIRIS-REx mission and brought back 121.6 grams of samples. 200 milligrams of which are housed at the Alfie Norville museum. Initial analyses indicate that the samples contain plentiful amounts of water locked up in minerals like clays and are also rich in carbon, nitrogen, sulfur, and phosphorus.

At our March meeting, we opened the program to the youth of the club. Once again this year, they impressed us with their maturity and knowledge. Two speakers, Celia and Maria Nopo, presented their experiences from their recent trips to the Tucson Gem and Mineral Show. Their presentations completed the requirements for the club's scholarship program. They both earned a \$250 scholarship that will help offset their travel costs from attending a national-level club event. Maria also showed pictures of her prize-winning exhibits, including photos of the banquet where she received her awards.



*Maria Nopo (top) and Mickey Johnson (bottom) joined Celia Zeibel in making junior presentations at our March NVMC meeting.*

Our third youth speaker, Mickey Johnson, talked about his collection of hazardous minerals. He covered the properties and safe handling procedures for orpiment, realgar, cinnabar, galena, and several other minerals.

A few other junior members were at the meeting, and I hope they were encouraged by our three speakers this year to consider volunteering for presentations next year!

One bittersweet moment came at the March meeting. One of our very generous members, Fred Gillis, has recently retired and is in the process of moving to Florida. Fred has frequently donated a variety of minerals to the club and the auctions over the last several years, including a nice selection of specimens at the March meeting. Before heading south, Fred invited the club to help clear out his storage unit, with the materials going to the club. Craig, Noah, and Xavi (one of our new members) headed out to Purcellville on a weekend help with the donation. The club is now in possession of several additional rock saws and lapidary machines, along with a gem-faceting machine.



*Longtime NVMC member Fred Gillis made a large donation of lapidary equipment and minerals to NVMC as he prepares for his retirement move to Florida. Thanks, Fred! And thanks to Noah, Craig, and Xavi for helping Fred clear out his storage unit!*

In addition, Fred donated many boxes of rough lapidary material. Noah and Xavi are in the process of going through the equipment from Fred, as well as the previously donated lapidary equipment.

One of those pieces, an oil-based lapidary saw that we received back in January, has been serviced and used to make its first successful cut as part of the NVMC lapidary inventory. A big shoutout to Xavi for volunteering to deal with cleaning up all the old oil and dirt and bringing the piece back to usability!

The club has approved a budget for consumables for this new lapidary hardware to cover things like saw blades, cutting oil, and polishing grit. My hope is that, once we have the equipment evaluated and in good working order, we can make it available to club members free of charge for checkout and use. My thanks again to Noah and Xavi for taking the lead in getting this program running and coming up with a standard operating procedure for it.

The latest club name tag order has come in. If you requested a name tag, please come to the next meeting to pick it up and pay \$15 to the club.

Also, if you have not paid your 2026 club dues, please do so! Only dues-paying current club members are authorized to sell at our auction and to go on field trips.

Also, we need to finalize our club hoodie design, so if you haven't voted for your favorite slogans, please do so at <https://forms.gle/tg4Ekj5RsBETbTxMA>!

I hope to see everyone at this month's auction. Come with cash or check preferably, although we will try to have a credit card option. I plan on bringing pizza and bottled water if time permits and will try to get there before 7 p.m. for those who want to get there early to set out their items for bidding. Our auctions could go on for hours, so we will do our best to start not long after 7:30 p.m. and to end promptly at 9 p.m.

Unfortunately, there will not be a virtual option for this month because conducting an auction by Zoom is a level of interconnectivity we don't yet have.

So come on out and join in the fun!

