THE NORTHERN VIRGINIA MINERAL CLUB INC

The Mineral Newsletter

Meeting: January 26 Time: 7:45–9:00 p.m.

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

Winter 2015—

Happy New Year!

Volume 56, No. 1
January 2015
You can explore our club website:
http://www.novamineralclub.org/

Northern Virginia Mineral Club members,

Please join our January 26 speaker, Mike Wise, for dinner at the Olive Garden 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 my cell at 703-407-5393 or kshrechka@msn.com.

Dr. Michael Wise, Smithsonian

Granitic Pegmatites: Patterns of Distribution—A Global Perspective

January 26 Program

Dr. Michael Wise has agreed to join us again for another sterling presentation on pegmatites! Mike is a geologist in the Department of Mineral Sciences at the Smithsonian Institution's National Museum of Natural History. He has been studying pegmatites all over the world for the past 30 years.

Mike's research focuses on the chemistry of rare minerals to understand how pegmatites form and evolve. These same rare minerals can also be used to help locate potential new deposits of economic significance. Mike's research has included studies of pegmatites in the New England states, California, Colorado, Nevada, North Carolina, and Virginia. He has

Pegmatitic granite. Note the relatively large crystals. Source: Wikipedia.

NVMC members:

If you have not yet paid your annual dues, now is the time! You can use the form on page 17.

also visited sites with pegmatites in Brazil, Canada, the Czech Republic, Italy, Madagascar, and Namibia.

Mike is heavily involved in managing the Smithsonian's Gem and Mineral Collections. He is also very active in the museum's education and outreach.

The Prez Sez … Balance!

by Wayne Sukow

BALANCE is an important word in the sciences—and also in mineral and lapidary club programs.

What do I mean? Using an extensive scientific vocabulary in a presentation to a club, with little explanation, would frustrate the amateur listener; whereas using a simpler vocabulary with lengthy explanations would bore the professional. Accordingly, a good program for a club meeting has … *balance*. Similarly, a healthy mineral and lapidary club balances the activities that the club sponsors and engages in.

Does that describe the NVMC? Or perhaps I should say your club, since without "all youse" participating, we have no club. In strong and active clubs, members are always balancing their enjoyment of what others contribute against their own contributions—against a willingness to volunteer, including being a club officer. Does that describe your club?

I've always been interested in knowing whether members of mineral and lapidary clubs balance their learning about geology, mineralogy, petrology, crystallography, etc., during club programs against self-learning at home. Do you?

From my own reading at home, I have learned that, in 1833, the Scotsman Charles Lyell stated that "a geologist should be well versed in chemistry, natural philosophy, mineralogy, zoology, comparative anatomy, botany; in short, in every science relating to organic and inorganic nature;" also, "In each of these physical sciences, knowledge and understanding is obtained (and retained) most successfully by direct observation of natural phenomena. Similarly, the science of geology has its basis in the study of rock exposures and geologic processes" (to read the account yourself, see http://en.wikipedia.org/wiki/Charles_Lyell).

In another account, James Hutton (June 1726–March 1797), yet another geologist from Scotland (see http://en.wikipedia.org/wiki/James_Hutton), "is credited as being the originator of one of the fundamental principles of geology—which explains the features of the Earth's crust by means of natural processes over geologic time. Hutton's work established geology as a proper science, and thus he is often referred to as the 'Father of Modern Geology.'"

What have you learned recently by reading about geology, mineralogy, petrology, crystallography, etc.? What have you learned about the Eastern Federation of Mineral and Lapidary Societies by reading the EFMLS newsletters? Who's ready to report, at the January 2015 NVMC meeting, on one of the committees or activities of the EFMLS? Let me know and I'll place it on the agenda for the meeting.

Your Prez

In this issue …

Holiday party ..... p. 3
Fred Schaefermeyer Scholarship Fund ... p. 5
Birthstones ..... p. 5
New AFMS President ..... p. 7
EFMLS: Wildacres spring registration ..... p. 7
Smithsonian dinosaur exhibit ..... p. 8
Virginia's Natural Bridge ..... p. 9
Olivine: Global warming solution? ..... p. 11
Natural Bridge photos ..... p. 12
Mineral springs ..... p. 13
Upcoming events ..... p. 16
Membership application ..... p. 17

Wanted!

Your expertise with QuickBooks!

Are you a bookkeeper? Do you have experience with QuickBooks? Can you help the NVMC Treasurer learn all the ins and outs? Can you help us set up and sort the accounts? Are you available to help audit the books?

If you can help, please contact Kenny Loveless at kenny53@verizon.net or Rick Reiber at math-fun34@yahoo.com.

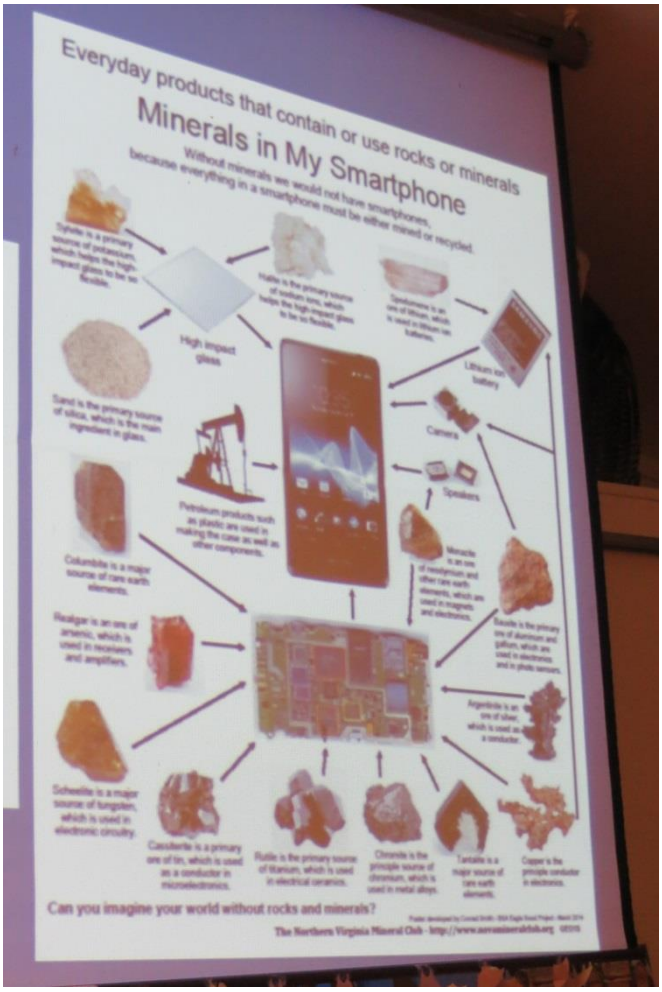
Club Meeting and Holiday Party
December 15, 2014

by Ti Meredith, Secretary

*P*resident Wayne Sukow called the meeting to order at 7 p.m. at the Long Branch Nature Center in Arlington, VA. The Micromineralogists of the National Capital Area joined the Northern Virginia Mineral Club for the festivities; the center was all decked out for the joint club holiday party, and we even had a geology tree.

