



# The Conglomerate

Newsletter of the Baltimore Mineral Society

[www.baltimoremineralsociety.org](http://www.baltimoremineralsociety.org)

Volume 11, No. 1

January 2016

## January Meeting

For our January 27th program, Jake Slagle will continue his review of features from his blog, Mineral Bliss ([www.mineralbliss.blogspot.com](http://www.mineralbliss.blogspot.com)). His topics will include Fred Parker's presentation on Maryland Mineralogy at the Rochester Mineralogical Symposium; Exquisite Maryland Micromounts; Lessons Learned from John S. White; Maryland's Embarrassing State Gemstone; The Largest Native Maryland Gemstone in Existence, and more.

The meeting will take place at the Natural History Society of Maryland, For directions, visit the BMS website at [baltimoremineralsociety.org/directions.html](http://baltimoremineralsociety.org/directions.html). The meeting will begin at 7:30 pm. Refreshments will be provided by the Weinbergers.

## Meet & Greet at NHSM

*by Brad Grant*

The Natural History Society of Maryland and Baltimore Mineral Society are hosting a Maryland Rocks & Minerals "Meet & Greet" on Saturday, February 14. The event will be held from 1 - 4 pm at NHSM on Belair Rd.

The focus of the afternoon will be the collection of Maryland minerals held by NHSM with specific attention given to chromite from Baltimore and Harford Counties. Johnny Johnson, well known area geologist and expert on chromite and copper mining in Maryland will be the guest speaker.

The program is free and open to the public. For more information, contact Brad Grant.

## The Mystery of Rose Quartz

*photos and text ©by John Vanko, 2015*

Quartz Crystal was my first mineral, in the mid-1950s, and it got me hooked. My Father took me to Loch Raven Reservoir and by picking up and turning over fist-sized rocks, along the shore, we found some small, beautiful clear points - I still have that specimen.

Then I had to discover everything I could about Quartz - from the Golden Nature Guide, Rocks and Minerals, by Herbert S. Zim. There I learned of other varieties of Quartz. I knew about Milky Quartz, and grey Smoky Quartz, but in Rocks and Minerals I read of Amethyst and Rose Quartz and Cairngorm.

Amethyst was fairly prevalent, especially in crystals, I soon learned, but Rose Quartz was much less common. Eventually, I obtained massive Rose Quartz but I was intrigued by the tales of crystals of Rose Quartz. They were quite rare, as far as I could tell.



*Rose Quartz, Newry, Maine crystal 3.5mm across*

I purchased my first Rose Quartz crystal specimen, and it came from Newry, Maine. At that time it was the

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## Baltimore Mineral Society

The BMS was established in order to allow its members the opportunity to promote the study of mineralogy and to act as a source of information and inspiration for the mineral collector. We are members of the Eastern Federation of Mineralogical Societies and affiliated with the American Federation of Mineralogical Societies.

Meetings are held the 4th Wednesday of each month (except November, December, June & August) at the Natural History Society of Maryland beginning at 7:30 p.m. Visit the club website <[www.baltimoremineralsociety.com](http://www.baltimoremineralsociety.com)> for directions.

Yearly dues are \$10 for individual members and \$15 for family memberships. Send payment along with your name, list of family members, if applicable, address, phone and e-mail to: BMS, PO Box 302; Glyndon, MD 21071-0302.

### Officers:

President.....Jim Hooper  
<[ijhooper at jhu.edu](mailto:ijhooper@jhu.edu)>

Vice President ..... Alice Cherbonnier  
<[alicecherbonnier at gmail.com](mailto:alicecherbonnier@gmail.com)>

Secretary.....Jake Slagle  
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Treasurer ..... Carolyn Weinberger  
<[cscrystals2 at gmail.com](mailto:cscrystals2@gmail.com)>

### Directors:

Bernie Emery                      Al Pribula  
Brad Grant                         Steve Weinberger

Conference Chair                 Mike Seeds

Editor .....Mike Seeds  
<[mseeds at fandm.edu](mailto:mseeds@fandm.edu)>

### Write for "The Conglomerate"!

Send news, announcements, comments, observations, or articles to <[mseeds at fandm.edu](mailto:mseeds@fandm.edu)>. No e-mail? Hand in your submission at a meeting.

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## President's Postings

by Jim Hooper, BMS President



Best wishes to one and all for a prosperous New Year! That being said, I can say I'm glad we're beginning our third year meeting at the home of the Maryland Natural History Society. The linking of the two organizations I believe has been very beneficial to both. Some of our newest members found us by that link and MNHS is very much welcoming the resources of our membership in enhancing their mineralogical and geologic areas with contributions of BMS members. It's gratifying to see the building getting its face lift and the changes that become apparent when we gather for our meetings. The link-up seems to be, well, a 'natural'.

