THE NORTHERN VIRGINIA MINERAL CLUB INC
Crystals are the flowers of the Mineral Kingdom

The Mineral Newsletter

Holiday Party: December 16 Time: 6:30 p.m.

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

Volume 54, No. 10
December 2013
You can explore our club Website at
http://www.novamineralclub.org/

Club Show at GMU a Tremendous Success!

Our November club show at George Mason University had higher attendance than ever before! Many thanks to all of the NVMC members who contributed so much to making the show such a resounding success. Kathy Hrechka took photos of club show events—enjoy!

Leslie Nanney and Cynthia Payne.

Silvia Kerry and Roger Haskins at entrance table.

Boy Scout Conrad Smith teaching Moh's Scale.

Sue Marcus shopping and Barry Remer vending.

Lois Dowell and Karen Lewis with hand-made jewelry.

Brian Whiteley—Kids Mini Mines, Saturday and *Sunday!!!*

Wayne Sukow.

Tom Taaffe vending KTB Minerals and Fossils.

Logan Babcock and David Fryauff micromounting.

Joe Murter promoting his "touch rocks."

December 16, 6:30 p.m.

You are cordially invited to our **Member Appreciation Holiday Party** on Monday, December 16, at the Long Branch Nature Center (our usual club meeting place).

As a special treat and thank you, especially for club member volunteers who served at our GMU club show, we have a budget for the event.

As our budget allows, the club will provide an entree, drinks, and other items at no cost to club members. To help defray costs, family members and guests who do not belong to the club will pay $5 each. We might also call on club members to provide holiday cookies or other supplies, as needed for the event.

In the holiday spirit, we are asking club members to bring a wrapped gift marked FOSSIL, MINERAL, or LAPIDARY.

Please RSVP! Space at the nature center is limited, so if you are coming, please contact Jim Kostka or Patricia Flavin.

Scout Corner Success

by Kathy Hrechka, Vice-President

Eagle Scout Jim Kostka, Boy Scout Conrad Smith, and geology counselors Kathy Hrechka and Victoria Martin were "taken for granite" as they promoted our mineral hobby to over 300 Scouts at the GMU club show in November. Tony Petruzzi, a Boy Scout coordinator for STEM (science, technology, engineering, and math), also volunteered at the Scout Corner, helping to give our show a proper STEM format.

The Scout Corner served a total of 228 Cub Scouts and 37 Boy Scouts. Many Girl Scouts, Brownies, Daisies, American Heritage Girls, home schoolers, and Science Olympiads also enjoyed our geology presentations. Kathy Hrechka signed off on five Boy Scout geology merit badges!

Jim Kostka instructing kids on the three basic rock types.

Conrad Smith showing the difference between minerals and rocks.

Left and above: Joe Murter and the "touch rocks" he made available for the show. All photos: Kathy Hrechka.

President's Thoughts

by Rick Reiber

The show was great!! Hundreds of kids participated in hands-on science and had a great time doing it. The displays drew crowds, including numerous Scouts and students from George Mason University (GMU) and elsewhere, and everything went smoothly. The quality of the venue and the volunteers reflected well on both GMU and the Northern Virginia Mineral Club.

And on the following day we had Dr. James Grant, a scientist on the team for the internationally renowned Mars Science Laboratory, as a presenter at our regular club meeting. Dr. Grant brought photos and diagrams that revealed amazing things about Mars, such as water-related erosional similarities with Earth (like alluvial fans).

We can all take pride in what NVMC does to make geological science accessible and interesting, not only for our own members, but also for the general public.

NVMC President Rick Reiber (left) poses with Dr. John A. Grant, III, from the Smithsonian Institution's team for the Mars Science Laboratory. Photos on this page: Kathy Hrechka.

Previous Meeting Minutes

November 25, 2013

by Lane Douglas Brooks, filling in for Secretary Dave MacLean

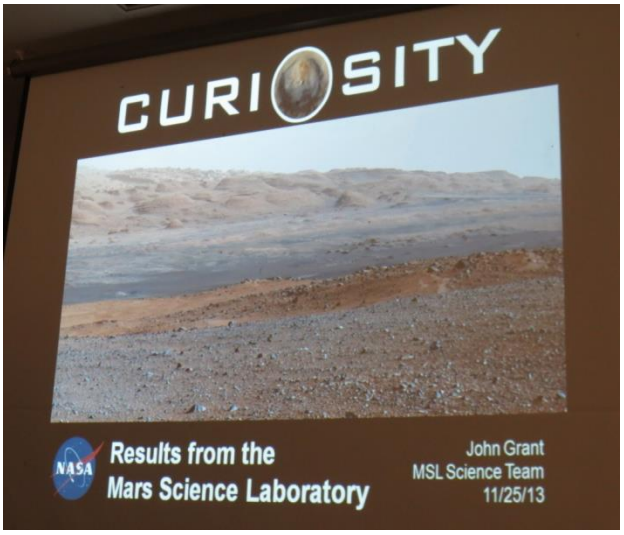
President Rick Reiber called the meeting to order at 7:48 p.m. Twenty-two people were in attendance.

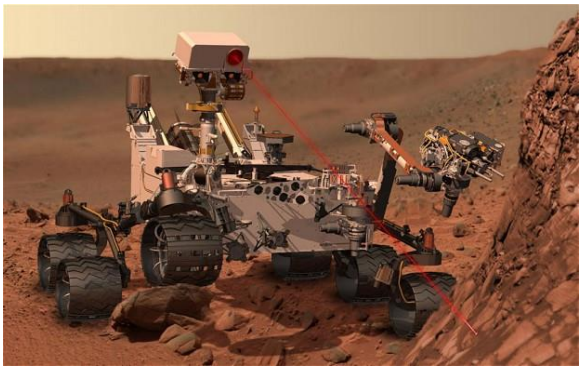
Presentation

Rick introduced the guest speaker for the evening, Dr. John A. Grant, III, geologist at the Center for Earth and Planetary Studies at the Smithsonian Institution's National Air and Space Museum. Dr. Grant is a member of the science team for the Mars Science Laboratory's rover *Curiosity*, which landed on Mars in August 2012. He gave an overview of recent data and discoveries from the *Curiosity* rover. *Curiosity* has been roving the interior of Gale Crater on Mars for over a year and has discovered rocks that contain evidence of past habitable conditions on Mars.