*Jason*



#### Tourmaline

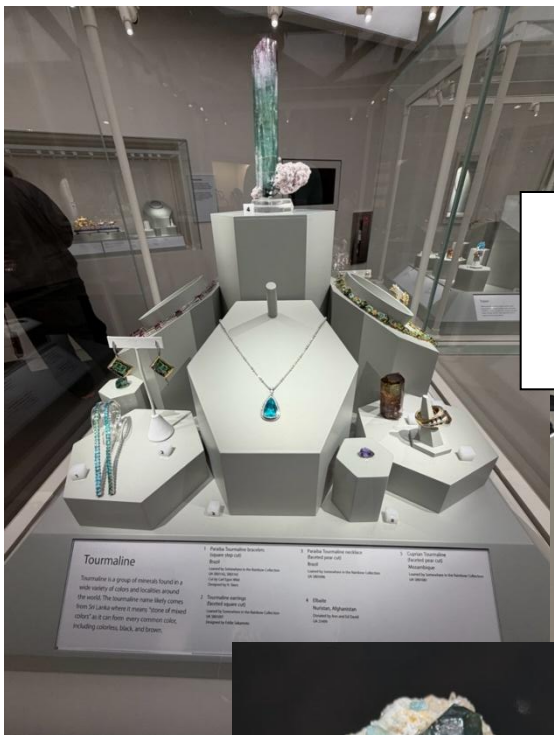
Tourmaline is a group of minerals found in a wide variety of colors and localities around the world. The tourmaline name likely comes from Sri Lanka where it means "stone of mixed colors" as it can form every common color.

12. Tourmaline Panel Bracelet (Faceted square cut)  
Loaned by Smithsonian in the Rainbow Collection  
J&K Jewelry  
Designed by Judy Davis

14. Rubellite Ring (Faceted rectangular cut)  
Loaned by Smithsonian in the Rainbow Collection  
J&K Jewelry  
Designed by Judy Davis and Gary Thompson

16. The color Tourmaline (Faceted rectangular cut)  
Loaned by Smithsonian in the Rainbow Collection  
J&K Jewelry  
Cut by Ken Collins

### More scenes from the Alfie Norville museum in Tucson



#### Tourmaline

Tourmaline is a group of minerals found in a wide variety of colors and localities around the world. The tourmaline name likely comes from Sri Lanka where it means "stone of mixed colors" as it can form every common color, including colorless, black, and brown.





