



The Mineral Newsletter

Next meeting: November 6 Time: 7:30 p.m.

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



Volume 63, No. 8
November 2023
Explore our [website!](#)

November Meeting Program:
2023 Club Show
details on page 10

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Creedite

Mina Potosí Santo Domingo, Santa Eulalia District, Chihuahua, Mexico

Source: Wikipedia. Photo: Didier Desouens.



Mineral of the Month Creedite

by Sue Marcus

I was surprised to recently discover that we haven't examined creedite in these Mineral of the Month columns. When I realized that we'd inexplicably skipped it, I wanted to learn more about it. Creedite is a beautiful mineral that forms lovely crystals in different colors. It is definitely worth being part of any collection. Let's jump in and explore creedite together.

Colorado Type Locality

Creedite was described and named in 1916 by E.S. Larsen and R.C. Wells based on samples found near Wagon Wheel Gap in Colorado's Mineral County. The mineral was named for the Creede Quadrangle, the USGS quadrangle map showing the locality. The town of Creede, CO—the county seat for Mineral County—was named for the prospector Nicholas Creede, who discovered a valuable silver deposit that was exploited as the Holy Moses Mine in what became known as the Creede Mining District. The type specimens were found on a mine dump rather than in their natural geological setting. The specimens contained white to colorless creedite crystals from a fluorite-barite vein. This can give hope to all of us who scrounge mine dumps for minerals.

Many localities have produced fluorescent creedite. A nicely crystallized fluorescent creedite specimen would be an attractive addition to a fluorescent-minerals collection.

The [Colorado Fluorspar Company Mine](#) near Wagon Wheel Gap, CO, may have exploited the source of the originally described creedite. Specimens from this locality (also known as the Wagon Wheel Gap Mine) were colorless to opaque, sometimes slightly yellow.

One specimen of violet creedite from the type locality is posted on Mindat. A source suggests that the first prospectors found a purple mineral (fluorite) that they thought could be amethyst. Since amethyst can be associated with gold or silver, they were encouraged—until they realized that they'd found fluorite.

The economic deposit was discovered in 1911, with active mining between 1913 (sources vary) and 1950. Ironically, gold and silver were byproducts of the

Happy Thanksgiving!



Northern Virginia Mineral Club members,

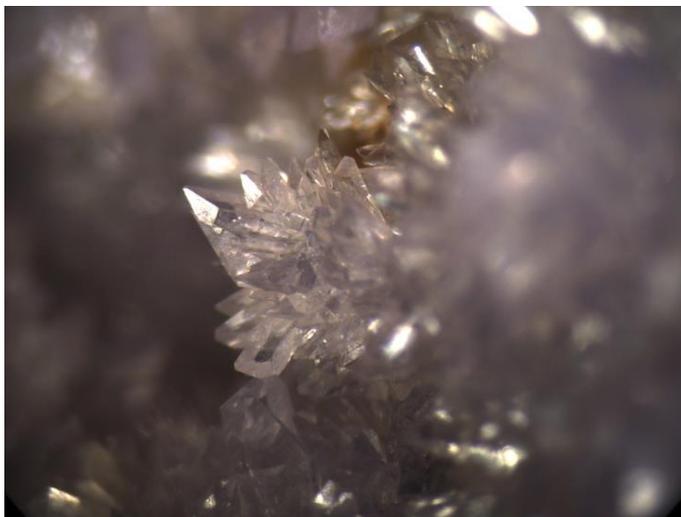
The next club meeting will be on **November 6, 7:30 p.m.**, at the Dunn Loring Fire Station, 2148 Gallows Road, Dunn Loring, VA. The fire station is next to Kilmer Middle School.

See program details on page 8.



Creedite, Colorado Fluorspar Company Mine, CO.
Source: Mindat; photo: Weinrich Minerals, Inc.

fluorite mining. The property is now a dude ranch, with some of the mine buildings used for lodging.



Creedite, Cresson open pit, Cripple Creek Mining District, Teller County, CO. Source: Mindat; photo: Alana Stern.

Cresson Mine

The [Cresson Open Pit Mine](#) near Cripple Creek, CO, has had many names, including Ajax, Victor, and Wildhorse. Gold and tellurium were the economic minerals found in this brecciated volcanic complex. Creedite formed late in the mineralizing processes. Crystals are a pale violet, with specimens of potential interest to both macro and micro collectors. People posting on Mindat report that creedite is commonly found with gearsutite (hydrous calcium aluminum fluoride) and clay.

