THE NORTHERN VIRGINIA MINERAL CLUB INC

The Mineral Newsletter

Meeting: November 16 Time: 7:45–9:00 p.m.

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

Volume 56, No. 9
November 2015
You can explore our club website:
http://www.novamineralclub.org/

Northern Virginia Mineral Club members,

Please join our November speaker, Wayne Sukow, for dinner at the Olive Garden on November 16 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 Kathy Hrechka, Vice-President, NVMC. Please RSVP to Kathy at 703-407-5393 or kshrechka@msn.com.

Wayne Sukow
November 16 Program

Wayne Sukow will present the November program, something to look forward to!

Feldspar: What's in a Name?

by Hutch Brown

Feldspar is the most common mineral on Earth. Note that I said on Earth, not in the Earth (huge difference!).

Like quartz (which is pure silicon dioxide—SiO_2), feldspar is a silicate mineral. It actually comprises groups of minerals, each involving some combination of metals with the most common elements on Earth, oxygen and silicon. The three feldspar groups (alkali, plagioclase, and barium) contain most of the silicon and oxygen in the Earth's crust. These silicate minerals alone account for about 60 percent of the Earth's crust.

Topaz
November birthstone

An uncut imperial topaz in the Smithsonian National Mineral Collection, originally from Minas Gerais in Brazil. Photo: Chip Clark.

Albite, a kind of plagioclase feldspar. The specimen shows the simple two-directional cleavage that gave the mineral groupings known as feldspar their German name Spat. *Source: Wikipedia.*

So what accounts for the name? Nobody knows for sure, but the origin is German. And I happen to speak German, so let's parse this out.

In German, the word is *Feldspat* (pronounced FELD-shpaht). Many German nouns, including this one, are combinations of two shorter nouns, like "icepick."

So we do it, too!

Of course we do, because our English (Angle-ish) derives from the Anglo-Saxon dialects brought into Celto-Roman Britain by Germanic invaders as the Roman Empire collapsed, somewhere around 500 AD. A good part of northern Germany is still called Saxony or Lower Saxony. The farther north you go in Germany and into Holland (original home of the Angles), the more the local "low German" tongues resemble English.

So what about feldspar or *Feldspat*?

In German, the word *Feld* means field. That part is easy!

Spat is pretty clear, too. It's a traditional mining term for any kind of rock that splits along clean planes. (The verb *spalten* means to split, and *Spat* probably derived from *Spalt*, meaning a split in the rock.)

Albite, a kind of plagioclase feldspar with the formula $NaAlSi_3O_8$, clearly has that trait. As the specimen above left (from Crete) shows, albite (like all feldspars) splits along clean planes.

But what about the combination of *Spat* with *Feld* to make *Feldspat* (or "easily cleavable rock that is found in fields")? That part isn't so clear. Since the 18th century, mineralogists have offered various explanations.

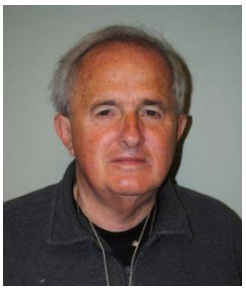
One theory is that *Feld* refers to individual grains in granite. As a major component of granite, feldspar is clearly visible in granite specimens as tiny "fields" in the rock, usually gray or pink.

Another theory is that *Feld* refers to fields for crops and pasture. Especially in mountainous parts of central and southern Germany, fields are littered with rocks and boulders that farmers go to great lengths to remove. Many of these pesky rocks derive from igneous and metamorphic sources (such as in the Alps) that contain plenty of feldspar.

Source

No author. 2015. Feldspat. Wikipedia, die freie Enzyklopädie.

In this issue …



Previous Meeting Minutes

October 26, 2015

by David MacLean, Secretary

President Wayne Sukow called the meeting to order at 7:45 p.m. at the Long Branch Nature Center in Arlington, VA.

Club members in attendance approved the minutes from the September 28 club meeting as published in *The Mineral Newsletter*.

The president recognized past presidents in attendance, including Rick Reiber and himself. The president also recognized guests Steve Hill as well as Scott and Jason Bryan.

Old Business

The annual NVMC gem, mineral, and fossil show will be in the Hub at George Mason University on Saturday and Sunday, November 21–22. Show setup will be late afternoon on Friday, November 20, and takedown will begin after 4 p.m. on Sunday, November 22.

Show Co-Chair Tom Taaffe had cards available for club members to post and pass out to advertise the show. You can print out the card on page 17 and bring it with you to the show for a discount! Four more coupons are on page 18; if you print out the page, you can cut up the coupons for passing out.

Bob Cooke, who presented the club program on microminerals, stands with items on display. Photo: Sheryl Sims.

The president and show co-chair said that many volunteers are needed to fill the open job slots on the online signup sheet. Both urged members to sign up. However, the Boy Scouts of America will supply trained instructors for the Scout activity slots.

This year, the Hub ballroom will contain only dealers. The kids' table, micromineralogy demonstration table, Scout activities, and other features will be in the adjacent room. Volunteers at the admissions table will steer attendees through the adjacent room before visiting the dealers in the ballroom.

Cabochons, minerals, and other items on display at the club meeting. Photos: Sheryl Sims.

New Business

The joint club Christmas party will be on Monday, December 14. The NVMC will invite the District of Columbia clubs to join the festivities at the Long

Branch Nature Center. The president asked for a volunteer to organize the Christmas party.

Announcements

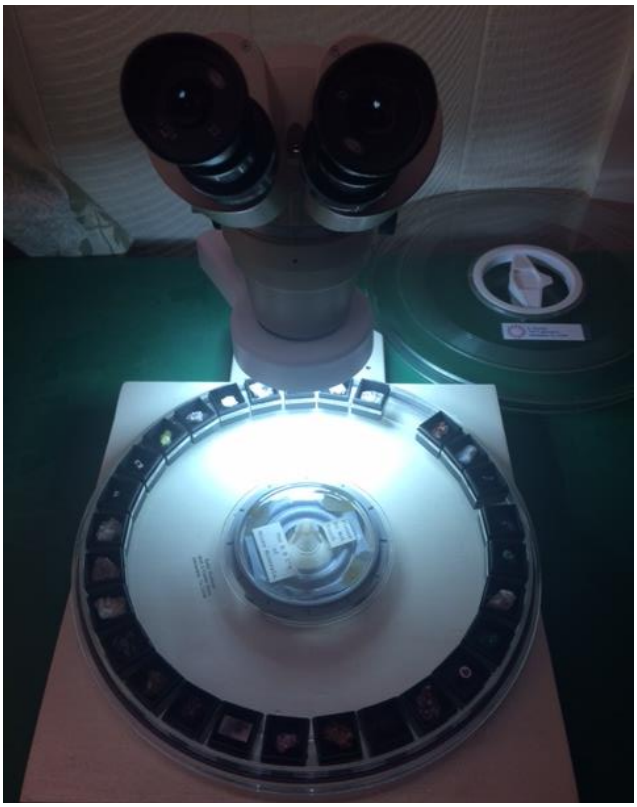
The November club meeting will be on Monday, November 16, on account of the club show held the following weekend.