Door Prizes

Matt Charsky, Sue Marcus, Ti Meredith, and Steve Smith brought door prizes for the holiday party. The prizes included a geology map, minerals, quartz, poinsettias, two Christmas trees, and posters of minerals from Pennsylvania and the Smithsonian.



Top: Logan Babcock and Kathy Hrechka showing slides of the November GMU club show. Right: Wayne Sukow presenting Lois Dowell with the President's Award for outstanding service. Above: Pat Flavin presenting Kathy Hrechka with a shark's tooth necklace. Left: One of the many educational posters on geology created by Conrad Smith for his Eagle Scout project. Photos: Ti Meredith.

Door prize winners included Nerine Clemenzi, Robert Clemenzi, Jeff Guerber, Roger Haskins, Lewis Holt, Jim Kostka, Karen Lewis, Sue Marcus, Ti Meredith, Bill Oakley, Toni Petruzzi, Rick Reiber, Sheryl Sims, and Linda Smith.

Member Appreciation

The NVMC expressed its deep appreciation to the dozens of volunteers who helped out at the GMU club show in November. Show Co-Chair Jim Kostka passed out certificates of appreciation to volunteers.

Kathy Hrechka, Jim Kostka, and Logan Babcock presented a slide show on the GMU club show. Kathy thanked a number of people in particular, including Dr. Julie Nord and the associate professors in GMU's Department of Atmospheric, Ocean, Earth Sciences and Tony Petruzzi for his help with the Boy Scouts. The slide show reflected the presence of the many vendors at the show, along with the many superheroes who were there to help out.

Gerry Cox spoke about the Wildacres program, which she participated in again this year. Mike Kaas, Logan Babcock, and Conrad Smith talked about Conrad's Eagle Scout project creating geology posters for educating Cub Scouts. In addition to Cub Scouts, Girl Scouts participated in the ballroom learning area at the GMU club show.

Pat Flavin presented Kathy Hrechka with a shark's tooth necklace in appreciation of her steady attendance at field trips for the past 3 years, especially the ones that Pat leads to Chesapeake Bay.

President Wayne Sukow bestowed the President's Award upon Karen Lewis and Lois Dowell for their longstanding dedication and service to our club.

Business

Both clubs elected board members for the coming year. For the NVMC, the results were as follows:

President..... Wayne Sukow
Vice-President..... Kathy Hrechka
Treasurer ..... Rick Reiber
Secretary ..... Dave MacLean

The NVMC budget for 2015 will be presented in January or February.

Party

At 8 p.m., the business meeting was adjourned and the party began, along with lots of great food.

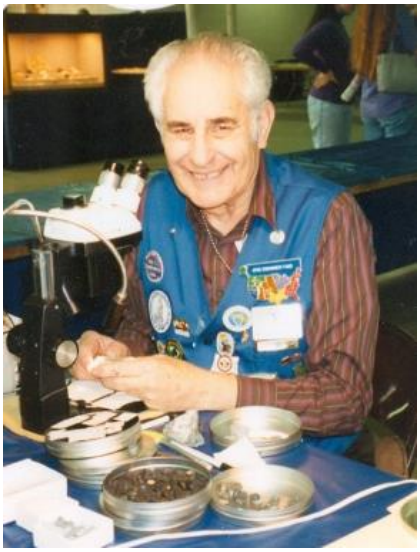
People brought presents related to our hobby to exchange. Items left over will become door prizes at the club's January meeting.

Kathy Hrechka introduced club members to Geology Bingo, with prizes from Cynthia Payne's collection. Everyone agreed that the party was a great success!

Thanks to Sheryl Sims for so many great photos!

Fred Schaefermeyer Scholarship Fund
January 2015 Update

by Kathy Hrechka, Vice-President



Fred Schaefermeyer in 1988. Photo: Kathy Hrechka.

When Peter Chin was president of our club, he introduced the idea of a scholarship program in the name of Fred Schaefermeyer. Fred became a member in 1982 and served in most club offices. He also chaired the EFMLS and the AFMS. Fred valued teaching youth about geology.

According to minutes from the NVMC meeting on March 23, 2009, Tom Tucker moved "that as long as funds in the Schaefermeyer Scholarship Fund permit, the club make annual 'grants' in the amount of $250 to a deserving student who is studying a specific mineral-related topic at James Madison University. This student will be selected by Dr. Lance Kearns, Professor of Mineralogy at the university. The recipient will be invited to present the results of their study as a club program or as an article in the newsletter." The motion was seconded. Discussion included dropping the professor's name. The motion was carried.

According to minutes from the NVMC meeting on September 26, 2011, Kathy Hrechka made a motion to provide junior members with access to scholarships in the amount of $100. Discussion resulted in a decision to ask interested junior members to complete an application form to receive a scholarship, for review by club officers. Kathy designed an application, which is available to junior members.

In 2013, we extended the $250 grants to deserving students at George Mason University, asking Dr. Julia Nord to recommend students for the grants. We also asked Dr. Shelly Jaye at Northern Virginia Community College in Annandale to submit names of students worthy of these funds.

As of January 1, 2015, the Fred Schaefermeyer Scholarship Fund had a total $1,700. Proceeds from our two club auctions each year and from the auction at our annual GMU mineral show go into the fund. We also accept personal donations.

Fred will celebrate his 96th birthday on January 28 together with his companion Muriel in Colorado. We continue to thank Fred for his investment in our club, and we wish him a happy birthday and many happy years to come!

The Meaning of Birthstones

by Victor Epand

Editor's note: The article is adapted from Star-O-Lite *(newsletter of the Augusta Gem and Mineral Society Inc., Augusta, GA), February 2013, p. 5. The author is an expert consultant for EngagementRing.info.*

Throughout the ages, people have revered gemstones as beautiful and even magical. In fact, some people used to believe that gemstones carried mystical powers and that each gemstone could bestow these powers to its wearer. For instance, a blue sapphire implied that the wearer was cool under pressure, whereas a red ruby meant that the wearer was passionate and fiery.

