The Conglomerate

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Color in Minerals – Part II: Some Additional Basics

by Al Pribula

In the first article of this series, I introduced the subject of color and the general ways in which light can interact with matter. Which of these interactions are the ones primarily responsible for producing color? It turns out that reflection (specular, diffuse, and/or internal), refraction, and scattering normally don't change the energy of the incoming light, so these don't affect the perceived color of the sample. (As we'll see later, though, refraction and internal reflection are involved in dispersing the light and producing the "fire" in some gemstones.) Fluorescence and phosphorescence, while both very interesting phenomena, are outside the scope of this series of articles. That leaves absorption of light as the major important interaction of light with matter that can affect the perceived color of the sample. (It is also possible for a sample to produce its own light, rather than interacting with light falling on it. More on that in a later article.)

When a "visible" light wave of a particular energy hits our eye, we perceive this as a specific color. What we call "white" light is a mixture of electro-magnetic (EM) waves of a number of different energies spanning a fairly limited range. (The visible light range is but a very small "slice" of the entire EM spectrum. Some other animals are sensitive to a different range of energies of EM radiation than humans are. For example, bees can see the higher-energy "light" of UV radiation, but our eyes aren't sensitive to those waves. We humans can detect UV light, but this is done by us by absorbing it in the skin, which causes chemical reactions to occur which darken or redden the skin (i.e., we get a suntan or sunburn).) As you proceed from the lowest to highest energy in the visible range, the color changes from red through orange, yellow, green, blue, indigo, and violet in that order—the "colors of the rainbow." If for some reason a particular object absorbs one specific energy (or a set of energies spanning a small range), the color corresponding to that energy will be "subtracted" from the light that reaches our eyes after being reflected or transmitted by the object. Rather than the mixture of all the colors we call "white" light, we will then perceive the mixture of the un-absorbed colors—what we call the complementary color to the one absorbed. So, for example, if light in the red/orange/yellow end of the spectrum is absorbed, then violet and blue light will predominate in what our eyes detect, and we would say that object has a blue or violet color. (Since different people have different visual sensitivities to various colors, as well as different

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Program Notes - March Meeting

by Jake Slagle, Program Chair

One of the segments of Jake's talk in February dealt with Fred Parker and his knowledge of the minerals found in Maryland. Fred gave an excellent talk several years ago at the Rochester Mineralogical Symposium on just that topic and we've obtained a copy to view during our March meeting. Come and enjoy Fred's talk and drool over the images he shows during it.

Our meeting will take place on Wednesday, March 23 at the Natural History Society of Maryland at 7:30 pm.. Jim Hooper will host the meeting.

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> 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.

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Write for "The Conglomerate"!
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President's Postings

by Jim Hooper, BMS President

We are now officially in the Spring season (depending on when you receive the newsletter). The vernal equinox or first day of Spring is March 20th, this fine leap year. Hopefully the weather for the March society meeting will be a little easier going than the February meeting. Do you recall? We had downpours and steady heavy rains with some thunder and lightning thrown in for special effects. I know the three members that got there a little early, including myself, were pretty sure we were the only ones who were going to be there. I was very surprised and impressed when another ten members arrived by 7:30 and we convened the meeting. We were glad to see Stewart and Anna again after many months. Al provided snacks for the break and Jake took us further into his online blog focusing on Maryland minerals. Jake has a wealth of information on his site on Maryland minerals as well as many other topics.

We were saddened by the news of our last founding member Life Member Harold Levey's passing. Jake and Alice have both written about Harold for the newsletter. In keeping with the wishes noted in his obituary, the society approved a donation of $100.00, be made to the Maryland Natural History Society and Museum. We will miss Harold greatly.

We welcome Alice back on her return from a 3-month tour of South America and surrounding waters. I know she'll have many tales to tell.

The Delaware society's annual show took place on the 5th of March. If you acquired some specimens you're particularly proud of or are curious about, please feel free to bring them to the meeting! The Gem, Lapidary, and Mineral Society of Montgomery County annual show in Gaithersburg is slated for the 19th and 20th of this month. Hope you are able to get there as it's one of the better shows in the area. With Spring officially here let's hope warmer temperatures will increase field trip opportunities for 2016. In the meanwhile be careful in getting around and I look forward to seeing everyone at the meeting. Looks like snacks are on me, yikes!

Thanks so much. Jim

It's The End of March – But We Still Could Have Snow!

If Baltimore **County** schools cancel their **evening activities** our meeting will be cancelled. You can obtain this information by tuning to WBAL radio (1090 AM) or most TV stations. You usually can also find it on the web at <wbaltv.com>. We'll also try to put out a notice via e-mail.

