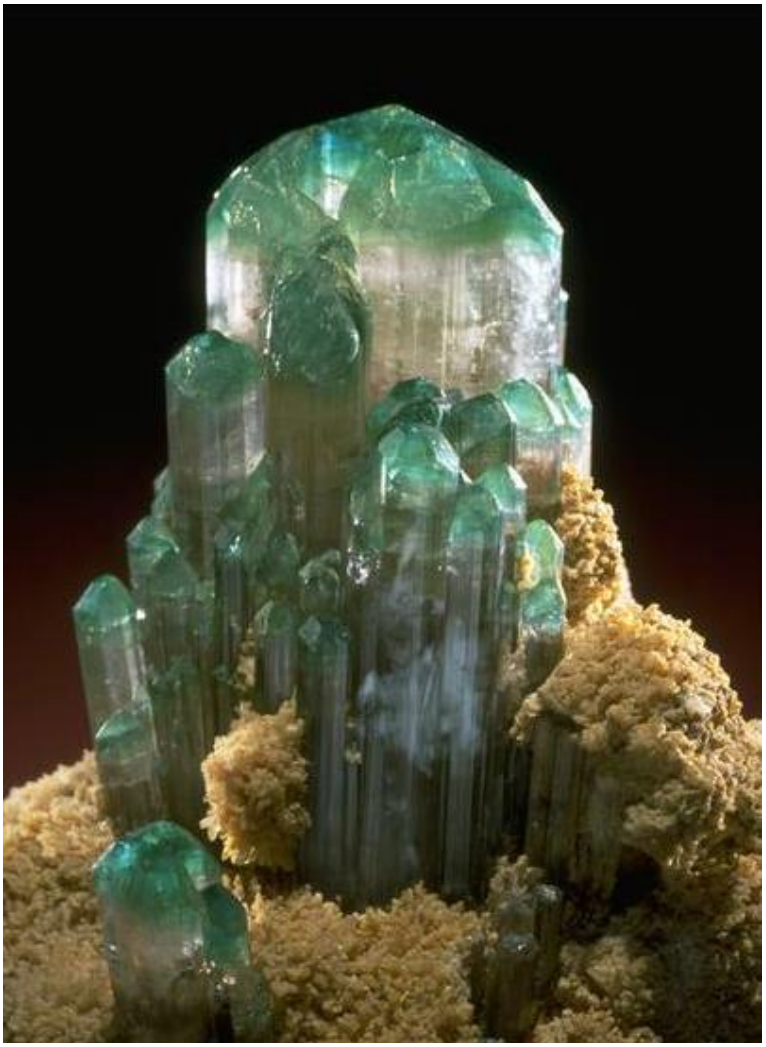
THE NORTHERN VIRGINIA MINERAL CLUB INC

# The Mineral Newsletter

## Meeting: March 22  Time: 7:30 p.m.

**The meeting will be remote due to the coronavirus pandemic. Details to come.**



Elbaite

**Golconda Pegmatite Mine**
**Minas Gerais, Brazil**

*Source: Smithsonian Institution.*  *Photo: Chip Clark.*

**Volume 62, No. 3**
**March 2021**
Explore our website!

**March Meeting Program:**

Maine's Tourmaline Pegmatites

*details on page 14*

**In this issue …**

## *Mineral of the Month*
# Elbaite

*by Sue Marcus*

What's red or pink on the inside with a green rind? Watermelon, and so is watermelon tourmaline. Watermelon tourmaline is a particular, informal form of elbaite, our March Mineral of the Month.

Tourmaline is a large family of minerals; in fact, it is now officially a supergroup with 33 recognized species. It is growing larger as scientists are increasingly able to delve into the chemistry and characteristics of the mineral group with more sophisticated equipment. When most people, especially mineral collectors, think of tourmaline, they see elbaite in their mind's eye, usually as a single red-pink or green crystal.

Elbaite is unusual in that it occurs in distinct yet very different colors. Some crystals might be totally green, red, or pink. Others might be primarily one color, though tipped by a contrasting one—for example the Smithsonian's beautiful "Candelabra" from Pala, CA. It features three large pink elbaite crystals ("candles") with blue-green terminations that result in a large and stunningly beautiful specimen.

*Happy St. Patrick's Day!*

**Northern Virginia Mineral Club members,**

No in-person social events for now!


Perhaps the earliest known use of elbaite as a gemstone was in St. Wenceslas's crown in the 14th century. Ceylon (now Sri Lanka) might have been the first known source of gems called *tourmalin* (tourmaline) in the

*Elbaite candelabra from the Tourmaline Queen Mine in California.*
*Source: Smithsonian Institution; photo: Chip Clark.*

early 18th century. Reports of the colors of the Ceylon material indicate that it was probably elbaite.

You might guess that elbaite is named after the eponymous Italian island. Elba was originally named Ilva. Ilvaite, another tourmaline species, had acquired the original island name, so the newer tourmaline species received the newer name, elbaite.

Elbaite was used for jewelry for hundreds of years before it was described between 1910 and 1913 (sources differ). I had to check several sources because it was hard to believe that such a well-known mineral was formally described so recently. It might have taken that long to develop the analytic techniques and equipment mineralogists needed to examine new samples.