On behalf of the Society I'd like to thank Vice President Alice Cherbonnier for hosting our annual winter holiday party at her place in Baltimore. It was there among the excellent food and beverage, and the convivial patter of many conversations that we found that the slate of candidates for officers and directors could remain as it was for the previous year with the addition of Brad Grant, our immediate past president and current webmaster. The motion to accept the slate was approved by the voting membership with no changes. I thank you one and all for that. It's great to see our newsletter and web site continuing to look better all the time. Thank you Mike Seeds and Brad Grant!

I think we're going to hear more about BMS supported activities put on by the MNHS and I'm looking forward to those. Both societies could jointly offer educational activities focusing on minerals and Maryland's history with these assets.

Local collecting at quarries has been unfortunately quiet reflecting the continuing trend nationwide in many quarries finding the costs and potential hazards of having groups at their sites just too much of a liability risk and disturbance to regular operations. Field trip marshal Bob Eberle says he still has some possible sites he's negotiating with in local areas and is looking over the horizon into Pennsylvania and Virginia for additional sites. Let's keep our hopes up and if you hear of a site that might be worth checking, please let Bob know.

I also want to thank Steve Weinberger for introducing his Mineral of the Month presentations that have quickly become a popular part of our regular meetings. And in a related area, we would like to have input for our monthly presentations. This includes both subject matter suggestions, and connections to speaker/presenters. As always, society members are invited to present on any mineralogical areas. If you have/know any, please contact Jake for scheduling, etc..

I'm looking forward to a year where we'll see more Maryland minerals at meetings, both those collected in the past and those found more recently.

I believe there is a show of sorts coming near the end of the month and into February. Tucson, AZ I believe is the locality and I hear the weather can be

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## Minutes From our Last Meeting

by Jake Slagle, Secretary



President Jim Hooper called the very informal meeting to order at approximately 6:50 p.m. during the Society's Holiday party at the home of Vice President Alice Cherbonnier on December 19, 2015. He stated that the purpose of the meeting was to nominate and elect a slate of officers and directors. He noted that all who had held these positions through 2015 were willing and able to serve

in said positions through 2016, and that the names of no other candidates had been submitted for nomination. He named the officers and directors who served for the year 2015 as follows:

President: Jim Hooper

Vice President: Alice Cherbonnier

Treasurer: Carolyn Weinberger

Secretary: Jake Slagle

Directors:

Bernie Emery

Al Pribula

Brad Grant (Past Pres)

Steve Weinberger

Mike Seeds (as Chair of the Desautels Symposium.)

Motions were made, seconded, and approved elect the slate of officers and directors.

Announcements:

Carolyn Weinberger announced that the American Federation of Mineralogical Societies had awarded Jake Slagle third place in the Written Features category for his article that appeared in the Conglomerate entitled "The Early History of the Baltimore Mineral Society."

With no further announcements or business, a motion was made, seconded, and approved for adjournment at 7:05 p.m.

Respectfully submitted,  
Jake Slagle, Secretary

## President's Postings

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very pleasant this time of year. Just beyond that will be the Spring semester of the Wildacres workshops in the beautiful setting of the North Carolina mountain woodlands. There is still be time to sign up. Contact Steve Weinberger for details or visit <efmls-wildacres.org> for a registration form, list of classes and more information.

If you ever wanted to submit an article for the newsletter, but weren't sure about how that works, please contact me or Mike Seeds <mseeds@fandm.edu>.

Remember to be careful collecting everywhere and be mindful of who's property you're on. See you at the meeting!

Hoop

## A Bit of Housekeeping

by Carolyn Weinberger, Treasurer

Now that the new year has begun, it's time to remind everyone that it's time to renew your membership in the BMS. A convenient information form has been included in this issue for you to fill out (so we're sure of having your correct information) and remit with your dues.



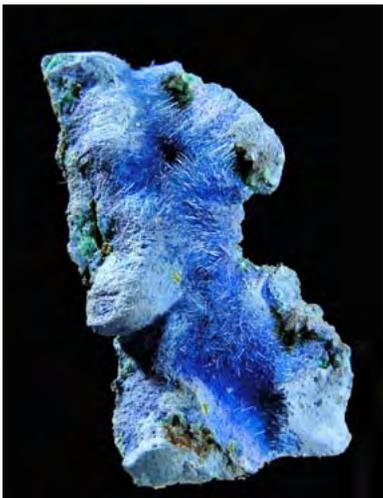
The "admission" price for remaining a member is a modest \$10 per individual member and \$15 per family (two adults and all kids under 18 living in the same home). Considering what you receive for your membership (our award winning Conglomerate, access to field trips, interesting programs and more), our dues are a bargain.

The cut-off for renewal is the February meeting, but why wait and chance forgetting. Information on where to send your renewal is on the form on page 11.

## Mineral of the Month – Cyanotrichite

by Steve Weinberger

Our mineral this month, Cyanotrichite, discovered in 1839, is a member of the nickelalumite group. Its name comes from the Greek *kyanos* and *thrix* meaning blue and hair.