Nevada Localities

One reason for choosing creedite as our Mineral of the Month is that I was lucky enough to be given a couple of very nice specimens when we lived in Reno, NV. Tom Lugaski was curator of the W.M. Keck Museum at the University of Nevada in Reno. Tom was a geologist and I was working for the U.S. Geological Survey on campus. Rockhounds and geologists find each other, and we became friends.

Tom visited the [Hall Mine](#) in the San Antonio Mountains in the early 1990s and brought back several specimens of beautifully crystallized lilac creedite. The Hall Mine was owned by Anaconda, a major mining company. Molybdenum (from molybdenite) was the metal extracted there. Although interest in the economic molybdenum potential, with additional silver and copper values, may have begun as early as about 1900, production did not start until 1979. The mine was operated intermittently by various companies until



Creedite, Hall Mine, San Antone Mining District, Nye County, NV. Source: Mindat; photo: Chris Stefano.

its closure in 2001. The site has been reclaimed, so more specimens are unlikely to be found.

This cycle of many interested parties exploring a deposit before it is mined, followed by many ownership changes, is typical of most metal mines. A mining industry saying is, “A property is walked over by 10 companies before exploration or production commence in earnest.”

The best specimens from this locality exhibit stocky sprays of transparent lilac crystals. Most are matrix specimens that formed in vugs or veins in the altered granitic host rocks. Specimens up to 12.8 centimeters (5 in) in size were reported on Mindat. Individual crystals are fairly small, only up to about 0.4 centimeters (0.2 in) in size.

Attractive specimens from the [Liberty Mine](#) are shown on a separate Mindat locality page, although the Liberty and Hall Mines might be different names for the same deposit. All “Liberty Mine” images are of transparent, pale violet, wedge-shaped crystals similar to the ones from the Hall Mine.

The Hall Mine isn’t the only creedite occurrence in Nevada. An [unnamed prospect](#) in Churchill County produced several specimens of colorless transparent creedite crystals, along with one displaying a “half spheroid” of translucent to opaque creedite crystals. All but the last of these are micros.



Creedite specimens. Above: Darwin Mining District, Inyo County, CA. Right, above/below: Navidad Mine, Indé Municipality, Durango, Mexico. Source: Mindat; photos: Michael Cline (above), Rob Lavinsky (right).



The [Siver Coin Mine](#) in Humboldt County and the [Boulder Hill Mine](#) in Douglas County each have a creedite specimen posted on Mindat. [Granite Camp](#) in the Lodi District of Nye County tops these with images of two nicely crystallized creedite specimens. These are like the Hall Mine creedites—transparent lilac-colored crystals, one in a vug in matrix that looks exactly like some of the matrix hosting Hall Mine specimens.

Other U.S. Localities

A single creedite crystal (micromount) from the [Grand Reef](#) deposit in the Aravaipa Mining District of Graham County, AZ, is shown on Mindat, though the locality is mentioned in multiple creedite references. Creedite may be more abundant than what's pictured on Mindat; otherwise, each reference may have simply repeated the scanty information from other sources.

Creedite crystals have been reported from the Darwin District, an old and well-known mining district in Inyo County, CA. Lustrous colorless microcrystals, some doubly terminated, have been found sporadically in vugs since the 1950s. The specific locality is unknown to me and has not been shared by successful collectors.

Localities in Mexico

The most prolific specimen producer in Mexico is the [Navidad Mine](#) in Durango. Possible alternate names

for the locality are the Abasolo or Rodeo mines. In a vein mined for fluorite, beautiful clusters of creedite sprays were discovered in the vuggy, brecciated rock. The best of the creedite samples show no apparent point of attachment. The colors of the sprays range from colorless to orange, with some exhibiting clear creedite sprays coming from an orange core. Other specimens may have pink to lavender sprays.

Less frequently, the sprays of creedite contrast with purple fluorite crystals. The fluorite is usually octahedral and turns pink in sunlight or when artificially

lighted. Individual crystals in the creedite sprays rarely reach 2 centimeters (0.8 in) in size. Undamaged clusters of creedite sprays up to 16.2 centimeters (6.4 in) in size were extracted, with a whopping, somewhat bruised specimen measuring 58.4 centimeters (23 in).

The [Santa Eulalia District](#) in the state of Chihuahua is famous for many minerals and is represented in many collections. Smithsonite, mimetite, and hemimorphite are among the dozens of crystalized mineral species found and marketed from this silver-lead-zinc mine.

The district is in its fourth century of production from economic deposits hosted in sedimentary rock. The deposits were enriched by multiple episodes of alteration by hydrothermal fluids. The fluids leached minerals and recombined their chemistry to form newly constituted minerals. Collectors are lucky that the host rocks and alteration processes formed many voids or vugs in which these new minerals were crystalized.