Modern Birthstone List

Eventually, people began to relate certain gemstones to zodiac signs or months of the year. People born in a particular month were thought to possess qualities resembling those of the gemstone—or "birthstone"—associated with it.

But what birthstones were associated with what months? For some months, different birthstones competed for public acceptance.

Round star ruby, July birthstone on the Modern Birthstone List and Capricorn birthstone on the Star Sign Stone Chart. Origin: Myanmar; source: Gemdat.com.

Sapphires, September birthstone on the Modern Birthstone List and Taurus birthstone on the Star Sign Stone Chart, come in every color but red (rubies). Origins: Sri Lanka (top); Thailand (bottom). Source: Gemdat.com.

In 1912, the American National Association of Jewelers issued the Modern Birthstone List for the United States (other countries have different lists):

- January—garnet
- February—amethyst
- March—aquamarine
- April—diamond
- May—emerald
- June—pearl
- July—ruby
- August—peridot
- September—sapphire
- October—opal
- November—yellow topaz
- December—blue topaz

Other Birthstone Traditions

There are also traditional birthstones, mystical birthstones, and Ayurvedic birthstones. Traditional birthstones, sometimes added to the Modern Birthstone List, reflect birthstone traditions heralding back to the 15th century. There is no standard list.

The mystical birthstone list is of Tibetan origin, going back a thousand years. The list of Ayurvedic birthstones comes from Ayurvedic medicine in India, a type of medicine used for over a thousand years.

The Star Sign Stone Chart offers a different slant, connecting birthstones with signs of the zodiac:

- Capricorn (Dec. 22–Jan. 19)—ruby, agate, garnet
- Aquarius (Jan. 20–Feb. 18)—garnet, moss agate, opal, amethyst
- Pisces (Feb. 19–Mar. 20)—rock crystal (clear quartz), sapphire, amethyst, bloodstone
- Aries (Mar. 21–Apr. 19)—bloodstone, diamond
- Taurus (Apr. 20–May 20)—sapphire, turquoise, amber, blood coral, emerald
- Gemini (May 21–Jun. 20)—agate, chrysoprase, pearl
- Cancer (Jun. 21–Jul. 22)—emerald, moonstone, pearl, ruby
- Leo (Jul. 23–Aug. 22)—tourmaline, sardonyx, onyx
- Virgo (Aug. 23–Sep. 22)—jasper, carnelian, jade, sapphire
- Libra (Sep. 23–Oct. 22)—opal, lapis lazuli, peridot
- Scorpio (Oct. 23–Nov. 21)—aquamarine, topaz
- Sagittarius (Nov. 22–Dec. 21)—sapphire, amethyst, turquoise, topaz

Personal Stones

Gemstones can affect our lives. Many forces and vibrations flow about us all the time, and gems—which are nothing but minerals—have a peculiar ability to concentrate these powers or forces in our lives.

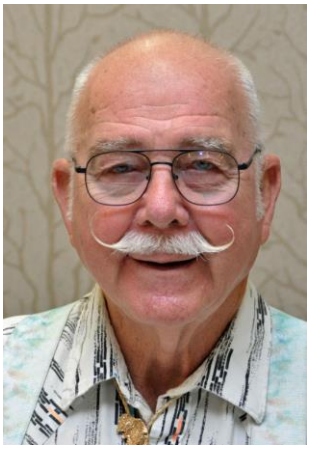
The forces have energy that can be positive or negative, so choosing the right stone can have a positive influence on your life, bringing good luck. Sometimes, you might need more than one stone for the luck you need.

As our lives change, our vibrations change, so gemstones might work differently for you at different times of your life. The best way to know what gemstone will be lucky for you is to hold it in your hand. Choosing the right stone is key, whether it is precious or semiprecious.

Your personal stone might be associated with a zodiac sign or a birth month, or it might be a family heirloom—or maybe just your favorite color. A personal stone can be anything you want, as long as your feeling for the stone is deep.

Chrysoprase, not on the Modern Birthstone List, but the birthstone for Gemini on the Star Sign Stone Chart. Origin: Tanzania; source: Gemdat.com.

A Word from the New AFMS President



by Marion Roberts

Editor's note: The article is adapted from A.F.M.S. Newsletter *(November 2014), p. 2.*

Greetings! As the new AFMS President, allow me to introduce myself to you. I served as President of the California Federation of Mineralogical Societies in 2005 and have been director of the CFMS lapidary and jewelry "camps" for several years. I've also served as AFMS 4th and 1st Regional Vice-President; last year, I was your President-elect.

I am very competitive in almost everything I do. My major competitor is me; I always want to improve, even if the result is only minutely better. My hobbies include all areas of lapidary, woodwork and wood turning, building replicas of old sailing ships, and bowling.

I worked as a maintenance mechanic for most of my working years. I retired on doctor's orders in 1992 and became busier than ever before.

For a long time, I have felt that intercommunication within our associations is lacking in a major way. I know that this is a subject that has been emphasized many times before, but I am hoping that it will improve with different people and an approach that I have not seen used before—or maybe it has been, but before my time.

First, I am asking all of our AFMS Regional Vice-Presidents to initiate contact with their respective committees at least twice within their terms in office. I am asking them to encourage their chairpersons to contact the regional federation chairs of their committees to find out what's going on and to share information about the AFMS program that they are responsible for.

If there is no other accomplishment, just familiarity can bring understanding and possible usable information for the committees. Much of this contact information needs to be relayed to myself and the President-elect. The incoming President will be able to use this to help compose his or her committees, which is a large project in that we are dealing clubs and individuals across the entire United States and with four time zones.

In closing, I want to commend the Tulsa Society and outgoing AFMS President Richard Jaeger for hosting an excellent AFMS show in 2014, including a great competitive area and meetings held in a very efficient manner.

Until next month,

Marion

Wildacres Spring Registration Now Open!

by Steve Weinberger

Editor's note: The article is adapted from EFMLS News *(December 2014), p. 1.*

The speakers for our 2015 EFMLS Workshops at Wildacres have been confirmed! Bob Jones, Senior Editor for *Rock & Gem Magazine*, will be with us in the spring. Dates for spring are Monday, May 18, to Sunday, May 24. Fall session dates are not yet set.

The fee for our 2015 sessions will remain the same as last year—$390 per person. This includes room and board, gratuity for the Wildacres staff, six talks by our outstanding speaker-in-residence, and class registration. What a deal!