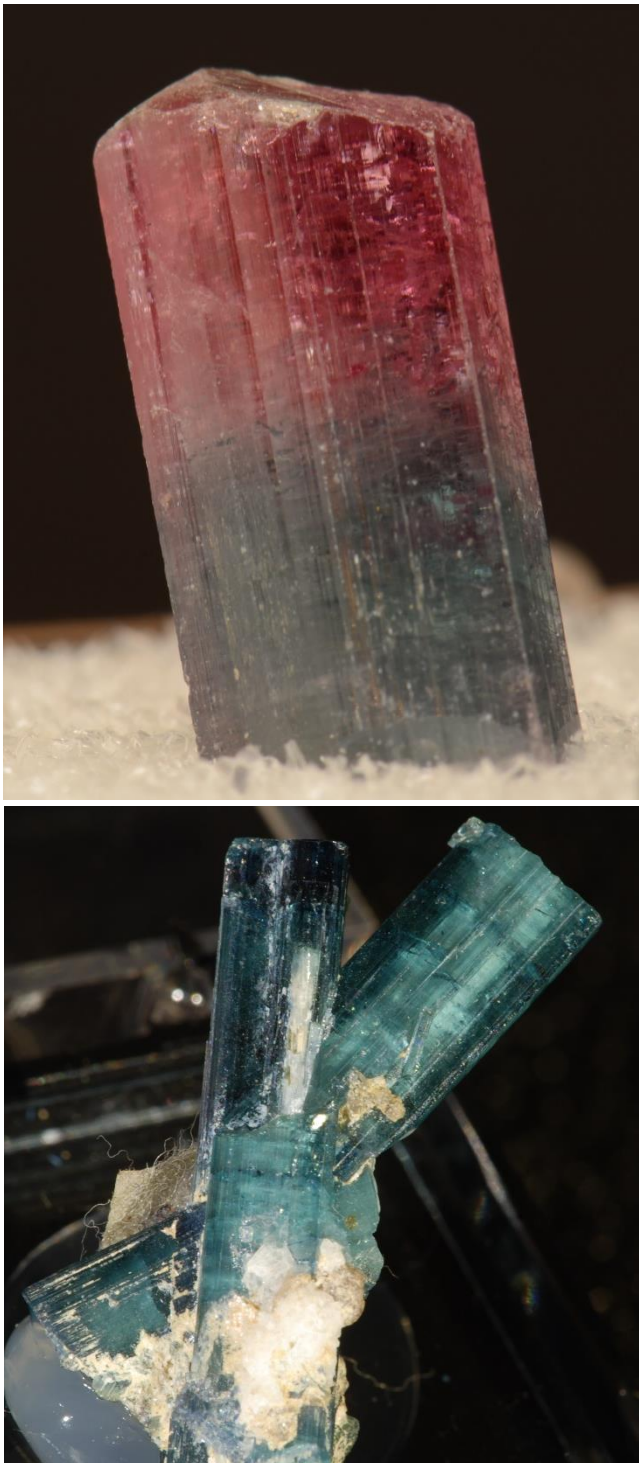
The International Mineralogical Association lists the first use of the name elbaite in a 1913 German reference. The German source refers to a 1910 paper by an Italian author. The paper does not, as far as I can tell, use ilvaite as a precursor name.

Color is not a good indicator of tourmaline species. Coloration in elbaite can be caused by traces of a metal in the elbaite crystal lattice or by interactions of elements at the ionic level (IVCT, or intervalence charge transfer).

Rubellite is the mineral name used for pink tourmaline. The mineral species name is usually elbaite, but it might be another species, depending on the specimen's chemistry. Manganese is the colorant of pink to red elbaite, although the full explanation is more chemically complex.

Similarly, indicolite is the name given to the blue variety of elbaite, with Mindat suggesting fluor-elbaite as a rarer alternative. Copper-bearing elbaite has the same chemical formula as elbaite, but the traces of copper in the crystal lattice cause the specimens to be blue or green, a color now known as "Paraíba blue" after their first discovery location in Paraíba, Brazil. Oddly, the Mindat webpage for elbaite states that lead causes the color in the Paraíba blue material; yet every other Mindat page and other site acknowledge copper as the cause of the color. The color is described as "neon" or "electric" blue. I suppose color too is in the eye of the beholder; I see it as a brighter color, with more brilliance—like adding salt or lemon juice to a dull food to brighten it and finding, wow, that is good.

Deep green colors are due to traces of chromium, sometimes with a bit of iron. Vivid greens may also be due to by iron, iron/titanium, vanadium, or vanadium/chromium. When small amounts of titanium interact with manganese, yellow-green elbaite can result. Namibian elbaite can receive green or blue hues from



*Elbaite in different hues from Minas Gerais, Brazil. Photos: Bob Cooke.*

*Elbaite in hues of green from Maine—Poland, Androscoggin County (left) and Greenwood, Oxford County (top). Photos: Bob Cooke.*

traces of iron. Verdelite is a term given to some green and yellow-green elbaite. Bright green chrome tourmaline from Tanzania is likely to be the tourmaline species dravite, not elbaite. As you can tell, chemical analysis—at a level beyond most of us—is necessary to distinguish elbaite varieties and often tourmaline species. Watermelon zoning (pink inside with a green "rind") occurs when the crystallizing fluid is initially manganese rich and then becomes iron rich; reverse conditions produce reverse colors.

Other optical properties of elbaite are pleochroism (in some specimens): when you look down the c-axis (the length or through the termination) of the crystal, the color seems darker or more intense than looking though the crystal in other directions. Those who remember the last Mineral of the Month column on chrysoberyl might recall that "cat's eye" pertains specifically to that mineral—unless you take liberties with the term. Elbaite can form "tourmaline cat's eyes" that are most attractive when cut into cabochons.

Elbaite crystals usually appear to be rounded triangles when seen in cross sections. This is distinctive of the tourmaline group. Like other tourmaline crystals, elbaite crystals are usually striated, parallel to their length, along the c-axis. Crystals commonly form as individuals, though radiating clusters of crystals, botryoidal mats, and "mushrooms" are also known. Also, like others in the tourmaline group, elbaite crystals may form, break, and heal themselves chemically and mechanically.

Pegmatites are the host rocks for elbaite. Of course, not all pegmatite magmas have the lithium, boron, and phosphorus in just the right quantities and at just the right temperatures and pressures to form elbaite. Again, geologic conditions have to be just right for miarolitic cavities or pockets to form. These are open areas—voids—in which minerals like elbaite can grow relatively unobstructed. The slower the growth, the larger the crystals.

*"Cat's eye" elbaite from Minas Gerais, Brazil. Source: Smithsonian Institution; photo: Chip Clark.*

*Elbaite on quartz (top and right) from Minas Gerais, Brazil. Photos: Bob Cooke.*

Pegmatites also create the perfect environment for nice specimens showing brightly colored elbaite contrasting with clear or white quartz or cleavelandite. The complex conditions required to create elbaite (or other gem or top-quality minerals) in pegmatite pockets makes those gems and specimens rare. The economic viability of production from deposits of gem and specimen-bearing pegmatites is usually intermittent because the pockets can seldom be predicted. The mining situation can literally be boom and bust, especially when blasting is done too near the pockets, resulting in fractured crystals. These may be usable as lesser valued gem material.

This is one mineral with U.S. localities that are world famous. Initial discoveries were in the Northeast—in pegmatites from Maine and Connecticut. Mt. Mica in Maine has a long but intermittent history of elbaite extraction. The first elbaite was discovered there in the early 1820s, and the latest photos posted on the quarry's Mindat page were of crystals found in 2017. Those latest ones are beauties, not what I would expect for a such a long-known locality and for such a coveted mineral. As recently as 1973, two tons of red, green, and bicolored elbaite were extracted from the Dunton Gem Quarry near Newry in Maine.