Maid of Sunshine Mine  
Turquoise Dist, Dragoon Mts.  
Cochise County, AZ

Photo: Rob Lavinsky, I-Rocks.com  
used under Creative Commons Attribution-  
Share Alike 3.0 license

Cyanotrichite's formula is  $\text{Cu}_4(\text{SO}_4)(\text{OH})_{12} \cdot 2\text{H}_2\text{O}$ . It forms in the orthorhombic system, is pale to azure blue, has a density of 2.74-2.95, and has a hardness of 1-3. There is a silky luster to it and it forms in velvet tufts or small acicular crystals. It is pleochroic.

It is a very pretty mineral because of its color and fine needle-like crystal structure, but it is sometimes difficult to photograph in micromineral size because the needles can move if slightly jarred, thus blurring the stacked images. The stacking has to be done because the very small crystals require magnification which causes a very shallow depth-of-field, thus causing most of a single image to be out of focus.

Excellent specimens of cyanotrichite have been found in Arizona at the Morenci, Maid of Sunshine, and Grandview Mines. Also, in nearby Nevada, good examples were found in the Majuba Hill and Mason Park Districts. Nice examples come from other world-wide regions such as the Atacama Region in Chile and France, Italy, Romania, Slovakia and Greece.



Grand View Mine

Cape Royal, Horseshoe Mesa, Grand Canyon National Park  
Grandview District, Coconino County, AZ

Photo: Rob Lavinsky, I-Rocks.com  
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## Poster Night

by Mike Seeds

Last month was poster night at the Big Dig Rock Club meeting. The members were invited to make posters about minerals and bring them to the meeting. Pudge promised to distribute the posters to science teachers in local schools. A number of members made posters and everyone had fun eating cookies and looking at the photographs and captions and diagrams.

Everyone liked Eddie's poster because he had big photos of some common copper minerals carefully captioned. A photo of azurite was labeled, "Azurite is  $\text{Cu}_3(\text{CO}_3)_2(\text{OH})_2$  meaning it is composed of atoms of copper (Cu), carbon (C), oxygen (O) and hydrogen (H). It is deep, intense blue." In the middle of the poster he had a photo of malachite with the caption, "Malachite is  $\text{Cu}_2(\text{CO}_3)(\text{OH})_2$  showing that it is also composed of atoms of copper, carbon, oxygen and hydrogen, but they are arranged differently than in azurite. Malachite is usually bright green and can form tiny hairs as well as solid crystals." At the bottom was a photo with the caption, "Azurite replaced by malachite. Because they are so similar, it is not unusual to find crystals of blue azurite that have been coated by or even replaced by green malachite."

Eddie pointed at the chemical formulae, "I wanted people to see how similar the two minerals are. It's the same bunch of atoms."

Slick's girlfriend, Suzy, nodded, "I teach high school chemistry, so this would be wonderful in my classroom, but one word isn't quite right," and she put her finger on a word on the poster.

What did Suzy point at?

Solution on page 5

### References:

Hyrsl, Jaroslav, and Jan H. Bernard. *Minerals and their Localities*  
*Mindat.org*  
National Audubon Society. *Field Guide to Rocks & Minerals.*

# Rose Quartz

*continued from page 1*

best, and the only, place in the world to find them. After another couple decades or so, Rose Quartz crystals from Brazil began to appear at mineral shows. They were very expensive, and much more gemmy than anything I had seen from Newry.

Finally, I was able to afford Brazilian Rose Quartz crystals. They were exquisite, far beyond the quality of my Newry specimens. But, why? In their tips, these Brazilian specimens were truly transparent, not clouded. Everything I had seen from Newry was opaque, turbid is the precise word. The color was that same, as far as I could determine, but the transparency was different as night and day. Why?



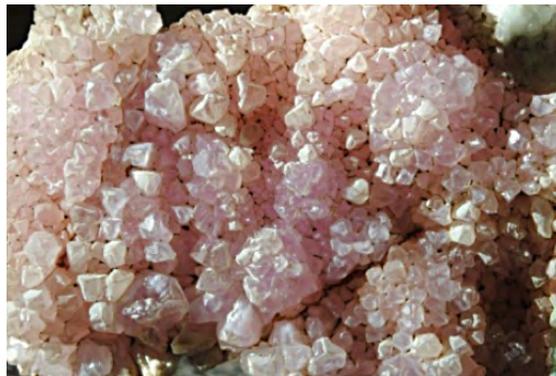
*Rose Quartz crystals, Galilea, Brazil, top crystal 4mm across*

As I became a serious student of mineralogy I obtained *The System of Mineralogy, Volume III - Silica Minerals*, by Clifford Frondel, seventh edition, 1962. It was the fount of knowledge I needed. The discussion of Rose Quartz recounted the early chemical analyses that focused attention on Manganese ion content and Titanium ion content as possible sources for the color. But massive Rose Quartz can be found that has almost no Manganese, and Titanium may come from included Rutile that often gives rise to asterism. The depth of rose color does not correlate with amount of Titanium content. So how can Manganese or Titanium be responsible for the color. Frondel gives no answer.