Dr. Grant was cochair of the landing sites selection committee for two previous rovers, *Spirit* and *Opportunity*, and his team was responsible for determining the most productive area for *Curiosity* to land. Based on his extensive experience, Dr. Grant described the science involved in selecting landing sites for all rovers to date. He announced that a new exhibit at the Smithsonian will soon open on the tenth anniversary of the first rover landing on Mars.

Curiosity's main objective is to study the past habitability of Mars. Mars has alluvial fans and



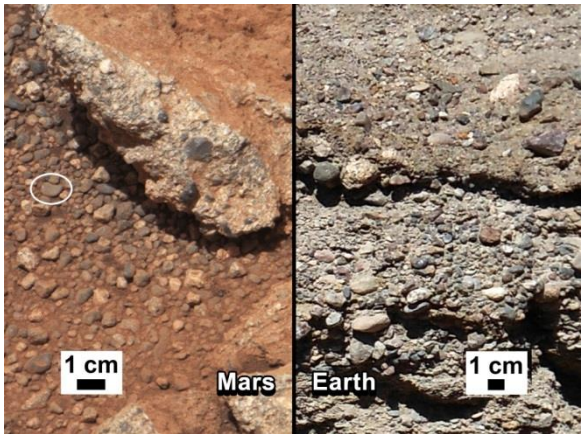


Mars rover Curiosity *in action*.

lake environments, evidence that water once flowed freely on the Red Planet. *Curiosity* is specifically studying Martian geology, geochemistry, mineralogy, and surface radiation for evidence of biological potential and the role of water.

Curiosity is huge, about the size of a Cooper Mini. Its six enormous wheels are independently articulated. According to Dr. Grant, *Curiosity* includes a "terribly complex, onboard laboratory for the analysis of rocks and minerals." Unlike previous rovers, *Curiosity* has X-ray diffraction and gas chromatography capabilities. Its detectors include RAD, REMS (weather), ChemCam (chemistry), APXS, and several specialized imaging cameras.

Curiosity landed in Gale Crater, about 100 miles wide. The site was selected for its layered clays, indicative of a past wet climate. The oldest layers are principally clays; the upper layers have acidic soils rich in sulfate, indicating an increasingly drying environment. There is an alluvial fan, showing evidence of previous waterflows



Conglomerate on Mars, like that on Earth, includes rounded pebbles formed by flowing water.

Dr. Grant conversing with club members.

from the crater walls.

Previous rovers did not have *Curiosity*'s ability to land in such a precise location. Scientists have been learning how to better fly in the thin Martian atmosphere, giving them the ability to target much smaller areas.

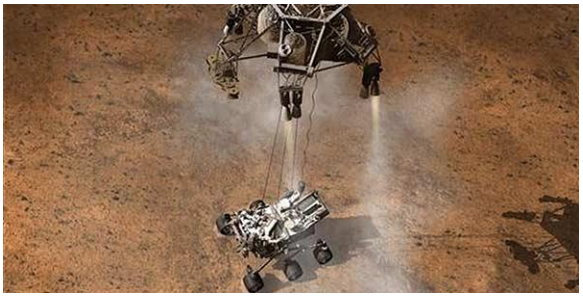
Dr. Grant showed a video of *Curiosity* launching from Cape Kennedy on an Atlas rocket. He also showed the *Curiosity* landing sequences, including the parachute and deployment of the rocket-propelled crane that lowered *Curiosity* to its final touchdown point. The images were taken from another spacecraft 110 million miles away!

After performing a thorough check of all systems, *Curiosity* completed its first task: drilling a hole in a small, grape-sized rock and transfering the rock chips and dust to its laboratory for analysis. Next, *Curiosity* began its slow drive at a speed of about 2 yards per minute in the general direction of Mt. Sharp, its final destination.

On the way, the rover made frequent stops to investigate interesting features, such as a conglomerate associated with rounded pebbles, evidence of water-worn rock deposits. Other discoveries included composition of the Martian atmosphere, with evidence of water vapor, carbon dioxide, oxygen, and sulfur dioxide.

The rover also found traces of methane gas, but this in itself is not proof of previous life. Salts weathered on serpentine can also account for trace methane.

Curiosity headed into a terrain called Yellowknife Bay, where it found interesting "chicken wire" surfaces, indicating that wet ground had



Rocket-propelled crane lowering Curiosity to the surface of Mars.

dried out, then become wet again. Analysis of the geology revealed fine-grained rock, clays, and minerals, suggesting that the area could have once supported life, although no direct evidence of life was found. In fact, the rover has come across several areas showing signs that they once had significant amounts of water.

Dr. Grant ended his talk by announcing that the December 9 issue of *Science* will contain an article speculating that Mars probably has granites.

Business Meeting

After a short break, the club's business meeting convened at 9:15 pm. Rick recognized past presidents and held the door prize raffle. Lisa Diernisse won a mounted and framed geode and Bill Oakley won a fish fossil.

President Reiber thanked everyone who volunteered to help out at the club show. In particular, he recognized Conrad Smith, who did a great job in the Scout Corner. Conrad, who attends Walther Johnson High School, is a Boy Scout and a Science Olympiad winner.

Kathy Hrechka, NVMC Vice-President, also worked in the Scout Corner until her voice gave out. The Scout Corner was exceptionally busy this year!

Also acknowledged were Brian Whiteley, who worked both days at the Kids Mini Mines; Roger Haskins at the front desk; Sue Marcus as well as Jeff and Diane Nesmeyer; Rob Robinson for conducting the Silent Auction; and Julia Nord of George Mason University. Rick noted the club signs, a new addition at this year's club show.

