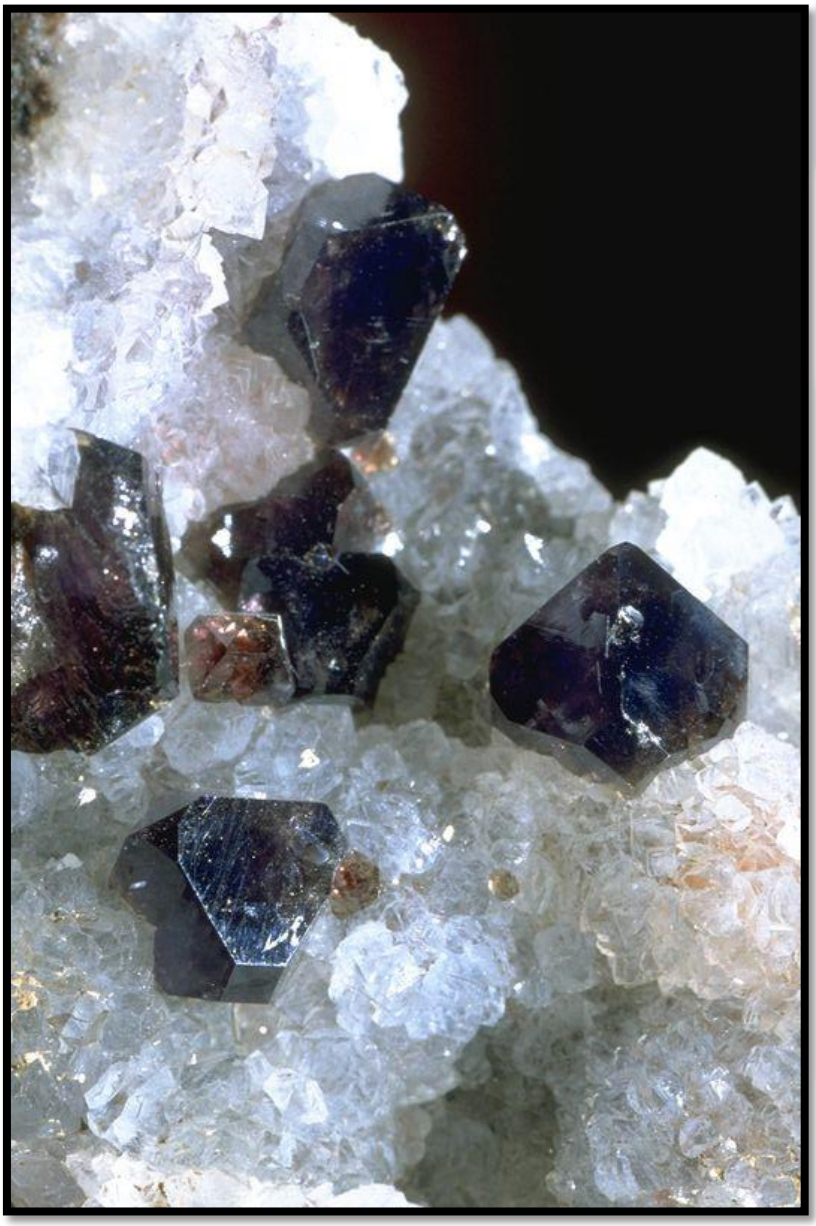
THE NORTHERN VIRGINIA MINERAL CLUB INC

The Mineral Newsletter

Meeting: June 27 Time: 7:45 p.m.

Long Branch Nature Center, 625 S. Carlin Springs Rd., Arlington, VA 22204



Smithsonian National Mineral Collection. Photo: Chip Clark.

Volume 57, No. 6
June 2016
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June Program:

The Estes Quarry in Maine

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Scorodite

from Mexico,
Crater of Papacatepetl

Mineral of the Month: Scorodite

by Sue Marcus and Hutch Brown

Scorodite is a collector's dream—and sometimes as hard to find in nice crystals. Johann Friedrich August Breithaupt first described this new mineral from material found in Saxony, Germany, where he was a professor at the Freiberg Mining Academy. In 1818, he named it after the Greek word *skorodon*, which alludes to the garlicky smell of arsenic when the mineral is heated.

Scorodite is a hydrated iron arsenate with the chemical formula $FeAsO_4 \cdot 2H_2O$. The mineral arsenopyrite, FeAsS, can alter to scorodite through oxidation; this secondary (second to the original mineral) occurrence is the most common geologic setting for scorodite. More rarely, scorodite also occurs as a primary mineral in hydrothermal deposits, sometimes as a crust precipitated on the outer rims of hot springs. It weathers into limonite (an iron ore).

Scorodite is in the orthorhombic mineral system. Its crystals can form dipyramids that look like octahedrons and resemble the much harder gem mineral zircon. The color of scorodite is variable; it can be deep blue or brown (like the sample on the cover) but is best known for bright green or blue colors.

Scorodite has an adamantine or vitreous luster. Its streak is greenish-white, and its hardness on the Mohs scale is 3.5 to 4. It has poor cleavage, a conchoidal fracture, and a specific gravity of 3.27.

In the United States, scorodite has been found at Gold Hill, Tooele County, UT, and in the Tintic district, Juab County, UT. It also occurs in the Majuba Hill mine, Antelope district, Pershing County, NV.

Sources: Mindat, Webmineral, Wikipedia.

Summer break ahead!

Northern Virginia Mineral Club members,

Please join our June speaker, Doug Rambo, for dinner at the Olive Garden on June 27 at 6 p.m.

Olive Garden, Baileys Cross Roads (across from Skyline Towers), 3548 South Jefferson St. (intersecting Leesburg Pike), Falls Church, VA Phone: 703-671-7507

Reservations are under Ti Meredith, Vice-President, NVMC. Please RSVP to me at ti.meredith@aol.com.

Douglas E. Rambo, P.G.

The Estes Quarry, West Baldwin, Cumberland County, ME: A Relatively New Pegmatite Phosphate Mineral Locality in Southwestern Maine

June 27 Program

The Estes Quarry in West Baldwin, ME, is a recent find among collectors—especially collectors of microminerals. It is located just off the edge of the Sebago Pluton, which is the principal source of the major Maine pegmatites (such as Newry, Paris, Greenwood, Auburn, and Topsham).

The site was adopted by Gene Bearss, an accomplished local collector and member of the Micromounters' Hall of Fame. The quarry has been studied by the Mineralogy, Pegmatology, and Petrology workgroup at the University of New Orleans. The locality is relatively young, but collectors have already identified over 50 minerals there, with the potential for many more.

Doug will give an overview of the local geology and explain how the minerals formed. He will show many of the minerals that can be found at the location.

The November/December 2000 issue of *Rocks and Minerals* magazine has a writeup of the quarry and its minerals.

Doug Rambo is the senior hydrologist in the Source Water Assessment and Protection Program at the Delaware Department of Natural Resources and Environmental Control (DNREC). He has a B.S. in geology from the University of Delaware and worked for 5 years as a well technician and staff geologist for Artesian Water Company in Newark, DE, prior to joining DNREC in 1999. Doug has been a Delaware licensed professional geologist since 2001 and currently serves as the President of the Delaware Board of Professional Geologists, a position he was appointed to by Governor Markell in 2011.

In his professional life, Doug works with both ground water and surface public drinking water systems, assessing the quality of the water delivered to customers and determining their sources' vulnerabilities and susceptibility to contamination. Currently, Doug is looking at chloride loading in Red Clay Creek (in the Christina watershed) related to road deicing practices upstream from a public drinking water intake.