## Meteorite Cut Section

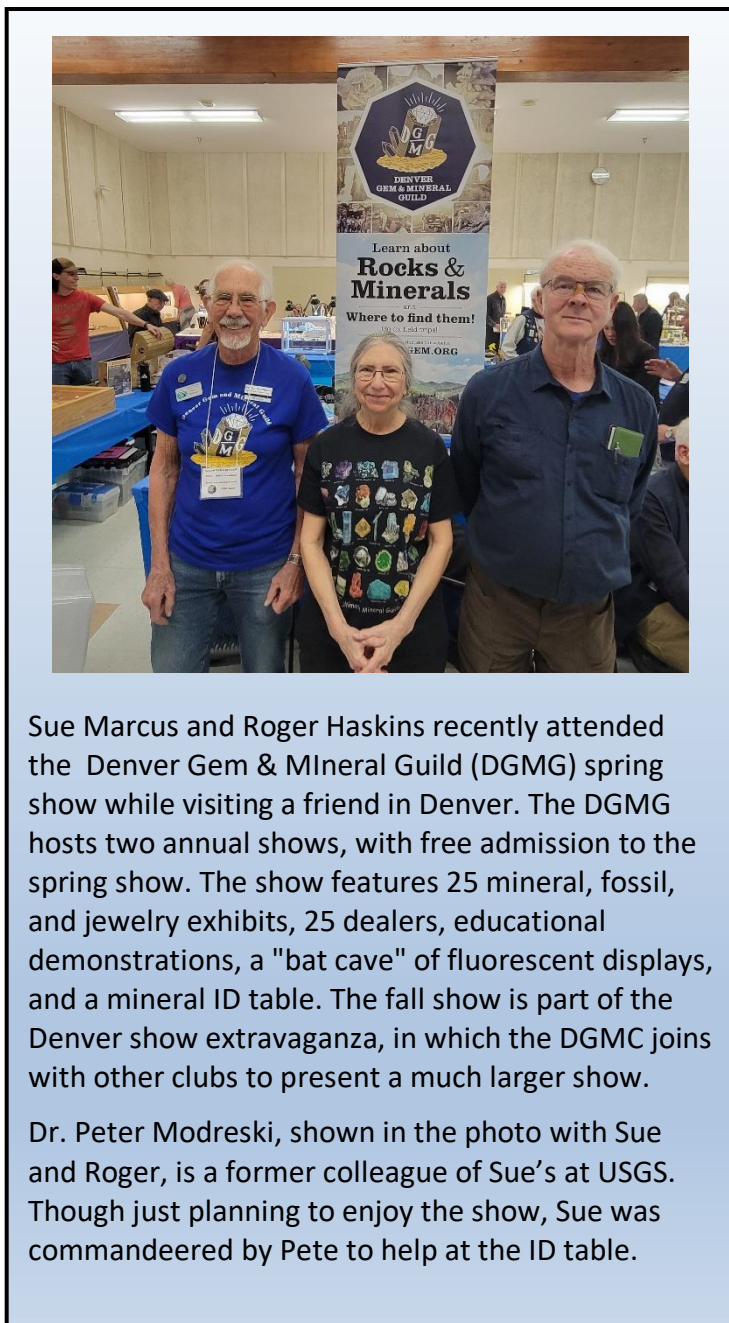
by Matt Herod

**Editor's note:** This Photo of the Week is from [EGU Blogs](#), 6 November 2015. Thanks to Sue Marcus for the reference!

**T**his beautiful cut section is of a meteorite that fell in northwestern Australia and was found in 1892. It was on display at the Empire of Crystals Museum in Munich, Germany.

It is an iron-nickel meteorite composed entirely of metal. The cross-hatching, commonly found in such iron-nickel meteorites, is called a Widmanstätten pattern. Widmanstätten patterns, also known as Thomson patterns, are revealed only when the meteorite is cut, polished, and acid etched. The patterns formed when the meteorite cooled and only do so if the meteorite cooled very slowly (over millions of years).

When the meteorite is hot, it is entirely monocrystalline; it forms from an iron-nickel phase called taenite. As it cools, another phase develops, called kamacite. Low in nickel, it grows within the high-nickel taenite lattice, resulting in the Widmanstätten pattern. ➤



Sue Marcus and Roger Haskins recently attended the Denver Gem & Mineral Guild (DGMG) spring show while visiting a friend in Denver. The DGMG hosts two annual shows, with free admission to the spring show. The show features 25 mineral, fossil, and jewelry exhibits, 25 dealers, educational demonstrations, a "bat cave" of fluorescent displays, and a mineral ID table. The fall show is part of the Denver show extravaganza, in which the DGMG joins with other clubs to present a much larger show.

Dr. Peter Modreski, shown in the photo with Sue and Roger, is a former colleague of Sue's at USGS. Though just planning to enjoy the show, Sue was commandeered by Pete to help at the ID table.

## 35<sup>th</sup> Annual Chesapeake Gem, Mineral, Jewelry & Fossil Show

**Saturday, April 4, 2026 10 a.m. – 4 p.m.**

Howard County Fairgrounds, 2210 Fairgrounds Rd., West Friendship, MD

**Free admission and parking**

Minerals, original jewelry, fossils, rough & cut gemstones, silent auctions, door prizes, activities for kids

Info: [www.chesapeakegemandmineral.org](http://www.chesapeakegemandmineral.org)

*Directions from Washington area:* Take Routes 29 or I-95 North to Rt. 32 west/north; turn left on Rt. 144 west; fairgrounds road is half a mile on the right.

## Celebrating Our Geological Heritage

On July 4, 2026, the United States will commemorate the 250<sup>th</sup> anniversary of the signing of the Declaration of Independence. There will be events and programs at most Smithsonian Museums, including the National Museum of Natural History. Below are two digital resources on the theme of the 250<sup>th</sup>.

A [Smithsonian Magazine article](#) lists 250 places to celebrate our geological heritage in the United States. You can choose from several categories, including *Science and Ingenuity* and *Natural World*. You will find entries for sites such as Mount St. Helens, Crater Lake, Mammoth Caves, and Crater of Diamonds.

The USGS WebApp [GeoHeritage Sites of the Nation](#) is an online tool for exploring geological sites in the United States, with features and landforms of geologic significance as well as the scientific, educational, cultural, economic, and aesthetic values that society places on them. You can access the WebApp [here](#) and the project background [here](#). ↗

## Best Homegrown U.S. Diamonds

by Scott Tong and Will Walkey

*Editor's note: The article is adapted and abridged from WBUR, 26 February 2026. Thanks to Sue Marcus for both this reference and the one above from GeoNews.*

The United States does not have a rich diamond mining history, but [an exhibit at the Smithsonian Institution's National Museum of Natural History](#) proves that some of the world's most dazzling gems are homegrown. In July 1924, the Uncle Sam Diamond was discovered by a miner at Crater of Diamonds in Arkansas. It was a whopping 40.23 carats, the largest diamond ever found in the United States. The Uncle Sam Diamond was cut twice—first into a 14.34-carat parallelogram and later into a more elegant, elongated emerald cut. This type of cut is ideal for showcasing just how flawless this particular diamond is.