*Rose Quartz, Brazil. Specimen back lit. Field of View, 10 cm*

In recent years, attention has begun to focus on Dumortierite (a basic aluminum borosilicate) inclusions, Phosphorous, and perhaps Phosphate ions. If you collect enough Rose Quartz you learn very quickly that matrix specimens occur in masses of Cleavelandite, a variety of Albite. An occasional accessory mineral is Eosphorite, a hydrous basic iron manganese aluminum phosphate.



*Rose Quartz, Brazil. Field of View 11 cm. Same specimen as previous, but lighting is from the side.*

Here is what Frederick H. Pough has to say about Eosphorite in *A Field Guide to Rocks and Minerals* (third printing, 1957), "Eosphorite is always a mineral of the late stage of complex pegmatite formation, in phosphate-rich pegmatites. ... in isolated crystals in the small cavities in cleavelandite. ... the best occurrences are in some of the Maine pegmatites, particularly at Newry."

The final word hasn't been written on the cause of color in Rose Quartz, and it may very well be that it has more than one origin. But Phosphorus, or Phosphate ions, seem to play a key role in the finest examples. In our world of technology overload, not knowing the answer to this mystery only enhances the desirability, and the mystique, of Rose Quartz.

## Poster Night Solution

Suzy was pointing at the word "replaced". Gus shook his head, "We say that all the time. Azurite replaced by malachite is common. It's all over Mindat. Everybody says that."

Suzy shrugged. "And it's not so unusual for everybody to be wrong. Azurite isn't really replaced by malachite. The azurite gives up some CO<sub>2</sub> and the atoms rearrange themselves to make malachite. That's not really replacement. It's transformation."

Eddie was nodding agreement, but Slick shook his head, "Come on Suzy. That's getting pretty picky," he said.

Suzy laughed, and pointed her finger at him. "Watch it sweetie," she smiled. "You could be replaced."

# Native Elements – The Sulfur Group

by Al Pribula. Photos and specimens by Mike Seeds

Towards the right-hand side of the periodic table, we encounter our final group of native elements—the sulfur group. The three nonmetals sulfur, selenium, and tellurium are all chemically similar to one another and are found in the same column of the periodic table as oxygen. (As I mentioned earlier, some folks prefer to classify tellurium as a metalloid, but mineralogically it is classified with the sulfur group and chemically it is less “metalloidal” than, say, arsenic or antimony.) Of the three, only sulfur is reasonably common (in any form, not just native) and likely to be familiar to most people.

All three of these materials have properties typical of nonmetals: soft, low-melting, poor conductors of heat and electricity, etc. These properties are summarized below.

Element	Symbol (Atomic #)	Melting Point	Hardness
Sulfur	S (16)	112.8° C (235° F)	1½-2½
Selenium	Se (34)	217°C (423°F)	2
Tellurium	Te (52)	449.5°C (841°F)	2-2½

Sulfur (also spelled sulphur, as on Mindat) is fairly common in the earth’s crust (about 300 parts per million) and is fairly commonly found in its native form. Most sulfur is found chemically combined with metals in sulfides and sulfosalts or with metals in its oxidized form of the polyatomic sulfate ion ( $SO_4^{2-}$ ). At the boundaries deep in the ocean where crustal plates are spreading, hot liquid rich in metals and sulfur is constantly being forced through the crust. As this cools, it forms deposits of metal sulfides, as well as hydrogen sulfide ( $H_2S$ ). (Since the metal sulfides formed are very dark in color, these are called “black smokers.”) It is believed that the large deposits of sulfide ores (of lead, copper, zinc, nickel, mercury, etc.) now found on land are the result of similar geochemical processes. Around these deposits, unique biological communities develop, where the organisms use the hydrogen sulfide as an energy source rather than oxygen. It is likely that other sulfur-containing minerals (including native sulfur) form from these initial deposits of metal sulfides.