Some pink elbaite from Mt. Mica fluoresces light blue. Most Dunton elbaite fluoresces blue-white, with red elbaite fluorescing brighter than green. Heat enhancement increases the fluorescent color intensity but can

*Elbaite with cookeite from Oxford County, ME. Photo: Bob Cooke.*

*"Steamboat" elbaite from California, named for the "smokestacks" of tourmaline on quartz. Source: Smithsonian Institution; photo: Chip Clark.*

render the specimen essentially colorless in daylight. The fluorescence of material from Dunton can help you distinguish it from specimens that might have been misidentified, perhaps trading on the name recognition that appeals to some collectors.

Late in December 1895, tourmaline—later identified as elbaite—was discovered in Haddom, CT, by M.P. Gillette, who opened what became known as the Gillette Quarry. Since it was a very early gem and mineral producer, close to buyers in New York and other eastern U.S. markets, the quarry became a well-known source of museum specimens and fine gemstones. The pegmatite was highly zoned, with pockets containing elbaite and other specimen materials. Elbaite crystals up to 8 inches long were reported, as were crystals with five colors. Green elbaite predominated, although other colors and colorless specimens and gem materials were also found. The property was worked until about 1944 for feldspar (for abrasives sold to the Bon Ami company), gemstones, and mineral specimens.

The best known U.S. locality probably comprises the pegmatite fields of eastern San Diego County, CA. In the mining district around Pala, CA, and specifically at the Stewart Mine, rubellite forms crystals in a sparkling matrix of lavender lepidolite, with both the lepidolite and the elbaite indicating abundant lithium available for mineral formation. I've been lucky enough to go underground at the Stewart Mine and have been able to collect on the dumps a couple of times. I found nothing of great value but it was fun—and the pink and purple specimens are different from the white calcite/gray limestone or dark green diabase around here.

In 1915, the Pala Chief Gem Mining Company seized on a marketing opportunity at the San Diego Exposition, where they built a mockup of the Pala Chief Mine for Exposition visitors to walk through. Exhibition goers could see the tourmaline and spodumene (another lithium-bearing mineral) in "faithful detail," the brochure assures us, as they learned of mining methods; I suspect that they could also get a marketing pitch about lovely gemstones.

Whether truth or myth, the story goes that the first gemstones found in the area were brought to the attention of Frank A. Salmons by ants. Mr. Salmons ran a trading post on the Pala Indian Reservation. In about 1897, he was out hiking when he saw an unusual red glint in the sand from an anthill. Looking for the source, he found a pink and green crystal—the first reported bicolor elbaite from the Pala District.

Apparently, 1915 was a major year for exhibitions in California. A World's Fair, also known that year as the "Panama Pacific International Exposition" in honor of the completion of the Panama Canal, was held in San Francisco. It included a "Palace of Mines" that featured a replica of part of the Tourmaline King Mine—with sales of crystals and jewelry, of course.

The pegmatites in the Pala District are zoned. Open areas, called pockets, gave crystals enough space to grow larger. The pockets are the "jewel boxes" that miners, professional and amateur, like to find. Specimens must be extracted carefully because crystals can be supporting each other, sticking into the open pocket from all directions; or the pocket can be filled with clay, so you might not know what it contains. One wrong blow can

decrease the value of a specimen, especially ones that could be faceted into expensive gems, by breaking it or causing fractures. More pieces don't mean more money in that situation! Sometimes, very large and valuable crystals that break can be repaired and sold if it can be done (1) without showing any obvious repairs, and (2) by honestly reporting the repair to prospective buyers.

The Pala Chief and the Tourmaline Queen Mines are among the notable historic mines in this district. Mining at the Tourmaline King, Tourmaline Queen, Pala Chief, Stewart, and other mines has been intermittent since the early 20th century but is continuing. The properties are patented, so collecting is not permitted. Mining equipment was emplaced and environmental and infrastructural planning completed at the Tourmaline King Mine by the end of 2017 in preparation for gem tourmaline production.

We're not done with famous elbaite producers from eastern San Diego County. Some of you have probably heard of or have specimens from the Little Three Mine in the Ramona District. The Little Three produced elbaite in diverse colors, with greens more common and with museum-quality specimens extracted from the 1960s until the early 1990s. Some of the elbaite crystals from the Little Three were topped with tiny topaz crystals, including a large, well-formed 8-ounce elbaite crystal with topaz toppers. I seldom quote from my sources, but this quote, from the Mindat description of the Little Three Mine, is worth sharing:

> A very fine topaz-elbaite matrix specimen weighing about 150 pounds was mined in 1905 from the Little Three Mine main dike. The specimen was placed on display for many years at the San Diego Chamber of Commerce until it was moved to the newly opened Natural History Museum. During World War II, the Navy took over the museum, and the displays were crated and stored away. The specimen hasn't been seen again, and it is said to have likely been put onto a junk barge and dumped into the ocean.

Another famous San Diego County mine is the Himalaya Mine, a top producer throughout the 20th century, with gems discovered there as early as 1898. Pink, green, and bi- and tricolor elbaites are found here, along with elbaite with watermelon zoning. The mine is now a fee-for-digging operation. The abundance of pegmatites in the region have led to other, smaller intermittent elbaite producers.

*Elbaite from the Himalaya Mine, California. Source: Smithsonian Institution; photo: Chip Clark.*

Brazilian pegmatites from Minas Gerais have been a long-term, dependable source of elbaite and other tourmaline species. Brazil is famous for cut gemstones of many types; tourmaline adds many colors to the palette of Brazilian gem options.

The Mindat entry for the Pederneira Mine shocked me. I had never seen a page not only with advertising for a mine but also with advertising for videos of the mine, including one called "Pederneira—The Mine, The Movie." I will simply tell you that the elbaite crystals from this locality are stunning in color, transparency, diversity of colors, and color combinations.