An avid micromineralogist, Doug specializes in identifying and collecting minerals that require the use of a microscope to fully view and appreciate them. His favorite localities are the Palermo and Fletcher Mines in New Hampshire and the Emmons and Estes Quarries in Maine. He and his father George (1931–2016) amassed a collection of nearly 10,000 micromounts primarily centered on phosphate minerals. He has collected extensively throughout the states of Maine, Pennsylvania, and New Hampshire.

Doug lives in Harrington, DE, with his wife Michele and their daughters Beth (7), Sabrina (3), and Noelle (1).

The Prez Sez

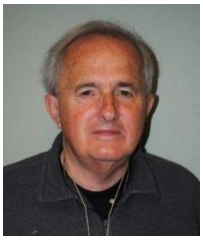
by Bob Cooke, President

Is it June already? I'm sure it must be. When else would my air conditioner break?

Is anyone up for a mineral collecting field trip? I receive several announcements of field trips by local clubs that have invited NVMC members to join them. Unfortunately, these announcements invariably come at short notice, leaving no time to coordinate with the publishing schedule for this newsletter. Consequently, I have started an e-mail list for NVMC members who want to receive these announcements. If you want to be added to the list just send an email to rdotcooke@verizon.net.

After the June meeting, we have 2 months of summer break before meeting again in September. Then it's time to start preparing for the November mineral show. This year's show is going to be a challenge without the help of Jim Kostka. One of Jim's unique talents was coordinating the online volunteer sign-up on Volunteer Spot. If anyone out there has used this product, I would certainly appreciate it if you could take over this task from Jim. Please call or e-mail me (contact info is on last page of the newsletter).

Bob



May Meeting Minutes
May 23, 2016

by David MacLean, Secretary

President Bob Cooke called the meeting to order at 7:30 p.m. at the Long Branch Nature Center in Arlington, VA.

The minutes of the May 25 meeting were approved as published in *The Mineral Newsletter*.

The president recognized past presidents in attendance: Sue Marcus, Rick Reiber, and Barry Remer. He also recognized guests Clarisse Flores, Braden Heller, Joe and Laurie O'Bryan, Patrice Roberts, and Roi Starkey.

The President's Award went to Hutch Brown, editor of *The Mineral Newsletter*. Hutch also received award materials from a past Bulletin Editors Contest (4th place for New Editor in 2014), as did Sue Marcus for her article "Opportunities for Self-Collecting: Where Can You Go?"

By motion duly made and seconded, the members approved the board nomination of Marissa Dudek for a $250 award from the NVMC's Fred C. Schaefermeyer Scholarship Fund. Marissa is a geology major on the Annandale campus of Northern Virginia Community College. She worked with Professor Callan Bentley on the MAJIC Gigapan project and is now an intern at USGS on Ar/Ar radiometric dating of rocks. She will transfer to James Madison University in fall 2016.

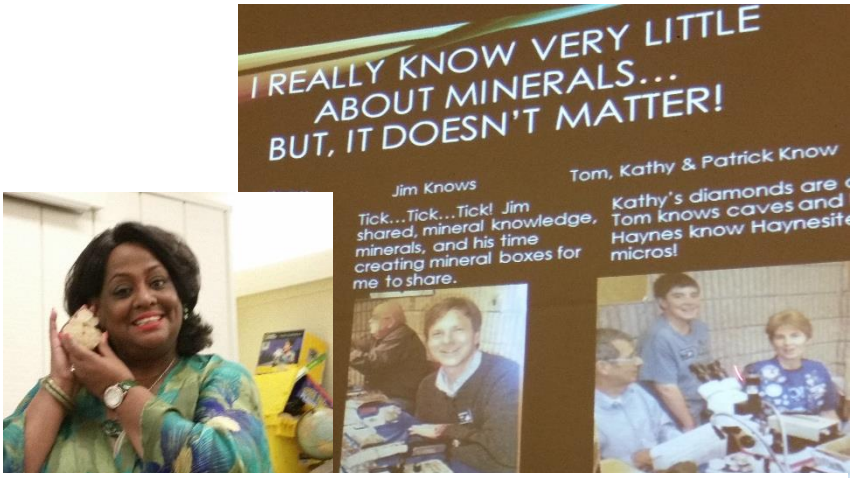
Club dues for 2016 are past due! See the last page of this newsletter for details.

In the door prize drawing, the winners were Walker Crews, David MacLean, Joe O'Bryan, Lisa Smyth, and Thomas Smyth.

Some people brought giveaway minerals from a variety of places, including Manassas quarry and Wasson's Bluff in Nova Scotia.

Three presentations followed the business meeting:

- Sheryl Sims, "Reflections of a Rockhound";
- Sue Marcus, "My Summer Vacation Adventures";
- Kathy Hrechka, "Geology Within My Airline Career: Adventures 1984–2016."



Sheryl Sims doing a Vanna White impression of modeling one of her mineral samples following her slide show presentation. Photos: Pat Flavin.

May 23 Club Meeting Program

by David MacLean, Secretary

At the NVMC's May meeting, three club members gave personal presentations related to our hobby.

Sheryl Sims, "Reflections of a Rockhound"

With her irresistible smile, Sheryl enthusiastically showed slides of her rockhound adventures and talked about the joys of becoming a rockhound.

"I love collecting rocks and minerals," she said, "and have incorporated that love into my writings, sewing, quilting, and photography. At first, I knew nothing about minerals, but I learned a few things along the way. For instance, I attended a thin section class at NOVA. I viewed and photographed thin sections of minerals through a microscope using my cellphone.

"Jim Kostka only scared me a little when he acquainted me with radioactive minerals. At my first NVMC meeting, I was put in charge of the door prize closet and given my own key!"

"Club meetings are great fun and learning experiences," Sheryl continued. "There is always a place for everyone, no matter what one's interest. I love introducing friends at their first mineral show or meeting. It makes me smile to share the joy! Teaching Scouts and junior rockhounds is delightful! I'm happy to pass on what I know, remembering how patient and helpful NVMC members were and are to me as they explain and identify minerals. Members are never too busy to take an interest in what others are doing in our wonderful hobby."

"Being a rockhound led me to all kinds of places," Sheryl explained. "In Farmville, VA, I happily dug in the mud and rain for amethyst. I've collected in local quarries and have taken road trips to federation conferences and mineral shows in various locations.

"In addition to collecting, I've painted rocks that I've displayed in my local library along with some of my favorite minerals. I've won awards, including EFMLS awards for my NVMC yearbook, for numerous articles, and as newsletter editor for another club." Sheryl ended with a slide of a unique mineral quilt that she made. She is an active member and enjoys being our "Vanna" at club auctions.

Sue Marcus, "My Summer Vacation Adventures"

Sue Marcus showed slides of her mineral-oriented trip to France via Ireland.

Sue Marcus delivering her slide show presentation, including a photo of a mineral show in France. Photo: Ti Meredith.

The first stop was Wicklow Mountain in Ireland's County Wicklow for the 19th-century lead and zinc mines.

In Noizay, France, near Tours, Sue and husband Roger Haskins stayed in a house carved into a cliff. Elegantly remodeled from its original use as a 17th-century warehouse, the house had an antique four-poster bed and an inoperative grand piano. Wine from the owner's vineyard was there, along with modern conveniences.

Sue met geologist Thierry Charrier and explored Le Mange Callioux, the wonderful mineral museum he built and operates. Then she went to a lovely mineral show in Blois with vendors who offered jewelry, minerals, and fossils. It was odd to see familiar localities listed (like Missouri, Kansas, and Oklahoma), along specimens from Morocco and India, plus a few French and European specimens. Sue traded with Thierry and with the Blois dealers and recommends traveling with trading material.