Sulfur has been known since ancient times. Its name is the same as in Latin, and it is also called brimstone (especially in ancient references, and in the Bible). Native sulfur is yellow in color (sometimes darkened to orange or honey-brown), and has a characteristic odor. (This is

actually the odor of sulfur dioxide, which forms from slight reaction of the sulfur with oxygen, not of the sulfur itself.) Sulfur crystals have the odd property of giving a crackling sound when held in the hand, due to thermal expansion of the crystals. It is in the orthorhombic crystal system, and its crystals tend to be diamond-shaped in cross-section, dipyramidal or thick tabular. (This is referring to the most common crystal form of sulfur, also called  $\alpha$ -sulfur (alpha-sulfur). There are two other polymorphs,  $\beta$ -sulfur (beta-sulfur, mineralogically named sulfur- $\beta$ ) and  $\gamma$ -sulfur (gamma-sulfur, mineral name rosickyite). These other polymorphs form monoclinic crystals and are considerably more rare than the  $\alpha$ -sulfur form most familiar to us.) It can also be found in solid masses and crusts. It can form around volcanic fumaroles (for example, in Hawaii Volcanoes National Park, the fumaroles along what they call the Sulphur Banks produce some gorgeous micro-crystals of sulfur, but they’re uncollectable because (1) you’re in a national park, (2) the smell of sulfur dioxide is almost overpowering in the area, and (3) the ground surrounding these fumaroles is unstable and you’re likely to fall in and asphyxiate and/or fry yourself). Sulfur forms in underground coal-mine fires, and can also form by bacterial action. It also is found in limestones and other sedimentary rocks, with celestite, calcite, aragonite, anhydrite, and gypsum. It often contains some selenium (possibly in the form of what used to be named selen-sulfur (S $Se$ )), which makes the color more orange, as well as tellurium, clay, or other admixed impurities.

It can be found in well-formed crystals at many localities. The best-known localities (and which produce probably the best crystals) are in Sicily (Agrigento and other towns), but good crystals are also found in Bolivia, Russia, China, Poland, Mexico (Baja California), and the US (NV, MI), as well as many other worldwide localities. The cap rocks on the salt domes in Texas and Louisiana are mined for sulfur, but since the underground deposits are mined by melting the sulfur with superheated steam, pumping the molten sulfur to the surface, and then cooling the sulfur to re-solidify it, these produce no good crystals, only massive specimens. Rosickyite, much more rare, is found in the Czech Republic, Italy, and CA, and sulfur- $\beta$  is even more rare, having been identified from a couple of volcanic fumaroles.

World production of sulfur is on the order of 60 million

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## Native Elements

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tons annually. Powdered sulfur (called flowers of sulfur) can be used as an insecticide and fungicide. It is added to rubber to vulcanize and strengthen it for vehicle tires, and is a component of gunpowder and fireworks. The biggest commercial use of sulfur is in the production of sulfuric acid, the chemical produced in the largest quantity by the chemical industry. Some of the sulfur used for this purpose is mined as native sulfur, but much of it comes from de-sulfurizing natural gas and petroleum, and from capturing and recycling the sulfur dioxide produced from coal-burning power plants and the smelting of metal sulfide ores. Sulfuric acid is used for pickling steel and other metals, in paper manufacturing, and in the production of fertilizers, explosives, detergents, synthetic fabrics, insecticides, and many other chemicals and products. Many sulfur compounds have pungent (and unpleasant) odors. The smells of onions and garlic are both due to sulfur compounds, and hydrogen sulfide (H<sub>2</sub>S) is nicknamed “rotten egg gas.” The aroma of skunk spray is due to a mixture of sulfur compounds, and they are also purposely added to natural gas (which has no odor of its own) to make it easier to detect leaks.

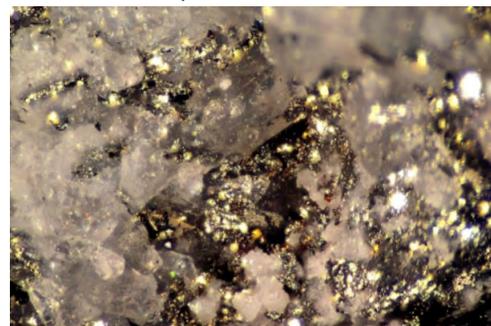
Selenium is much less common than sulfur, both in the earth’s crust (about 50 parts per billion, the same as mercury) and in its native form. Ingestion of selenium compounds can lead to an unpleasant condition called “selenium breath” because the body partially metabolizes the selenium to dimethyl selenide, which has a strong garlic-like odor. It exists in two allotropes, one more nonmetallic (with the same structure as sulfur) and one more metallic. The more metallic allotrope is the one that occurs naturally. Natural samples normally contain a small amount of sulfur, and perhaps significant amounts of tellurium. It can be found as acicular crystals on sandstone in the Homestead Mine, NM and also in South Dakota, Colorado, Arizona, and New Mexico in the US, and in the Czech Republic. It has also been found as a result of the underground coal mine fires in Pennsylvania. It is used in photocells and photocopiers (it conducts electricity 1000 times better when light is shining on it), to de-



*Selenium needle, 3mm long; Jerome, AZ*

colorize glass (or, in a different form, to give it a deep red color), in some pigments, and in animal feeds.