Crater of Diamonds is only one of two diamond mines in the United States that have produced commercial diamonds. The other is the Kelsey Lake Diamond Mine in Colorado, which produced the Freedom Diamond (shown above) in the 1990s. The Free-



*The Great Stalacpipe Organ is the world's largest musical instrument, spread across 3.5 acres in Virginia's Luray Caverns. The lithophone (a percussion instrument made of stone) produces sound when small mallets tap stalactites of various sizes.*



*The Freedom Diamond from the Kelsey Lake Diamond Mine in Colorado, on display at the Smithsonian. The cushion-cut diamond is 16.87 carats.*

dom Diamond is a 16.87-carat gemstone cut from a 28.18-carat diamond crystal with a yellowish cast.

Read the full article [here](#).



## *The Rocks Beneath Our Feet* **Anchialine Pools: Jewels of Hawai‘i**

by Hutch Brown

Upon retiring a few years ago, my wife Kathy and I bought a small condo on the Hawaiian island of Maui, where Kathy grew up. During our stays, we have hiked many island trails, some multiple times.

One trail begins where the road ends near Maui’s southernmost point, at the foot of Maui’s younger and larger volcano, Haleakalā (pronounced ha-leh-AH-ka-lah). (I use Hawaiian spellings out of respect for the native language and culture. The diacritic symbol ‘ in Hawai‘i signals what linguists call a glottal stop, as in “uh-oh.” Hawai‘i is actually pronounced ha-VYE-ee, with a stop before the “ee.”)

This particular trail leads through Maui’s last major lava flow, dated by geologists to the 1750s. The trail runs along a spectacular coastline, then up through barren lava fields to a promontory with the remains of an old lighthouse.

From there, we took a side trail down through the jagged lava to the coast beyond the lighthouse, where we found a large pond behind a wide sand beach strewn with pieces of black lava rock mixed with bleached coral. The scenery was gorgeous, with black basalt and white coral set off against green vegetation, orange sand, and blue pond (fig. 1, top).

At first, the pond seemed to me to be a tidal pool. Though set back from the sea, the nearby coral attested to flooding by Maui’s occasional king tides and huge storm-driven surfs. The water tasted brackish, so I figured it was mostly stormwater runoff.

Only later did we learn that the pond was no tidal pool. We went back to explore and found five separate pools in the same large basalt basin, all well back from the beach and entirely landlocked.

All five were anchialine pools (pronounced ANK-yuh-line, from Greek *ankhialos*, “near the sea”). The pools are globally rare ecosystems in relatively young lava depressions close to the sea. Anchialine pools are seldom, if ever, reached by ocean waves. Hawai‘i has hundreds of them, almost all on the Big Island, with some on Maui and O‘ahu. Samoa has some too, as do the Galapagos Islands and a few other places around the world. Mexico has anchialine pools in limestone, a whole separate story.



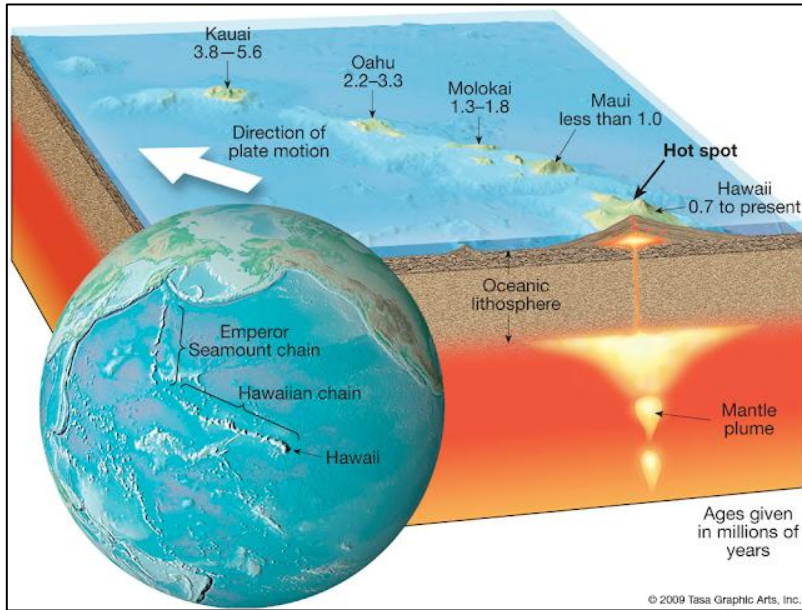
**Figure 1**—Anchialine pool (top) along the coast below Hanamanioa Point near Makena in South Maui (bottom, black arrow on the map). Black basalt mixes with bleached coral from the nearby beach; succulent plants growing in the sand hint at freshwater sources. Haleakalā rises in the distance above lava fields too recent for much vegetation to take hold. Photo: Hutch Brown; map: The Hanson Ohana (2025).