The geology museum in Paris displayed a lot of quartz crystals from Brazil, along with beryllonite and fluorite from the Pyrenees Mountains. Sue showed slides with photos from the Louvre of bowls and other items carved from amethyst, agate, quartz, and lapis, along with the jewelry of French queens.

The micromineral society of France conducts symposia and publishes its own academic journal.

Kathy Hrechka, "Geology Within My Airline Career, Adventures 1984–2016"

Kathy began her presentation by thanking Fred Schaefermeyer for being her mentor.

"As a girl, I collected agates from the shore of Lake Superior in Wisconsin," she said. "After that, I became an airline attendant and traveled the world, all compliments of the airlines. I am passionate for microminerals. I demonstrated micromineralogy at the NVMC show and have volunteered at the Smithsonian for years. With help from Jim Kostka, I continue to help the National Capitol Area Boy Scouts with geology-related activities."

Wherever Kathy landed, she made a beeline to somewhere having to do with minerals. Examples include the Harvard Museum; the Denver Natural History Museum; a marble quarry in Marble, CO; Arches National Park and the Petrified Forest in Arizona; Carlsbad Caverns in New Mexico; the Museum of the Rockies in Bozeman, MT; and the California Mining and Mineral Museum in Drumheller, CA. Kathy discovered fulgurites in Petoskey, MI. She and her husband Ken enjoyed their honeymoon in Hawaii and Beijing, China.

Kathy Hrechka kicked off her presentation with a tribute to her mentor, Fred Schaefermeyer, shown above. Photos: Ti Meredith; Pat Flavin.

Kathy showed slides of her travels to the British Museum of Natural History; Harrods of London to see Princess Diana's diamond ring; Drum Heller and the Athabasca Glacier in Alberta, Canada; a world-class mineral show in Munich, Germany; Rome, Florence, and Pisa in Italy; and a chapel carved from salt in the Wieliczka mine in Krakow, Poland.

Kathy's archeology treks to Mexico included Chichen Itza, El Tajin, Uxmal, Palenque, Monte Alban, and Teotihuacan. Kathy also visited Tikal in Guatemala and Copan in Honduras. She collected Larimer stone (pectolite) and amber in the Dominican Republic.

Kathy's mineral passions include smithsonite, microdiamonds, and snowflakes. She showed amazing snowflake photos taken during a snowfall last February outdoors under her microscope.

Let's Go Crazy With Purple Gemstones!

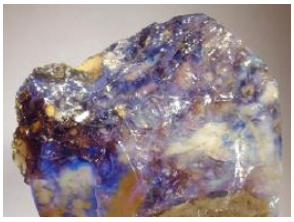
by Sheryl E. Sims

With the passing of Prince, a gem of a performer and musical artist, I felt it only proper to submit, for your enjoyment, an article spotlighting some beautiful purple gemstones. It's not hard at all to find oneself attracted to beautiful, sparkling purple crystals, symbolizing regal beauty.

Most of us are familiar with amethyst, but purple garnets are equally beautiful. Varieties of garnet such as spessartine and pyrope are actually blue garnets that turn purple under incandescent light (n.a. 2016a; Pandan 2016). Garnets come in every color of the rainbow; purple is just one of the beautiful colors that make them so popular. Purple garnets are some of the rarest garnets and are very expensive.

Garnet:

Category	nesosilicate
Formula	$X_3Y_2(SiO_4)_3$
Crystal system	isometric/cubic, rhombic dodecahedron, icositetrahedron
Color	virtually all, blue very rare
Crystal habit	rhombic dodecahedron or cubic
Cleavage	indistinct
Fracture	conchoidal to uneven
Mohs hardness	6.5–7.5
Luster	vitreous to resinous
Streak	white
Polish luster	vitreous to subadamantine
Optical properties	Single refractive, often anomalous double refractive
Ultraviolet fluorescence	variable
Other characteristics	variable magnetic attraction
Major varieties	pyrope ($Mg_3Al_2Si_3O_{12}$); almandine ($Fe_3Al_2Si_3O_{12}$); spessartine ($Mn_3Al_2Si_3O_{12}$); andradite ($Ca_3Fe_2Si_3O_{12}$); grossular ($Ca_3Al_2Si_3O_{12}$); uvarovite ($Ca_3Cr_2Si_3O_{12}$)



Purple garnet

Taaffeite

Alexandrite

Photos: Dr. Robert Lavinsky, used with permission by Monica Kitt monica@irocks.com, 4/25/16, http://www.irocks.com.

Another sweet-looking purple mineral is taaffeite, noted for being one of the only minerals that was actually discovered after the stone was cut and faceted. Richard Taaffee is credited with having discovered this purple gem, previously mistaken for spinel. It can also be found in red and is extremely rare and pricey, costing $6,000 per carat (n.a. 2016b)!

Taaffeite:

Category	oxide minerals
Formula	$BeMgAl_4O_8$
Strunz classification	04.FC.25
Crystal system	hexagonal, 6/mmm (6/m 2/m 2/m)
Color	Colorless, grayish violet, violet red, red, greenish, light green, pink violet, mauve
Crystal habit	Prismatic, alluvial grains
Twinning	by reflection on (0001)?
Cleavage	imperfect/fair/absent
Fracture	conchoidal
Mohs hardness	8–8.5
Luster	vitreous
Streak	white
Diapheneity	Transparent to translucent
Specific gravity	3.60–3.61
Optical properties	uniaxial
Refractive index	$n_\omega = 1.722$, $n_\varepsilon = 1.777$
Birefringence	$\delta = 0.055$
Pleochroism	weak

Alexandrite is a color-changing gemstone form of the mineral chrysoberyl. Although it ranges from green to blue in daylight, alexandrite appears as reddish purple in candlelight or incandescence light. Alexandrite is a rare mineral; after diamond, it is the most valuable of the purple gemstones, with prices of up to $45,000 per carat.

Alexandrite:

Chemical composition	Beryllium aluminum oxide ($Al_2(BeO_4)$)
Crystal system	Orthorhombic
Habit	Tabular, pseudo-hexagonal
Cleavage	imperfect prismatic
Fracture	weak, conchoidal
Mohs hardness	8.5
Optical properties	biaxial +
Refractive index	1.744–1.755
Birefringence	0.009
Dispersion	low, 0.014
Specific gravity	3.70–3.72
Luster	bright vitreous
Pleochroism	strong

Sources

N.a. 2016a. Garnet. Wikipedia.
N.a. 2016b. Taaffeite. Wikipedia.
Pandar, D. 2016. Twenty-six types of purple gemstones in jewelry. Kamayo Jewelry.

Volunteer Honored by Smithsonian

by Kathy Hrechka

A member of our club, Kiersten Hoff, was honored by the Smithsonian National Museum of Natural History for her exceptional service as a volunteer at the Hall of Geology, Gems, and Minerals.

Pseudomorphism

by Stephen A. Nelson

Editor's note: The piece is adapted from a posting by the author, a professor of geology at Tulane University in New Orleans, LA, for a class in mineralogy. All photos are from Wikipedia.

A pseudomorph is a mineral that looks like another mineral. ("Pseudo" is an old English term meaning false, and "morph" derives from a Greek word meaning form.)

In pseudomorphism, a mineral's internal structure and chemical composition change but its external form remains. There are three kinds of pseudomorphism:

1. ***Substitution.*** A mineral's chemical constituents are removed and replaced by other chemical constituents. In petrified wood, for example, wood fibers are removed and replaced by quartz, but the mineral still looks like wood. Another example is fluorite, which forms isometric crystals; during alteration, the fluorite is replaced by quartz, but the resulting quartz crystals look isometric. The quartz is said to be pseudomorphed after fluorite.