Creedite is fairly abundant, though localized. Most specimens seem to have come out in the 1970s and 1980s, mostly from the West Camp part of the mining district. Creedite crystals form small groups that range from colorless, through pale lavender, to deep violet. Specimens of every size were found, from beautiful micros to a large piece measuring 18 centimeters (2 in) in size. Individual crystals were usually small, though a 1.4-centimeter (0.6-in) complex crystal was shown on Mindat.

Locality in Bolivia

The [Colquiri Mine](#) in Bolivia's Inquisivi Province produced notable creedite specimens in the 1970s. At this locality, creedite formed in brecciated metasedimentary rocks. Crystals can be colorless and transparent to milky and translucent. The largest specimen on Mindat is 7.5 centimeters (~3 in) in size. The deposit may have been known by the region's indigenous people before European contact in the late 1400s. The mine has operated from about 1880 to 2021 and may still be active. Perhaps more creedite specimens will come to market.

Localities in Greece

The Greek mines near Lavrion (Laurium) were noted for their silver. More recently, the [Christiana Mine](#) has been a source of many rare or unusual minerals, including tripuhyite, hydrokenoralstonite, and creedite. It is also the type locality for attikaite. At this locality, creedite crystals are colorless and form attractive micromount-size specimens.



Creedite in various hues, Santa Eulalia Mining District, Chihuahua, Mexico. Source: Mindat; photos: Rob Lavinsky.

Localities in Central Asia

The [Akchatau Mine](#) in the Karganda Region of Kazakhstan was a significant source of sparkling lilac creedite crystals, along with crystals from other min-



Creedite, Akchatau Mine, Karaganda Region, Kazakhstan. Source: Mindat; photo: Rob Lavinsky.

eral species. The finest specimens featured pincushions of radiating creedite crystals, some with matrix, others without it. Crystals up to 3.8 centimeters (1.5 in) in size on a 15-centimeter (6 in) specimen came from this mine.

One Mindat photo shows opaque botryoidal mounds that appear to grade into massive material. This specimen, identified as creedite, is unlike any others I have seen from this or any other locality.

The mine—no longer active—extracted tungsten, with creedite finds apparently prior to the 1950s and in the 1980s. The creedite here formed in skarns (calcareous rocks like limestones that were metamorphosed by hot, mineral-laden fluids driven by granite intrusions). Creedite was also found with tungsten and molybdenum mineralization in nearby granitic rocks.

The Pamir Mountains of Tajikistan are noted as a source of creedite in numerous sources, although I could find no images or more specific information. It is doubtful that this is a significant creedite locality.

Localities in China

The [Qinglong Mine](#) in Guizhou, China, produced many interesting minerals, including creedite from a deposit primarily worked for antimony. Creedite from this mine comes in pale yellow, lavender to deeper purple, and colorless crystals. Yellow specimens can



Creedite specimens, Qinglong Mine, Da chang Sb orefield, Guizhou, China. Source: Mindat; photos: Rob Lavinsky.

resemble dandelion flowers, whereas colorless crystals seem to commonly form small bowtie-like clusters.

The colorless crystals are larger than the other forms here, growing up to 2.25 centimeters (0.9 in) in size; some are doubly terminated. Specimens up to 10.1 centimeters (4 in) in size were extracted. Lavender or purple specimens here tend to have smaller crystals than specimens in the other colors.

I was unable to determine whether the Qinglong Mine is still active. Creedite specimens have been recovered sporadically, including in about 2004 and 2018.

Creedite Value

Creedite has no economic value, other than as a nifty crystallized mineral specimen.

Of course creedite has been faceted, although Joel Arem, mineralogist and gemologist, believes that fewer than a dozen stones have been cut. This mineral is relatively soft, cleavable, and sensitive to acid, so it is not a practical gemstone.

Arem shows a pretty, deep purple transparent [faceted creedite](#) weighing 0.96 carats from Chihuahua, Mexico (probably the Santa Eulalia District) and states that the largest faceted creedites may be no heavier than 2 carats. [Gemdat](#) shows two translucent orange faceted stones from Mexico and China and one beautiful, very pale purple cut stone from Kazakhstan. The largest of the Gemdat stones is only 0.50 carats.