What are Maui’s anchialine pools, and where did they come from?

### **Lava Flows**

First, a bit about Hawaiian geology. (For more detail, see the [April 2024](#) issue of this newsletter.)

The Hawaiian Islands are at the end of a long chain of volcanic islands and submerged seamounts called the Hawaiian Ridge–Emperor Seamount Chain (fig. 2). The chain stretches for thousands of miles from the



**Figure 2**—Hawaii in relation to the Hawaiian Island–Emperor Seamount Chain, showing island formation over the mid-Pacific hotspot and islands weathering away as they move from the hotspot. Numbers are rough estimates showing millions of years since peak volcanic activity. Maui is the youngest island after the island of Hawai‘i. Source: Rambo (2011).

Hawaiian Islands northwestward to the Aleutian Islands. The chain formed as the Pacific Plate moved for millions of years over a hotspot, a huge magma chamber underlying the ocean crust. Until a few hundred thousand years ago, Maui was over the hotspot, with erupting volcanoes like Haleakalā, now considered dormant. The Big Island, with its active volcanoes, now lies over the hotspot (fig. 2).

Over hundreds of thousands of years, Haleakalā’s eruptions sent lava flowing down its slopes to the sea. The last major lava flows, which took place on South Maui less than 3 centuries ago, left huge lava fields that are still largely devoid of vegetation (fig. 3).

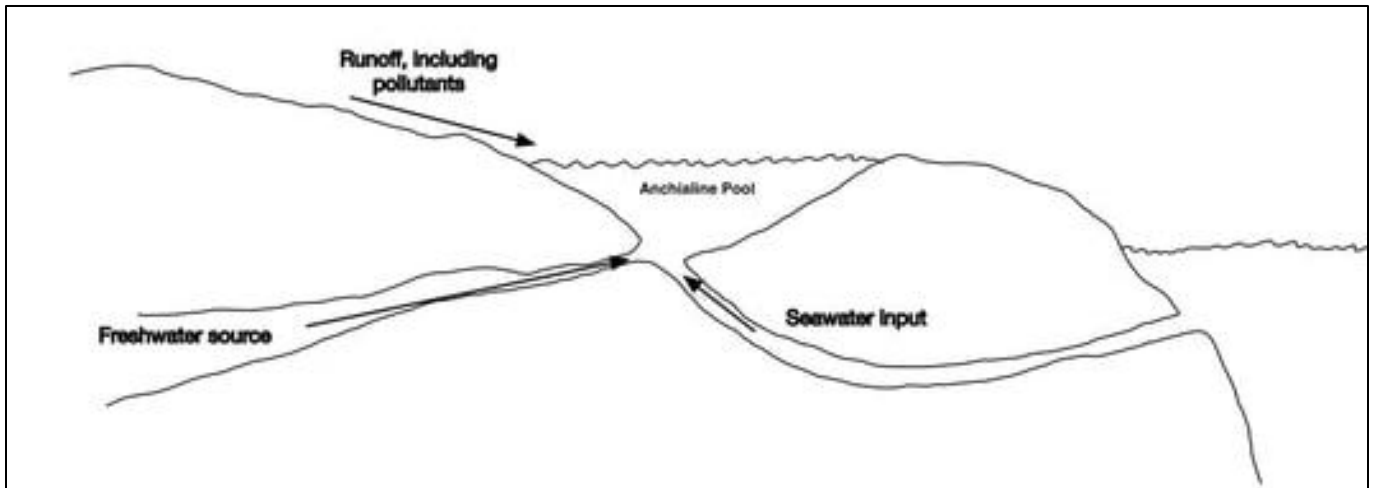
The lava flows were typically of two kinds—a‘ā and pāhoehoe (in English, pronounced AH-ah and pah-HOY-hoy). Pāhoehoe is a Hawaiian term meaning smooth; pāhoehoe flows were the hottest, making them viscous—thick and sinuous, oozing rather than flowing. Pāhoehoe transitioned into a‘ā when the lava temperature dropped below 1200 °C and the flow became more liquid. South Maui’s lava fields are cut by deep channels that look like river beds, once filled with flowing molten rock.