Tellurium is the rarest of the three (about 5 parts per billion in the earth’s crust) and is seldom seen in any mineral form, either combined or native. Probably not surprisingly (Selenium and Tellurium are chemically pretty similar, after all), ingestion of tellurium compounds can lead to “tellurium breath,” which is just as bad as “selenium breath,” if not worse. It has been found in Cripple Creek and other localities in Colorado with gold tellurides, in New Mexico, Mexico, Turkey, Romania, Australia, and Japan. It has no large commercial/industrial applications, but it is used to some extent in metal alloys and in photoreceptors and other microelectronic devices.



*Tellurium, Nagygag, Romania. Field of view 3 mm.*

This concludes my series on the native elements. I hope that you stayed with me throughout the series and that I have helped you to appreciate and better understand these simple yet interesting and important minerals.

## Publish Your Mineral Photos and Stories

Want to see your minerals in The Conglomerate? Whether you dig them yourself or buy them from a dealer, whether they are micromounts or boulders, whether they are rare or common, readers would enjoy seeing your mineral photographs and hearing about your adventures. Have you visited a mineral museum lately, gone collecting, driven through promising geology? Got some selfies in a rock shop or a mineral show? Submit your photos and stories so everyone can enjoy them. Send photos to [mseeds@fandm.edu](mailto:mseeds@fandm.edu)

# Shoobox Adventures: Xls

photos and text by Mike Seeds

Crystals are the things that make us collect minerals. It's all very well to have a yellow smudge on a rock and know that it is a rare mineral, but we really like those crystals. The regularity and precision of their formation is both beautiful and fascinating, and it is all produced by the forces that hold the atoms together. Nevertheless, crystals, like people, are always more interesting than we might expect, and some crystals are just a little bit off.

There were lots of beautiful crystals at the East Coast Gem and Mineral Show in Springfield, Massachusetts last August, but one of the best was a little blue benitoite. Benitoite is a rare mineral originally found at only one site in California. It is now known from the Czech Republic, Japan, and Arkansas, Montana, and 6 places in California. Usually vitreous, the little specimen from the Springfield show was a bit abraded, but it showed the typical crystal faces, so it rode home in my shoebox.

Minerals are classified into six systems depending on their atomic structure. (See <[www.gemsociety.org/article/mineral-habits/](http://www.gemsociety.org/article/mineral-habits/)>). Halite (salt) is part of the cubic system, and forms cubic crystals. Fluorite is also cubic and forms cubes, but it can also form octahedrons. Cubes and octahedrons are two of the habits that minerals from the cubic system can form. Benitoite is a member of the hexagonal



Benitoite TL Dallas Gem Mine, San Benito County, California. Field of View 10 mm.

system along with vanadinite. Although vanadinite forms hexagonal crystals, benitoite forms triangular crystals, and that is one of the permitted habits of minerals from the hexagonal system. So the little benitoite crystal has the shape it is supposed to have.

Anatase is in the tetragonal system, and although it can take a number of different forms, mineral collectors know it best in a dipyrmidal habit. That is, it takes the shape of two four-sided pyramids joined base to base and often truncated at the points. In fact, that shape is so common, it is unusual to see anatase in any other form, but other habits are possible in the tetragonal system. A little blue anatase turned up recently that was a pill; it was not dipyrmidal but rather a squarish pill shape. Lots of faces are visible on the crystal, but they are all part of an uncommon habit for te-

tragonal minerals. The anatase crystal is unusual, but it isn't going to get a ticket for having an illegal habit. It is following the rules for tetragonal minerals.



Anatase, Minas Gerais, Brazil. Field of view 3 mm

Chambersite is a rare mineral from the orthorhombic system, and it is most often found as tetrahedrons, four-sided figures with a triangular base and three triangular sides. Seen from above, the crystals have a triangular outline. The points are often truncated and sometimes extra crystal faces are visible along the edges. Out of the 32 photos of chambersite on Mindat.org, nearly all have this shape. Roughly half of the notes accompanying the photos refer to a tetrahedral shape.



Looking down on a point of a crystal of Chambersite. Barbers Hill Salt Dome, Chambers County, Texas. Field of view 7 mm.

But a tetrahedron is not one of the habits permitted in the orthorhombic system. Chambersite should have a hall pass giving it permission to have the wrong habit. It isn't clear how the little atoms manage to stack up to make something that looks like a tetrahedron, but they do it almost every time. Something about the forces between the atoms sorts them into this form. So the crystals are not really tetrahedrons and should more properly be called pseudotetrahedrons.

Al Pribula points out that the axial ratios given for Chambersite are 1 to 1 to 1.412. That is, two of the axes are equal and one is 1.412 times longer. This raises two interesting questions. If two of the axes are equal, then shouldn't the mineral be in the tetragonal system? Perhaps the two axes are not exactly equal. But second, 1.412 is a very interesting number. It is nearly equal to the square root of 2, which equals 1.4142135 . . . Is that an accident, or does it mean something about that atomic structure?

Mineral crystals are lovely and fascinating in their overall shape, and some people find their shapes so beautiful, they expect crystals to have special powers to affect us. But the deepest and most interesting secrets in crystals lie among the atoms that join together to give crystals their shapes.