The web has many (at least hundreds) of creedite specimens listed for sale. The least expensive are from China, although I'm dubious about the sources. They are auctioned on eBay for about \$1 and up. Navidad Mine specimens start at about \$13 and go as high as you like. (Prices were found online on September 19, 2023.) ↗

Technical Details

Chemical formula..... $\text{Ca}_3\text{SO}_4\text{Al}_2\text{F}_8(\text{OH})_2 \cdot 2\text{H}_2\text{O}$
Crystal form..... Monoclinic
Hardness 3.5-4
Specific gravity 2.71
Color..... Colorless, yellow to orange, pale purple (lilac) to deeper purple
Streak..... White
Cleavage 1 perfect
Fracture..... Conchoidal
Luster..... Vitreous

Sources

4UR Ranch. N.d. (no date). [4UR Ranch and the Wagon Wheel Gap Fluorspar Mine](#).
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Creedite, Navidad Mine, Indé Municipality, Durango, Mexico. Source: Mindat; photo: Rob Lavinsky.

Database of Luminescent Minerals. N.d. [Creedite](#).
History Colorado. 2023. [Wagon Wheel Gap Fluorspar Mine and Mill](#).
Larsen, E.S.; Wells, R.C. 1916. Some minerals from the fluorite-barite vein near Wagon Wheel Gap, Colorado. *Proceedings of the National Academy of Sciences of the United States of America* 2(7): 360-365.
Mindat. N.d. [Creedite](#).
Parker, R.L. 2020. [Creedite: A rare fluorinated sulfate](#). *Outcrop* 69(7): 24-30.
Schwochow, S.D. 1983. [Wagon Wheel Gap Fluorspar Mine](#). U.S. Geological Survey.
Urquidi-Barrau, F. 1978. [Colquiri Mine](#). U.S. Geological Survey.
Wikipedia. N.d. [Creedite](#).

Mineral Show Coming Up November 6 Program

For our NVMC meeting on **November 6, 7:30 p.m.**, we will meet in person at the Dunn Loring Fire Station, 2148 Gallows Road, Dunn Loring, VA. You can also join us on Zoom at <https://tinyurl.com/ycx7tf8j>.

We will discuss the upcoming club show on November 18-19. Show Chair Tom Taaffe will lead the discussion; see his article on page 10. We will need volunteers to play various roles needed for a successful show. You can sign up [here](#).

In addition, club members are invited to participate in a show-and-tell and to give short presentations (with a few slides) on a favorite collecting trip. ↗

number of popular sites in the mid-Atlantic region, and the donation included many boxes of garnets, tourmalines, mica, and fossils that he pulled out of the ground



Generous donations of minerals and fossils from the estate of Bob Wolf to the NVMC (top) included garnets from Mars Hill, NC (middle). Some minerals were auctioned off at the October NVMC auction (bottom), with Craig Moore as auctioneer and Jason and Celia Zeibel handling the finances. All photos: Jason Zeibel.

President's Collected Thoughts

by Jason Zeibel

We often hear that November is a time to give thanks. I believe that it is more than that. This is not just a time to give thanks, but also a time to do things for others.

This point was driven home to me earlier this month when I was contacted by the Smalfelt family in Fairfax, VA. They were blessed to have a loving neighbor named Bob Wolf, who happened to be an avid rockhound. Bob spent over a decade introducing the Smalfelts' son (aptly named Jasper) to geology. Bob frequently brought specimens back for Jasper from his travels around the country. Bob gave Jasper not only quite a number of rocks, but also his time.

Recently, Bob passed after a long and full life, and Jasper has grown up and moved out on his own. The Smalfelt family wanted to honor Bob's contributions to the next generation of geologists by donating a large quantity of Bob's rocks and minerals to the club (see the photos). Some of them were recently auctioned off in our club auction to benefit our scholarship fund. The rest will be contributed to the Kids' Activity Room at the NVMC's upcoming rock, gem, mineral, and fossil show at George Mason University. Bob collected in a

himself, as well as a number of other specimens obtained over many years.

If you have piles of extra specimens that are no longer the core of your collection, consider putting together a few boxes of minerals and fossils for the Kids' Room. I charge you to not stop there, however! Take it one step further and donate some of your time and energy to teaching someone young or young at heart about geology! They will then have someone to be thankful for this upcoming holiday season!

This is the month of our 31st Annual Gem, Mineral, and Fossil Show at George Mason University. Please book your calendars for November 18-19. Tom Taaffe is our show chair and has printed handouts, which will be available at all club events between now and then. I encourage you to take some and leave them at appropriate community locations and bulletin boards to get the word out.

Also, please consider signing up to help at the show. You can see the available volunteer slots by clicking [here](#). There are many ways to help out, and all are deeply appreciated—Tom and I thank you! We really do need help from every club member. Come by and join Celia and me in the Kids' Activity Room at least once! Even if you can't come to the show, please help get the word out about the event. Finally, please remember to thank our volunteers at the show!