The Smithsonian's National Museum of Natural History has the "SGC Cranberry Crown." The Crown is 7.5 inches high, meaning that the longest crystals are probably at least 6 inches long. They are like pencils,

*"Strawberry Crown" elbaite from the Pederneira Mine, Minas Gerais, Brazil.*
*Source: Smithsonian Institution; photo: James Elliott.*

*"Paraiba blue" elbaite from Paraiba, Brazil.*
*Source: Smithsonian Institution; photo: Greg Polley.*

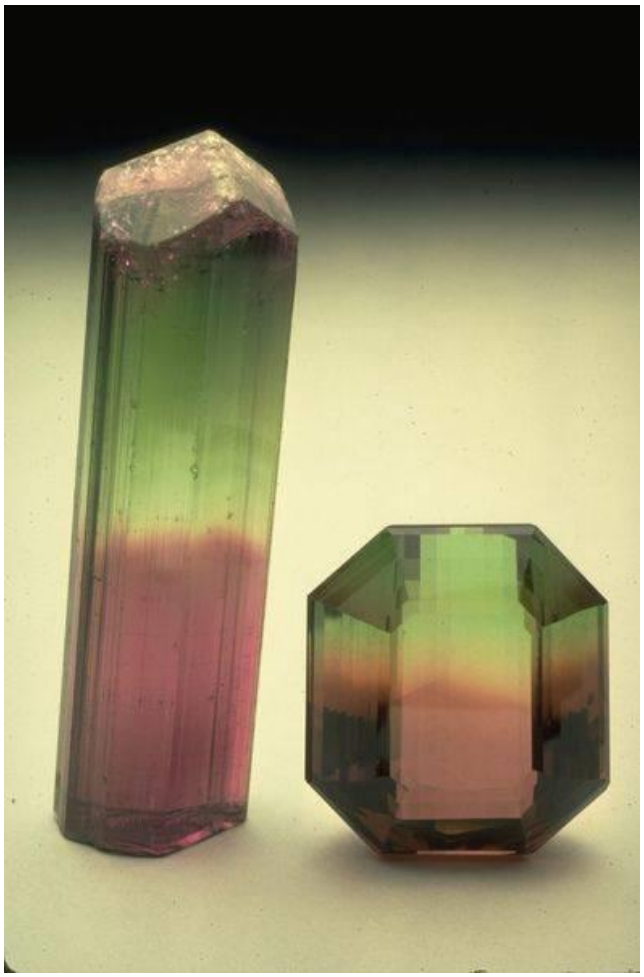
free standing and hot, dark pink in color. The Pederneira Mine's bicolor crystals, with cranberry-colored bases and contrasting blue-green upper shafts, are the most beautiful to me, although I found the owners' website news on spending triple digits on minerals off-putting to my budget.

The Pederneira Mine was originally opened for muscovite in the 1940s; not until the 1980s did it became known as a tourmaline producer. More than 10 tons of gem rough tourmaline were extracted between 1980 and the late 1990s. Starting in 1999, new mine owners found what are probably the world's best tourmaline specimens. Many of the long thin pencils are pink and green in the various ways that those colors can be zoned: top/bottom, bottom/top, inner/outer, and outer/inner. Since the pencils are delicate, they readily fracture, so repaired specimens, even as museum specimens, are not unusual—and even repaired specimens can be expensive.

Wouldn't you like to have a hairy elbaite? One elbaite specimen I saw consisted of two crystals from Minas Gerais (no specified mine), although I've seen similar schorl specimens. These oddities start with a single tourmaline crystal. The conditions slow or change, though the chemistry may remain the same or similar while giving rise to the parallel growth of fine, acicular "hairs" of tourmaline growing atop the larger single crystal. These crystals, even the elbaites, are usually dark and look a bit like the long inflatable tubes that wave in the wind as outdoor marketing devices.

The Bathala Mine, also called the Paraiba Mine in Brazil's Paraiba State, surprised the gem and mineral collecting world with electric bright blue elbaite. The color, to me, is like that of a different mineral, beryl, as exemplified by the Smithsonian's Dom Pedro aquamarine obelisk. The initial discovery was made in 1982, but there was little notice of the unique find until more than a decade later. The color is caused by traces of copper in the elbaite crystal lattice. Similarly colored elbaite has been discovered in Nigeria and Mozambique, along with other locations in Brazil. Properly, the name "copper-bearing elbaite" should be used for any specimens not from Paraiba.

Deposits in the Conselheiro Pena pegmatite district of Brazil's Minas Gerais State have produced some incredible specimens. Two rubellite crystals, named the "Rocket" and the "Jonina," from the Jonas or João Pinto Mine were discovered in 1977. Each crystal was about 3.2 feet long and sold for $1 million the following year (about $4 million apiece in today's dollars).



The single pocket produced 3.6 tons of high-quality rubellite.

Beautiful tricolor elbaites from the Sapo Mine in the Conselheiro District were extracted in the late 1990s, along with single-colored material. The multicolored crystals occur in every color variation, from green-pink-white-blue/green to pink-blue/green with a clear outer rim. The Sapo Mine was operating in 2008 and might still be active.

Dozens of other Brazilian mines produce—or have produced—elbaite from pegmatite districts in different parts of the large country, in bicolored or single-colored crystals, on matrix or not, gem quality or not.

Let's cross an ocean (and then some) to check out the wonderful elbaites in the Himalayas, coming from Pakistan and Afghanistan (sometimes with localities unspecified). Elbaite has been extracted from the Stak Nala area of Pakistan's Gilgit-Baltistan territory (formerly the Northern Areas) for more than 30 years. Various shades of green are most common, with different

*Bicolor elbaites from Minas Gerais, Brazil.*
*Left: Smithsonian Institution; top: Bob Cooke.*

*Elbaite, Stak Nala, Gilgit, Pakistan.*
*Photo: Bob Cooke.*

***Top:*** *Elbaite from Stak Nala, Hardu District, Pakistan. Source: Wikipedia; photo: Rob Lavinsky.*
***Bottom:*** *Elbaite from Afghanistan. Photo: Bob Cooke.*

shades of green in one specimen, though other colors also occur here. Skardu, also in Gilgit-Baltistan, is known for elbaite of different colors, including bicolored crystals, and of different forms, like bent and naturally repaired crystals, curved crystals, and sheafs that are wider at their tops than at their bases.

Afghanistan has many small mines and prospects in the Dara-i-Pech (Pech Valley) of Kunar Province. Once again, elbaite comes in many different colors and in multiple colors within a single crystal or specimen. Unusual specimens can be clear in part and colored in part, or they can be lovely copper blue-green like some of the Brazilian material. Near Paprok, in the Nuristan Province of Afghanistan, the usual colors of elbaite along with bi- and tricolor specimens have been recovered. I can't think of a color other than true black that I didn't see in elbaite from Nuristan.