Imagine a week in the mountains of North Carolina away from all the hustle and bustle. Imagine a week immersed in our hobby, whether it's jewelry, lapidary, or minerals. Imagine a week of no cooking, cleaning, running errands, or blaring TV. Imagine six fabulous talks by Bob Jones!

Best of all, imagine a fun-filled week with an auction, a field trip, a day set aside for you to explore the area (Asheville, NC, is but an hour away), and much, much more!

For a complete list of available spring classes, see http://www.efmls-wildacres.org/. Or check out the December 2014 EFMLS newsletter, page 7, at http://www.amfed.org/efmls/efdec14web.pdf. A registration form is on page 8.

The experience of an EFMLS Wildacres workshop is one you won't want to miss! Register early to get the classes you want.

Smithsonian Dinosaur Exhibition

Submitted by Sue Marcus; adapted from Maria del Carmen Cossu, Senior Volunteer and Visitor Experience Coordinator, National Museum of Natural History, Smithsonian Institution.

I am happy to share with all of you that we have successfully opened the Natural History Museum's newest exhibition, "The Last American Dinosaurs: Discovering a Lost World"—much to the relief of dinosaur-starved children and adults the world over! The 5,400-square-foot exhibit is located on the museum's second floor at the rear of the Osteology Hall (previous location of "Written in Bone").

The exhibition tells the story of the final days of the late Cretaceous ecosystem in what is now Montana and the Dakotas, preserved in the famous Hell Creek Formation. It takes us back 66 to 68 million years, to the time just before an enormous asteroid impact drastically altered Earth's flora and fauna.

Visitors explore some key questions: What made up the ancient Hells Creek ecosystem? How did life reboot after such a cataclysmic event? The exhibition features Triceratops, Tyrannosaurus rex, and other fossils from our museum's collections—many on view for the very first time! Visitors get an insight into the late Cretaceous world and discover how the world responds to dramatic change.

A 42-foot-wide mural by Mary Parrish, developed in collaboration with many experts from our Paleobiology department, reconstructs the temperate Hell Creek ecosystem. Also featured are a relocated working FossiLab; videos and 3D animations; previews of the museum's new Fossil Hall (under construction); and a vintage arcade-style videogame called "How to Become a Fossil," developed by our paleontologists in the1980s. The exhibition's vibrant graphics and work-in-progress design show how science, too, is a constantly evolving work in progress. The exhibition team is led by curator Hans Sues and co-curator Kay Behrensmeyer.

We are also pleased to announce that we have 40 new and enthusiastic volunteers who have trained with the curators and exhibition specialists to engage visitors in this exciting exhibition. Welcome to all the Last American Dinosaurs exhibition volunteers!

The exhibition, funded with support from David H. Koch, is expected to run until 2018 while the new Fossil Hall is under construction. Please take time to visit the exhibition! And get the inside scoop as our museum scientists and experts blog about behind-the-scenes stories associated with the exhibition at http://www.mnh.si.edu/fossil-hall/last-american-dinosaurs/blogs.cfm

Museum artists Mary Parrish (right) and Eleonore Dixon-Roche stand before a mural depicting the ancient Hell Creek ecosystem.

The Rocks Beneath Our Feet
Virginia's Natural Bridge

by Hutch Brown, Editor

More than 200 feet tall and 90 feet wide, Virginia's Natural Bridge is stunning. In American Indian lore, an epic battle took place on the bridge, with Monacans (a Siouan-speaking people from the Virginia interior) defeating pursuing Powhatans (Algonquians, the people of Pocahontas from the Coastal Plain).

Frontiersman John Howard first described the bridge to colonists in 1742 after exploring southwestern Virginia under commission from colonial Governor William Gooch. George Washington is said to have surveyed the bridge, and Thomas Jefferson acquired it, calling it "the most Sublime of nature's works."

Regarded as one of the Seven Natural Wonders of the World, the bridge was frequented in the 18th and 19th centuries by visitors who marveled over its mysterious origins. The creek flowing under the bridge seems to have tunneled through the rock, but water is known to go around such obstacles, not through them.

So what created the bridge?

Ancient Seas

Natural Bridge is located in aptly named Rockbridge County, in the southern part of the Great Appalachian Valley in Virginia. It bridges Cedar Creek, a stream that flows southeastward across the valley and under Natural Bridge before emptying into the James River. The James flows northeast along the base of the Blue Ridge before joining the Maury River at the James River water gap through the Blue Ridge.

Arrow shows the approximate location of Natural Bridge in the Great Appalachian Valley on a small tributary of the James River. Source: Fichter and Baedke (1999).

Natural Bridge, *a painting by Frederic Edwin Church (1852). Virginia's Natural Bridge fired the imagination of Romantic-era artists. Source: Wikipedia.*

The Great Appalachian Valley reaches from Alabama through Virginia to Vermont. It is made up of sedimentary rock, much of it carbonate (limestones and dolomites) formed from bits of decomposing sea life laid down in ancient seas.

Accordingly, Natural Bridge is made up of limestone and dolomite. Dolomite forms when magnesium ions replace calcium ions in limestone (calcium carbonate, or $CaCO_3$), turning it into calcium magnesium carbonate ($CaMg(CO_3)_2$). They appear quite similar.

In Rockbridge County, the Great Valley narrows to 12 miles wide or less. Typical for the Valley and Ridge Province, the landforms range from southwest to northeast. Cedar Creek forms in hills to the north of the James River and flows northeast between sandstone ridges before abruptly turning south and descending into the James River valley. When it reaches carbonate rock, it carves a gradually deepening gorge with walls up to 200 feet high before flowing under Natural Bridge and into the James River.

Why the Cedar Creek gorge? And what does it have to do with Natural Bridge?

Underground Stream

Streams are typically at ground water level. Springs form where the water table reaches the surface, and ground water feeds the growing streams. When the water table sinks, the streams dry up—or go underground. Over time, Cedar Creek apparently went underground (fig. 1). The reason has to do with how water affects carbonate rock.

Rainwater becomes slightly acidic as it passes through decaying organic matter in the soil. The acidic water transforms limestone, creating a calcium bicarbonate that easily dissolves in water.