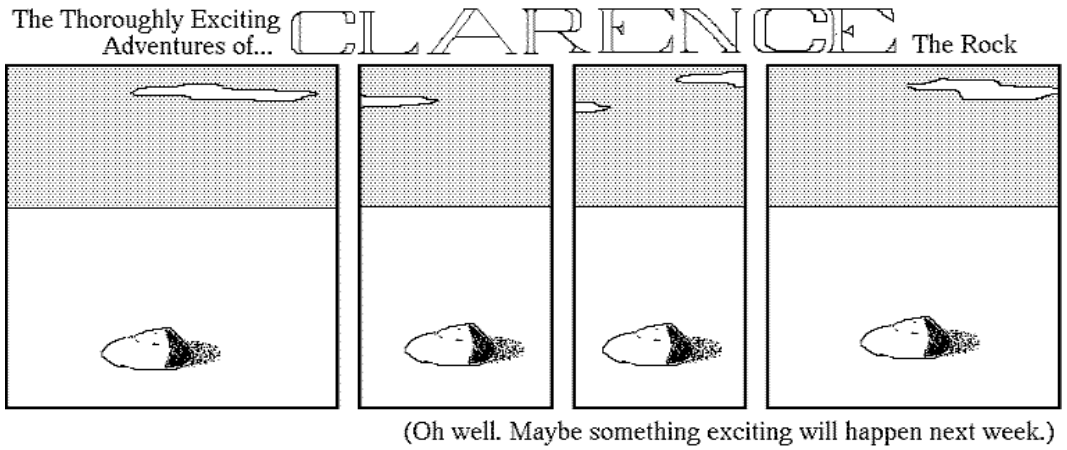
Pat Flavin made a motion that club funds be used to provide catering for this year's club holiday party, in particular to honor the volunteers at the club show. Kenny Loveless proposed an amendment to cap the expenditure at $350, and a short discussion followed. Douglas Brooks called for the question; the motion, as amended, passed with no dissenting votes.

Rick announced formation of a nominations committee to select a slate of officers for 2014. Lisa Diernisse agreed to chair the committee, with Rick Reiber, Kathy Hrechka, and Treasurer Kenny Loveless as members.

Kenny had no final financial report, but the club show earned $3,200 on Saturday, $2,500 on Sunday, and $681 through the Silent Auction, for a total of $6,381.

Jim Kostka passed on information on upcoming mineral shows in the region (see the next to last page of this newsletter for a list).

The meeting adjourned at 9:43 pm.



Source: The Athens Observor, *ca. 1993, at* http://wiki.hypertwins.org/Clarence_the_Rock

Minerals in the Land of Oz

by Sue Marcus

This fall, Roger and I were lucky enough to spend a month in Australia, spring time in the Southern Hemisphere. It was a perfect vacation, topped off by our visit to a local mineral show near our last stop in Melbourne.

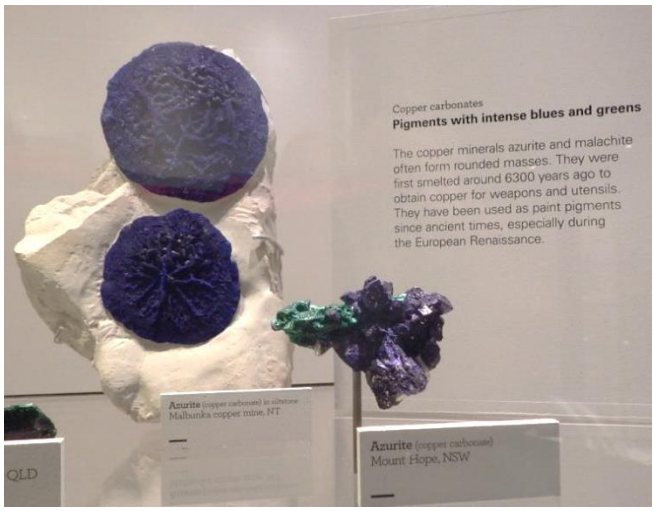
A month seems like a long time, until you realize how large Australia is—about the size of the entire United States. From east to west, it is close to the distance from Washington, DC, to San Francisco, CA.

Australia is colloquially known as Oz (from "Aussie," pronounced "Ozzie"). We visited only part of eastern Oz, including Sydney, Darwin, Kakadu National Park, Port Douglas and the Great Barrier Reef, Kangaroo Island, Adelaide, and Melbourne. We saw wild platypuses, echidnas, and lots of koalas, wallabies, and kangaroos. Holding koalas was my greatest delight!

With our limited time, we optimized what we could do and see. Mineral collecting would have to be the focus of a separate trip. (I can only dream!)

Before the trip, I'd tried to contact mineral dealers in the places we'd visit. Only one, Cyril Kovacic of CK Minerals, responded. He mentioned that he would be participating in a mineral show near Melbourne while we were there, the fall 2013 show held by the Nuwading and District Lapidary Club, Inc.

Mineral display cases at the Nunawading Lapidary Club, Inc., mineral show in Dorset, near Melbourne, Victoria, Australia. All photos: Sue Marcus.



Ore minerals on display at the Melbourne Museum, Australia.

BINGO!

Melbourne was our last stop, and we had a car. So whatever we purchased wouldn't have to be hauled around Australia for the entire trip.

There were about 15 vendors at the Nuwading and District Lapidary Club show, which was held in the gym of an elementary school. Display cases featured jewelry made by club members, along with mineral and fossil exhibits.

Cyril and his colleague Peter Hall were there, as promised, with tables of appealing specimens. They were very welcoming. We were amazed to see specimens from the United States for sale. Cyril told us that he trades and buys specimens from around the world. Although he has a Website for online purchases, it is always nice to select choice specimens on the spot.

Roger Haskins (NVMC member) and Cyril Kovacic (CK Minerals) enjoying the Nunawading Lapidary Club, Inc., exhibition in Dorset, near Melbourne, Victoria.

So we helped the local economy and purchased several specimens. I'd brought a couple of small (light!) Elmwood specimens, and Cyril was a generous trader.

The club offered several large tables of specimens for sale—no auction like ours. It was easy to spend a few dollars there, too. Like our club, theirs has difficulty recruiting healthy, robust volunteers to help set up and staff their show.

Australia has many wonderful museums, and we sampled a few. The Melbourne Museum has terrific displays, with stellar examples of Australian minerals. The exhibits are educational without being overwhelming. Each exhibit presented a few superb examples of the point they were illustrating, such as the uses of minerals or the causes of mineral coloration.

The Australian Museum in Sydney has a relatively small set of mineral displays, though also excellent. The museum has a terrific collection of fossils, particularly dinosaurs. We were lucky that a wildlife rescue group had brought some live animals to the museum for the day. The flying foxes used their wing-claws to walk around their cages—that was wild!

The Museum and Art Gallery of the Northern Territory in Darwin has few minerals, but it has an informative display of geologic history, illustrated by samples of fossils from throughout the Northern Territory.

Some museums had fossils and a few minerals for sale. Many were imported (from India, Morocco, the United States, and elsewhere).

For anyone interested in self-collecting in Australia, you might contact mineral clubs in the areas that interest you. They will have the best contacts. Many famous properties are no longer available to collectors, either because they stopped producing long ago and have been thoroughly picked over or because the owners do not welcome visitors.