Door Prizes

Door prize winners included Scott Bryan, Joseph Poranski, Barry Remer, Sheryl Sims, and Brian Whitely. The door prize donors were Ti Meredith and Sue Marcus.

Program

Club member Bob Cooke explained the basics of collecting microminerals, including the history of the hobby and its various techniques and advantages. Bob showed splendid photos of microminerals taken by Mike Pabst and Kathy Hrechka. Bob and Kathy had scopes set up so that club members could view various microminerals.



Kathy Hrechka's scope set up with microminerals on a wheel for easy viewing. Photo: Sheryl Sims.

Lucky door prize winner Sheryl Sims. Photo: Sheryl Sims.

Above: *Show Co-Chair Tom Taaffe (left) and former President Rick Reiber chat before the meeting.*
Below: *Club members listen to Bob Cooke's presentation on microminerals. Photos: Sheryl Sims.*

Mineral of the Month
Topaz

by Sue Marcus

When I think of topaz, I think blue, although I was recently told that the November birthstone, topaz, is usually considered to be yellow. Topaz is an aluminum silicate mineral with the chemical formula $Al_2(SiO_4)(F,OH)_2$.

Topaz is relatively hard, with a hardness of 8 on the Mohs scale. It forms orthorhombic crystals. According to Mindat, topaz is named for Topasos Island in the Red Sea; the name might have originally been used for what we now call peridot. According to Wikipedia, the Roman naturalist Pliny is the source of the Topasos reference in relation to topaz. Alternatively, Gemdat claims that the name derives from different Greek and Sanskrit sources.

Blue topaz is the state gem of Texas. According to Netstate, blue topaz "is found in the Llano uplift area in Central Texas, especially west to northwest of Mason."

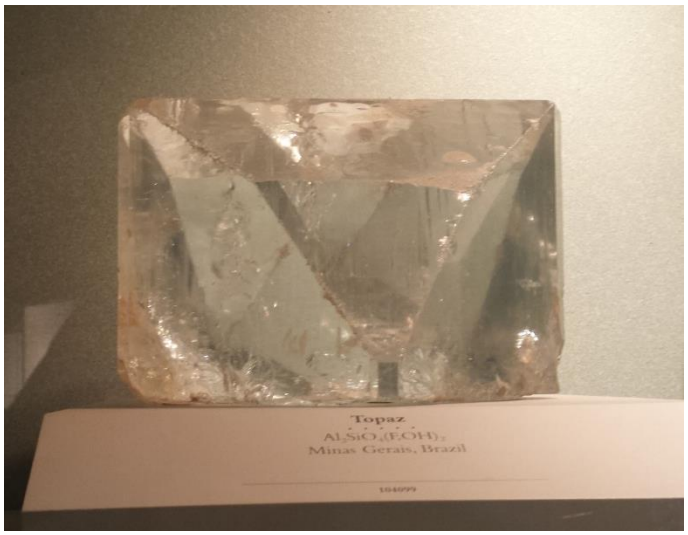
Pakistan has been producing some beautiful topaz crystals from the pegmatites around Gilgit. The pegmatite at Morefield Mine in Amelia County, VA, has also produced topaz.

Imperial topaz (see page 1) is notably orange, red, or pink. Naturally occurring topaz can also be colorless. Most blue topaz currently for sale as gemstones is irradiated to enhance the blue color. "Mystic" topaz is natural material that is artificially treated with a titanium coating that might not be permanent.

Genny Haskins with giant topaz crystals on display at the Smithsonian National Museum of Natural History. The crystals weigh 70 and 111 pounds, respectively. Photo: Sue Marcus.

Topaz is typically found in igneous rocks that have high amounts of silica. A good example is the rhyolite in the Thomas Range of Utah, including Topaz Mountain. The topaz crystals there are light sherry-colored or light peach-colored. Parts of the area might be open to mineral collecting. Topaz crystals from Utah make lovely, relatively inexpensive additions to a mineral collection.

You can find more photos of topaz at the Smithsonian's Mineral Gallery.



Topaz crystal from Minas Gerais, Brazil, on display at the Smithsonian National Museum of Natural History. Photo: Sue Marcus.

GeoWord of the Day

(from the American Geoscience Institute)

type specimen

The single specimen on which the original description of a particular mineral species is based. The type specimen serves as a permanent point of nomenclatural reference for application of the name of that species. The type specimen can be a *holotype*, a *neotype*, or a *lectotype*.

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

Henry Heuland: Heulandite

by Sheryl E. Sims

John Henry Heuland (1778–1856) was a 19th-century British mineral dealer. He was noted for being ahead of his time when it came to keeping good mineral records.

Heuland was actually born in Bayreuth, Germany. At the age of 21, he became involved with minerals through the influence of Count Louis de Bournon. He traveled a lot and was fluent in English, French, Spanish, and Russian, in addition to German.

Heuland had a large collection of Russian minerals and inherited half of Jacob Foster's collection when Foster died. (Foster was a relative by marriage.) Heuland was elected to the Geological Society of London in 1813. After retiring, he spent his final years living with his second wife in Sussex, where he died on November 16, 1856.

The Royal Cornwall Museum in Truro houses many of Heuland's specimens, with his own hand-written labels. The museum, with over 7,000 superb specimens, is considered one of the finest in Europe.

Heulandite—$(Ca,Na)_{2-3}Al_3(Al,Si)_2Si_{13}O_{36}•12H_2O$—was first distinguished from stilbite by August Breithaupt in 1818. Heuland named it "euzeolite," meaning beautiful zeolite. In 1822, H.J. Brooke gave the mineral the name heulandite, after Heuland.