"Mushroom tourmaline" is a unique form of elbaite found in Mogok, Myanmar (Burma). Though new to most of us, this unusual form of tourmaline has been extracted since the 1800s. Sources differ as to whether this material is elbaite or not. Some "mushrooms" have dark, almost black cores of more schorl composition. Outer parts may be elbaite—or liddicoatite, olenite, or rossmanite. Technology has allowed splitting the tourmaline group into more distinct species that cannot be distinguished using the lay collector's eyes or tools.

The Minh Tien Mine in Vietnam's Lục Yên District is known for pink, green, and bicolored elbaite, some tending towards more yellow shades. Zoning is due to the trace composition of the mineral-forming fluids, which can tip the species designation into liddicoatite, dravite, or another tourmaline species. In other words, tourmaline from this locality has been found to start as one species, then move along the chemical spectrum to another species as the fluid chemistry changes. Alluvial (placer) elbaite crystals have also been found in this district.

An important Russian locality that is producing a dark red elbaite is the Malkhan pegmatite in Transbaikalia, Siberia. Some elbaite crystals are zoned vertically, others horizontally (the zoning shown in cross-sections). More than 40 elbaite or other gem-bearing pegmatite dikes have been found in this field, although pockets are few and the miners have damaged many specimens. Much of the material is used for lapidary purposes. Miners can sell gem rough, so they might not try to preserve specimen material. According to the latest report I found about this locality, Czech collectors

visited the mines in 2013 and saw a 1.2-foot tourmaline that was (unfortunately) broken during extraction; I couldn't determine whether it was elbaite or another species. This is the only locality where I've seen bismuthite and zeolites as associated minerals. The zeolites help cement and "naturally repair" broken tourmaline crystals. However, they are weak; and when miners tug to extract the tourmaline crystals, the specimens tend to fracture at the weaker places.

The wonders of elbaite continue in Mozambique, where colors of this mineral occur that I'd never seen elsewhere, including deep amethyst and a new, vibrant green, along with a "Paraiba-like" aqua. The Mavuco mining area in Nampula Province, Mozambique, is where these rainbow colors of elbaite were discovered in 2003–08. Part of the mined area, though on a different continent, is confusingly named Paraiba Mine after the original occurrence of the bright aqua material from Brazil.

Maraca in Nampula Province and Alto Ligonha in Zambezia Province are other significant elbaite sources in Mozambique, sometimes from placer deposits, with coloration from iron and titanium or, more rarely, copper. Heat treating is used to enhance the color of some of these gemstones and possibly mineral specimens too.

Tourmaline from Madagascar seems to fall chemically along the elbaite-liddicoatite line. Gems or specimens might be labeled as either species; fine crystals, though usually small, seem to be sold more frequently as elbaite.

*Elbaite from Zambia.*
*Source: Smithsonian Institution; photo: Ken Larsen.*

*Elbaite from Madagascar.*
*Source: Smithsonian Institution; photo: Chip Clark.*

Zambia offers another highly unusual color for elbaite: bright yellow, from the Canary mining area of the Lundazi District. The yellow color is due to less iron and lithium than usual and relatively high levels of boron, manganese, and titanium at the necessary times in the elbaite crystallization process. Early crystallization of schorl pulled iron from the fluid melt, providing the low iron environment required for yellow-brown elbaite formation.

A 50-carat stone was cut from this material. Mining began here in the 1970s at what was then called the Kaombeka Mine near the villages of Muchapansala and Chanyalubwe for electronics-grade quartz, with brown tourmaline tossed aside as waste. Tourmaline

extraction started in the late 1980s. Most material consists of fragments; in my research, I saw no descriptions of images of fully developed, terminated crystals. Post-mining heating of brown or yellow-brown elbaite can brighten the yellow color, making the stones more valuable.

In the 1980s–90s, Nigeria's Jos Plateau was the source of well-terminated, gemmy elbaites ranging from mint green to raspberry. Many of these became cut stones, although some are beautiful collectible specimens for those who can afford them. Deep pinks and reds occur most commonly in elbaites from Oyo State, Nigeria, although other colors are also found. There are more cut stones and fewer mineral specimens on the market.

World-class gem and specimen elbaites were found in Namibia in the Otjua pegmatite. They have all the classic colors, as well as polychromatic zoning, with occasional added clarity or luster that makes a specimen extra special. A lesser though still important elbaite locality nearby comprises the Usakos pegmatites. There was cesium, bismuth, and tantalum/niobium in fluids that crystalized into this pegmatite field, yielding interesting minerals like pollucite and diverse colors of elbaite.

*Elbaite (cut and polished) from Oyo, Nigeria. Photo: Bob Cooke.*

I like to consider the collectability of each Mineral of the Month: Can most collectors afford a specimen if they want one? Unlike chrysoberyl, our Mineral of the Month for February, elbaite can be affordable for most of us, with specimens usually available for $10 and up.

*Elbaite gems from Nigeria.*
*Source: Smithsonian Institution; photo: Greg Polley and Adam Mansur.*

*Elbaite gems from Afghanistan, Brazil, Madagascar, and the United States. Source: Smithsonian Institution; photo: Chip Clark.*

At the lower end of the price range, expect a package of small pieces of crystals or even a small whole crystal or a poor-quality opaque pink crystal in matrix. It is a start, and you can work upwards if you want.

The depth of color in elbaite can be enhanced by irradiation. Some California samples tested in color studies were irradiated. Natural radiation, caused by small amounts of radioactive minerals decaying in the host pegmatites, can also enhance the color of elbaite and other tourmaline species.

Elbaite is a beautiful gemstone that has increased in value in the past couple of decades. Discovery of the Paraiba elbaite provided a new color for jewelry designers and wearers. A 2011 paper stated that a single carat of this material could sell for $25,000!

The breadth of colors in elbaite gives designers a rich palette to work with. And this mineral adds to the eye appeal by allowing for a single faceted stone with multiple colors, for example a stone that is red-pink on one end and green on the other.

Again, the sky is the limit on what you can pay for faceted elbaite jewelry. I've learned that the cost is in the design artistry and the metal, with the cost of the faceted stones usually being the least expensive part of custom jewelry. Lesson learned: Do not do as I do—fall for the cut stones first.