Some active properties do allow collecting, either by their own miners or by mineral collectors. But they mine through crystallized zones only sporadically, so you have to be at the right place at the right time.

We learned that it is illegal to export Australian fossils without a permit, so we confined our enjoyment to looking at displays in museums and at the show.

We ate at several Greek restaurants in Melbourne, including one named Stalactites. The food wasn't the best, but with a name like that, we had to give it a try!

Ron Criner at the National Opal Collection in Melbourne shows a stunning display of opalized fossils. You can see the collection online at http://www.nationalopal.com/opal-showrooms-museums/virtual-tour.html. The collection in Sydney, which we missed, is even better. Both are free.

Australian Rubies

by Stephen Combe

Editor's note: The piece is adapted from Gemform *(newsletter of the Nunawading and District Lapidary Club, Inc., in Melbourne, Victoria, Australia), October 2013, p. 10. It is based on* Sojourners, *a book by the historian Eric Rolls.*

Henry Vere Barclay reported rubies in the Hale River area in central Australia in 1878. The country was difficult and remote, with the only white settlement at a telegraph station, now called Alice Springs.

But David Lindsay, explorer and surveyor, went there in 1885–86. The stones he picked up in the Hale River sand amazed him.

His report brought miners willing to risk everything. They employed aborigines to sift through the sand. The men used shovels and the women used their digging sticks, and they turned up gems like yams.

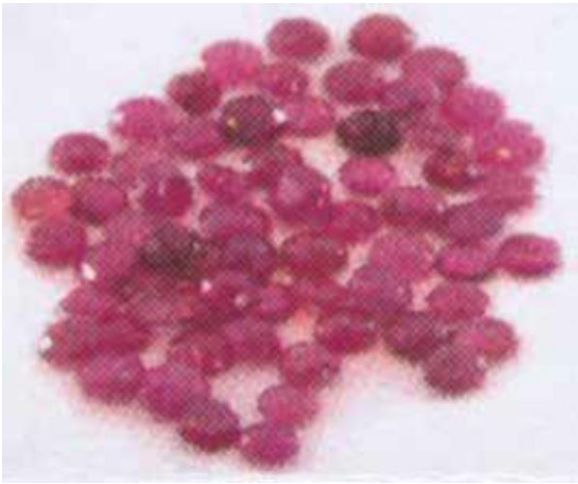
The miners sorted the gems and consigned them to Streeter, a lapidarist in London. He reported them indistinguishable from fine Siam rubies, worth ten times the value of diamonds.

They set prices accordingly, and 24 companies sprang up in a speculative fever. Afghan camel drivers came with strings of camels and loaded up tons of stone at a time for the railroad, which was approaching what was to become the railhead at Oodnadatta 800 miles to the south.

Overwhelmed by the quantity, the London market made a panicky reassessment. Who had ever heard of rubies by the ton? No market could cope with them.

A fortunate chemical analysis found the Australian rubies composed of 23.44 percent crystalline alumina instead of 90 percent, as in oriental rubies. Despite the beauty of these stones, they graded them defensively as garnets.

Camel drivers dumped their loads wherever the disheartening news reached them. Danny Peddler tipped his load into the Todd River near Stuart Town, later named Alice Springs. They glowed through the sand years later.



Australian garnets (above) and rubies (below). Source: Gemform *(October 2013).*

The best of these stones were not garnets. Apart from their strong color, they do not fuse under the blowpipe as garnets do. It was not the stones' fault, it was the marketing. Had they been sparingly eased onto the market, as De Beers' South African diamonds were, they would still be regarded as rare gems.

The rubies came out of the sand in Glenn Annie Gorge, named by David Lindsay, who first reported the gemstones. Higher upstream, as the water swirls around bends before the gorge walls confine it, it deposits stones from Maude Creek, Florence Creek, and a score of other tributaries.

The pebbles glint and sparkle and roll with color. Individual stones present themselves; one might be walking over spilled treasure chests.

In the hills east of Glenn Annie Gorge, miners worked the rock for mica at a time when it was valuable. Wherever the mica stopped, beryl began, and the miners chipped out slabs as long and as thick as their forearms.

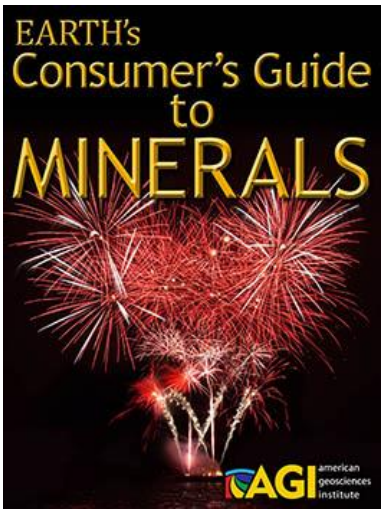
Did this point to emeralds and aquamarine? No one looked. Beryl is also associated with aluminum.

A Consumer's Guide to Minerals

Editor's note: The article is adapted from the American Geosciences Institute Website at http://www.agiweb.org/pubs/pubdetail.html?item=111701.

The *Consumer's Guide to Minerals* is a different take on minerals. Rather than focusing on visual and physical properties, this book explores minerals' myriad uses in scientific research, manufacturing, medicine, and commercial applications—some of which might even shock you.

This digital exclusive, available in digital format only is an important reference for mineral enthusiasts. A collaborative effort between EARTH Magazine and the U.S. Geological Survey, it compiles articles from EARTH Magazine, edited by Megan Sever and Dr. Christopher M. Keane. For more information, go to the American Geosciences Website at http://www.agiweb.org/pubs/pubdetail.html?item=111701.



Australia Has World's Oldest and Largest Meteorite Impact Site

Scientists have discovered the world's oldest and largest meteorite impact structure through research on the formation of gold deposits in western Australia.

At its widest point, the so-called Watchorn Impact Structure is almost 350 miles in diameter. It is estimated to be more than 2.6 billion years old—more than half of Earth's entire age!

You can read more at: http://www.laboratoryequipment.com/news/2013/11/geologists-find-oldest-largest-meteorite-impact-structure

School Newspaper

Editor's note: The piece is adapted from Geology Jokes *at http://www.jokes4us.com/miscellaneousjokes/schooljokes/geologyjokes.html.*

A local news reporter, browsing through his son's high school newspaper, noticed an article about a deadly chemical called dihydrogenoxide.