Minutes From our Last Meeting

by Jake Slagle, Secretary

President Jim Hooper called the February 24, 2016 meeting of the Baltimore Mineral Society to order at 7:30 pm. As the previous month's meeting was cancelled due to snow, there were no minutes to be approved. Treasurer Carolyn Weinberger noted that the Society was financially solvent.

Unfinished Business

Jim Hooper and Carolyn Weinberger once again urged the membership to recommend a "Rockhound of the Year" candidate to submit to the AFMS from among our club members.

New Business

Al Pribula moved that BMS donate $100 to NHSM pursuant to an "in lieu of flowers" notice in Harold Levey's obituary in the Baltimore Sun. Jake Slagle seconded. Motion carried.

Mineral of the Month:

The mineral of the month was cyanotrichite. Several small specimens were quickly shown.

With no further business, the formal meeting adjourned shortly before 8 p.m. for refreshments. Jake Slagle then gave a presentation that was a continuation of coverage regarding selected posts to the Mineral Bliss Blog from the years 2010 and 2011.

Respectfully Submitted,
Jake Slagle: Secretary

Editor's Note

Last months *Conglomerate* contained a review of the article "Mineral Evolution" by R. M. Hazen. Interested readers would enjoy a similar but more detailed article, "Mineral Evolution: The Great Oxidation Event and the Rise of Colorful Minerals" in the November-December issue of *The Mineralogical Record* p. 805.

Mineral of the Month

by Steve Weinberger

Hemimorphite– $Zn_4(OH)_2(Si_2O_7)\bullet H_2O$

The name Hemimorphite comes from the Greek hemi (half) and morph (form) referring to differences in form displayed on opposite sides of the "c" axis.

Hemimorphite w/Mimetite Ojuela Mine, Mapimi, Durango, Mexico.
Photo: Wikimedia Commons Creative Commons Attribution-Share Alike 3.0 License

Hemimorphite is a secondary zinc mineral frequently found in tropical arid regions. Crystals are orthorhombic, usually thin, tabular and vertically striated, but can also be found in fan-shaped aggregates or in massive, granular, or mammillary masses. It is soluble in HCl, but does not bubble.

Hemimorphite can be colorless to white, pale green or gray and can exhibit blue fluorescence. It is brittle with an uneven to subconchoidal fracture. The luster is vitreous and the streak is colorless. It is transparent to translucent.

The largest crystals found have been 13 cm. from Francisco Portillo, Santa Eulalia, Mexico. Examples are also found in Sterling Hill, NJ, Virginia, Pennsylvania, Nevada, Arizona, Brazil, Italy, Spain, Germany, England, plus other worldwide locations.

Hemimorphite is found associated with galena, smithsonite, sphalerite, cerussite and anglesite.

For the March meeting, bring in your examples and give a brief description of your collection.

References:

Bernard, Jan H. and Hyrsl, Jaroslav. Minerals and their Localities

Sinkankas, John. Mineralogy for Amateurs.

Hemimorphite
Santo Niño Mine Santa Maria del Oro, Durango, Mexico.
Photo: *Wikimedia Commons Creative Commons Attribution-Share Alike 3.0 License*

Color in Minerals, Part II

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"color vocabularies," some might say "blue," while others might say "violet," and others might say they see a mixture of the two.) It is this selective absorption of light by a material that is the cause of many of the colors that we see, and of most of the colors of minerals. The specific cause of the color (particularly if it is due to the presence of a particular atom or ion) is referred to as the chromophore (from the Greek words meaning "color bearer" or "color producer") in that material. There are a number of different ways in which this selective absorption can occur, depending on the atom(s) involved and how they are bonded.

Before getting into those, however, I want to address some questions that I posed at the end of Part I. First, why is it that some minerals (such as azurite, crocoite, vanadinite, cuprite, etc.) always have the same color (perhaps darker or lighter, but always the same basic hue), while others (quartz, fluorite, beryl, corundum, apatite, etc.) can occur in a variety of colors? When a mineral always has the same color, it is said to be idiochromatic, which derives from the Greek words meaning "self-colored."

Rosasite is idiochromatic. That is, it is always the same basic color. This specimen of Rosasite with calcite is from the Ojuela Mine, Mapimi, Mexico. Field of view 12 mm. (Photo by M. Seeds.)

This means that the source of the color derives from some essential chemical component or structural feature in the pure material, so it will have the same color from one sample to another. If/when this is true, the color can be used as a means of identification. So, for example, if you find a red mineral on a collecting trip, you can be sure that it isn't malachite—malachite is always green due to the copper ions it contains. (Well, at least the surface of the sample isn't malachite. It could be malachite with a surface coating which gives it a different color due to epimorphism or chemical alteration.)