**Figure 3**—Lava once oozed here, cooling into a low ridge between depressions that later filled with water, becoming anchialine pools. As the lava cooled, it condensed and cracked, forming a rift several feet deep. Photo: Hutch Brown.

Pāhoehoe and a‘ā flows that were relatively rich in iron and magnesium (and relatively low in silica) cooled into black lava. A‘ā became jagged and vesicular (filled with holes) from gas bubbles trapped in the rock. Over time, most a‘ā rock turned a reddish brown in color from oxidation (rusting) of its iron content. By contrast, most pāhoehoe flows cooled into a relatively smooth black basalt reminiscent of asphalt (fig. 3).

During eruptions, some liquid lava continued to flow even as its surface cooled and hardened, creating underground lava tubes. When the lava finally stopped flowing, it left caves. As the surrounding lava cooled, it condensed and cracked, forming aboveground rifts and underground fissures that were often interconnected with lava tubes in the porous rock. We found a large rift in the basalt between two of the five anchialine pools (fig. 3), hinting at their origins.



**Figure 4**—Water sources yielding the brackish water in anchialine pools include freshwater runoff from rain, freshwater aquifer inputs through underground cracks and rifts in the lava, and saltwater inputs through interconnected cavities in the lava with connections to the ocean.

## Brackish Waters

The uneven lava flows left ridges and depressions, some becoming tidal pools—and some farther inland becoming anchialine pools. The landlocked pools filled with water not from ocean waves but rather from the many interconnected tubes and fissures in the lava rock itself. Figure 4 is a rough representation of an anchialine pool with freshwater inflows from rain-fed groundwater and stormwater runoff (on the left) and with seawater inflows through lava tubes and fissures (on the right). In Hawaiian, anchialine pools are known as loko waikai (pronounced LOW-coe VYE-kye), meaning mainland place (loko) of stream (wai) and ocean (kai).

The result is a series of unique aquatic ecosystems ranging up to several acres in size and reaching from 8 to 22 percent in the salinity of their brackish waters. No two anchialine pools are quite alike in size, shape, and salt content, so each has slightly different environmental conditions. The pools contain plants and animals adapted to their unique environments, some found only on one particular island or even in one particular pool.

The five anchialine pools we saw were all relatively small and shallow. Cyanobacteria (also known as blue-green algae) have colonized all five pools (fig. 5). Through photosynthesis, the algae anchor the food chain, forming yellow-orange mats of calcium carbonate drawn from the brackish water. In addition to the mats, we saw what looked like a kind of aquatic



**Figure 5**—Anchialine pool with lava fields and cloud-covered Haleakalā looming in the distance. Note the mats in hues of yellow and orange produced by blue-green algae in the process of photosynthesis. Photo: Hutch Brown.

grass growing in only one of the five pools (fig. 6), maybe because only it has just the right conditions.

Animals in Maui’s anchialine pools include aquatic insects, marine snails, a kind of crab, and 10 known species of tiny shrimp. The Hawaiian name for the largest shrimp (about the length of a dime) is ‘ōpae ‘ula (pronounced OH-pye OO-la), “red shrimp.” We didn’t see any ‘ōpae ‘ula because we didn’t know to look for them, but they are apparently bright red (fig. 7). They dart about while feeding on the algal mats and the debris that collects there, keeping the mats



**Figure 6**—Anchialine pool with what appear to be aquatic grasses. Note the algal mats in various hues on the bottom of the pool. Photo: Hutch Brown.

clean and healthy. We did see shorebirds feeding on shrimp and other crustaceans in the anchialine pools.