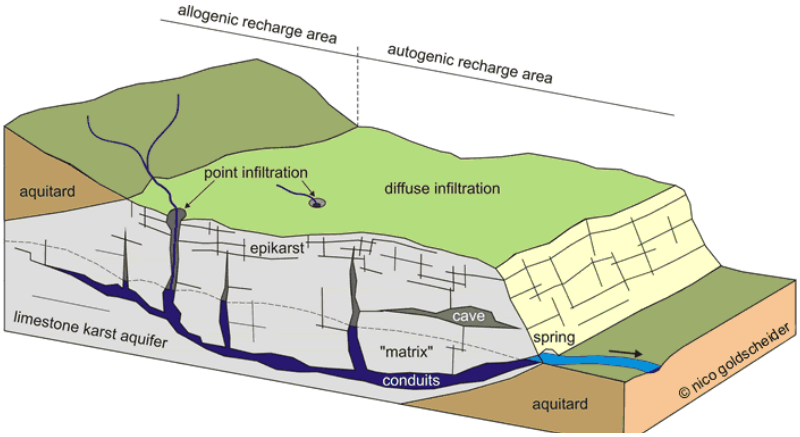
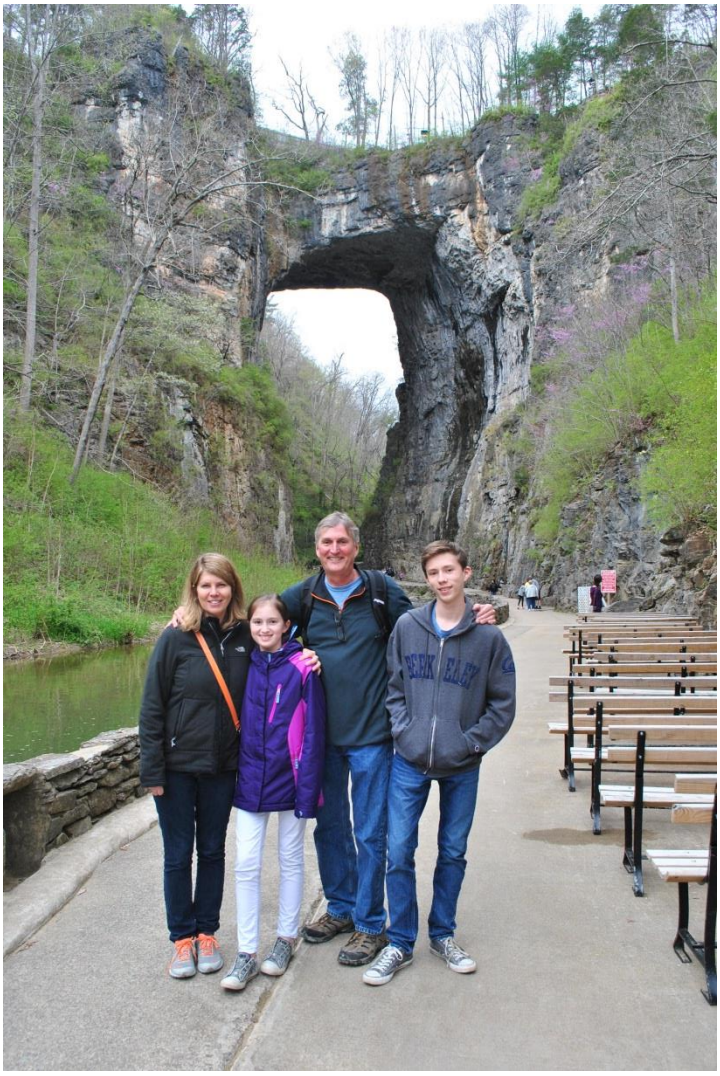


Figure 1—*Graphic illustration of topography similar to that in Virginia's Rockbridge County. Headwaters drain onto carbonate rocks, where erosion forms underground passages. As the water table drops, the stream drops with it, widening the passages. Further erosion leaves dry caves, and the stream finally emerges from a cave far from its original source. Source: IAH (2013).*



The author and family at Natural Bridge in April 2014.

Over hundreds of millions of years, the carbonate formations around Cedar Creek were exposed to precipitation. The carbonate rock, fractured by folding and faulting during the mountain-building event that shaped the Blue Ridge Mountains, formed cracks and seams that were easily penetrated by acidic water.

As the water seeped into the rock, it formed tiny underground channels that grew over time into caves. The surrounding rock supported the weight of the overlying sediments and allowed the caves to grow into caverns. As the rock gradually dissolved, the ground water dropped to lower levels, leaving dry caves above (fig. 1), such as those exposed at Luray Caverns and elsewhere in the Great Valley.

A karst topography took shape, with springs, sinkholes, and caves. (*Karst* is the German word for a limestone plateau near Trieste, Italy, once part of the Austrian Empire.) As the water table dropped, it took Cedar Creek with it deeper underground. The flowing water took the course of least resistance, emerging from a spring at Natural Bridge.

Over time, Cedar Creek widened its passageways into a series of caverns with an opening at Natural Bridge. As water ate away at the overlying carbonate rock, the roof gradually gave way, forming sinkholes that expanded over time and connected into chasms—until only Natural Bridge remained.

All that was left of the ancient caverns was a rubble-filled chasm drained by Cedar Creek. As the creek continued to gouge its channel, the valley floor eroded faster than the surrounding walls, deepening the Cedar Creek gorge.

A Complicated Story

The story of Virginia's Natural Bridge is long and complex. It began with carbonate sediments laid down in ancient seas about 460 million years ago, when what is now Virginia was completely under water. It continued with mountain-building episodes that buckled, fractured, and moved the carbonate rocks, placing them where we see them today in the Great Valley. And it culminated in the karst-forming and erosional processes that left Natural Bridge as a remnant of ancient caverns formed by Cedar Creek.

Natural Bridge is well worth a visit. But if you go there, don't just admire the view of the arch, spectacular as it is. Hike up Cedar Creek and discover the gorge, imagining what it might have looked like when it was still underground.

And visit the nearby caverns. They are not the grandest in Virginia, but they will give you some idea of the area's karst topography—and what Natural Bridge might have been like millions of years ago.

Sources

Bentley, C. 2013. Natural Bridge, Virginia. Mountain Beltway blog. 22 August. http://blogs.agu.org/mountainbeltway/2013/08/22/natural-bridge-virginia/.

Fichter, L.S.; Baedke, J.K. 1999. The geological evolution of Virginia and the mid-Atlantic region. Harrisonburg, VA: College of Science and Mathematics, James Madison University. http://csmres.jmu.edu/geollab/vageol/vahist/A-Protero.html.

IAH (International Association of Hydrologists). 2013. About karst hydrogeology. http://karst.iah.org/karst_hydrogeology.html.