According to the article, the chemical kills almost 400,000 people per year, usually through inhalation. Even if you wash your food, you can never get it off. In fact, no matter what you do, you will be exposed to this deadly substance every day of your life.

The article ended by calling for government research to find a solution. Intrigued, the reporter asked his son to introduce him to the author, saying he might want to interview her.

"Gosh, dad, she wrote it as a joke!" the boy replied. "Di … hydrogen … oxide—get it? H_2O? Water?"

With a sinking feeling, the reporter asked about all the people dying each year.

"Drowning, dad … *duh*! Sheesh, I thought you were smart!"

Rocks of Old Rag Mountain

by Hutch Brown, Editor

Author's note: This piece is partly based on Fichter and Baedke (1999), referenced at the end. They tell a fascinating story of Virginia's geological history, and I will be drawing on them to tell more of that story in future newsletters.

In November 2013, I took a hike with my kids up Old Rag in the Blue Ridge Mountains of Virginia, in Shenandoah National Park, to the west of Washington, DC. Old Rag is the most challenging hike in our area, requiring scrambles up steep inclines through boulders and over rounded granite surfaces to reach the summit.

Old Rag is made up of Grenville granite, more than a billion years old. As part of the Blue Ridge geologic province, it is ancient basement rock that was detached from its original location

Top: Weathered Old Rag granite—reddish areas are oxidized iron—on a less weathered rock face. White crystals are alkali feldspar; dark components are blue quartz as well as chlorite, epidote, magnetite, and sphene. Bottom: Old Rag diabase, composed mainly of tiny plagioclase feldspar crystals in a matrix of clinopyroxene. Photos: Hutch Brown.

Old Rag owes its raggedy appearance to weathering of exposed rocks. Photo: Hutch Brown.

near what is now Richmond, VA, during the Alleghanian mountain-building event around 320 million years ago. As proto-Africa slammed into proto-North America, tremendous tectonic forces pushed the detached basement rock up along a thrust fault to its present location, overlying younger sedimentary rock.

The ancient Alleghanian Mountains have long since eroded away. Since then, uplift and erosion have formed Old Rag, shaping its distinctive raggedy appearance.

But the mountain is not all granite. It is laced with dikes and sills of a much younger igneous rock called diabase.

I never knew that Old Rag was anything but granite. I was a Boy Scout in this area, and I've been up Old Rag a number of times, but it wasn't until my trip in November that I paid any attention to the geology. I was pleased to discover that I could actually begin to read the rocks.

Toward the beginning of the hike, I noticed finer grained rocks intermixed with the coarse granite along the trail. I immediately suspected what they were and found a recently broken piece—and, sure enough, it was similar to basalt. So I suspected we might see diabase dikes toward the top, and we did.

How did they get there?

More than a billion years ago, all of Earth's continents were grafted together in a supercontinent called Rodinia. Plumes of magma had welled up when the continents collided, never reaching the surface but rather cooling deep underground,

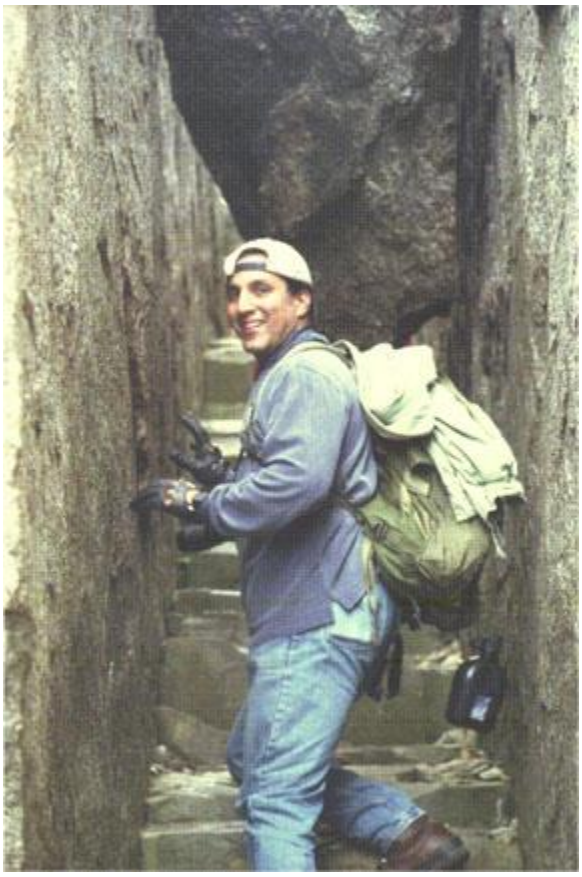
giving the minerals time to form the coarse crystalline structure of Old Rag granite.

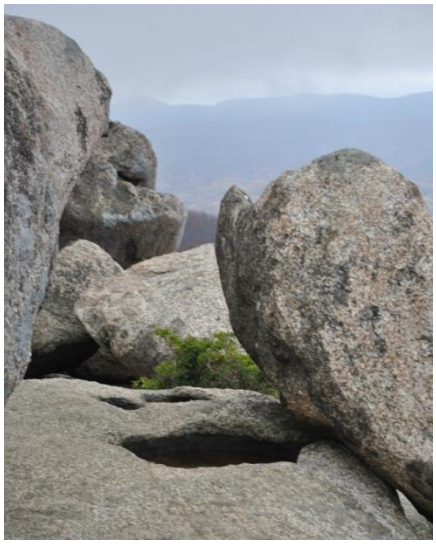
Notably, the granite formed fractures and fissures as it cooled. And that's where the next part of the story begins.

Supercontinents don't last forever. About 570 million years ago, the mantle formed a hot spot along the edge of what is today the Blue Ridge Province. The mantle sent magma upwards, stretching and breaking the overlying rock and widening the fissures in the granite. The supercontinent of Rodinia began to break apart.

As rifting began between proto-North America and proto-Africa, volcanoes erupted and magma welled up to the surface, causing lava flows we see today as the metamorphosed basalt called Catoctin greenstone. Upwelling magma also filled the fractures and fissures in the overlying granitic rock, forming sills and dikes. Because the granite was close to Earth's surface, the magma rapidly cooled, and it didn't have time to break into visible crystals. Instead, it formed the igneous crystalline rock known as diabase.