## Why Do Minerals Have Different Hardness?

By Don Peck from *Chips & Deposits*, January 2008

Hardness in minerals is resistance to scratching or abrasion. We all use the scale proposed by Friedrich Mohs in 1822 to estimate the hardness of our unknown finds. There are other scales used by professional mineralogists; the one most commonly used being the Vickers scale. It employs a micro indentation process in which a diamond point is pressed into the mineral

We know that different minerals have different hardness's. Why? Well, hardness is related to the strength of chemical bond, the size of the ions or molecules in the structure, the electrical charge on the ions, and the closeness of packing.

Calcite is calcium carbonate ( $\text{CaCO}_3$ ). Siderite is iron carbonate,  $\text{FeCO}_3$ . The size of the calcium ion is significantly larger than the iron II ion. Both ions have the same electrical charge and both minerals have the same crystal structure. The packing in siderite is closer than that in calcite, making for slightly stronger ionic bonds; and siderite has a hardness of  $4\frac{1}{2}$  while calcite's is 3

Aragonite and calcite are both calcium carbonate,  $\text{CaCO}_3$ ; but the crystal structure is different. Calcite has a trigonal packing structure while aragonite is orthorhombic. There is less space in the orthorhombic aragonite, making it more densely packed, thus the ionic attractions are stronger. Its hardness is 4 as opposed to calcite's 3. (Aragonite also has a density of  $2.93\text{g/cm}^3$  against calcite's  $2.71\text{g/cm}^3$ ) We all know that diamond is the hardest mineral known and graphite is one of the softest.

Both are pure carbon. But while the carbon in diamonds is linked in a three dimensional network of strong rigid covalent bonds, graphite has its carbon atoms linked strongly in flat, two dimensional, hexagonal networks with weak bonds between the stacked layers of nets.

Water of hydration reduces the hardness of minerals. A good comparison is anhydrite to gypsum. Anhydrite is calcium sulfate,  $\text{CaSO}_4$ . Gypsum is calcium sulfate with two molecules of water,  $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ . The water molecules do not carry an electrical charge and are loosely bonded in the structure. The result is that gypsum (2) is softer than anhydrite ( $3\frac{1}{2}$ )

Knowing the reasons for differences in hardness will not help us measure it, but it can help in differentiating between two minerals...in any case, knowing is satisfying.

## EFMLS Wildacres Workshops

by Steve Weinberger

Imagine yourself spending a week away from the pressures of life, the noise of car and truck horns, blaring radios, stories of crime blaring at you from the local news, and, if you're not retired, the pressures of "the boss" who expects you to "work" to earn that paycheck. We have a terrific solution for you – an opportunity to get away from all of the above and immerse yourself in relaxing, learning a new skill or two, and learning new things from a guest speaker. That solution is attending one or both of the 2016 EFMLS Workshops at Wildacres in North Carolina.

Wildacres is a fantastic retreat located on Pompeys Knob just off the Blue Ridge Parkway about an hour north of Asheville. The property consists of over 1,000 acres, much of which is truly kept "wild". The facility features two large lodges with private, motel style bedrooms (each with private bath), well equipped lapidary and jewelry studios and other classroom spaces, an auditorium, hiking trails, dining room and fantastic views of Mt. Mitchell and the surrounding Blue Ridge range. Owned by a private foundation that allows non-profit groups such as ours to come for a few days for workshops that encourage the betterment of mankind, we've been privileged to be allowed to use the facility for the past 43 years.

Each session consists of time for participants to take one or two classes, hear excellent talks from our guest speaker, join a field trip, explore the area, and participate in a variety of other activities. Our instructors, all volunteers are outstanding and bring with them a wealth of knowledge about their subject, lots of teaching experience and above all, patience!

Dates for 2016 are May 9 – 15 and September 5 – 11. Descriptions for our spring classes are on page 8. We're still working on the fall list, but will include faceting, fused glass, silversmithing and wirewrap for sure. Descriptions for all fall classes will be in the next EFMLS News and on our website. Tuition for each session this year will be \$400 per person which includes your room and board for the week and gratuity for the Wildacres Retreat staff. You will be asked to pay your instructor(s) a materials fee, but that depends on what class or classes you select. Materials fees will be announced closer to the workshop session since costs, especially that of metals, do tend to change.

Interested? Visit [efmls-wildacres.org](http://efmls-wildacres.org) for info on classes, registration and more.

## My Initial View

by Matt Charsky, AFMS President. From AFMS Newsletter, December-January 2015

On my way up the Presidential ladder, I learned a lot about how the AFMS functions. As I performed my duties in each position, I see three primary areas of importance: membership, contact, and participation.