Spencer, E.W. 1968. Geology of the Natural Bridge quadrangle, Virginia. Rep. of Investig. 13. Charlottesville, VA: Virginia Division of Mineral Resources.

Wilkes, G.P.; Spencer, E.W.; [and others]. 2007. Geology of Rockbridge County, Virginia. Virginia Div. of Min. Res. Pub. 170. Charlottesville, VA: Virginia Division of Mineral Resources. http://www.dmme.virginia.gov/commercedocs/PUB_170.pdf.

Olivine: Global Warming Solution?

by Hutch Brown, Editor

In a front-page article in the *New York Times* ("Climate Tools Seeking to Take Nature in Hand," 11/10/14), I discovered a story on the potential use of minerals to address climate change.

Since 1990, scientists and engineers have been exploring the feasibility of using minerals that react with carbon dioxide to capture excess carbon from the atmosphere and store it in solid form: as carbonate minerals that will remain stable for thousands or even millions of years.

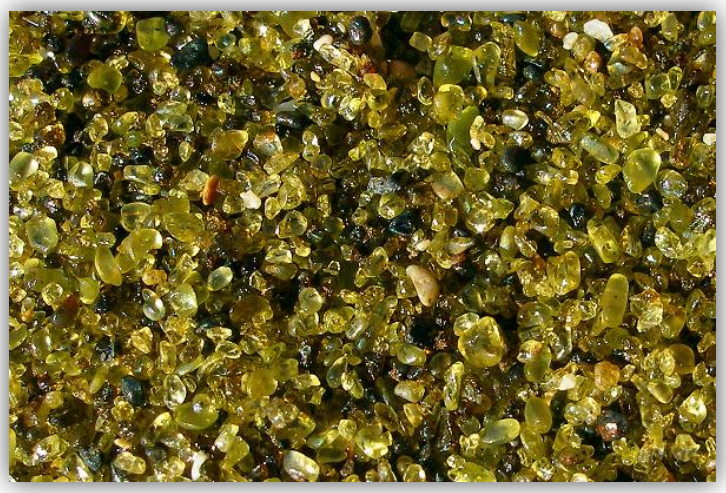
The mineral olivine (Mg_2SiO_4) has been the focus of most research. Olivine forms the carbonate mineral magnesite ($MgCO_3$) by reacting with carbon dioxide:

$$Mg_2SiO_4 + 2CO_2 = 2MgCO_3 + SiO_2 \text{ (quartz)}$$

Olivine is abundant and rich in magnesium, and it reacts readily with carbon dioxide because it is far from equilibrium with the atmosphere and surface waters. Crushed to maximize its surface area and corresponding weathering rate—and then spread over oceans and beaches—olivine might one day help reduce the effects of global warming.

"Green" beaches? There already is at least one green sand beach in Hawaii!

For more information from a scientific source, go to: https://www.ldeo.columbia.edu/gpg/projects/carbon-sequestration.



Olivine sand eroded from lava, at Papakolea Beach in Hawaii. Source: Wikipedia.

Natural Bridge Photo Essay

by Hutch Brown, Editor

In April 2014, I took my family to visit Natural Bridge in Virginia's Great Valley. Here are some photos I took.

Unique microclimate: *Cedar Creek is named for northern white-cedar* (Thuja occidentalis)*, common on the floors of the ancient cavern remains. The tree is a relic of a northern forest type that persists in the relative coolness of Cedar Creek gorge, promoted by limestone seeps and soils. Some of these slow-growing cedars are more than a thousand years old.*

Before/after: *Natural Bridge crosses Cedar Creek, which carved out caverns from carbonate rock laid down in seas about 460 million years ago. Above left is a small tributary of Cedar Creek flowing from a cave, resembling the initial opening to Natural Bridge millions of years ago (note the tilted limestone bedding). Above right is what the cavern entrance might have looked like before the ceilings collapsed, leaving the bridge remnant.*

Intermediate stage: *Nearby Natural Bridge Caverns show some of the calcite flows that the Cedar Creek caverns might have featured.*

Calcite flows: *Rainwater, acidified by soil organic matter, dissolves the calcium carbonate in limestone. Water seeping over surfaces both underground (left) and aboveground can deposit the dissolved minerals, forming features characteristic of karst topography, such as braided streams and falls (above left, a tributary of Cedar Creek) and calcite deposits from seeps over limestone (above right, a seep about 20 feet above Cedar Creek). You can see such features on Cedar Creek Trail.*

Minerals in Spring Water

by Andrew A. Sicree

Editor's note: The article is adapted from Gem Cutters News *(newsletter of the Gem Cutters Guild of Baltimore, MD), February 2013, pp. 10–11. The original source cited is* Popular Minerology© *41, 2011.*

Travel the backroads and byways of America, and before long you will encounter a town called Mineral Springs. Sometimes the name is more specific, such as Alum Springs in Virginia or Radium Springs in New Mexico. Towns bearing the name Sulfur Springs appear in California, Kentucky, Texas, and other states, and there is a Hot Sulfur Springs in Colorado.

As you might expect, these towns are named for nearby mineral springs. But what *is* a mineral spring? And how does it differ from an ordinary spring?

A Little Hydrology

Rain falls on the ground, and what doesn't evaporate or run into nearby streams percolates underground. The water descends to the water table, the upper surface of what is called the saturated zone underground. In the saturated zone, water fills all of the cracks and joints in the bedrock and all of the spaces between grains of sediments.

If the water table comes to the surface, water flows out of the ground (fig. 1). The water table hits the surface at the banks of many streams and ponds, delivering water from underground. This keeps many ponds full and streams flowing even when it has been weeks since the last rainfall.

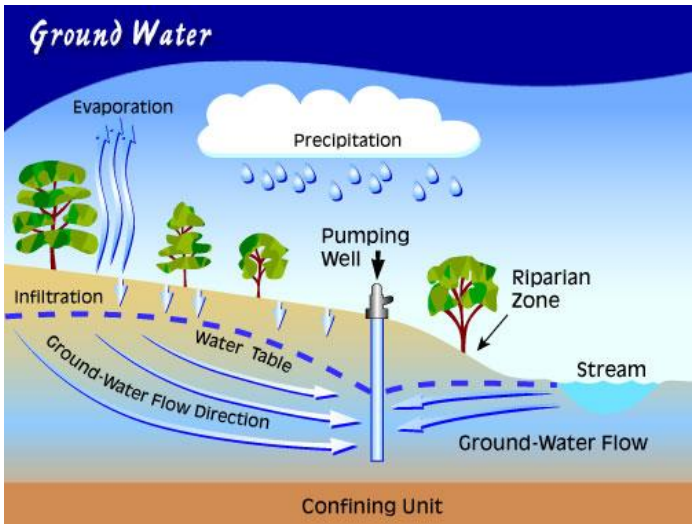


***Figure 1**—Where the underground water table surfaces, it feeds streams and lakes. Source: Tap Into Quality (2012).*

When the water table comes to the surface uphill from local streams, springs form. Water seeps out of the ground and trickles downhill to nearby streams.