We had our semi-annual club auction in early October at the Dunn Loring Fire Station. Attendance was down somewhat from previous auctions, although there was certainly some spirited bidding on a number of items. Club Vice President Craig Moore filled in superbly as auctioneer, while my daughter Celia and I handled all the paperwork and financial transactions. All in attendance agreed that it was an enjoyable and well-run affair, though we certainly did miss having our traditional team helping out. The auction is typically one of the highlights of the year; we need more people to attend and would like to hear your ideas on how to encourage members and guests to show up in person.

The November meeting will be in person on Monday, November 6, at the Dunn Loring Fire Station. I will try to have the Zoom option up and running for this event. The main order of business will be to work logistics for the upcoming show.

However, Craig has put a challenge out there for club members: come with a show-and-tell presentation or— even better—a short presentation (only a few slides)

on a favorite mineral collecting trip. The point is to encourage members to have the courage to share so that we can learn from each other. I hope to hear some fun collecting stories! 🐉

Jason

Marine Reptile Fossil Found in Utah

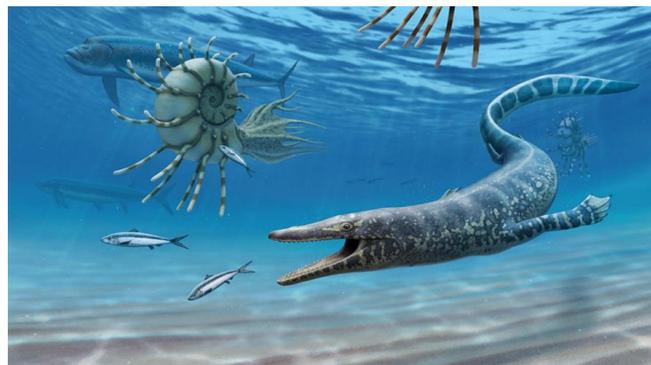
by Carter Williams

Editor's note: Adapted from KSL News (25 June 2023). Thanks to Sue Marcus for the reference!

A set of fossils found in southern Utah over a decade ago is now believed to be the oldest mosasaur fossil ever uncovered in North America, and it's helping paleontologists better understand the evolution of the marine reptile that once existed in the age of the dinosaurs.

The fossils were discovered in Glen Canyon National Recreation Area near its border with the Grand Staircase-Escalante National Monument all the way back in March 2012, according to the Bureau of Land Management.

Scott Richardson, a trained volunteer at the time, was helping University of North Florida paleontologist Barry Albright look for fossils of underwater creatures from the late Cretaceous Period at the time. That's when Richardson came across multiple small skull fragments and vertebrae on a shale slope. ... [Read more](#).



Artist's reconstruction of the Sarabosaurus dahli swimming with ammonites and fish in southern Utah, 94 million years ago. (Artwork by Andrey Atuchin.)



Club Show Coming Up! November 18-19, 2023

by Tom Taaffe, Show Chair

After a successful show last year, the NVMC is holding our 31st Annual Gem, Mineral, and Fossil Show this fall with sponsorship by the Department of Atmospheric, Oceanic and Earth Sciences at George Mason University (GMU) in Fairfax, VA. The show will be on November 18-19 in Dewberry Hall, Johnson Center Building, GMU. After setup on November 17, show hours will be from 10 a.m. to 6 p.m. on Saturday, November 18, and from 10 a.m. to 4 p.m. on Sunday, November 19. 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 Scouts in uniform, children 12 and under who are accompanied by a parent, and GMU students and faculty with ID.

Here are various suggestions for ways that NVMC members can help with this year's show.

Staffing the Show

You can volunteer by clicking [here](#). For example, we need help during show hours on Saturday and Sunday, including volunteers for the **Kids' Activity Room**. This job entails administering quizzes, helping with puzzles, and awarding free specimens to kids who earn them. It also includes fielding any questions the kids have as well as helping with mineral and fossil identification. The Kids' Room can get a little crazy at times, but it's lots of fun and very worthwhile.

Show volunteers needed!!

We also need volunteers to help with **setting things up** on Friday, November 17. That includes bringing items from the club's storage unit to GMU, helping to set up the Kids' Room, and helping dealers at the unloading dock so that the process goes smoothly.

We need volunteer help at the **admissions table**. If several club members take a shift or two, it will make the process less chaotic and more efficient.

When the show ends at 4 p.m. on Sunday, we need volunteers to help **teardown**. We will need volunteers to



NVMC gem, mineral, and fossil show in November 2022.