Substitution: *Native copper pseudomorph after aragonite, with red cuprite and green malachite alteration. Source: Wikipedia.*

2. ***Encrustation.*** A thin crust of a mineral forms on the surface of another mineral. The crust takes the shape of the other mineral.

Encrustation: *Quartz pseudomorph after calcite. Source: Reddit.com.*

3. ***Alteration.*** If only partial removal of the original mineral and only partial replacement has taken place, then it is possible to have the space once occupied entirely by the original mineral be partially composed of the new mineral. This results, for example, in serpentine pseudomorphed after olivine or pyroxene; anhydrite ($CaSO_4$) after gypsum ($CaSO_4 \cdot 2H_2O$); limonite ($FeO(OH)nH_2O$) after pyrite (FeS_2); and anglesite ($PbSO_4$) after galena (PbS).

Alteration: *Limonite pseudomorph after pyrite (Carratraca, Spain;, 6 cm wide). Source: Mindat.*

A Night of Highlights!

by Sheryl E. Sims

The curator of the Smithsonian Institution's National Gem Collection, Dr. Jeffrey Post, gave an excellent and well-attended presentation at the MSDC meeting on April 6. He offered highlights of his past year as curator of the collection, and he showcased some great finds from the Denver and Tucson annual mineral shows.

Dr. Post was very appreciative of the large, welcoming group gathered to hear him speak. His presentation focused on the "Great Montana Sapphire." His opening slide was of the northern lights in Helena, MT, which welcomed his arrival.

Dr. Post visited Yogo, MT, where the most beautiful sapphires in the world are found in beautiful shades of blue and purple. Tiffany & Company bought many of its sapphires from the Yogo locality, but no active mining remains there.

The highlight for me was seeing Dr. Post's slides of amazing minerals. Some pieces, such as the azurite and malachite in figure 1, came from parts of Asia, former sites of war but now recognized as sources of magnificent minerals. We were very fortunate to have the opportunity to see pieces yet to be displayed in public, perhaps in 2017 or later, depending on the Smithsonian's exhibition schedule.

Dr. Post was extremely grateful to the many donors whose contributions made it possible to make such

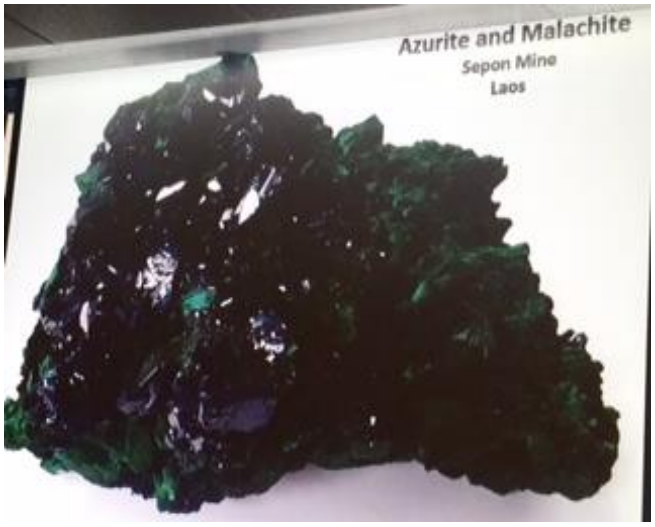
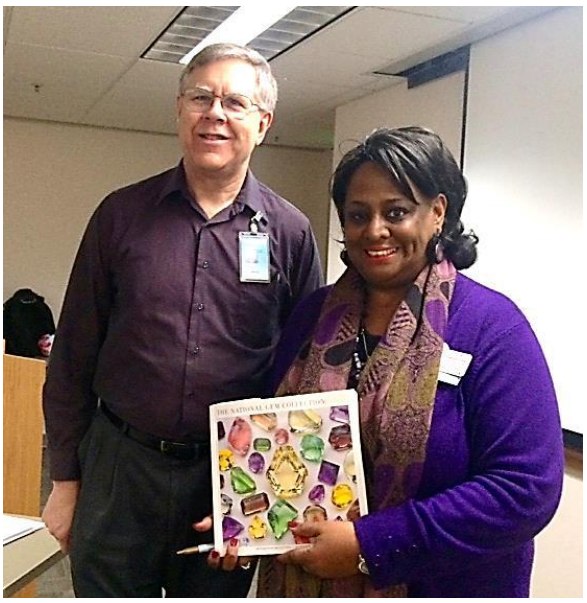


Figure 1—*Azurite and malachite from Laos.*



Dr. Jeffrey Post with the author holding an image of sapphires in an array of colors. All photos: Sheryl Sims.

fantastic acquisitions. He stated that there are times when a pool of donors are given the chance to vote on the piece that the museum will purchase. Such was the case with a beautiful elbaite specimen (fig. 2), called the Cranberry Crown.

Donors also made it possible for the museum to purchase one of the best and largest collections of sapphires and emeralds around. The 6.5 pounds of emer-

Figure 2—*The Cranberry Crown—elbaite from Brazil.*

alds shown in figure 3 was purchased in Spruce Pine, NC, and is from the Crabtree Mine.

Figure 3 also shows a beautiful barite donated by Wendell and Jo Ann Mohr, mineral club friends and rockhounds whom many of us know.

The night closed with pictures of Dr. Post's favorite fluorescent minerals. They were beautiful both in natural light and under fluorescent lights.

All in all, a most enjoyable presentation and opportunity to listen to one of our nation's most interesting curators.

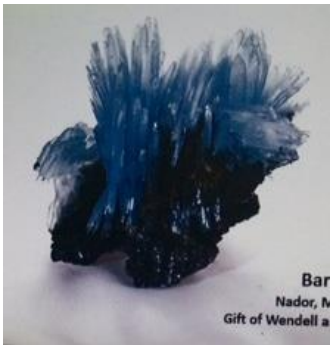
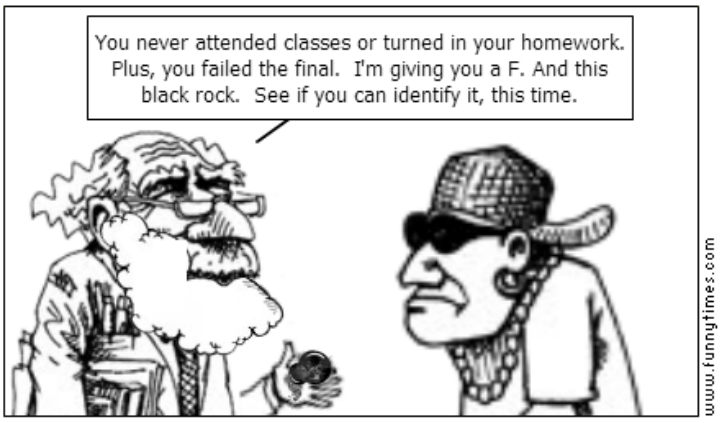
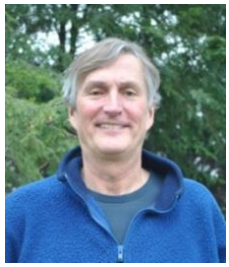


Figure 3—*Emeralds galore (left) in a spectacular cluster on matrix; and blue barite from Morocco (above).*



Source: Funny Times.

Editor's Corner
Simplicity



by Hutch Brown

Desktop publishing has opened doors for editors in ways that were once inconceivable. Editors today have myriad choices for fonts, sidebars, margins, borders, images, links, symbols, clipart, shapes—the list goes on. With so many bells and whistles at their fingertips, the temptation is to use them all.