Category ..... Zeolites (tectosilicates)

Color ..... Colorless, yellow, green, white, pale pink

Crystal habit ..... Tabular, parallel aggregates

Crystal system ..... Monoclinic

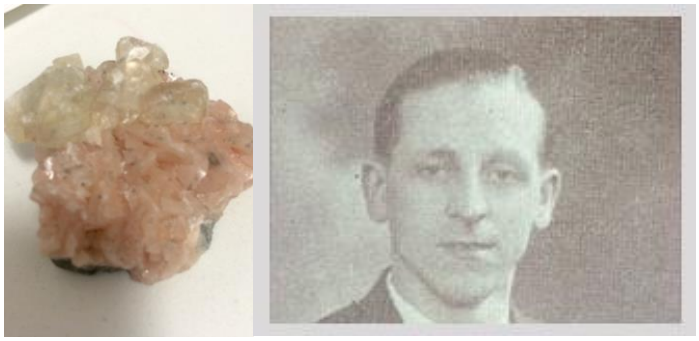
Cleavage ..... Perfect basal

Mohs hardness 3.5–4

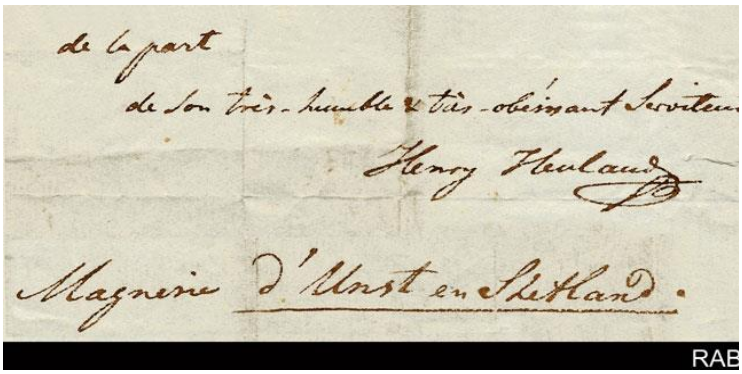
Luster ..... Pearly, vitreous

Streak ..... White

Heulandite occurs with stilbite and other zeolites in the amygdaloidal cavities of basaltic volcanic rocks and occasionally in gneiss and hydrothermal veins. Good specimens have been found in the basalts of Berufjörður, near Djúpivogur, Iceland; the Faroe Islands; and the Deccan Traps of the Sahyadri Mountains of Maharashtra near Mumbai, India.



Left: Heulandite from India. Photo: S. Sims. Right: Henry Heuland. Source: Connections to People.



Label in French for a specimen of magnesia from Unst in the Shetland Islands, signed by "your very humble and very obedient servant, Henry Heuland." The flowery language is typical of the European aristocracy.
Permission to use from Wendell Wilson, Mineralogical Record.

Crystals of a brick-red color come from Campsie Fells in Stirlingshire, England, and from the Fassa Valley in Trentino, Italy. A variety known as beaumontite occurs as small yellow crystals in syenitic schist near Baltimore, MD.

Sources

Cooper, M.P. 2006. Robbing the sparry garniture: A 200-year history of British mineral dealers. Mineralogical Record, Tucson, AZ.

No author. No date. Connections to people. Crystals in their eyes: Collection of lustful rocks and minerals.

No author. 2015. Heulandite. Wikipedia.

Exploring Minerals in France: Part 1

by Sue Marcus

Is mineral collecting your vacation? Or are minerals part of your vacation? Here's how we incorporated seeing, buying, and trading minerals into our September trip to France.

Limestone Dwelling

An easy choice was selecting a geology-related place to rent in the Loire Valley, known for its many stunning chateaux and excellent wines. We chose a *troglodyte gite*, a house dug into a soft limestone called tufa in France (not what that word means in the United States). Located near Noizey, the dwelling dates from the 16th century.

The house includes two spacious bedrooms, a dining room, a kitchen, a living room, and bathrooms. There are very modern appliances, like a Bosch dishwasher, and the front rooms have large windows or French doors that let in lots of light, so don't think "cave dwelling"!

Mineral Museum

Our next minerals-related stop was planned in advance. I'd researched mineral shops, mostly coming up empty. But I struck gold with Thierry Charrier, an economic-geologist-turned-museum-owner/director in Mortagne-Sur-Sevre, near Cholet. We e-mailed back and forth before we left and agreed on a time and date to meet.

A troglodyte gite, *a 16th-century dwelling carved into a limestone cliff in France. Photo: Sue Marcus.*

Wow—we weren't expecting a full-blown mineral museum! Thierry created everything himself, from the displays, to the lighting, to the painting of a mine. It is amazing, with far and away the best displays we saw anywhere in France, including Paris.

The museum, called Le Musee du Mange Cailloux (meaning stone or pebble muncher), features a room of displays of beautiful mineral specimens in various groups—by crystal system, primary element, and so

Museum Director Thierry Charrier (left) and Roger Haskins in Le Musee du Mange Cailloux. Photo: Sue Marcus.

Roger and Thierry standing in front of a painting of a mine done by Thierry himself. Photo: Sue Marcus.

forth. Drawers beneath the displays show examples of products made from the economic minerals. And some are simply beautiful specimens!

Another room displays Thierry's lovely collection of specimens that look like landscapes, animals, eggs, spacefolk, and more. Yes, there are lots of agates, but there's also a wonderful prehnite panda! The museum also exhibits small displays of fluorescent and radioactive minerals, as well as a map of local inactive mining sites.

Thierry has done a lot of collecting himself, evidenced by many lovely specimens in the collections and in the shop. I had a great time in the shop, mostly selecting French materials. I'd brought specimens for trading, but Thierry already had a lot of what I'd brought—and better specimens than mine. Still, I successfully traded, and we left with a hefty box of fragile minerals to cart throughout the rest of our trip.

Murphy's Law: If Anything Can Go Wrong …

Editor's note: *The piece is adapted from* Mineral Humor, *a Website maintained by Larry Rush.*

Laws of Field Collecting

Rick's Rule No. 1: The distance to crystal groups in narrow vugs always equals the length of your arm plus 6 inches.

Rick's Rule No. 2: The attractiveness and desirability of a crystal pocket is in inverse proportion to its accessibility in the wall.

Rick's Rule No. 3: The best crystal pockets are always in vertical walls at least 5 feet above your head.

Laws of Shopping, Swapping, and Shows

First Rule of Trading: Any specimen received in a swap is less valuable than the one you traded.

Second Rule of Trading: The value of specimens in a mail swap is always exceeded by the cost of your postage.

Third Rule of Trading: The other trader never needs what you have the most of to swap.

The frequency of specimen damage in the mail is directly proportional to the number of "FRAGILE" markings on the package.

Your worst enemy's first-place prize crystal on exhibit in your club's show will be inferior to the one you decided not to show.

The specimen you have always wanted will be cheaply priced on the dealer's table NEXT to the one where you just spent your last dollar.

Dropping a dropped flat of specimens will do the worst damage to the best piece and no damage to the worst piece.

Fisherman's Law No. 1: The size and quality of the crystals you found will double each time you tell your collecting story.

Fisherman's Law No. 2: With a knowing smile, your listeners will silently cut the size and quality of the crystals you describe in half.

No one present ever wins a mineral show door prize.

The Joy of Junior Rockhounds!

by Sheryl E. Sims

Many of my friends will tell you that I am overly enthusiastic about rocks and minerals. Admittedly, it can all be too much for most of them. That's because they haven't seen the light! That is, the light that shines from within when you've found or received your first specimen! It's the same light that shines when you've bought that long-sought-after piece for your growing collection. We all know that feeling.