Photo: Tom Taaffe.

pack up the Kids' Room and gather all the club equipment and gear. We will need additional help with bringing it all back to our storage unit as well.

Donating Specimens for Kids

You can volunteer by donating mineral and fossil specimens for our kids' mines in the Kids' Activity Room. These should be suitable specimens for children, not too big or small (about 1 to 3 inches in size or weighing about 1 to 4 ounces). The specimens should be somewhat interesting and somewhat attractive and hopefully have some educational value.

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.

Devising New Quizzes for Kids

You can volunteer to design or create a new mineral challenge, puzzle, or identification quiz for the Kids' Activity Room. Your new mineral quiz should not be too easy or too difficult; you want children to get some of the answers correct while still feeling challenged, and you want them to have learned something. If you have an idea and want feedback, please email me (Tom Taaffe) at rockcllctr@gmail.com.

For your newly designed quiz, you might want to use photos, line art, or even actual specimens. All of these ideas can work. Just remember that you want your quiz to be relatively uncomplicated and straightforward so that it is easy enough to take and easy to grade. It's been a long time since anyone other than me designed a new quiz for the Kids' Activity Room, so please give it a try!

Getting the Word Out

You can volunteer to help promote our annual show and really get the word out. We always need help with show advertising and promotion. After 2 years of doing without a show during the pandemic, rebuilding our show's following remains important—one or two people taking it on won't be enough. We mail post-cards to previous attendees, and we post our show on some rockhound show calendars; but we really could use much more help.

As you might know, myriad social media options and opportunities exist, including Facebook, neighborhood websites, the Patch, websites of regional mineral clubs, and so on. I am sure that several NVMC members are much more fluent in and comfortable with navigating and posting on the web than I am. So please volunteer to get the word out.

When you are ready, please send me (Tom Taaffe) an email at rockellctr@gmail.com, and I will give you all the specifics you will need to post our show on your selected spots on the web (show dates, place, hours of operation, admission fees, and so on). ↗

2023 Gem, Mineral, and Fossil Show: Participating Dealers

R and L Minerals, Ron & Linda Tonucci, Waldorf, MD
Jon Feigin, Sewell, 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



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 18 & 19, 2023
Place: Dewberry Hall, Johnson Center
George Mason University - Fairfax Campus
GPS: www.bit.ly/3fBZfh8 (Lot A)
Hours: Saturday 10am-6pm, Sunday 10am-4pm
Admission: Adults: \$6, Seniors: \$4, Teens (13-17): \$3
Children 12 & under, accompanied by adult are FREE
GMU Students & Faculty 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)

Demonstrations, Exhibits, Kids Activities, and Door Prizes.
Mini-mines for children to dig in and get free fossils and minerals.
Approximately 20 Dealers with Gems, Minerals and 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



Uniquely Preserved Gut Contents Illuminate Trilobite Paleophysiology

by Petr Kraft, Valeria Vaskaninova, Michal Mergl, and others

Editor's note: The piece is the lightly edited abstract for an article in [Nature](#). Thanks to Casper Voogt for the reference!

Trilobites, among the most iconic of fossils, formed a prominent component of marine ecosystems during most of their 270-million-year-long history from the early Cambrian period to the end Permian period. More than 20,000 species have been described to date, with presumed lifestyles ranging from infaunal burrowing to a planktonic life in the water column. Inferred trophic roles range from detritivores to predators, but all are based on indirect evidence, such as body and gut morphology, modes of preservation, and attributed feeding traces; no trilobite specimen with internal gut contents has been described.

Here, we present the complete and fully itemized gut contents of an Ordovician trilobite, *Bohemolichas incola*, preserved three-dimensionally in a siliceous nodule and visualized by synchrotron microtomography. The tightly packed, almost continuous gut fill comprises partly fragmented calcareous shells, indicating high feeding intensity. The lack of dissolution of the shells implies a neutral or alkaline environment along the entire length of the intestine supporting digestive enzymes comparable to those in modern crustaceans or chelicerates. Scavengers burrowing into the trilobite carcass targeted soft tissues below the glabella but avoided the gut, suggesting noxious conditions and possibly ongoing enzymatic activity. ↗



Pure manganese cube and oxidized manganese chips.
Source: Wikipedia.

Manganese Mining for Electric Vehicles Threatens Worker Health

by Rachel Chason and Ilan Godfrey

Editor's note: Adapted from The Washington Post (8 June 2023). Thanks to Sue Marcus for the reference!

Dirk Jooste had never been a big drinker. But when he showed up for his job as an electrician at a manganese mine in the Kalahari Desert one Monday morning, he was trembling so much that his supervisor asked him if he was “babalas,” or hung over.