But in so doing, editors risk violating a cardinal principle of desktop publishing: simplicity. The simpler the lines of a publication and the fewer its elements, the less likely readers are to be distracted and the more likely they are to focus on content.

Our newsletter is not flashy. The flashiest page is the cover, which has only a few elements: the photo; the masthead; the newsletter/club information; and the list of newsletter contents.

Design elements elsewhere in our newsletter are simple and few, and consistency is key. Titles, bylines, and intertitles all have consistent styles, including identical fonts and spacing. The sidebar formats are the same from issue to issue, as are the footers.

Our newsletter avoids certain features, particularly underlining and boldfacing. Boldfacing is great for headings, of course, and we use it.

But underlining and double-spacing after periods are holdovers from typewriting. Desktop publishing has so many alternatives to underlining that it is simply not needed. When was the last time you saw underlining in a book or newspaper?

And boldfacing sentences or even individual words is the equivalent of screaming. Well-written publications don't need to scream to make a point.

Deadline for Submissions

September 1

So we can send out the newsletter on time, please make your submission by the 1st of the month! Submissions received later might go into a later newsletter.

Safety Matters

Give Yourself a Hand

by Ellery Borow, AFMS Safety Chair

Editor's note: *The article is adapted from* A.F.M.S. Newsletter *(March 2016), p. 4.*

Give yourself a hand if you are one of the many folks who make a concerted effort to take care of one of your most important assets—your hands.

Many folks earn their living by using their hands. Even if you don't, your hands are likely in constant use. If you doubt it, try going even half an hour with one hand held behind your back. Still unsure? Try going even 10 minutes without using either hand.

In my trusted and well-worn 15th edition of *Gray's Anatomy*, I found the metacarpus, carpus, scaphoid, cuneiform, ulna, radius and 22 other bones of the forearm, wrist, palm, and fingers. Counting both right and left hands, that's 60 of the body's 200 or so bones. It behooves us to take good care of these assets, and not just occasional hand lotion.

From winter to spring, I moved from snowshoeing to bicycling. During the transition, I moved from using certain muscle/bone groups to using others, awakening muscles I had not used in a while. Had I not properly prepared for the transition, I would have been sore in places. That showed that I was not exercising all of me well enough.

The same goes for hands. For the hand tasks we do frequently, we need to keep well exercised, and muscles weaken for movements we seldom do.

We occasionally do bad things to our hands. I have had days when I'm using my rock hammer so much that my fingers freeze in the curl of my hammer handle. Not a good sign. What I should have done is change the activity over the course of the day.

Another way we are bad to our hands is to hold a rock in one hand and strike it with a rock hammer in the other. It sends shivers down my spine when I think of all the small bones in the wrist being affected by that hammer. Just about all of the striking force goes through the rock and into the bones and connective tissues of the hand. Just ask any orthopedic surgeon and you will get an earful.

Then we see the all-too-common near misses of the hammer aiming for the end of the chisel. Not pretty.

Hands do not have an easy life! What is a hand to do?

There are (ta-da!) hammer guards for chisels. A guard on the end of a chisel really can help prevent hand injury!

There are also chisel-holding devices in a range of styles, compositions, and glove sizes. They can prevent scratches, scrapes, and cuts on our hands. Or just use dirt or a flat rock.

Many devices and programs can help stretch, exercise, strengthen, and increase the flexibility of our hands. Some can do more harm than good, so please consider consulting a professional.

Oh, and use hand lotion to maintain sensitivity, grip, epidermal integrity, and so on!

Watch out for too many repetitive motions. Avoid shocks to the delicate hands and fingers. And take a break when you constantly use your hands! I have even seen problems from too firm a grip for too long on dopsticks used by dedicated cabbers.

And consider asking for a hand. A helping hand to share a load or relieve stress can sure help keep our hands healthy.

With proper maintenance, our hands can last a lifetime—and that is good for the hobby as well as good for you.

So please keep up the good work, and give yourself a hand for a job well done! Be safe, stay safe!

GeoWord of the Day

(from the American Geoscience Institute)

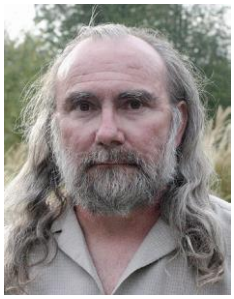
proglacial

Immediately in front of or just beyond the outer limits of a glacier or ice sheet, generally at or near its lower end; said of lakes, streams, deposits, and other features produced by or derived from the glacier ice. Ancient Lake Missoula was proglacial.

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

Where Do Rocks Come From?

by Andy B. Celmer, EFMLS Historian



Editor's note: *The article is adapted from* EFMLS News *(January 2014), p. 5.*

*I*n the late 18th century, James Hutton (1726–97), known as the Father of Modern Geology, put forth the idea of Uniformitarianism: that geological processes such as erosion, sedimentation, and volcanism taking place today are the same processes that, in the distant past, formed the rocks we see today.

The prevailing view at the time was based on biblical interpretation. The Earth was about 6,000 years old and the Great Flood caused the landscapes seen today. So the Great Flood formed valleys, and later rivers found the valleys to flow through.

Our current view is that rivers cut the valleys.

Remember the TV cartoon show *The Flintstones*? Fred and his family were on vacation and visited the Grand Canyon. Fred explained that the trickle of water they saw on the ground would be really impressive in a few million years. Fred was speaking as a Uniformitarian, and if rockhounds can't trust somebody named Flintstone, who can they trust?

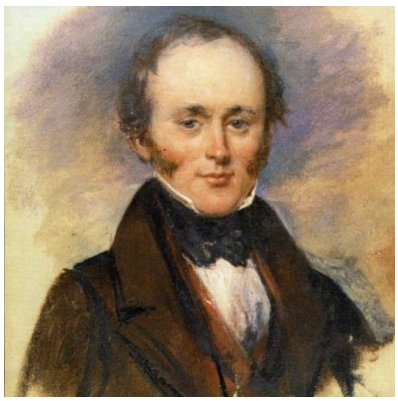
But I digress. So where do rocks come from?

The year James Hutton died—1797—is the same year that Charles Lyell was born. Lyell would be instrumental in popularizing Hutton's concept of Uniformitarianism. Remember the old Blood, Sweat and Tears song? "And when I die … there'll be one child born in this world to carry on, to carry on."

I would like to think the same thing would happen for me; but, alas, I am a legend in my own mind!

Charles Lyell was a professor of geology at King's College in London and later became the president of the Geological Society of London. At the time, many people still believed the Great Flood story, and Lyell wanted to "free the science from Moses." [*Editor's note:* Moses ostensibly wrote the Book of Genesis]. Lyell's *Principles of Geology*, published in 1830, was therefore controversial. But the three-volume work earned him income and fame.

Lyell used as his frontispiece in volume I an engraving of the Temple of Serapis, located on the Italian coast north of Pozzuoli. Lyell visited the temple in 1828 and described portions of the standing columns that had been damaged by a marine bivalve called Lithodomus, which bores holes in stone.



Charles Lyell in a painting by Alexander Craig from 1840. Source: Wikipedia.

These bivalves cannot live above low tide; and the holes in the columns still contained shells of Lithodomus. The temple, constructed about 2,000 years ago, would have been built above sea level. Who wants to wade through the sea to go to temple? Not I!

Lyell therefore concluded that the temple was above sea level, then below sea level for a period of time, then above sea level again. Lyell reasoned that if these small changes occurred in a mere 2,000 years, then much greater changes, such as deposition underwater, uplift of sedimentary rocks, and mountain-building could occur in millions of years.