That's the same type of feeling that I get when I introduce children to the world of rocks and minerals! Few things bring me more delight than seeing their eyes brighten and hearing their squeals of delight when holding something as beautiful as a mineral.

As mineral collectors, we have boxes and boxes of minerals. However, to truly appreciate one's collection, sometimes you have to actually get in the box!

That was the case with "Baby Jack Talay." It's clear that "Baby Jack" is headed down the right path. Tight squeezes and rocky roads don't deter true rockhounds at any age.

Baby Jack Talay. Photo: Rachel Talay.

Bella Boone. Photo: Jean Kochendorfer.

Pretty in pink, Bella Boone is very enthusiastic about her new collection. When I gave her some minerals to start her collection, she couldn't wait to take them to "Show & Share" at her daycare center. Partial to shiny minerals, Bella knows how to strike a pose with any specimen. She wasted no time using her handy mineral chart to identify other specimens in her collection.

I look forward to watching these two junior rockhounds grow in their knowledge and desire to pursue the numerous paths leading to mineral shows, geology classes, and delightful field trips to the quarry!

AFMS News

"Lapidary of the Month" Articles Sought

by Jim Brace-Thompson

Editor's note: *The article is adapted from* A.F.M.S. Newsletter, *September 2015, p. 3.*

Rock & Gem is the official magazine of the American Federation of Mineralogical Societies. It has done much to promote rockhounding and rock clubs like yours and mine.

As you might know, I'm a regular contributing author, mostly with articles for the magazine's "Rock & Gem Kids" section. *Rock & Gem* Managing Editor Lynn Varon asked for my help in soliciting articles for the magazine's "Lapidary of the Month" feature.

"Lapidary of the Month" is usually the very first article in each issue of the magazine. In it, a lapidary artist (amateur or professional) describes a relatively simple project, giving a photo and step-by-step procedures for others to follow. For example, see page 8 of the July 2015 issue.

We would like to encourage you to contribute! It's easy!

Here's all you need:

- A 500-word description telling step by step how you crafted your lapidary project from start to finish, saved as a document file.
- At least one close-up digital color photograph of the finished project (with camera set for high resolution, that is, 300 dpi at 4 inches by 5 inches, minimum).

Send your document file and digital photo (.tif or .jpg) as e-mail attachments to editor@rockngem.com with the subject line "Lapidary of the Month." Include your name and a street address (not a P.O. box) for prize delivery should your entry be selected for publication. (Only winners will be notified.)

Authors of articles selected to appear in "Lapidary of the Month" receive a two-speed Dremel Model 200 N/40 MultiPro kit and a wall plaque in recognition of their creativity and craftsmanship. (Thus the need for a street address.)

For questions or further submission details, please contact Lynn Varon at *Rock & Gem*, 5235 Mission Oaks Blvd. #201, Camarillo, CA 93012; phone 972-448-4626; e-mail editor@rockngem.com.

Here's to good projects and good writing—and to seeing you as a Lapidary of the Month!

EFMLS News

Safety Tip: Personal Limits

by Ellery Borow

Editor's note: *The article is adapted and abridged from* EFMLS News, *March 2015, p. 6.*

Safety depends on knowing and respecting your own personal limits.

You sometimes hear of someone shoveling snow and having a heart attack. A heart attack can happen any time, but when you ignore your personal limits, you tempt fate, especially if you are in a high-risk group, as many older people are.

In our hobby, it pays to be aware of your limiting factors. Sure, you can walk that quarter mile into a quarry, but will you be able to walk out again carrying a bucket or pack full of rocks? What is your personal limit ... 200 feet, 1,000 feet, 1/2 mile, 2 miles ... and back?

How do you know? You might ask your doctor. Otherwise, let caution and commonsense be your guide.

Each of us has other personal limits. How good is your eyesight? Is it good enough for faceting a stone? You don't want to make a vision-related mistake! How tired are you feeling? You wouldn't want to get into a driving accident from being too tired! How achy are you feeling? You don't want to keep missing the chisel with your hammer because your muscles ache!

So please mind your limits—and stay safe!

Who Is This Guy?

by Matt Charsky, AFMS President

Editor's note: *Outgoing AFMS President Marion Roberts challenged newsletter editors to communicate more of what is going on in our national organization. In response, I have adapted an article from the* A.F.M.S. Newsletter *(November 2015, p. 2), in which incoming AFMS President Matt Charsky—a member of our club—introduced himself.*

If you have attended one of the recent AFMS conventions, you might have seen me in several vice-president positions and in the president-elect position. If not, you might be wondering: Who is the new AFMS president?

Professionally, I am a geologist with a degree from the University of Rochester in New York. I did my field work at Boston University in Massachusetts.

Right out of college, I worked for an oil service company, Core Laboratory, and traveled throughout the Gulf Coast and offshore. My job was to run a field lab during oil and gas exploration.

Next, I joined the federal government, helping the Federal Energy Regulatory Commission carry out the Natural Gas Policy Act. I spent the rest of my federal career in the Environmental Protection Agency carrying out the Superfund Program. My focus was on protecting human health and the environment, overseeing groundwater resources, and drafting policy.

In the AFMS, I have served as 1st, 2nd, and 5th vice-presidents and of course as president-elect. I have attended many AFMS conventions throughout the United States.

I have held various offices in the EFMLS, serving as president and as 1st and 2nd vice-president as well as chair of the Nominating Committee, Convention Advisory Board, and Show Coordination Committee. I have also been a member of the Past-President Advisory Council, and I have served on the Wildacres Functioning Committee, as an area representative advisor, as a judge for the Bulletin Editor Advisory Committee, and as an auctioneer. I received the EFMLS Citation Award in 2010.

On the level of local clubs, I was president of the Gem, Lapidary, and Mineral Society of Washington, DC, for 7 years and performed many other functions to further the hobby and our relationships with other clubs.

As you might expect, my focus in the hobby is on minerals and crystals. I started collecting minerals in upstate New York. When I worked on the Gulf Coast, I field-collected in Arkansas and Texas. I have also had the opportunity of collecting in Colorado and Utah. Today, I stay in the mid-Atlantic region, mainly in Virginia, Maryland, and Pennsylvania.

I have been fortunate to have the assistance of many people in the EFMLS and AFMS. Without their help, I would not be serving the AFMS as president.

The AFMS has an experienced crew of committee chairs who are excited about serving for another year. They are ready and I am ready, so let's go! I look forward to working with each of you.

If any executive board member, committee chair, regional officer, or local club member has a concern about the AFMS or suggestion for improving our national organization, let me know and I will see what we can do about it. Throughout my career, I have solved many problems, and I have tried to spend my time productively in every position I have held.

So that this article does not get too long, let me end by saying that my next article will share with you what I have learned in my various AFMS positions and how I see the AFMS progressing into the future.

'Til next month!

Matt

Matt Charsky serving as auctioneer at the NVMC auction in September 2014. Photo: Sheryl Sims.