Jooste, then in his early 50s, soon lost the ability to keep his balance, walk straight, and remember things as basic as the TV show he’d seen the night before, he recounted more than a decade later. Eventually, a doctor delivered news that shocked Jooste: the powdery black manganese dust he’d worked with each day for years appeared to have caused irreversible poisoning.

As [demand for electric vehicles](#) has soared in recent years, automakers have rapidly turned to manganese, a common and relatively inexpensive mineral that is already used in about half of rechargeable batteries and is seen as key to making supply chains more reliable and cars more affordable. The industry’s demand for manganese has quintupled over the past 5 years, and analysts predict it could increase a further ninefold by 2030.

For years, however, manganese has taken a toll on the health of those who mine and process it, according to scientific research that shows that high-level exposure can be toxic, causing a spectrum of neurological harm. ... [Read more.](#)



Club History

What Is the Health of Your Club?

by Dave Korzendorfer, former EFMLS President

Editor's note: The article is adapted and abridged from EFMLS News (January 2017), pp. 2, 3.

About 10 years ago, Bob Livingston wrote a three-part series in the *EFMLS Newsletter* about assessing the health of your club. In his article, he wrote about the life cycle of a club from its inception, to its growth years, to its sustainable healthy activities, to its eventual decline.

So what are the clues that your club has a problem?

The obvious ones are the trend of your club membership; the average age of your club members; whether you meet in a public location; and whether you have a newsletter, bulletin, or some other means of communication.

Another sign of health is your club treasury. Is it large enough to support the ongoing needs of the club as well as some growth ideas? My understanding is that having onhand about 1 year's worth of your annual club revenue is a safe level to support ongoing club activities; amounts above that can be used to support new activities to build growth.

One of the ideas Bob put forward as an indicator of a healthy club was a "rallying-point activity" for keeping members involved in the club. Many clubs would consider their show to be that "rallying point," but it could also be a picnic, swap, kids' day, annual trip, or something else. What's important is that it is supported by most club members.

Bob also wrote about the importance of youth for sustaining a healthy club. By youth, many of us think of kids who are future enthusiasts, but it can also be members who bring energy and new ideas to your club, regardless of their age. It is vital to grow your core group of members who volunteer and make things happen.

Another critical factor is the core group of volunteers in your club. Relying too much on one or two individuals to assume responsibility for getting things done is a recipe for ultimate decline.

A club can do many things to breathe new life into the organization, and the third part of Bob's series offers some ideas. One is to take full advantage of help from the federation. Your club has a regional vice-president



Field trip participants at a West Virginia quarry.
Frequent field trips indicate a healthy club.

Photo: Tom Kim.

available to work with you one-on-one, bringing you ideas that have worked for other clubs.

In fact, one of the ideas from a recent teleconference call with the regional vice presidents was to put together a list of successful ideas for helping clubs grow. The list will go into an upcoming issue of the *EFMLS Newsletter*. ↗

Earth's Mysterious Core Is Weirder Than You Think

by Marianne Guenot

Editor's note: The piece is in *Business Insider* (22 September 2023). Thanks to Sue Marcus for the reference!

The Earth's mysterious core is crucial to every part of life on our planet. This furnace of molten metal, which lies about 1,800 miles beneath our feet, keeps our atmosphere intact and protects us from being bombarded by solar radiation.

But scientists still don't really understand exactly how it works. We can't go down there, for obvious reasons, so researchers have to rely on shock waves traveling through Earth to give us clues into what's really going on in our planet's heart. Recent studies have revealed a series of surprising discoveries about the core, and now scientists say they are beginning to unravel its secrets. ... [Read more.](#)

Ancient Crystal-Filled Rock Hides Dinosaur Secret

by Sascha Pare

Editor's note: The article is adapted from ScienceNews, April 2023. Thanks to Sue Marcus for the reference!

Paleontologists have confirmed that a rock enclosing a round agate crystal [*sic*—agate is not a crystal] is actually a titanosaur egg, which was probably smothered by lava after a volcanic eruption 67 million years ago.

The agate specimen was originally stored in the mineral collection at the Natural History Museum in London, but researchers think the gem grew inside a 67-million-year-old titanosaur egg. So a beautiful crystal stored away in a mineral collection 135 years ago was harboring an even rarer treasure: the shell of an ancient dinosaur egg.

The encrusted egg originated on a volcanic plain in central India, prompting researchers to think that a lava flow smothered the nest shortly after the dinosaur laid it. The embryo decayed, but layers of solidified volcanic rock preserved the shell. Over time, silica-rich water seeped into the shell and crystalized to form a light pink-and-white agate mineral.