## Technical Details

Formula ..... $Na(Li_{1.5}Al_{1.5})Al_6Si_6O_{18}(BO_3)_3(OH)_4$
Crystal form ..... Hexagonal/trigonal
Hardness ..... 7.5
Density ..... 2.9–3.1 g/cm3 (measured); 3.069 g/cm3 (calculated)
Color ..... Green, red, pink; less commonly blue, yellow, orange, colorless
Streak ..... White
Cleavage ..... Poor/indistinct
Fracture ..... Uneven to subconchoidal
Luster ..... Vitreous

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**Asterisked titles are of special interest.*


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Mindat. N.d. Rubellite.

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*Skip Simmons*

# Gem Tourmalines From Maine

## March 22 Program

*by Sue Marcus, Vice President*

Our March program is "Maine's Premier Gem Tourmaline Pegmatites" by Skip Simmons. Dr. Simmons recently presented the same slide show, about 50 minutes in length, to the Colorado Mineral Society via Zoom.

Dr. Simmons will discuss the discovery of the famous Newry gem tourmaline pegmatite and the discovery and production of Mt. Mica pegmatite. He will finish with the Havey gem tourmaline pegmatite. The presentation will focus on the history of the high-quality gem materials, with accompanying high-quality images. It will also provide a brief explanation of how gem tourmaline forms in pegmatites. It is about 50 minutes in length.

Dr. William B. "Skip" Simmons is Professor Emeritus and University Research Professor at the University of New Orleans. He directed the Mineralogy, Petrology and Pegmatology ($MP^2$) Research Group in the Department of Earth and Environmental Sciences at the University of New Orleans.

Currently, he is the Research Director at the Maine Mineral and Gem Museum in Bethel, ME. His principal specialty is pegmatology (the study of the mineralogy, petrology and geochemistry of pegmatites). He has conducted field research on pegmatites worldwide, publishing analyses of colored gemstones. Recent research includes the anatectic origin of B-, Be-, and Li-enriched pegmatites of western Maine.

Dr. Simmons is the organizer and director of the Maine Pegmatite Workshop, a week-long short course on pegmatites. The course runs every June and involves lectures and daily field trips to pegmatites. The course attracts an international audience of pegmatite professionals, aficionados, and students. The mineral simmonsite is named in his honor.

We look forward to having you join us for an educational presentation on a region famous for interesting minerals.

# President's Collected Thoughts

*by Tom Kim*

Like many of you, I am reeling a bit from the passing of Ti Meredith. I first met her when, as club vice president, she greeted my son and me to our first club meetings. It wasn't until I volunteered for the Kids' Room at one of our club shows, however, that I sat down with her and got to have an extended chat. Even from that sole interaction, it was clear that she was warm, good hearted, and complicated in the best possible way.

I have been thinking about Ti a lot as we consider whether or not to prepare for a show this fall. Members like Ti made the show possible, not only by volunteering in myriad ways but also by populating the room with their enthusiasm and knowledge. Ti seemed to appreciate that she was on a spectrum of devotion and liked to see others pulled into and upward in that passion, especially kids.

The show is probably the most outward facing activity of our club. As such, it's been uniquely vulnerable to the coronavirus pandemic. Doing a show this year would likely mean making it significantly different from previous shows and probably also different from future ones. We would, of course, need to make accommodations for public health purposes, not only for general safety but also to meet any requirements by George Mason University. The accommodations would probably require both more volunteers and fewer participants—exhibitors and attendees. We might have to severely restrict or do away entirely with youth participation, which would compromise our club's commitment to education. Certain logistical aspects, especially registration, might take us out of our comfort zone. And, of course, there would be a number of uncertainties that we just couldn't nail down until perhaps the very last minute.

*Ti Meredith (left) supervising the Kids' Table at the 2018 NVMC Club Show. Photo: Tom Taaffe.*

*Scene from the 2019 NVMC club show, with vendor and club member Casper Voogt. Photo: Tom Taaffe.*

And yet, a show this year would invite old rockhounds and new to gather to share their common interests, get excited about what's out there, return to some semblance of prior normalcy, and persevere in their passion. Perhaps that merits an asterisked show, after all. It would be quite an accomplishment if we pulled together to make it happen—and understandable if we chose not to.

I have heard a real variety of opinions about all this, but many of you who have not yet weighed in. I'd love to know why.

Is it because you don't have a firm position? Because you'd rather wait and see? Because you think you have an unpopular viewpoint? Because you'd rather ignore the issue?

Please speak your mind, as briefly or for as long as you'd like. Email me at president@novamineral.club and let me know what you think so that I can better represent the overall concerns of the whole club.

## Ti Meredith Tribute

*by Sue Marcus, Vice President*

Ti Meredith is remembered as a vibrant, smiling member of the Northern Virginia Mineral Club. She was always generous with her time, help, and even her home. She hosted a fun-filled picnic, with minerals, fossils, and rocks—and too much food—in her lovely home by the water in the more carefree pre-COVID days of 2019.

Ti was the Vice President of our club for 5 years, a position that includes the responsibility of finding and engaging monthly presenters. This demanding task was made more difficult when COVID-19 closed our meeting place and canceled our biannual auctions and holiday party, resulting in more meetings with presenters. Ti rose to the challenge with creative ideas, including more interactive club member presentations.

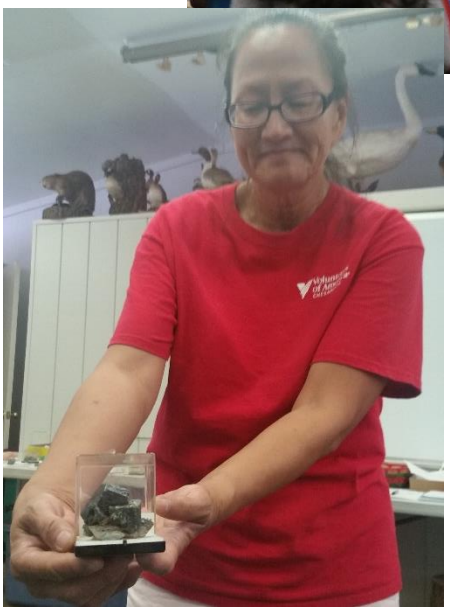
Ti's enthusiasm for our shared hobby was evident at our club shows, where she excelled at engaging young people in our kids' activities area. She was always animated, eyes sparkling, as she would pass a rock and either ask or answer a question. She also served as club greeter for 9 years, and her generosity was apparent as she so ably awarded door prizes back in the days when we still had meetings in person.