Diabase erodes faster than granite, because it is made up mainly of feldspar, whereas granite has





The peak of Old Rag shows the effects of erosion. The water-formed basins in the granite are called opferkessels. Note the pine, which delivers needles that turn water in the basins acidic enough to erode away the granite. The rounded boulders are the result of spheroidal weathering, mainly by water. Photo: Hutch Brown.

a high proportion of quartz. Feldspar is softer than quartz, more easily eroded. At the top of Old Rag, you can actually see tiny blue quartz crystals in the sand at your feet, left over after feldspar and other minerals in the rock have eroded away.

As a result, the diabase dikes in the granite are deeply eroded. Some dikes in Old Rag are many feet wide, creating passages through the granite on each side. People have used the dikes for thousands of years to clamber to the top of Old Rag. Today, many of the trails maintained by the National Park Service follow the dikes, especially towards the peak.

At the peak, we found an interesting phenomenon known as opferkessel. (My higher education

Left: Diabase dike, forming part of Old Rag Trail. Source: UMD (n.d.). Top: South side of Old Rag, showing spheroidal weathering in the rocks and a Table Mountain pine. Photo: Hutch Brown.

is in German literature, and once in awhile it comes in handy.) The term opferkessel derives from a German word meaning "kettle of sacrifice," based on the belief that ancient peoples carved these holes in the rock to make "burnt offerings" to ancient gods—slaughtered animals burned on great pyres.

But opferkessels are quite natural. Geologists believe that acidic water collects on the rock and gradually breaks it down, forming shallow basins. The acid comes from pine needles furnished by Table Mountain pines, which grow in the thin sandy soils at higher elevations in the Appalachians, including on Old Rag.

The power of water to weather the rocks is obvious in the rounded granite blocks you see towards the top of Old Rag. The tremendous tectonic forces that moved the Grenville basement rocks to their present location during Alleghanian mountain building might have weakened the granite. According to one source (Frye 1986), the mountain-building processes crushed the grains of the granitic rocks, leaving tiny cracks and fissures, known as planar fractures.

When the rock is exposed at the surface, water seeps into the cracks, freezes, and gradually wears away the rock edges, resulting in a series of rounded boulders, occasionally standing on end. Old Rag is an excellent example of this kind of erosion, called spheroidal weathering. Some of the spheroidal rock formations on Old Rag are quite spectacular.

Balance Rock, a distinctive formation on the west side of Old Rag. Source: Hiking Upward (2013).

Old Rag is well worth the trip. The hike is a circuit, with a longer but much easier trail looping from the top around the west and north sides of the mountain back to the parking lot. You can get to the top that way, too, avoiding any rock scrambles.

But if you want a real challenge, try Old Rag Trail straight up from the parking lot on the east side of the mountain. Through USGS, the geologist Paul Hackley has published a wonderful guide to the rocks along the way, with various stops and descriptions (Hackley 2000).

Next time I go up with my kids, Mr. Hackley is coming along!

Sources

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/index.html.

Frye, K. 1986. Roadside geology of Virginia. Missoula, MT: Mountain Press Publishing Company.

Hackley, P. 2000. A hiker's guide to the geology of Old Rag Mountain, Shenandoah National Park, Virginia. USGS open-file report 00–263. U.S. Geological Survey, Reston, VA. http://pubs.usgs.gov/of/2000/of00-263/of00-263.pdf.

Hiking Upward. 2013. Old Rag Mountain—SNP, Virginia. http://www.hikingupward.com/snp/oldrag/.

UMD (University of Maryland). N.d. Geology Club field trip to Old Rag Mountain, Shenandoah National Park. College Park, MD. http://www.geol.umd.edu/~piccoli/geoclub/oldrag.htm.

Rocking a Cycle of Life

by Sheryl E. Sims

Editor's note: The article is adapted from Mineral Minutes *(newsletter of the Mineralogical Society of the District of Columbia), December 2013, pp. 11–13. Photos: http://library.thinkquest.org/05aug/00461/images/igneous.jpg; http://www.nms.ac.uk/ images/restlessearth-metamorphicrock.jpg; http://4.bp.blogspot.com/sedimentary+rocks.jpg.*

Igneous

Igneous

Who am I in the cycle of my life? I am Igneous. Alicia Keys might be that girl who's on fire, but I am *ignis*—Latin for fire, formed of fire, hot and burning.

I was formed through a transformative process. Gradually, I cool myself. Ages pass during my life cycle. Solidifying over time, my mass increases. My magma, so magnificent, comes from burning layers of lava.

I may be hot, but my form is present and ever changing. It changes with my dark, obsidian mood. Sometimes I appear crystallized; other times, not. I rock unadorned.

I'm vesicular, pegmatitic, spherulitic, and fragmental in texture. Deep below Earth's surface, I'm intrusive and plutonic. With a slow rise to the surface, I'm extrusive. My attributes become volcanic; yet, still I rock. I am Igneous.

My marvelous magma is out of this world! Made up from preexisting rocks, I sometimes melt partially away, exposing myself in the process. Fluid fire, harrowing heat, what will I be when next we meet?

I am what I am. Affected by temperature, I soar. Affected by pressure, I morph into myself, sometimes changing my disposition and composition completely. Why? Because I can. I am Igneous.

You think you know me, don't you? There are over 700 types of me. I hide, waiting to be discovered—waiting in my molten, liquid, mineral form—spongelike at times. A river of firewater running free. Really, who can stop me? I wait, warming in the Earth's crust. Aphanitic, I'm hard and dense. Cooling slowly, I wait, lying just beneath the surface. What's a thousand years? I wait for the time when I am forced to show myself, revealing myself, crystallized, cracks and all.

I am massive and I am small. Within my being, I have it all. I am Igneous. See my plutons? They are exposed for you to see me better. If you'd rather, call them batholiths—or, if it's easier, Mount of Sierra Nevada.

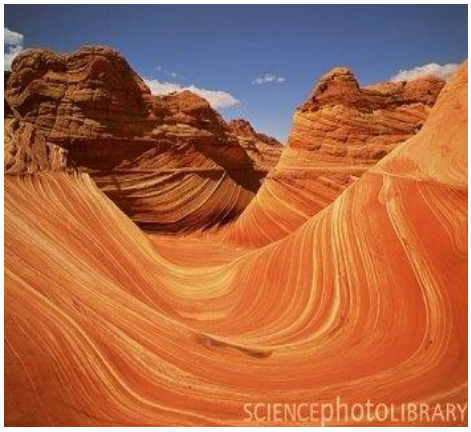
Cooling quickly, my hot, fiery lava spills generously. I warm the Earth and blanket it with colors of the sun. Although many volcanoes try, few can hold me. Cooling slowly, when I surface, I am granite, not to be taken for granted.