A man named Charles Fraser found the crystal while living in India between 1817 and 1843, according to Hansen, and the Natural History Museum in the U.K. cataloged it as agate in 1883. It sat in the museum collection for more than a century until it was put on display in 2018, when it caught the attention of Robin Hansen, curator of minerals at the Natural History Museum in London.

The near-perfect spherical shape of the rock, as well as the imprint of two other round objects clustered around it and the thin layer around the crystal, suggest it could be a dinosaur egg. The specimen measures 5.9 inches across, which is consistent with titanosaur eggs found in China and Argentina.

Paleontologists tried to scan the specimen to confirm its origin, but the density of the agate obstructed the finer details. They are confident that it is a titanosaur egg in part because these gigantic beasts were the most common dinosaurs in what is now India during the late Cretaceous Period (100 million to 66 million years ago). Earlier this year, [scientists uncovered a large number of titanosaur nests in India](#) roughly 3 million years older than the newly described agate-egg.



Despite being the [world's largest dinosaurs](#)—growing up to 123 feet long and weighing up to 70 tons, titanosaurs laid relatively small eggs with a diameter ranging from 4.7 to 5.9 inches, according to a study published in the journal [PLOS One](#) that described the titanosaur nests discovered in India.

Titanosaurs may have taken advantage of the warm soils of volcanic plains in central India to lay and incubate their eggs.

“It looks like titanosaurs adopted a strategy of laying large clutches of about 30 or 40 smallish eggs,” said Paul Barrett, a paleobiologist at the Natural History Museum. “As titanosaurs were far too big to have brooded their eggs, they most likely covered them with vegetation or soil to help incubate them.”

This reproductive strategy is similar to how sea turtles and crocodiles lay their eggs today. According to museum experts, titanosaurs in India may have taken advantage of the volcanic environment by laying their eggs in the warm soil to keep them toasty until they hatched. This perk could explain why scientists have found titanosaur fossils between layers of volcanic rock in an area in central India called the Deccan Traps. ↗

Note from Sue Marcus: Agate (cryptocrystalline quartz) around the inside edges of the egg grades into purer quartz crystals that grew inside the egg void.

November 2023—Upcoming Meetings/Show in Our Area (see details below)

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			1 MSDC mtg	2	3	4
5	6 NVMC mtg	7	8	9	10	11 Veterans Day
12	14 GLMSMC mtg	15	16	17	17 NVMC Show, GMU (setup)	18 NVMC Show, GMU
19 NVMC Show, GMU	20	21	22 MNCA mtg	23 Thanks-giving	24	25
26	27	28	29	30		

Event Details

- 1: Washington, DC**—Mineralogical Society of the District of Columbia; <http://www.mineralogicalsocietyofdc.org/>.
- 6: Dunn Loring, VA**—Northern Virginia Mineral Club; <https://www.novamineralclub.org/>.
- 14: Rockville, MD**—Gem, Lapidary, and Mineral Society of Montgomery County; <https://www.glmsmc.com/>.
- 22: Burke, VA**—Micromineralogists of the National Capital Area; <http://www.dcmicrominerals.org/>.
- 17-19: Fairfax, VA**—NVMC/GMU Club Show (details on page 10).
- 18-19: Raleigh, NC, Columbia, SC, Lebanon, PA**—various shows (see [Rock&Gem Magazine](#) for details).



Creedite, Qinglong Sb-Au deposit, Qinglong County, Qianxi'nan Autonomous Prefecture, Guizhou Province, China. Source: Mindat; photo: Rob Lavinsky.



2023 Club Officers

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The Northern Virginia Mineral Club, Inc.

Visitors are always welcome at our club
meetings!

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<http://www.novamineralclub>

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RENEW YOUR MEMBERSHIP!

SEND YOUR DUES TO:

Roger Haskins, Treasurer, NVMC

4411 Marsala Glen Way, Fairfax, VA 22033-3136

OR

Bring your dues to the next meeting.

Dues: Due by January 1 of each year;

\$20 individual, \$25 family, \$6 junior (under 16, sponsored by an adult member).

Club purpose: To encourage interest in and learning about geology, mineralogy, lapidary arts, and related sciences. The club is a member of the Eastern Federation of Mineralogical and Lapidary Societies (EFMLS—at <http://www.amfed.org/efmls>) and the American Federation of Mineralogical Societies (AFMS—at <http://www.amfed.org>).

Meetings: At 7:30 p.m. on the first Monday of each month (except January and September) 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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