Story of Geology

The World According to Abraham Gottlob Werner: Neptunism

by Hutch Brown

Editor's note: *The author is solely responsible for the views expressed here, which do not necessarily reflect those of other NVMC members. If you would like to comment or contribute to our newsletter, please contact me at hutchbrown41@gmail.com.*

In early modern Europe (roughly from 1500 to 1800), most scholars believed that the natural world attested to the Word of God as revealed in the Bible, a notion called natural theology. In particular, scholars sought to find the story of Genesis, from the Creation to the Great Flood, inscribed in the Earth's surface, particularly in its rock formations.

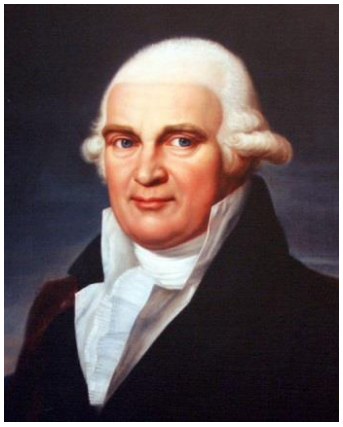
Natural theology led scholars to observe and describe the natural world in painstaking detail, yielding new insights and laying the foundations for modern scientific methods. By the late 18th century, however, naturalists such as Georges-Louis Leclerc, Count of Buffon (1707–88), had learned enough about the physical world no longer to need supernatural explanations for the origins of the Earth, including the story of Noah. Ironically, natural theology was beginning to undermine its own precepts.

Synthesizing Science and Religion

However, most scholars still accepted the origins of rock formations in a global flood as fact. Some naturalists (including Buffon) instead proposed fiery origins for the Earth, but the primeval flood story still held sway. The flood theory was close enough to the book of Genesis to save its proponents from censure by religious authorities, a fate that befell the unfortunate Buffon. The flood story also seemed to fit parts of the geological record, and no one was better at making that case than the great German geologist Abraham Gottlob Werner (1749–1817).

Werner was born into a family of mining professionals in Saxony, a province in north-central Germany. An expert mineralogist, Werner developed an influential method for classifying minerals, and he was the first to describe a number of them. For example, he first identified the mineral zoisite, named for the naturalist Sigmund Zois, who sent Werner specimens from his native Austria in 1805.

An inspector and teacher at the Freiberg Mining Acadamy in Saxony, Werner carefully studied the rock formations around him. Based on his observations and the Law of Superposition first proposed by the Danish naturalist Nicolas Steno, Werner developed a system for explaining and classifying all of the Earth's rock layers in accordance with the notion of a great global deluge.



Abraham Gottlob Werner. Source: Wikipedia.

Werner postulated the formation of not one but two great global oceans—a primeval ocean corresponding to the time of Creation and a later global deluge that fit nicely with the story of the Great Flood. Both oceans had periods of calm and storm. The primeval ocean had a time of great ebbing floodwaters, and the later global ocean was associated with both rising and ebbing floods.

Like Nicolas Steno, Werner believed that the Earth's oldest rocks precipitated from the primeval ocean before God created life; hence, they contained no fossils. Werner also recognized the importance of erosion and sedimentation, incorporating them into his scheme. In Werner's view, erosion and sedimentation associated with the global oceans collectively explained the stratigraphic relationships among the Earth's rock layers. Recognizing that all of this would have taken a lot of time, Werner speculated that the primeval ocean might have formed as much as a million years before our time.

Werner's Scheme

Werner divided the rocks of the Earth into five formations, from oldest to youngest:

1. Primordial mountains (*Urgebirge*), made up of igneous and metasedimentary rocks, took shape from materials precipitated from the first global ocean onto the ocean floor.

Zoisite, first described by Werner. Source: Wikipedia.

2. Transitional mountains (*Übergangsgebirge*) included sedimentary rocks as well as dikes and sills formed from materials deposited on the ocean floor. These rocks were in uniform layers extending around the world.
3. Stratified rock layers (*Flötz*) took shape from materials eroded and redeposited as mountains emerged from receding floodwaters. These sedimentary rock layers contained fossils.
4. Upwashed (*aufgeschwemmte*) layers of poorly consolidated materials ranging from cobble to clay were left by receding floodwaters. (The equivalent in our area is the Potomac Formation and the overlying Tertiary sediments.)
5. Volcanic rocks took shape from volcanic ash and lava flows associated with veins of underground coal that had caught fire.

Knowing that rock layers are not uniform around the world, Werner explained their variability in terms of the various periods of oceanic calm and storm, ebb and flood, and erosion and sedimentation at work in different ways in different places at different times.

For example, the Potomac Formation of unconsolidated sediments in our area (formation 4 in Werner's scheme) directly overlies metamorphic rock (formation 1). Geologists today recognize a huge gap in the geologic record between the Cambrian bedrock (put in place about 300 million years ago during the Alleghanian Orogeny) and the Cretaceous Potomac Formation (100–140 million years old). Geologists call the gap an "unconformity" attributable to erosion. In Werner's system, periods of oceanic ebb and flood caused the erosion.

Neptunism: An Influential School of Thought

Werner was a gifted speaker who built a strong following across Europe. Werner's focus on explaining landforms worldwide in terms of oceans became a popular school of thought known as Neptunism—after Neptune, the Roman god of the sea. Neptunism appealed to deep-seated beliefs among contemporary scholars in the cataclysmic origins of the world, particularly in Noah's flood.

Yet Werner's scheme begs some obvious questions. Where did the global oceans come from and where did all the ebbing waters go? The coal-burning hypothesis for volcanic activity is weak; volcanic southern Italy, for example, has no coal, whereas coal-rich Germany has no volcanic activity. Werner's scheme also failed to account for discoveries that basalt and other igneous rocks are associated with volcanic activity—intrusions of molten rock from below rather than submarine deposition of materials from above.

Nevertheless, Werner's painstaking observations and systematic descriptions fostered the modern science of stratigraphy. Building on work by Steno, Buffon, and others, Werner created the first detailed and systematic stratigraphic model on a geologic time scale. Neptunism dominated the emerging science of geology until the work of the Scottish geologist James Hutton (1726–97) revolutionized the field.

Acknowledgment

Thanks to Sue Marcus for reviewing and commenting on the article. The author is solely responsible for the views expressed here and for any errors.

Next issue: James Hutton, the founder of modern geology, established core principles of geological science as we know it today.

Sources

No author. 2008. Abraham Gottlob Werner. Complete Dictionary of Scientific Biography. Encyclopedia.com. 26 January 2015.

No author. 2014. Abraham Gottlob Werner. Wikipedia. October 14.

Wernerite, named in honor of Werner, comes in various colors. Wernerite is a fluorescent variety of scapolite. Sources: Wikipedia (top); Mindat (bottom).