Often, but not always, the springs produce high-quality water for drinking. Many people prefer spring water, and a good portion of the bottled-water industry exploits natural springs for this purpose.

Mister, can I drink from that water hole?

Early settlers soon noticed that not all springs were so refreshing. Some springs were warm or even boiling—the so-called hot springs—and others tasted bad, smelled worse, or were hard on the digestion. In a few cases, spring water was even poisonous.

There was more than just water coming out in these so-called mineral springs. For example, James Wilson, in *A Collector's Guide to Rock, Mineral, and Fossil Localities of Utah* (1995), noted springs made poisonous by dissolved selenium in the uranium-rich Poison Strip, east of Crescent Junction, UT.

It wasn't long, however, before resourceful speculators and quack doctors decided to turn a liability into an asset by promoting mineral springs as healthful. Throughout the late 1800s and into the 1900s, patients suffering from a wide variety of ailments were sent off to mineral springs to "take the waters."

Patients swam and soaked in the springs and drank mineral waters for their supposed therapeutic value. Health benefits were uncertain, but popular vacation resorts grew up around the springs as first one, then the other became trendy destinations for the rich and famous. The popularity of mineral springs continues to this day.

What Are Mineral Springs?

As one might suspect, mineral waters contain a lot of dissolved minerals. Typically, they contain gases, sulfur compounds, and a variety of salts.

You might have heard of the term "total dissolved solids" (or TDSs), used to describe the concentration of dissolved minerals in streamwater. The Environmental Protection Agency recommends that drinking water contain less than 500 parts per million. Waters with more than 1,500 parts per million are designated as having high mineral content.

Hot spring with sulfur deposits at Yellowstone National Park. Source: National Park Service (2014).

So where do the dissolved solids originate? As ground water passes through rock, it dissolves minerals. Many minerals, such as quartz or corundum, are not very soluble, especially in cold water. But carbonate minerals such as calcite and dolomite as well as sulfate minerals such as gypsum will dissolve, and halide minerals such as halite and sylvite dissolve very readily.

When a mineral like halite goes into solution in the ground water, it dissociates into sodium and chloride ions. Much of what makes up the total dissolved solids of many natural waters is in the form of ions such as calcium, magnesium, carbonate, bicarbonate, sodium, and chloride ions. If you evaporate these waters, compounds such as calcium carbonate (calcite) and sodium chloride (halite) will precipitate as solids. Warm waters in thermal springs will dissolve more minerals than cool water; at high temperatures, even barely soluble minerals like quartz begin to dissolve.

Types of Mineral Springs

Not all mineral springs are the same. Some are called sweet springs because the water is quite low in dissolved solids; they scarcely deserve to be called mineral springs.

Due to alum ($KAl(SO_4)_2 \cdot 12H_2O$) in the water, alum springs contain higher levels of potassium, aluminum, and sulfate ions. If you drink water from alum springs, you can get diarrhea and have other gastrointestinal problems.

You might be familiar with synthetic alum crystals sold at mineral shows. Alum can also be found in your grocery store together with the canning supplies.

Chalybeate springs produce ferruginous (iron-rich) waters. Containing dissolved iron(II) carbonate (siderite) and manganese(II) carbonate (rhodochrosite), the water has a distinct taste of iron. Among the notable chalybeate springs are Tunbridge Wells in England and the Sweet Chalybeate Springs of Allegheny County, VA.

Sulfur springs are notable for their strong rotten-egg smell. Dissolved hydrogen sulfide (H_2S) escapes from the water, giving it a brimstone odor. Our noses are extremely sensitive to hydrogen sulfide, and we can detect extraordinarily low levels in the air; most people can discern it at levels of 0.5 parts per billion! The source of the hydrogen sulfide can be sulfide minerals such as marcasite and pyrite (FeS_2).

Saline spring waters typically contain dissolved chloride salts of sodium, calcium, and/or magnesium. They have a strong salty taste, much like seawater.

Alkaline springs contain high levels of alkalis or alkaline earth elements, such as sodium, potassium, lithium, calcium, or magnesium ions, along with carbonate or hydroxide ions. Alkaline waters are more bitter and more basic than other spring waters, with a pH of 8 or more. Lithia springs contain lithium ions, and calcic springs are high in calcium.

Spring water can be radioactive. Radon gas dissolves readily in ground water but will rapidly escape from any water that reaches the Earth's surface. Radium springs contain traces of radium derived from underground uranium or thorium deposits.

Alkaline spring, Shoshone Lake Geyser Basin, Yellowstone National Park. Photo: Bob Lindstrom, 1996; source: National Park Service (2013).

A hundred years ago, radium was valued as a wonder drug reputed to cure many diseases, including cancer. A mineral spring that contained traces of radium was thought to be particularly healthful. Radium springs near Albany, GA, produced radium-laced water and became the site of a spa and a casino. Radium Springs, NM, is a village of about 1,700 people just northwest of Las Cruces.

Carbonated Waters

Soda springs contain excess dissolved carbon dioxide in the form of sodium carbonate or as the dissolved gas itself. At depth and under pressure, natural waters can dissolve carbon dioxide gas. Upon rising to the surface, some of these soda waters might effervesce like so much natural champagne, releasing bubbles of carbon dioxide.

Carbonated water is also called seltzer water. Seltzer water originally referred to *Selterswasser*, the German word for the effervescent mineral water from the natural springs in Niederselters, Germany. Today, seltzer water is produced artificially. Interestingly for mineralogists, the Yale chemistry professor Benjamin Silliman (for whom sillimanite was named) bottled and sold artificial seltzer water beginning in 1807. Flavored seltzer waters followed, eventually leading to the flavored artificial mineral waters sold as Coca-Cola and Pepsi.

References

National Park Service. 2013. Geysers: Shoshone Geyser Basin. http://www.yellowstonenationalpark.com/shoshone.htm.

National Park Service. 2014. Emerald Spring. http://www.nps.gov/yell/photosmultimedia/norris-tour-emerald-spring.htm.