Ti was multifaceted, with multiple talents. Her life revolved around family, friends, and service to others, and she always persevered through personal setbacks, continuing to learn and grow.

Ti volunteered as a firefighter and an emergency medical technician for many years; beginning in 2018, she served with the Lake Jackson Volunteer Fire Department. In recent years, she embarked on a new career in substance abuse counseling.

Ti is survived by her beautiful son and daughter, three sisters, the father of her children, and many friends.

One type of rockhounding that Ti enjoyed was collecting heart-shaped minerals or rocks. She herself was a rock. She will be missed and will remain in our hearts.



***Top:*** *Ti (right) at the 2016 Club Holiday Party.*

***Center:*** *Ti supervising the Kids' Room at the 2019 Club Show.*

***Bottom:*** *Ti demonstrating a mineral at the 2019 Fall Club Auction.*

*Photos: Sheryl Sims, Sue Marcus.*

*The Rocks Beneath Our Feet*

# Geology Near the Long Branch Nature Center: The Basics

*by Hutch Brown*

We haven't met there in a while, but the NVMC's meeting place is the Long Branch Nature Center in Arlington, VA. Hopefully, we can use it again soon. Just to remind you, I've included a couple of photos showing the nature center and the local creek, Long Branch, just 50 feet downhill.

I live nearby, so I've studied the local geology, which is typical of our broader metropolitan area. Because it is so representative, the geology near the nature center deserves a closer look.

Oh, and it's not quite what I learned in school (in Fairfax County in the 1960s).

The geology of our area is complex, in part because it straddles the border between two physiographic provinces: the Piedmont to the northwest and the Coastal Plain to the southeast. The Piedmont is hilly, with bedrock exposures and fast-moving streams (like Long Branch). The Coastal Plain is flat and made up of sediments, with slow and meandering streams (like the Potomac River at Mount Vernon).

In Arlington, you can see the transition from the bedrock of the Piedmont to the sediments of the Coastal Plain (which are *not*, as I learned in school, sedimentary rock—I wasted hours along Long Branch looking for nonexistent sandstone, shale, and the like).

*At Huffman's Falls on Four Mile Run, the metamorphic bedrock is well exposed, along with prominent veins of white quartz (arrows). Photo: Hutch Brown.*

*Long Branch Nature Center (top) and Long Branch creek (bottom) below the nature center.*

You can also see the transition from the Piedmont to the Coastal Plain in what geologists call the Fall Line, which is actually a zone that can stretch for miles. The Fall Line zone for the Potomac River reaches from Great Falls at least to Little Falls (some 5 miles) and perhaps all the way to the tidewater at Theodore Roosevelt Island (some 15 miles).

Long Branch joins Four Mile Run (Arlington's only major stream) about a quarter mile downstream from the nature center. The Fall Line zone for both streams extends throughout the area. The largest abrupt drop, analogous to Great Falls or Little Falls on the Potomac, is Huffman's Falls. At times audible from the nearby W&OD Trail, Huffman's Falls lies just downstream from the confluence of Long Branch with Four Mile Run, about a 20-minute stroll from the nature center.

The bedrock for the metropolitan area, well exposed along Long Branch and at Huffman's Falls, formed from sands, silts, and rocks at the bottom of a deep-sea trench about 450 million years ago. The tremendous heat and pressure associated with colliding tectonic plates—pieces of the Earth's crust—lifted the deep-sea sedimentary rock onto the North American continent and transformed it into metamorphic rock. The bedrock differs in name and somewhat in composition from place to place; near the nature center, it's called Indian Run sedimentary melange.

The Indian Run rock ranges from gray to brown in color. You can see lots of glittering mica, along with welded grains of sand (partly melted, then recrystallized). You can also find embedded rocks in various sizes and shapes, and in places you can see veins of white quartz, especially at Huffman's Falls.

The metamorphic bedrock contains occasional intrusions of massive quartz. Because quartz is relatively erosion resistant, the intrusions can form huge outcrops, such as Brandymore Castle along the W&OD Trail a few miles upstream from the confluence of Four Mile Run with Long Branch.

Overlying the bedrock is a dense layer of sediments deposited by ancient rivers from about 140 million to 100 million years ago. Forerunners of the Potomac, the rivers carried sand, silt, clay, and cobble (pebbles and rounded river rocks) from inland and deposited them where the waters slowed as they approached sea level on the Coastal Plain. The sediments, known as the Potomac Formation, start at about Interstate Highway 66 and gradually thicken to the southeast. Exposed by erosion along our creeks, the Potomac Formation looks like packed sandy or silty soil, often mixed with rounded river rocks, and it is dense and hard to pick apart.

On top of the Potomac Formation is a much younger layer of sediments laid down from about 10 million to 5 million years ago in the elevated areas where homes are built today. Geologists call these broad, relatively flat surfaces terraces, and "Tertiary" is the name for the geologic period of the deposits, which are known as Tertiary Terraces.

The Tertiary Terrace near the nature center is higher upslope but otherwise hard to tell apart from the Potomac Formation. It too comprises tightly packed sands and silty clays mixed with gravel and rounded river rocks.

**Top:** *Metamorphic bedrock (Indian Run sedimentary melange) with embedded rocks (arrows).* **Middle:** *The overlying Potomac Formation, exposed by erosion near the Long Branch Nature Center.* **Bottom:** *Soil horizons exposed by erosion, underlain by Tertiary Terrace sands, gravels, and river rocks (arrows). Photos: Hutch Brown.*

The Tertiary deposits came from rivers meandering across a flat plain. What was once a flat Piedmont plain became hilly only within the past 5 million years or so due to uplift across our region. Even today, we are seeing a slow rise of the Allegheny Plateau and Blue Ridge Mountains to our west and a lesser uplift of the Piedmont. Over millions of years, the uplift caused our local rivers and streams to cut valleys and gorges into the rising Piedmont plateau.

The downcutting force of our streams was magnified by sporadic Ice Ages over the last 2 million years. The glaciers never reached our area, but our local streams were locked in ice for much of the year. Released for only a few months in summer, our rivers and streams became raging torrents with far greater downcutting power than today. Nothing else can explain Mather Gorge on the Potomac River or the deep valley gouged by tiny Long Branch in the county park containing the nature center where our club meets.