Polymorphism

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.*

Polymorphism means "many forms." In mineralogy, it means that a single chemical composition can have more than one crystal structure.

The arrangement of atoms in a crystal depends on the size of the atoms, which can change with changing pressure and temperature. As pressure on a crystal rises, its volume declines to the point where a more compact crystal structure will form, and a different mineral will appear.

Similarly, as temperature rises, the atoms will vibrate more and become larger. The crystal might reach the point where a less compact structure will form, changing the mineral.

There are several familiar kinds of polymorphs.

Graphite

Carbon has two polymorphs. At high pressure, it has an isometric crystal structure that we all know as diamond. As temperature and/or pressure falls, diamond should transform into the hexagonal structure of graphite. But that involves a drastic rearrangement of atoms—diamond is the hardest mineral there is, and graphite is one of the softest. So the rate of transformation is glacial, and diamond is able to exist indefinitely at Earth's surface in a condition called metastability.

Aluminum silicate (Al_2SiO_5) has three polymorphs. The high-pressure form is kyanite; the high-temperature form is sillimanite; and the low-temperature, low-pressure form is andalusite. Like carbon, the rate of transformation is extremely slow, so all three forms coexist at the Earth's surface. At higher temperatures deep in the Earth, transformation rates are higher.

Sillimanite

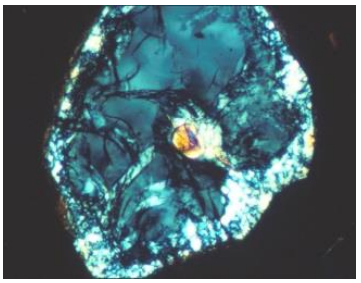
Calcium carbonate ($CaCO_3$) has two polymorphs. The high-pressure form is aragonite and the low-pressure form is calcite. Again, enormous energy is required to transform one into the other, so the polymorphs are metastable, coexisting on the Earth's surface.

Aragonite

Silicon dioxide (SiO_2) has six polymorphs, most of which form at very high temperatures. With decreasing temperature at low pressure, cristobalite transforms into tridymite. Further lowering of temperature transforms tridymite into so-called high quartz.

Tridymite

At 1 atmosphere pressure, any temperature below 580 ºC will change high quartz into low quartz; accordingly, high quartz is never seen at the Earth's surface. By contrast, cristobalite and tridymite are metastable at low temperatures near the Earth's surface, and both can be found in rocks.



Coesite

With increasing pressure at low temperatures, low quartz transforms into coesite, and coesite changes into stishovite at even higher pressures. Both coesite and stishovite are metastable polymorphs that can be found in rocks. Only high quartz is the oddball.

Finally, ***potassium aluminum silicate*** ($KAlSi_3O_8$) has three polymorphs, each based on how quickly the parent rock cools. One polymorph is sanidine, found only in volcanic rocks that cool very rapidly. In rocks that cool more slowly, sanidine transforms into orthoclase feldspar, and orthoclase eventually transforms into microcline when cooling is extremely slow.

Microcline

Flagstaff's Lava River Cave

by Jack Hommel

Editor's note: The piece is adapted from Little Gems *(newsletter of the Mohave County Gemstoners, Kingman, AZ), November 2009, p. 4.*

This mile-long lava tube cave, located on the Coconino National Forest 14 miles north of Flagstaff, AZ, was formed roughly 700,000 years ago by molten rock that erupted from a volcanic vent in nearby Hart Prairie. The top, sides, and bottom of the flow cooled and solidified first, after which the insides of the lava river continued to flow, forming the present cave.

The story of how the tube was born is written in the rocks. Small wavelike undulations on the floor of the cave are the last ripples of the molten rock that flowed from the cave. Stone icicles hanging from the ceiling show where a final blast of volcanic heat caused the rock to partially reliquefy and drip, only to cool again.

In places, the cave is a closed tubular structure that insulated the much hotter rock flowing inside. When the eruptions ceased, the shielded lava case enclosed a flow of molten rock that left behind what is effectively an empty stone pipe.

After centuries of cooling, the interconnected tubes in the cave became marvelous readymade shelters in both winter and summer. All manner of creatures, from bugs, to snakes, to horses, to people, have found refuge in the cave. Artifacts have been found—sometimes tragic—but always interesting.

Lava tube entrance (above) and lava tube interior near the entrance (below left), with a long camera exposure to capture light. Source: Wikipedia.

Dress appropriately when you come to visit, with warm clothes and sturdy shoes. The cave is as cool as 42 °F even in summer; you might even find some ice inside. The rocks are always sharp and slippery. Bring two or three sources of light, in the event one fails.

Once Upon a Time

by Jack Hommel

Editor's note: The piece is adapted from Little Gems *(newsletter of the Mohave County Gemstoners, Kingman, AZ), November 2009, p. 5.*

You can generally figure that when a tale begins with "Once upon a time" it's time to hitch up your pantlegs a bit, because it's probably going to get pretty deep and thick pretty soon. You can never tell for sure, though.

Once upon a time, more than a half century ago, while wandering around the relatively flat and seemingly featureless high desert of eastern Oregon with a buddy, I stumbled upon a sizable hole in the ground. This particular hole turned out to be something a bit more than just a hole. What we had stumbled upon was a lava tube. In fact, it was an entrance to a whole complex of interconnected lava tubes.

So there we were, two 16-year-old boys who were absolutely certain that we were rough and tough and "MEN, by God!" Being completely full of "go" and

Opening of a high-desert lava tube.

not knowing the meaning of the word "slow," we clutched our one and only flashlight and ventured into the maw of that irresistible cavity.

For about 4 hours, we had great fun being adventurous and brave. Some of the fun was in knowing with absolute certainty that we were too smart to be made fools of by "some old hole in the ground."

Oh, little did we know! After clambering and sometimes crawling around in the fascinating maze of interconnecting passages and dead ends, we eventually decided to go back to our vehicle and have a bite of lunch. We blithely headed toward our exit point only to find a dead end.

Oh well, we thought, it must be just back that-away a little bit. Or maybe just over there! Better yet, just through that passage there!

So … after fussing and fumbling around for a couple of increasingly tense hours, we finally came to the realization that we were completely and thoroughly LOST! We were also two completely and thoroughly scared BOYS! The sudden sense of utter, total isolation was overwhelming, not to mention the fact that it was dark and cold down there.

By the grace of God and some extremely small glimmer of native intelligence, we managed to not panic. So, sitting there in the dark, trying to conserve what little battery we had left, we actually came up with a not-too-silly plan.

We decided that the only way we'd get out was by a process of elimination. Our plan was to go completely to the end of every passageway, then to return to the entrance of that particular hole and mark it with some article we carried with us.

We were tired, cold, hungry, and very frightened boys. Proceeding with our plan, we probed, surveyed, and marked hole after hole, some short, some long, and each more ominous than the preceding one. We had determined that by flashing the light in half-second bursts and memorizing each revealed scene, we could save our battery power.