Charles Lyell's books influenced the scientific thinking of the day. Charles Darwin used his copy of volume I on his voyage aboard the Beagle to decipher the geologic history of the Canary Islands by applying Lyell's ideas to the volcanic rocks he studied there. As Darwin put it, "I never forgot that almost everything which I have done in science I owe to the study of [Lyell's] great works."

Stephen Jay Gould (1941–2002), an American paleontologist and evolutionary biologist and the best-selling writer of popular science books, called Lyell's volume I "the most famous geological book ever written."

Well, I could go on and on, but as my late father-in-law always said, "That reminds me of a, ha-ha, Little Story!" And my job description says I am to write about the history of the EFMLS, not the history of the Scientific Revolution.

And remember when I said that I would write about Gravity and its opposite, Comedy? I lied!

The Rocks Beneath Our Feet

Maryland's Calvert Cliffs

by Hutch Brown

Maryland's Calvert Cliffs are known as a treasure trove of marine fossils from the Miocene Epoch, which lasted from about 24 million to 5 million years ago. The Calvert outcrops have some of the best samples of Miocene formations on the East Coast.

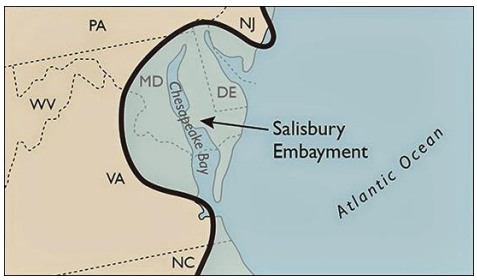
The area was covered by ocean for millions of years. The cliffs are full of the evidence—bits of sea creatures that clearly never lived on dry land.

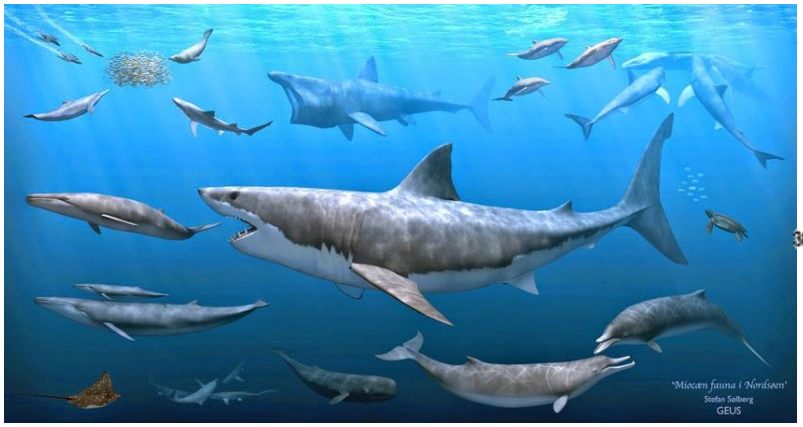
Yet today the cliffs are high and dry. What happened? Why such dramatic change?

Marine Transgressions

The late Cretaceous and Tertiary Periods, from about 100 million to 1.6 million years ago, were warmer than today, and sea levels were often higher. In a series of what geologists call marine transgressions and regressions, sea levels rose and fell over millions of years, at times reaching all the way to the Fall Line (fig. 1).

The marine transgressions occurred in a series of pulses into what geologists call the Salisbury Embayment. The embayment was seldom entirely covered by ocean; instead, individual marine transgressions cov-





Depiction of Miocene sea life in the coastal seas near what is now Calvert Cliffs, MD. Source: Share (2014).

Calvert Cliffs on the western shore of the Chesapeake Bay in Maryland. Source: Wikipedia.

Figure 1—*Maryland's Coastal Plain encompasses the entire Chesapeake Bay, including Calvert Cliffs (circled). Source: USGS.*

ered different parts of the embayment at different times (fig. 2).

Each transgression laid down characteristic marine sediments. Each was followed by a marine regression, in turn followed by another marine onlap into the Salisbury Embayment. In the middle and late Miocene, the transgressions were so frequent that parts of the embayment were almost always underwater (fig. 3).

Sediments at Calvert Cliffs

For each marine transgression, the distinctive sediments are named for the locality where they were first described (fig. 4). At Calvert Cliffs, the sediments are grouped into three formations: the Calvert, Choptank, and St. Marys. Each formation has two to four members composed of one or more sediment beds.

The Calvert Formation is the oldest, comprising marine transgressions during the early to middle Miocene Epoch (21–14 million years ago). The seas during this period reached deep into the Salisbury Embayment, all the way to the Fall Line (fig. 2).

The Calvert Formation has beds made up of clays laced with diatoms. Diatoms are a group of algae that

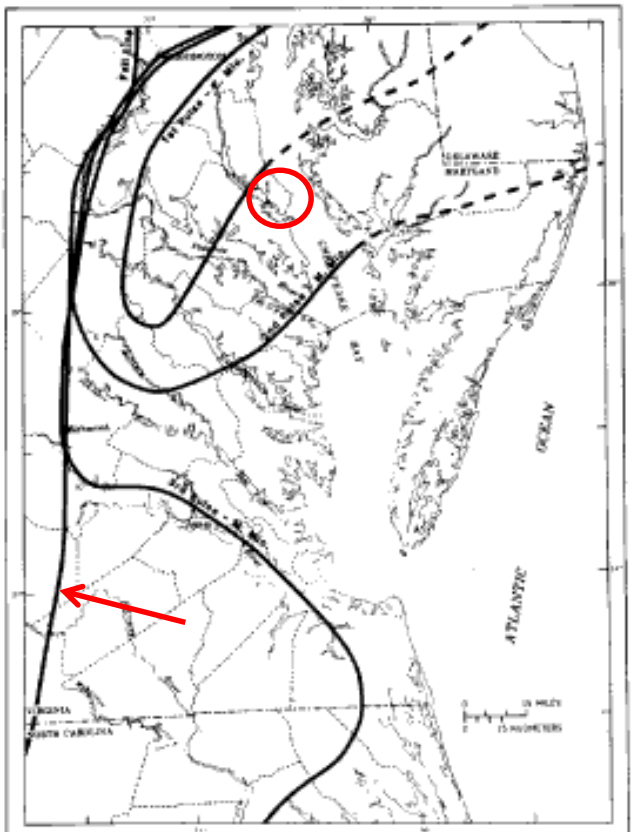


Figure 2—*Marine transgressions from 21 million to 14 million years ago reached the Fall Line (red arrow) and laid the sediments of the Calvert Formation. Calvert Cliffs is circled. Source: Ward and Powars (2004).*