*Potomac River, Mather Gorge. In Arlington and elsewhere in the metropolitan area, forces of tectonic uplift and riverine downcutting have created sharp relief in the Piedmont. Source: Wikipedia; photo: Carl Lindberg.*

## ED Talks: Colorado Minerals and Mining

*by Mike Kaas*

You've heard of TED Talks but maybe not ED Talks. The "ED" is Ed Raines, Curator of the Colorado School of Mines Museum of Earth Science. Ed is a geologist, mineralogist, and mining historian, and his ED Talks are from a series of lectures presented from 2018 to 2020 at the School of Mines.

The talks are a unique Ed-blend of geology, mineralogy, the science of mineral deposit formation, and mining history. Two or more talks cover each of the following topics (and many more):

- Colorado Gold Rush
- Leadville Mining District
- Aspen Mining District
- Gilman Mining District
- Creede Mining District
- Pike's Peak Minerals

*Ed Raines leads a tour of the Leadville Mining District. Photo: Mining History Association.*

Mineral collectors will find amazing specimens presented in a way guaranteed to expand your knowledge of their origins. To view ED Talks, download the mp4 file for the individual talk from the Colorado School of Mines Mountain Scholar website at https://mountain-scholar.org/handle/11124/172463.

## Field Trip Opportunity

### Northern Virginia Community College

NOVA's Annandale campus offers 1-day weekend courses—essentially, field trips—related to our hobby. You can get more information at the Field Studies in Geology—GOL 135 Website.

### Geology of Washington, DC

***April 10, 2021, 10 a.m.–6 p.m.*** Trip explores several National Mall sites, examining the geologic history and architecture and the rocks used to construct the federal buildings and monuments there. The face-to-face component is contingent upon the status of COVID at the time of the class and DC policy on public gatherings. Students and faculty will be required to wear masks that cover nose and mouth and practice social distancing according to the public health guidelines at the time of the class.

***Bench Tip***

### Drilling Small Items

*Brad Smith*

Small pieces need to be held securely while drilling to prevent them from spinning if the drill catches. Having sliced my fingers occasionally in my younger days, I avoid bandaids now by using flat-jaw pliers or a ring clamp. Pliers also save you if the piece gets hot. Put a little tape or a piece of vinyl tubing over jaws of the pliers if needed to avoid scratches.

*See Brad's jewelry books at*
amazon.com/author/bradfordsmith

## Upcoming Conventions

***Editor's note:*** *The article is based on* AFMS Newsletter *(March 2021), p. 12.*

COVID or not, several conventions are planned for this year. (Conventions are usually held in connection with a club show.)

- AFMS: June 17–20, Big Piney, NY
- California Federation: June 25–27, Lodi, CA
- Eastern Federation: July, Syracuse, NY
- Midwest Federation: September 10–12, Syracuse, NY

## EFMLS Convention

***Editor's note:*** *The article is based on* EFMLS News *(February 2021), pp. 1, 3.*

The Gem and Mineral Society of Syracuse, NY, will host the EFMLS Annual Convention during its annual show on its 70th anniversary. The tentative agenda is:

***Friday, July 9:***

- Cracker Barrel at 4 p.m.
- Annual Meeting at 7 p.m.

***Saturday, July 10:***

- Editor's Breakfast at 8 a.m.
- Gem and Mineral Society of Syracuse annual show, New York State Fairgrounds, from 10 a.m. to 6 p.m.
- EFMLS Auction at 1:30 p.m.
- EFMLS Banquet Happy Hour at 6:00 p.m., Dinner at 7 p.m.

***Sunday, July 11:***

- Gem and Mineral Club annual show from 10 a.m. to 5 p.m.
- Field Trip to Tully to look for trilobites and brachiopods

***Monday, July 12:***

- Field trip to Herkimer to look for Herkimer diamonds

## March 2021—Upcoming Events of Interest in Our Area/Region (see details below)

| Sun | Mon | Tue | Wed | Thu | Fri | Sat |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 MSDC mtg | 4 | 5 | 6 |
| 7 | 8 GLMSMC mtg | 9 | 10 | 11 | 12 | 13 |
| 14 Daylight savings begins | 15 | 16 St. Patrick's Day | 17 | 18 | 19 | 20 Spring begins |
| 21 | 22 NVMC mtg | 23 | 24 MNCA mtg | 25 | 26 | 27 |
| 28 | 29 | 30 | 31 | | | |

### Event Details

**3: Mineralogical Society of the District of Columbia**—meetings via Zoom until further notice; info: http://www.mineralogicalsocietyofdc.org/.

**8: Gem, Lapidary, and Mineral Society of Montgomery County**—meetings via Zoom until further notice; info: https://www.glmsmc.com/.

**22: Northern Virginia Mineral Club**—meetings via Zoom until further notice; info: https://www.novamineralclub.org/.

**24: Micromineralogists of the National Capital Area—**meetings via Zoom until further notice; info: http://www.dcmicrominerals.org/

**Disclaimer**

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

*Elbaite with albite from São José da Safira, Minas Gerais, Brazil.*
*Source: Wikipedia; photo: Ivar Leidus.*

Hutch Brown, Editor
4814 N. 3rd Street
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THE NORTHERN VIRGINIA MINERAL CLUB INC
Crystals are the flowers of the Mineral Kingdom

## 2021 Club Officers

President: Tom Kim
president@novamineral.club
Vice President: Sue Marcus
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Secretary: David MacLean
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Treasurer: Roger Haskins
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Communications: Vacant

Editor: Hutch Brown
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Field Trip Chair: Vacant

Greeter/Door Prizes: Vacant

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Show Chair: Tom Taaffe
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Tech Support: Tom Burke
tech@novamineral.club
Webmaster: Casper Voogt
webmaster@novamineral.club

**Mineral of the Month: Elbaite**

PLEASE VISIT OUR WEBSITE AT:

http://www.novamineralclub.org

# The Northern Virginia Mineral Club

**Visitors are always welcome at our club meetings!**

Please send your newsletter articles to:
hutchbrown41@gmail.com

**RENEW YOUR MEMBERSHIP!**

**SEND YOUR DUES TO:**
Roger Haskins, Treasurer, NVMC
4411 Marsala Glen Way, Fairfax, VA 22033-3136

**Dues:** Due by January 1 of each year; $20 individual, $25 family, $6 junior (under 16, sponsored by an adult member).

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

**Meetings:** At 7:45 p.m. on the fourth Monday of each month (except May and December)* at **Long Branch Nature Center**, 625 Carlin Springs Road, Arlington, VA. (No meeting in July or August.)

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