It worked, after a fashion, with considerable bumping of heads, much very grownup profanity, and walking and crawling with our arms and hands fully extended as feelers.

Once each passage had been determined not to be our salvation, we marked it with a small item from our pockets (chewing gum wrapper, coin, etc.). Fortunately, there was little air movement to disturb our markers, so we became a bit more confident that we might eventually find our way out. Some of the markers ended up being bits and pieces torn from our clothing, but we thought it was a good trade.

After a seemingly endless passage of time stumbling along in the dark in our energy-saving mode, I just happened to look up. There was absolutely no earthly reason for me to look up while underground, but something led me to do so.

There above me was the most astoundingly beautiful, wonderful sight my tender years had ever seen. A star! I was looking up through a vent or collapsed ceiling at a tiny portion of the awesome night sky.

It was an extremely difficult stretch and climb on wobbly piles of rock just to get to the beginning of that opening. The wriggling, stretching, grasping climb up through that quite tight and rather lengthy opening was a totally undignified and somewhat bloody affair, what with banged heads and shoulders as well as scratched and abraded knees, elbows, and fingers.

We did eventually prevail and managed to stand, once again in the open air. We began a victory dance of cheering and laughing which very quickly turned into sobs of relief and prayers of thanks for our deliverance, while shuddering and clinging to each other in that wonderful nighttime air. By then, we were two half-naked, dog-tired, scared, and relieved big boys.

Once we managed to get our bearings, we found that we were almost a mile from our entry point.

The moral of this tale is, BE PREPARED! Don't start vast journeys with half-vast plans!

Presented by The Northern Virginia Club, Inc. www.novamineralclub.org
Sponsored by the Dept. of Atmospheric, Oceanic and Earth Sciences at GMU

Date:	November 21 & 22, 2015
Place:	The Hub Ballroom (Student Union II Bldg) George Mason University Campus Braddock Rd. & Route 123, Fairfax, VA
Hours:	Saturday 10am-6pm, Sunday 10am-4pm
Admission:	Adults: $6, Seniors: $4, Teens (13-17): $3 Children 12 & under, Scouts in uniform, and GMU Students w/valid ID are FREE.

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

Demonstrations, Exhibits, and Door Prizes. Mini-mines for children to dig in and get free fossils and minerals.

Over 20 Dealers with Fossils, Minerals, Crystals and Gems for sale.

Use Parking lot A, enter Lot A from Nottaway River Lane.
Look for our Courtesy Shuttle to Mineral Show

Note: ***Print out this page and bring it with you to the show for the discount!***

Participating Dealers

Arrowwood Minerals—Richard and Mary Ann Ertel, Lexington, VA

Alan's Quality Minerals—Alan Benson, Mt. Laurel, NJ

John Culberson—Minerals, Arlington, VA

Jon Ertman—Minerals, Rockville, MD

Bob Farrar—Minerals and fossils, Bowie, MD

Geosol Imports—Rob Evans, Hawley, PA

Harsteins Fossils—Gene Hartstein, Newark, DE

David Hennessey—Minerals, Woodbridge, VA

George Loud—Minerals, Hilton Head, SC

Jan Minerals—Jehan Sher, Stafford, VA

KBT Minerals & Fossils—Tom Taaffe, Vienna, VA

John Kress—Minerals, Falls Church, VA

The Mineral House—Tom and Pam Kottyan, Bucyrus, OH

The Prospector Shop—Marrianne Cannon, Ligonier, PA

Barry Remer—Minerals, Reston, VA

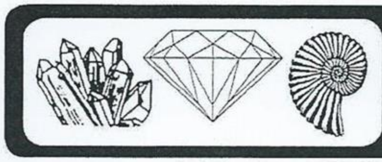
Mike Shoemaker—Minerals, Manassas, VA

Wayne Sukow—Minerals, Fairfax, VA

Yinan Wang—Fossils, Meteorites, Arlington, VA

Williams Minerals—Keith Williams, Rio, WV

Zembla Minerals—Casper Voogt, Sterling, VA



24th Annual GEM, MINERAL AND FOSSIL SHOW

Presented by The Northern Virginia Club, Inc. www.novamineralclub.org
Sponsored by the Dept. of Atmospheric, Oceanic and Earth Sciences at GMU

Date: November 21 & 22, 2015

Place: The Hub Ballroom (Student Union II Bldg)
George Mason University Campus
Braddock Rd. & Route 123, Fairfax, VA

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

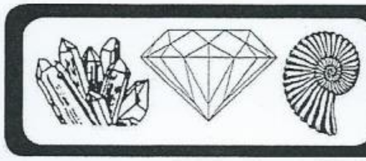
Admission: Adults: $6, Seniors: $4, Teens (13-17): $3
Children 12 & under, Scouts in uniform, and GMU Students w/valid ID are FREE.

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

Demonstrations, Exhibits, and Door Prizes. Mini-mines for children to dig in and get free fossils and minerals.

Over 20 Dealers with Fossils, Minerals, Crystals and Gems for sale.

Use Parking lot A, enter Lot A from Nottaway River Lane



24th Annual GEM, MINERAL AND FOSSIL SHOW

Presented by The Northern Virginia Club, Inc. www.novamineralclub.org
Sponsored by the Dept. of Atmospheric, Oceanic and Earth Sciences at GMU

Date: November 21 & 22, 2015

Place: The Hub Ballroom (Student Union II Bldg)
George Mason University Campus
Braddock Rd. & Route 123, Fairfax, VA

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

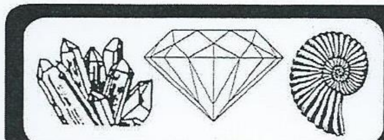
Admission: Adults: $6, Seniors: $4, Teens (13-17): $3
Children 12 & under, Scouts in uniform, and GMU Students w/valid ID are FREE.

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

Demonstrations, Exhibits, and Door Prizes. Mini-mines for children to dig in and get free fossils and minerals.

Over 20 Dealers with Fossils, Minerals, Crystals and Gems for sale.

Use Parking lot A, enter Lot A from Nottaway River Lane.
Look for our Courtesy Shuttle to Mineral Show



24th Annual GEM, MINERAL AND FOSSIL SHOW

Presented by The Northern Virginia Club, Inc. www.novamineralclub.org
Sponsored by the Dept. of Atmospheric, Oceanic and Earth Sciences at GMU

Date: November 21 & 22, 2015

Place: The Hub Ballroom (Student Union II Bldg)
George Mason University Campus
Braddock Rd. & Route 123, Fairfax, VA

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

Admission: Adults: $6, Seniors: $4, Teens (13-17): $3
Children 12 & under, Scouts in uniform, and GMU Students w/valid ID are FREE.