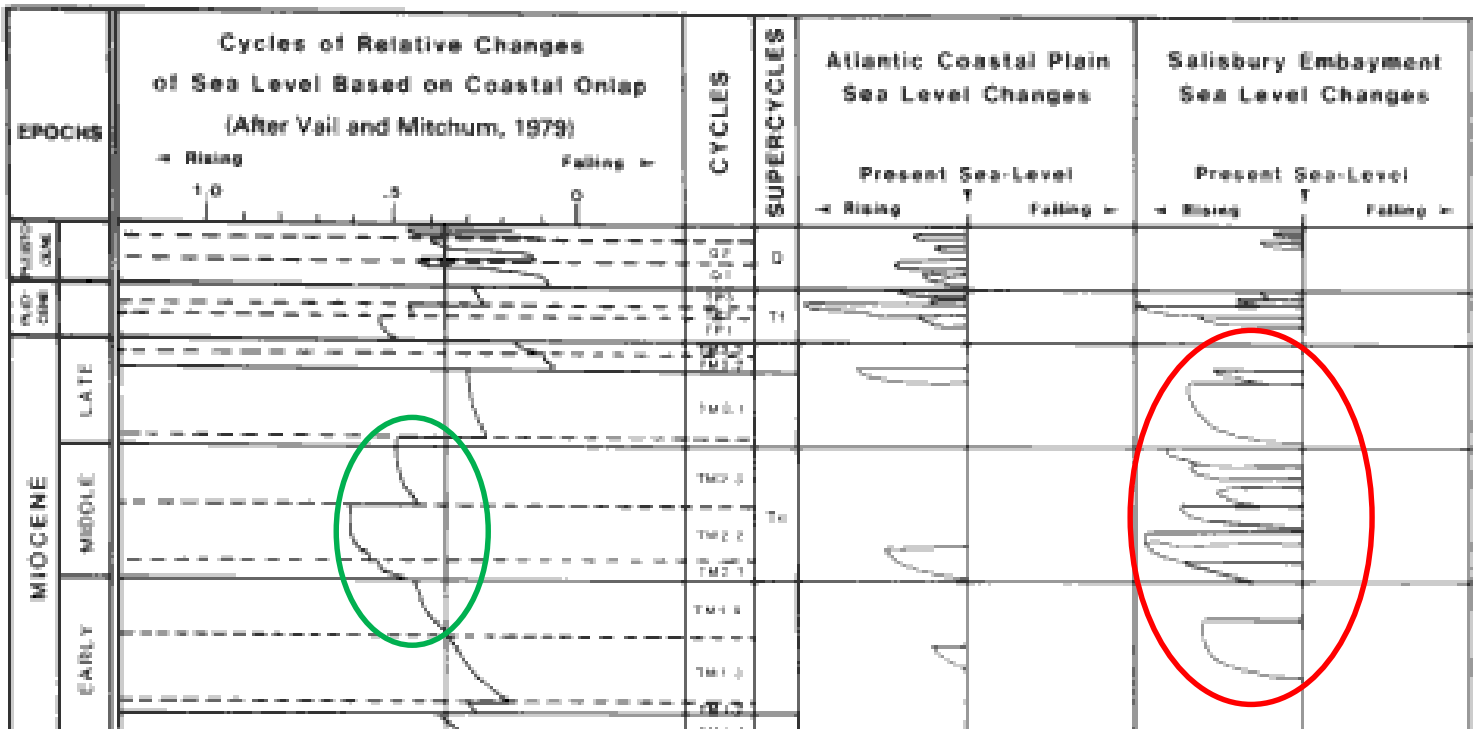


Figure 3—*Sea level fluctuations during the Miocene Epoch. Note in particular the general sea level rise during the middle Miocene (circled in green) and the specific marine transgressions—massive sea level surges—in the Salisbury Embayment during most of the Miocene (circled in red). Source: Ward and Powars (2004).*

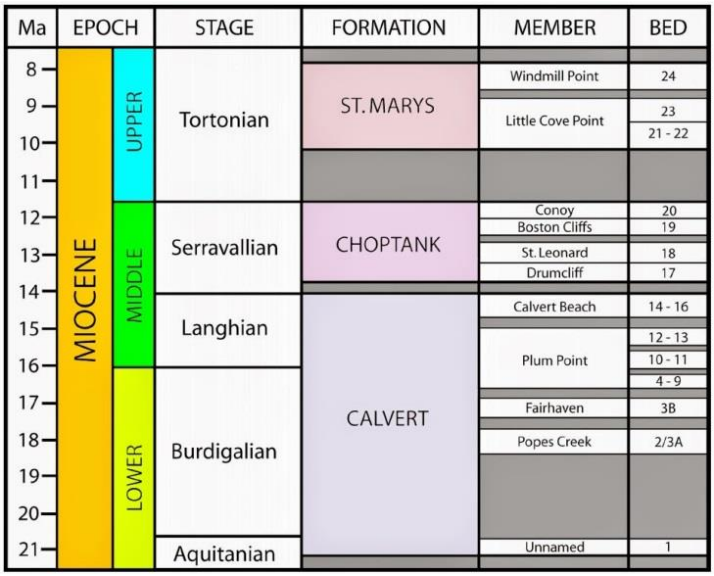


Figure 4—*The three Miocene formations exposed at Calvert Cliffs. The named members of each formation are distinct deposits corresponding to individual marine transgressions. Gray areas indicate unconformities due to erosion. Source: Share (2014).*

allow scientists to identify and date the separate marine transgressions that produced the Calvert Formation (fig. 2). The Calvert Formation also has silty sands, often in beds alternating with the diatomaceous clays. The sands contain marine fossils, especially in the uppermost member (Calvert Beach) (fig. 5, top).

Following a brief interlude, a second series of marine transgressions during the middle Miocene lasted for about 2 million years. The seas left deposits known as the Choptank Formation, which directly overlies the Calvert (fig. 4). The boundary between the two formations is what geologists call an unconformity, because a period of marine regression exposed the top of the Calvert Formation to erosion (fig. 4, shaded).

The Choptank transgressions were shorter and less extensive than the Calvert onlaps, but they brought coarser materials into the Salisbury Embayment (fig. 5, middle). The mollusk fossils they left indicate "cool-temperate to warm-temperate, shallow-shelf, open-marine conditions" (Ward and Powars 2004).

In the late Miocene, a pair of marine transgressions from about 10 million to 8 million years ago—neither of which ever came close to the Fall Line—left deposits known as the St. Marys Formation (fig. 5, bottom). They are mostly bluish clays that grade into