### Pleasant Surprise

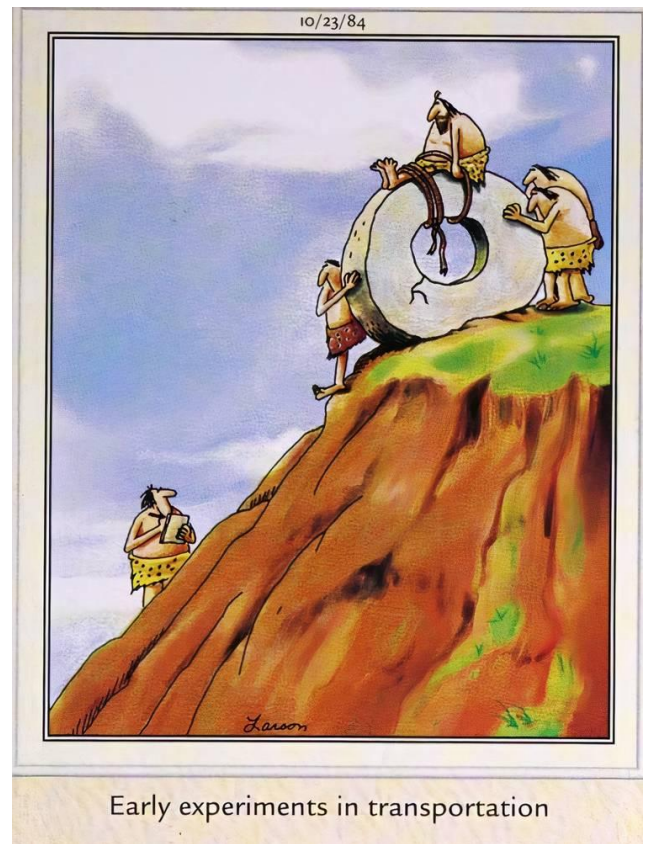
Until our latest trip, I had never heard of anchialine pools, much less realized it when I was looking at one. The Sierra Club offers nature walks to see them on Maui; in finding out about one Sierra Club tour, Kathy and I finally realized that we had already seen an anchialine pool, so we went back to explore. We missed the tour, but if you ever get to Maui or to the Big Island, it might be something to consider! ↗

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**Figure 7**—Red shrimp (ōpae ʻula) feeding on an algal mat on the bottom of an anchialine pool in Hawai'i. Source: Hawai'i Wildlife Fund (n.d); photo: Lindsey Kramer.



Early experiments in transportation



## 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.*

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SUMMARY SHEET FOR AUCTION ITEMS SUBMITTED BY \_\_\_\_\_

Initials	Item #	Description	Minimum bid	Final sale price
	1			
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	5			
	6			
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	9			
	10			
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	18			
	19			
	20			

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

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			1 MSDC mtg	2	3	4 Show: W. Friendship, MD
5	6 NVMC spring auction	7	8	9	10	11 Show: Johnson City, NY
12 Show: Johnson City, NY	13 GLMSMC mtg	14	15	16	17	18
19	20	21	22	23	24	25
26	27 MNCA mtg	28	29	30		

### Event Details

- 1: Washington, DC**—Mineralogical Society of the District of Columbia; info: <http://www.mineralsocietyofdc.org/>.
- 4: W. Friendship, MD**—Annual show; Chesapeake Gem and Mineral Society; Howard County Fairgrounds, 2210 Fairgrounds Rd; Sat 10-4; free admission; info: Lynne Emery, [chesapeakegemandmineral@gmail.com](mailto:chesapeakegemandmineral@gmail.com).
- 6: Dunn Loring, VA**—Northern Virginia Mineral Club; info: <https://www.novamineralclub.org/>.
- 11-12: Johnson City, NY**—Annual show; New York Southern Tier Geology Club, Inc; Johnson City Sr Ctr, 30 Brockton St; Sat 9-5, Sun 10-4; adults \$5 (cash only), kids under 12 free; info: Mark Smith, 807-760-3769, <https://efmls.org/clubdetails/new-york-southern-tier-geology-club-inc/>.
- 13: Rockville, MD**—Gem, Lapidary, and Mineral Society of Montgomery County; info: <https://www.glmsmc.com/>.
- 27: Burke, VA**—Micromineralogists of the National Capital Area; info: <http://www.dcentimetersmicrominerals.org/>.



*Vanadinite from Morocco. Source: Mindat; photo: Rob Lewinsky.*

# 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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[hutchbrown41@gmail.com](mailto: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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## 2026 Club Officers

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Field Trip Co-Chairs: Katy/Mickey Johnson  
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Greeter/Door Prizes: Craig Moore  
Historian: Kathy Hrechka  
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Show Chair: Tom Taaffe  
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Webmaster: Casper Voogt  
[webmaster@novamineralclub.org](mailto:webmaster@novamineralclub.org)  
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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