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

Demonstrations, Exhibits, and Door Prizes. Mini-mines for children to dig in and get free fossils and minerals.

Over 20 Dealers with Fossils, Minerals, Crystals and Gems for sale.

Use Parking lot A, enter Lot A from Nottaway River Lane.
Look for our Courtesy Shuttle to Mineral Show

24th Annual GEM, MINERAL AND FOSSIL SHOW

Presented by The Northern Virginia Club, Inc. www.novamineralclub.org
Sponsored by the Dept. of Atmospheric, Oceanic and Earth Sciences at GMU

Date: November 21 & 22, 2015

Place: The Hub Ballroom (Student Union II Bldg)
George Mason University Campus
Braddock Rd. & Route 123, Fairfax, VA

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

Admission: Adults: $6, Seniors: $4, Teens (13-17): $3
Children 12 & under, Scouts in uniform, and GMU Students w/valid ID are FREE.

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

Demonstrations, Exhibits, and Door Prizes. Mini-mines for children to dig in and get free fossils and minerals.

Over 20 Dealers with Fossils, Minerals, Crystals and Gems for sale.

Use Parking lot A, enter Lot A from Nottaway River Lane.
Look for our Courtesy Shuttle to Mineral Show
Look for our Courtesy Shuttle to Mineral Show

Upcoming Events
(of interest in the mid-Atlantic region)

November

4: PBS TV—"Making North America: Origins"; Dr. Kirk Johnson, Sant Director, Smithsonian National Museum of Natural History; 9 p.m.; info: pbs.org/nova.

7–8: Oaks, PA—Gemarama 2015: Rocks in the USA; Tuscarora Lapidary Society; Sat 10–6, Sun 10−5; Hall C, Greater Philadelphia EXPO Center; info: www.lapidary.org.

7–8: Lancaster, PA—Symposium and field trip; Friends of Mineralogy—Pennsylvania Chapter; Hackman Physical Sciences Bldg, Franklin and Marshall College; Saturday symposium on recent advances in mineralogy, five presentations; Sunday field trip, details to follow; registration: nonmembers $25, members $15, students w/ID free; register in advance at http://www.rasloto.com/FM/; info: Joe Marchesani, 609-433-5129, Jmarch06@comcast.net.

11: PBS TV—"Making North America: Life"; Dr. Kirk Johnson, Sant Director, Smithsonian National Museum of Natural History; 9 p.m.; info: pbs.org/nova.

18: PBS TV—"Making North America: Humans"; Dr. Kirk Johnson, Sant Director, Smithsonian National Museum of Natural History; 9 p.m.; info: pbs.org/nova.

21–22: Fairfax, VA—24th Annual Gem, Mineral, and Fossil Show; cosponsors: Northern Virginia Mineral Club & George Mason University's Department of Atmospheric, Oceanic, and Earth Sciences; George Mason University, The Hub Ballroom, Rte 123 & Braddock Rd, Fairfax, VA; Sat 10–6, Sun 10–4; adults $6, seniors $4, teens (13–17) $3, 12 and under free, Scouts in uniform & students w/ID free; info: http://www.novamineralclub.org/events/2015-show.

21–22: West Palm Beach, FL—49th Annual Gem, Mineral, Jewelry, Bead and Fossil Show; Gem & Mineral Society of the Palm Beaches; South Florida Fairgrounds Expo Center East, 9067 Southern Blvd., West Palm Beach, FL; Sat 9–6, Sun 10–5; adults $9, children under 12 free, free parking; info: Jeff Slutzky, 560-585-2080, show@gemandmineral.cc

27–29: Salem, VA—36th Annual Roanoke Valley Mineral & Gem Society Show; Salem Civic Center, 1001 Boulevard, Salem, VA; Fri 2–7, Sat 10–6, Sun 12–5; 3-day ticket $4, under 16 free, free parking; info: CKWLT@aol.com

December

5–6: Miami, FL— Gem, Jewelry, Mineral, and Fossil Show; Miami Mineralogical and Lapidary Guild; Evelyn Greer Park, 8200 SW 124 Street, Pinecrest, FL, just one block off US 1; Sat/Sun 10–5; adults $4, children under 12 free, free parking; info: www.miamigemandmineral.com.

February

19–21: Indianapolis, IN—GeoFest: 14th Annual Indiana State Museum Fossil, Gem and Mineral Show; Fri/Sat 10–5, Sun 11–4; museum admission: adults $13, seniors $12, children $8.50; info: Peggy Fisherkeller, 650 West Washington Street, Indianapolis, IN 46204; 317-232-7172; pfisherkeller@indianamuseum.org; Website: www.indianamuseum.org.

March

5–6: Newark, DE—53rd Annual Earth Science Gem and Mineral Show; Delaware Mineralogical Society, Inc.; Delaware Technical and Community College, 400 Stanton-Christiana Road, Newark, DE (I-95 Exit 4B); Sat 10–6, Sun 11–5; adults $6, seniors $5, kids 12–16 $4, 11 and under free; info: www.delminsociety.org or contact gene@fossilnut.com or call Wayne Urion at 302-998-0686.

19–20: Sayre, PA—47th Annual Che-Hanna Rock & Mineral Club show; Athens Twp. Volunteer Fire Hall, 211 Herrick Ave; Sat 9–5, Sun 10–4;. info: Bob McGuire at 570-928-9238 or uvbob@epix.net.

April

2–3: Orange, CT—43rd Annual Show 2016, Minerals, Gems, Jewelry & Fossils; New Haven Mineral Club; Sat 9:30–5, Sun 9:30–5; Amity Regional Middle School, Sheffield Rd (off Rt 34), Orange, CT. Adults $5, children under 12 free when accompanied by an adult; info: newhavenmineralclub.org.

THE NORTHERN VIRGINIA MINERAL CLUB INC

Crystals are the flowers of the Mineral Kingdom

2015 Club Officers

President: Wayne Sukow
d8olite@fastmail.fm
Vice-President: Kathy Hrechka
kshrechka@msn.com
Secretary: Dave MacLean
dbmaclean@maclean-fogg.com
Treasurer: Rick Reiber
mathfun34@yahoo.com
Field Trip Chair: Ted Carver
jtcarve@msn.com
Webmaster: Casper Voogt
webmaster@novamineralclub.org
Communications: Jim Kostka
jkostka@juno.com
Editor: Hutch Brown
hutchbrown41@gmail.com
Show Co-Chair: Tom Taaffe
rockcllctr@aol.com
Show Co-Chair: Jim Kostka
jkostka@juno.com
Greeter/Door Prizes: Ti Meredith
ti.meredith@aol.com

PLEASE VISIT OUR WEBSITE AT:
http://www.novamineralclub

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:
Kenny Loveless, Treasurer, NVMC
PO Box 10085, Manassas, VA 20108

OR

Bring your dues to the next meeting.

Purpose: To promote and 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, 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, November, 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.*