Ever changing, I cloak myself in obsidian cases of red, brown, snowflake, and rainbow colors. Smooth as glass and in a class of my own. I am Igneous, and I rock.

Sedimentary

So-so sedimentary, I am like painted desert sand, layers upon layers of sediment ever forming, and thus compacting and cementing me into who I am.

I am sedimentary, fragmented by the remains of the day. Fragmented, perhaps, by plants and animals that stay and decay. My very being comes from both water and air coming in to play.



Sedimentary

Like a character from *Wuthering Heights*, I am broken. Exposing myself near the Earth's surface like a token, my core affected in place, transporting nothing, never molten.

There are two sides to me. Weathered mechanically and chemically, I am reduced to mere pieces of myself. Composed of all that is me, I remain unchanged, for I am sedimentary.

Mechanically, I'm hit. Whether by frost wedges or abrasive encounters; plants and animals may wear me down. Exfoliating me and peeling away my essence, I remain sediment.

Chemically, I'm it. With rocks decomposing around me, vapors of water released and reformed. Who am I? Hydrolysis? Dissolution? Oxidation? All cause me to react.

How acid rain upon me grows; and carbon dioxide within me blows! Dissolute, I am broken, changing to reddish-brown. I crumble as if in need of calcium, I am but a crumbling rock, carried away by erosion.

My load is a heavy one, streaming through my life; leaving behind my silty clay remains, which rest and settle slowly onto the streambed, for that is best.

For I may be called clastic, chemical, or even organic. Yet, though formed by pieces of other rocks, affected by weathering and erosion, I am always sediment.

As such, I am never out of sorts, though I may do well or poorly. Or, missed most sorely, I am what I am, coarse of finely regaled.

Therefore, you can call me conglomerate, sandstone, and shale. For these are just a few of the names by which I hale. Rock salt or halite, limestone or coal, you will find me there; from recent years if you like, or from ages of sediment old.

You will know me by my stratification, fossils, and geodes. My prints are remarkable; they are formed by winds and waves, over many miles. Still, mud cracks me up and fills me until I become fossilized.

Metamorphic

Many might wonder, isn't it time for a change? To morph into something or to change back again? For I derive from a parent rock, existing just for me. I undergo chemical and structure changes, you see. And you wouldn't believe what a relief it can be— to feel heat and pressure texturizing my innermost being.

Changing my internal structure, my weight, and still more. Mountains deformed create such beauty to form me. Both local and regional, it's all metamorphism, you see?

Aligning in layers, my foliation can be great, de-

Metamorphic

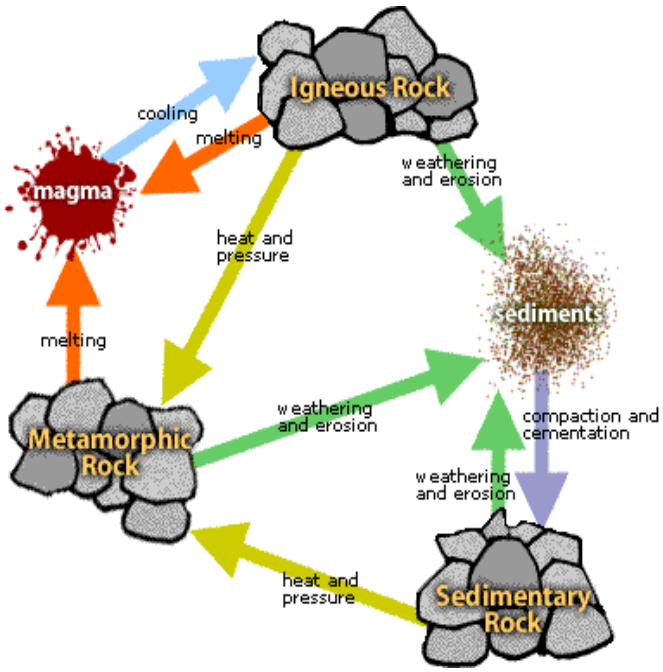
pending on the degree of regional metamorphism, heat, pressure, fluids, and gases so free, determined by the amount of extreme metamorphism that I choose to be.

Contact metamorphism displays hot magma and can really move. Deformational metamorphism is caused by stress and friction, yet grooves. Usually near faults, but none of my own, based on a parent rock that's right in my zone.

To be foliated or not to be—that really is the question. Whether to be quartzite, slate, marble, or even schist, at long last. I may be like sugar, yet not so sweet, but quite gritty alas!

I may be dissolute like an acid with a sizzling fizz to my touch. Or, largely like calcite, colorful and crystalline, as such. Still, maybe just limestone turned to marble, if that's not revealing too much.

For I am metamorphic—and with me—change is oh-so-good. I will become whatever it is that I, for a time, think that I should. As for the pressure, well, I'm not alarmed. In fact, I've grown to like it, so please, pile it on!



Quartz Inclusions

by Paul E. Desautels

Editor's note: The article is adapted from The Cowtown Cutter *(newsletter of the Fort Worth Gem and Mineral Club), August 2013, p. 5; a version appeared as far back as August 1989 in* Agatizer. *The author, Paul Desautels (1920–1991), was the long-time curator of minerals at the Smithsonian Institution.* The Mineralogical Record *has called him "the most influential American curator of the 20th century" (http://www.minrec.org/labels.asp?colid=773).*

When the seven dwarves placed Snow White in a crystal casket to preserve her, they were duplicating a long-established natural process.

Almost every time Nature grows a crystal, she encases in it materials called inclusions. Inclusions give evidence of the temperatures, pressures, composition, and other characteristics of the environment in which the mineral formed.

Not only solids, but also liquids and gases are often trapped during crystal growth. The difference between white, opaque milky quartz and the clear quartz known as rock crystal is multitudes of tiny bubbles of trapped liquid. Frequently, the inclusion will be more than one kind, each called a phase.

One of the most amazing sights under a microscope is the two-phase inclusion of a tiny bit of carbon in a Herkimer diamond from Herkimer County, NY. The carbon can be seen jittering around, bombarded by the ever-moving liquid molecules. This is called the Brownian Motion, after Robert Brown, the botanist who first reported it in 1827.