Tap Into Quality. 2012. http://tapintoquality.com/ground-water.html.

Niederselters town coat of arms.

Herbert Muth Spring, a soda spring in Niederselters, Germany, yielded some of the world's original seltzer water (depicted in the statue holding water containers). Photo: Karsten Ratzke; source: Wikimedia.

Source: The Teaching Blog (http://theteachingbog.com/post/15844707355).

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

January 2015

11: Rocks on the Mall; Audubon Naturalist Society; program led by Joe Marx, 1–4; 2-mile loop to see rock in facades, fountains & walls; Audubon members $24, nonmembers $34; information: www.ANShome.org/adultnatureprograms

February 2015

14: 25th Annual Mineral, Jewelry & Fossil Show; Southern Maryland Rock and Mineral Club; Show Place Arena, 14900 Pennsylvania Ave, Upper Marlboro, MD; Sat 10–5; admission $5, senior citizens & students $4, children 12 & under and Scouts in uniform free; contact Michael Patterson at michael.patterson@pgparks.com.

14: Field trip, James Madison University, 9 a.m.; hosted by Dr. Lance Kearns; details to follow.

March 2015

7–8: 52nd Annual Earth Science Gem and Mineral Show; Delaware Mineralogical Society, Inc.; Delaware Technical & Community College, 400 Stanton-Christiana Road, Newark, DE; Sat 10–6, Sun 11–5; $6 adults, $5 seniors, $4 children 12–16, under 12 free; http://www.delminsociety.org

14–15: 26th Annual Clifton/North Jersey Gem & Mineral Show; North Jersey Mineralogical Society; 775 Valley Road, Clifton, NJ (just off Rt. 3/46); Sat 10–6, Sun 10–4; for more info, see www.nojms.webs.com

21–22: Annual show, Franklin County Rock and Mineral Club, Inc.; Hamilton Heights Elementary School; 1589 Johnson Road, Chambersburg, PA ; Sat 10–5, Sun 10–4; $5, children 12 and under free with paying adult; more information from Mike Mowen, 717-264-9024, mlmo@innernet.net

21–22: 51st Annual Gem, Lapidary & Mineral Show; Gem, Lapidary & Mineral Society of Montgomery County; Montgomery Co. Fairgrounds, Gaithersburg MD; Sat 10–6, Sun 11–5; $6 for 12 & older, children free, Scouts in uniform free.

28–29: 46th Annual Che-Hanna Rock and Mineral Club Show; Athens Twp. Vol. Fire Hall, 211 Herrick Ave, Sayre, PA; Sat 9–5, Sun 10–4; contact Bob McGuire uvbob@epix.net

28–29: 15th Mineral Treasures & Fossil Fair 2015 Annual Show; the Philadelphia Mineralogical Society & the Delaware Valley Paleontological Society; LuLu Temple, 5140 Butler Pike, Plymouth Meeting PA (2 miles from Norristown exit, PA Turnpike); Sat 10–5, Sun 10–4; admission $5, 11 & under $1, uniformed Scouts free; information: www.philamineralsociety.org

28–29: 65th Annual EFMLS Convention and Show, sponsored by the Catawba Valley Gem and Mineral Club; Hickory Metro Convention Center, Hickory, NC.

April 2015

10–11: Annual Atlantic Micromounters Conference; Micromineralogists of the National Capital Area; Springhill Suites Alexandria Marriott, 6065 Richmond Hwy, Alexandria, VA. Registration at www.dcmicrominerals.org/.

18: Annual Jewelry Gem & Mineral Show; Patuxent Lapidary Guild, Inc.; Earleigh Heights VFC on Rte 2 in Severna Park, MD; 10–5; 10 and over $1, under 10 free.

May 2015

18–24: Wildacres; Little Switzerland, NC; $390 plus materials fee; registration starts Jan 1; information at http://efmls-wildacres.org/

October 2015

23–25: AFMS Convention and Show, hosted by the Southwestern Federation; Austin, TX.

GeoWord of the Day

(from Kathy Hrechka, courtesy of the American Geoscience Institute)

Bergeron–Findeisen process

Precipitation formation in cold clouds whereby ice crystals grow at the expense of supercooled water droplets in response to differences in vapor pressure relative to water and ice surfaces. Also known as the ice-crystal process.

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

MEMBERSHIP APPLICATION FOR
THE NORTHERN VIRGINIA
MINERAL CLUB, INC.
www.novamineralclub.org

Please Indicate:

New Member: _____

or Renewal: _____

Dues Payment enclosed is for calendar year 201___

Fees are due January 1st or upon submission of a new application.

* New membership dues paid after June will be prorated for ½ year.

Collecting trips / field trips can only be attended by NVMC club members who are current with dues payment and are in "good standing."

Application for Membership

Date: _____

Name: _____

Street: _____ Apt / Unit #: _____

City: _____ State: _____ Zip Code: _____

Phone: _____ Cell: _____

E-Mail: _____

Email is needed to receive newsletter electronically

Applying for:

Individual Adult: (over 18) ($15.00/yr*) Name: _____ adult _____

or Family Membership: ($20.00/yr*) Name: _____ adult _____

Name: _____ adult _____

Name: _____ youth _____ age _____

Name: _____ youth _____ age _____

Name: _____ youth _____ age _____

Name: _____ youth _____ age _____

Family is defined as one address.

Maximum 2 adults living in same home and children under 18 years of age residing at same address.

Hobby Related Interests (check all that apply)

Minerals ___ Fossils ___ Artifacts ___ Micromounts ___ Field Trips ___

Lapidary ___ Tumbling ___ Carving ___ Jewelry ___

Other (please describe) _____

The Club Newsletter is distributed by email using G-Mail. Electronic versions are full color and approximately 1MB in size (other arrangements to receive the Newsletter by regular USPS mail can be arranged, but there may be an extra yearly charge). The membership lists, emails and your contact information is kept private and is only used for club business or hobby related distributions. If you are concerned about privacy issues, please specify the items that you wish to remain private. _____

I do hereby waive all right to hold *The Northern Virginia Mineral Club, Inc.* and its Officers liable for any personal injury or loss sustained by me or any member of my family while participating in club activities. I also agree to adhere to the rules and regulations of *The Northern Virginia Mineral Club, Inc.* as set forth by its bylaws.

Signature of Applicant: _____

Please pay at meetings or mail to: **Northern Virginia Mineral Club, P.O. Box 10085, Manassas VA 20108**

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.*