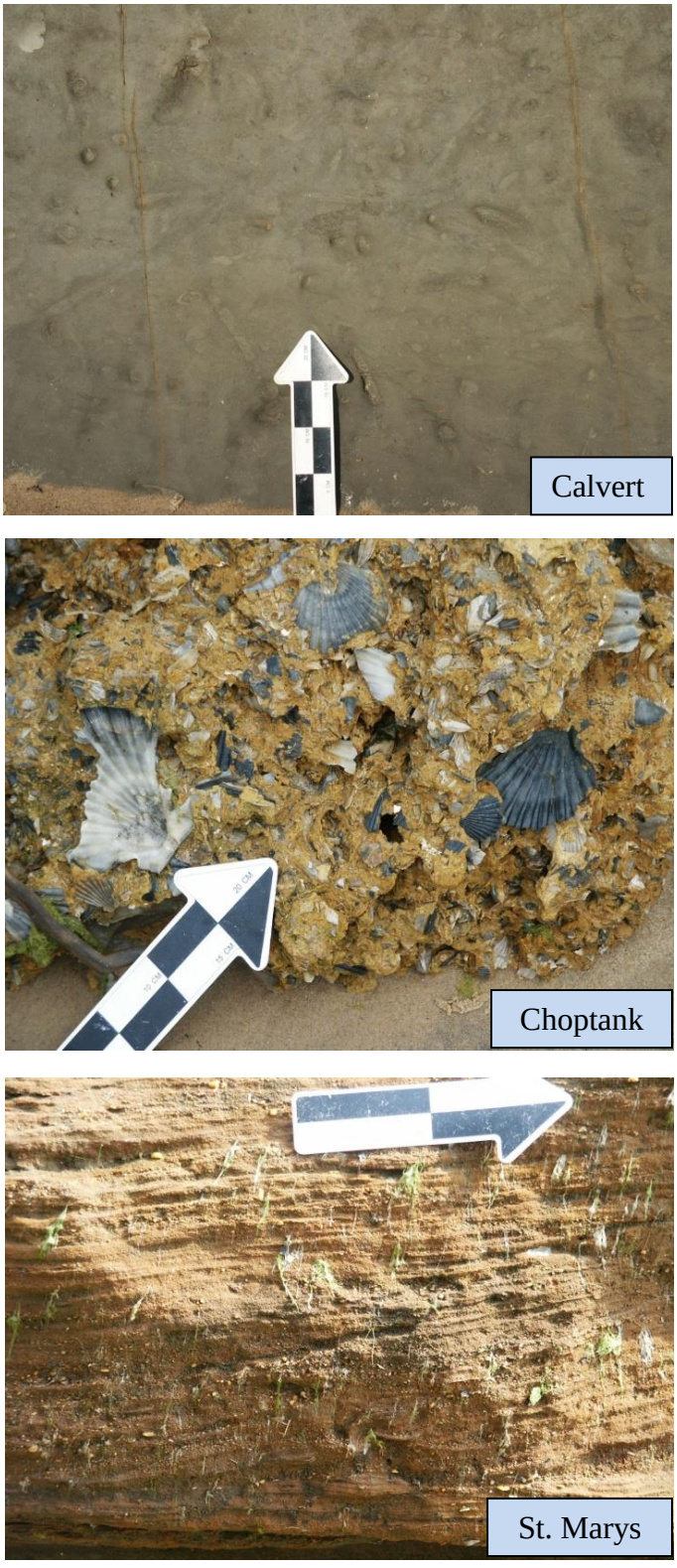


Figure 5—*Samples of beds in each of the three formations exposed at Calvert Cliffs.* **Top:** *Fossiliferous clay in the Calvert Formation.* **Middle:** *Shelly sands in the Choptank Formation.* **Bottom:** *Bedded sands in the St. Marys Formation, showing the influence of tides, currents, and wave action. Source: UVM (2008).*

sands, some rich in mollusks. The mollusk fossils indicate warm-temperate to subtropical conditions.

During the Pleistocene Epoch, which began about 1.6 million years ago, global cooling ended the ocean onlaps in the Salisbury Embayment. During periods of glaciation—and even during the interglacial Holocene—so much water has been locked up in ice that the Miocene formations have been exposed to the erosion we see today, shaping hills and cliffs.

Tilting

The Atlantic seaboard is what geologists call a passive continental margin. Tectonic activity in the region all but ceased by about 175 million years ago, when a well-established Atlantic Ocean was steadily spreading, separating Africa from North America, a process still going on today. On our continental margin, flat layers of sediment cover the largely inert crystalline basement rock under the continental shelf and Coastal Plain.

Location of the three formations at Calvert Cliffs. **A** = Calvert; **B** = Choptank; **C** = St. Marys. *Source: Wikipedia.*

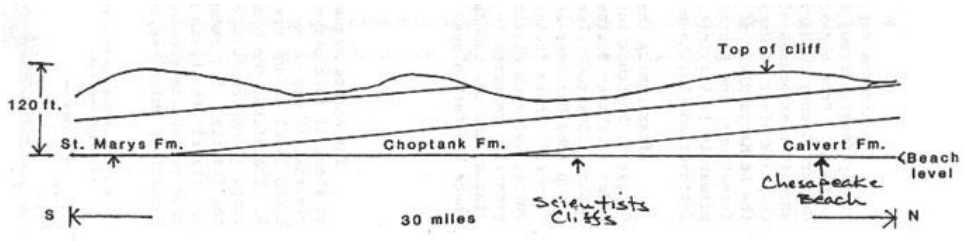


Figure 6—*The formations at Calvert Cliffs are tilted up to the north enough to bury the Calvert and Choptank Formations as you move 30 miles from north to south. Sources: UVM (2008) (above); Share (2014) (right).*

But even passive continental margins can be subject to tectonic activity, and the Calvert Cliffs are proof: The formations dip slightly to the south (fig. 6). As a result, the Calvert Formation is completely exposed at Chesapeake Beach, to the north of Calvert Cliffs, where the St. Marys Formation is barely in view. Moving south to Scientists Cliffs, the Calvert Formation is mostly buried but the Choptank is fully exposed and the St. Marys is now plainly in view. South of Cove Point, the Choptank is buried, and all you can see is the St. Marys and overlying deposits.

Evidently, the area was tilted up to the north after the St. Marys Formation was laid down—that is, within the past 8 million years. Did it have to do with the advance and retreat of Pleistocene ice sheets to the north of our area beginning about 1.6 million years ago? Was it caused by reactivated faults in the Triassic basins buried under the Coastal Plain and continental shelf? Or is there some other explanation?

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June 2016—Upcoming Events in Our Area/Region (see details below)

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			1 MSDC mtg, Washington, DC	2	3	4 Shows, Macungie, PA; Canandaigua, NY
5 Show, Canandaigua, NY Field trip	6	7	8	9	10 Auction, Oella, MD	11
12	13 GLMSMC mtg, Rockville, MD	14 **Flag Day**	15	16	17	18 EFMLS Picnic, Charlotte Hall, MD
19 **Father's Day**	20	21	22 MNCA mtg, Arlington, VA	23	24	25
26	27 NVMC mtg, Arlington, VA	28	29	30		

Event Details

1: Washington, DC—Monthly meeting; Mineralogical Society of the District of Columbia; 1st Wednesday of the month, 7:45–10; Smithsonian Natural History Museum, Constitution Avenue lobby.

4: Macungie, PA—2016 Spring Mineralfest, 66th Semi-Annual Show; Pennsylvania Earth Sciences Association; Macungie Memorial Park; info: Don Pitkin, pitkind@earthlink.net or www.mineral.com.

4–5: Canandaigua, NY—23rd Annual GemFest; Wayne County Gem and Mineral Club; Sat 10–5, Sun 10–4; adults $3, children 12 and under free; info: fredmhaynes55@gmail.com.

5: Purse State Park, MD—Field trip, low-tide fossil collecting, Charles County; Delaware Mineral Society; info: Tom Pankratz, tjpankratz@verizon.net.

10: Oella, MD—Auction; Chesapeake Gem and Mineral Society; Fri 7:30 pm (viewing at 7:00 pm); Westchester Community Center, 2414 Westchester Ave, Oella, MD (if using GPS use Ellicott City); go to chesapeakegemandmineral.org for directions

13: Rockville, MD—Monthly meeting; Gem, Lapidary, and Mineral Society of Montgomery County; 2nd Monday of the month, 7:30–10; Rockville Senior Center, 1150 Carnation Drive.

18: Charlotte Hall, MD—2016 EFMLS Region IV Potluck Picnic and Rock Swap/Sale; Southern Maryland Rock and Mineral Club; Gilbert Run Recreational Park, 13140 Charles Street; Sat 9–5; carload $5; info: Dave Lines, 240-427-7062, Dave.Lines@earthlink.net

22: Arlington, VA—Monthly meeting; Micromineralogists of the National Capital Area; 4th Wednesday of the month, 7:45–10; Long Branch Nature Center, 625 S Carlin Springs Rd.

27: Arlington, VA—Monthly meeting; Northern Virginia Mineral Club; 4th Monday of the month, 7:45–10; Long Branch Nature Center, 625 S Carlin Springs Rd.

THE NORTHERN VIRGINIA MINERAL CLUB INC

Crystals are the flowers of the Mineral Kingdom

Mineral of the Month: Scorodite

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PLEASE VISIT OUR WEBSITE AT:
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The Northern Virginia Mineral Club

You can send your newsletter articles to:

news.nvmc@gmail.com

Visitors are always welcome at our club meetings!

RENEW YOUR MEMBERSHIP!

SEND YOUR DUES TO:
Rick Reiber, Treasurer, NVMC
PO Box 9851, Alexandria, VA 22304

OR

Bring your dues to the next meeting.

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).

Dues: Due by January 1 of each year; $15 individual, $20 family, $6 junior (under 16, sponsored by an adult member).

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 22204. (No meeting in July or August.)

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