Natural Chimneys Park in Virginia

by Gerald Elgert

Editor's note: The article is adapted from The Rockhounder *(newsletter of the Gem, Mineral, and Lapidary Society of Montgomery County, MD), August 2013, pp. 5–6.*

Resembling the turrets of a medieval castle, a circle of natural stone chimneys in the Shenandoah Valley near Harrisonburg, VA, tells an interesting geological story.

The chimneys date back roughly 500 million years to the pre-Cambrian period of the Paleozoic era. Although created by natural forces, they resembled manmade structures to the German immigrants who flooded into this region from Pennsylvania in the 1700s. The name chimney stuck.

The early settlers soon discovered deposits of iron in the area; in time, numerous smelting furnaces were constructed. These manmade chimneys were also used to burn the local limestone for use in agriculture.

Actually, chimney is a misnomer; the natural chimneys are not hollow. They are remnants of what was once the compressed and compacted bottom of a sea, capped by a layer of resistant chert. With a hardness of 7 on the Moh Scale, the chert that formed on the bottom of the prehistoric sea made the perfect protective roof for preserving ancient sediments below.

The chert was formed from the compacted silica skeletons of microscopic creatures like sponges, diatoms, and glassy radiolarians that died and fell to the bottom of the muddy sea floor. Over time, small nodules and large sheets of this highly concentrated silica mixture formed.

Reddish chert forms the capstone for the sedimentary rocks that make up the natural chimneys. Photo: Gerald Elgert.

Seven chimneys form a circle in Virginia's Natural Chimneys Park. Photo: Gerald Elgert.

We sometimes find chert as nodules in limestone or as float in a stream, and then we call it flint. If surrounding sediments lend a distinctive color to chert, we know it as jasper. Oxidation of iron minerals caused the redness of the rocks found at Natural Chimneys. The dark red jasper favored by the Native Americans on Maryland's Eastern Shore for their cutting tools and weapons originated from this region.

The surrounding land mass eroded away from the free-standing chimneys. With their table-like tops and steep sides, they resemble small mesas.

The chimneys form a circle. Inside the circle, now obscured by vegetation, are the remains of a lava intrusion. A column of molten magma, driven by pressure from deep within the Earth, forced its way up between the sediment layers and then cooled below the surface. The resistant chert capstone might have kept it from reaching the surface and erupting. The chimneys contain a layer of volcanic stone that squeezed between the layers of sedimentary rock that had been deposited over the ages.

Today, the seven chimneys range in height from 65 to 120 feet. They form the centerpiece of a county park, and they are a geological wonder to be shared by all. How about a field trip?

Upcoming Events

March 2014

1–2
51st Annual Earth Science Gem and Mineral Show, sponsored by the Delaware Mineralogical Society
Delaware Technical and Community College, 400 Stanton-Christiana Rd, Newark, DE (Exit 4B off I–95)

8
24th Annual Mineral, Jewelry, and Fossil Show, sponsored by the Southern Maryland Rock and Mineral Club
The Show Place Arena, 14900 Pennsylvania Ave., Upper Marlboro, MD; 10 a.m. to 5 p.m.; $4 per person, kids 12 and under free

15–16
50th Annual Gem, Mineral and Fossil Show, sponsored by the Gem, Lapidary and Mineral Society of Montgomery County, MD
Montgomery County Fairgrounds, Bldg. 6, 16 Chestnut St., Gaithersburg, MD

22–23
45th Annual Che-Hanna Rock and Mineral Club Show, sponsored by the Che-Hanna Rock and Mineral Club
Athens Twp. Volunteer Fire Hall, Sayre, PA

April 2014

7–13
Wildacres spring classes ($390 per person)
Pompey's Knob, near Little Switzerland, NC

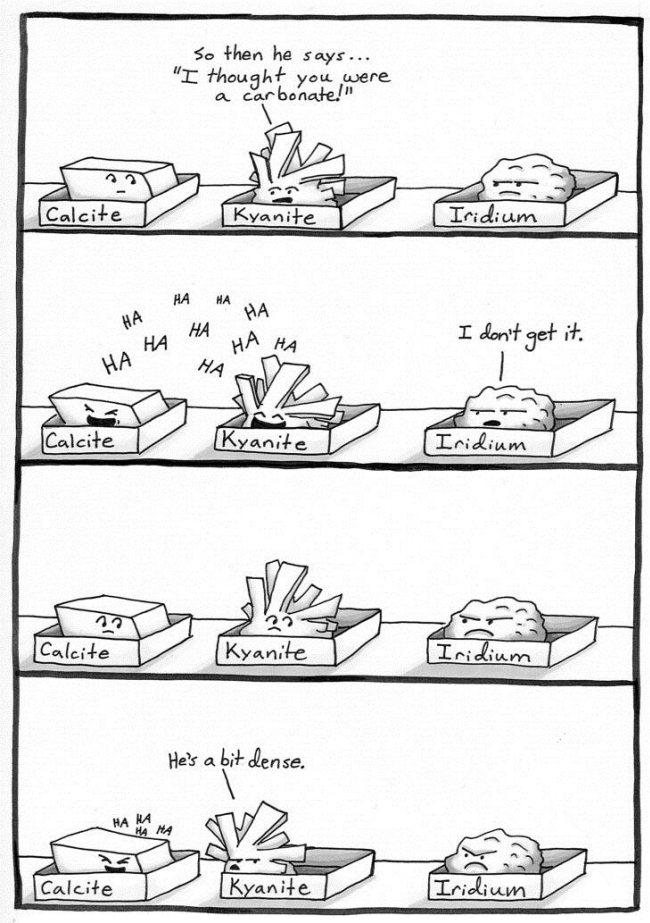
11–13
NY/NJ Mineral, Fossil, Gem, and Jewelry Show
NJ Convention and Exposition Center, 97 Sunfield Ave., Edison, NJ

July 2014

AFMS Convention and Show, sponsored by the Tulsa Rock and Mineral Society
Central Park Hall, Expo Square, Tulsa Fairgrounds, 21st and Yale

August 2014

15–17
Gem Miner's Jubilee
Lebanon Expo Center, 80 Rocherty Rd., Lebanon, PA; Route 72, 5 miles north of PA Turnpike—Exit 266



Source: Deviantart.com.

THE NORTHERN VIRGINIA MINERAL CLUB INC

Crystals are the flowers of the Mineral Kingdom

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The Northern Virginia Mineral Club

You can send your newsletter articles to:

news.nvmc@gmail.com

Visitors are always welcome at our club meetings!

RENEW YOUR MEMBERSHIP!

SEND YOUR DUES TO:
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 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.*