### Membership:

AFMS and Regional Federations rely heavily on the funds generated from membership dues. Recent years, except for 2015, have shown a slight decrease in the portion of membership dues that comes to AFMS, but the decrease does not represent a significant change. In fact in 2015, most Regional Federations increased membership – is this a one year blip? I hope not and so I would like to reward the Regional Federation that increases membership the most from one year to the next. Let's call it a "friendly competition" that gives one Federation bragging rights for one year. All that has to be done is to compare membership numbers for two consecutive years (2014 and 2015) and the highest difference is the winner. I volunteer to do it for the first year and share the results in early 2016.

### Contact:

AFMS is set up to encourage contact among all the Regional Federations. The AFMS Officers and Committee Chairs may initially take the lead, but the Regional Representatives need to be players also. So let's have some contact throughout 2016 by all Committees but especially on those that have a combined AFMS/Regional Federation focus. Each AFMS officer has tasks and duties that might be accomplished a little easier with some contact. As President, I will start the ball rolling by contacting the AFMS Regional Vice-Presidents, AFMS Committee Chairs, and the Presidents of each of the Federations throughout 2016. I would like the AFMS Regional Vice-Presidents who have responsibilities with several AFMS Committee Chairs to contact these chairs and find out how that particular Committee is functioning during 2016 – good and bad. You do not have to wait until the 2016 AFMS Convention in July to contact the Committee Chairs.

### Participation:

AFMS has numerous programs and competitions for the benefit of Regional Federations. For example, we have Informational Programs like American Lands Access Association (ALAA), Legislation and Conservation, Judges Training Seminar, Special Congress Representing Involved Bulletin Editor (SCRIBE), and Safety. We also have rewarding programs like Club Rockhounds of the Year, Junior Activity

Badge Program, Program Competition, and Inter-Regional Field Trips. In addition, we have Competitive Programs like Bulletin Editors Advisory Contest (BEAC), Web Site Contest, and All American Club. Hopefully, none of these programs is a surprise to

any of you. My point is that AFMS spends resources on these programs (i.e., people, time, and money), so let's continue to support all of them. These programs are part of who we are, so please participate.

If you can do one activity this year, please try to contribute to our Endowment Fund. With our next convention scheduled for July, the time-frame for donations will be limited. We have a new Endowment Fund Chair for 2016, Cheryl Neary, and she is a real gem.

Finally, there is nothing like having face to face contacts between AFMS and Regional Federations, so try to attend AFMS and Regional conventions and Regional Board meetings if you can. If you cannot be there in person, email your ideas and suggestions to the existing officers. We need to hear from the membership.

So as I travel to each Regional Convention in 2016, show me what you do to further the hobby and maybe it will be part of one of my monthly messages.



## AFMS Scholarship Fund Donation

by Steve Weinberger

You may recall that during our October meeting we voted to send the AFMS Scholarship Foundation a contribution of \$1 for each of our members. That contribution, plus a memorial contribution sent by Carolyn and me in memory of BMS member Cynthia Payne has now brought our giving percentage up to 500%. (That means the club has given \$1 for each of its members 5 times).

# Baltimore Mineral Society Membership Renewal

Name: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Telephone: \_\_\_\_\_

E-mail: \_\_\_\_\_

Names of family members included in membership:

\_\_\_\_\_  
\_\_\_\_\_

Annual dues for individual memberships are \$10.00

Annual dues for family memberships shall be \$15.00 for husband and wife and all children residing in the home under the age of 18.

***Renewal deadline is the February meeting.***

Mail or give to: Carolyn Weinberger  
PO Box 302  
Glyndon, MD 21071-0302

Checks should be made payable to "Baltimore Mineral Society".

## 2016 Meeting "Caterers"

Thanks to the following members who have volunteered to "cater" our upcoming BMS meetings.

January - the Weinbergers  
February - Al Pribula  
March - Jim Hooper  
April - Steve Dyer  
May - Jake Slagle  
July - Mike Seeds

September - Herb Close  
October - Anitra Schorr

Additional volunteers would be most welcome. Just contact the person listed so you can coordinate who's bringing what!

# The Conglomerate

Mike Seeds, Editor  
516 Bald Eagle Ct;  
Lancaster, PA 17601



## Upcoming Events

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### January:

27: BMS meeting at NHSM - 7:30 pm.

### February:

2: Gem Cutters Guild meeting, Meadow Mill at Woodberry - 7:30 pm

13: Chesapeake Gem & Mineral Soc. meeting at Westchester Community Center; Oella, MD - 7:30 pm. Bernie Emery will discuss sunstone.

24: BMS meeting at NHSM. Topic to be announced.

### March:

19-20: GLMS/MC show. Mont. Co. Fairgrounds, Gaithersburg, MD

23: BMS meeting at NHSM

### May:

21: 27th Annual Chesapeake Gem & Mineral Show, Ruhl Armory, Towson. Hours 10 am – 4 pm.

## Parting Shot

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by Jim Hooper