When a mineral can occur in a number of different colors, it is said to be allochromatic, which derives from the Greek words meaning "alien colored." This means that the color is caused by some "alien" atom or ion present as an impurity in the sample, or by a defect in the lattice, rather than by some essential chemical component of that mineral. In most cases, the pure form of an allochromatic mineral is colorless. For example, sphalerite is zinc sulfide, chemical formula ZnS. When pure, zinc sulfide is colorless. Huh? You say that every sphalerite specimen you've ever seen has been orange, red-orange, brownish-orange, or even black? (Miners in lead-zinc mines often refer to the red-brown sphalerite ore as "ruby jack.") That's because you've never seen a sample which was pure ZnS. Just about invariably, sphalerite contains a significant number of iron ions (with a +2 charge) substituting for (i.e., occupying the lattice position normally occupied by) a corresponding number of zinc ions (which also carry a +2 charge). (There are often other impurities present as well, but the iron is the chromophore in this case.) The higher the proportion of iron ions in the sample, the darker the color will be. This is why you will sometimes see the chemical formula for sphalerite written as (Zn,Fe)S, meaning that the predominant (and essential) cation is zinc, but that some fraction of those cations have been replaced by iron ions. ("Colorless" sphalerite (especially if it's on the gemmy side) is referred to as cleiophane. Any specimens that I have ever seen labeled as such had a pale-to-medium yellow-greenish color to them.) I'll discuss lots of additional examples of allochromatic colors due to these so-called substitutional impurities when I get to specific minerals later in the series. In addition to substitutional impurities, a mineral can also be allochromatically colored due to the presence of inclusions of small crystals of some other mineral (chlorite or hematite in quartz, cinnabar in calcite, etc.), surface coatings, and by defects in the crystal lattice. I'll explain more about these as we go along.

It is also possible for a sample to exhibit different colors when viewed from different directions. This phenomenon is referred to as pleochromism, which derives from the Greek words meaning "multi-colored." This property is related to the symmetry of the crystal lattice of the material. As light travels through any sample, it interacts with the atoms it encounters. If the atomic arrangement in one direction is different from that in another, the light will interact differently, potentially producing a different color. In a mineral which crystallizes in the isometric system, the atomic arrangement is the same along each of the axes, so light interacts with the atoms in the same way in each direction. Such a crystal is said to be isotropic, and will show the same color in all directions. A crystal in the hexagonal, trigonal, or tetragonal system has one unique crystal direction and is said to be uniaxial. Such a crystal has the potential to show two different colors when viewed from different directions and is said to be dichroic. A

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Five Will Get You Fifteen

by Mike Seeds

Spring is coming and the members of the Big Dig Mineral Club have been thinking about collecting trips. Just last Wednesday night they were talking and, Slick spoke up. "I know a spot where wecun dig calcite un pyrite and it's only 5 miles fum 'ere, but it's 15 miles back."

Eddie shook his head. "That's not possible, Slick. If it's 5 miles out, it has to be 5 miles back. On small scales, the surface of Earth is a simply connected domain."

Eddie grinned at his fancy math talk, but Slick shock his head. "Nope," he said. "It's five out and 15 back, but it's easy parkin'. There's a pullout right there.

The quarry owner's pretty daughter began to laugh. "I understand," she said.

And she did. How can it be 5 miles out, but 15 miles back.

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Color in Minerals - Part II

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crystal in the orthorhombic, monoclinic, or triclinic system has three unique crystal axes, is said to be biaxial, and can show different colors in three directions (that is, it may be trichroic). If pleochromic crystals are viewed using polarized light, they can show two colors in each unique direction. Familiar minerals which exhibit strong pleochromism are kyanite, benitoite, tourmaline, spodumene (var. kunzite), zoisite (var. tanzanite), and cordierite (var. iolite). Rubies and blue sapphires also can show this effect.

Just what's behind the selective absorption of different energies of light which is the cause of the colors in minerals? The one word that answers that question in the majority of cases is: electrons. "What are electrons?" I hear you asking. That question will be answered in the next article in the series as we begin to delve more deeply into the specific ways in which color can be produced by a material. "Stay tuned."

Minerals Day at the NHSM

by Al Pribula

Twice a month, the Natural History Society of Maryland sponsors "Nature Connections," at which the society hosts a program and open house focusing on some topic of interest to the public. On February 14, the BMS partnered with the NHSM to present a "Minerals Day" program. About 50 adults and 25 youngsters attended the event and it looked like a good time was had by all. Anita Tyler of the NHS is the overall coordinator for the Nature Connections series, and she was joined at the event by Joe McSharry, Charlie Davis, Patty Dowd, and Nick Spero from the NHS.

Al Pribula looks over a display of Maryland minerals ready for visitors. (Photo by Brad Grant)

From the BMS, Brad Grant coordinated the program and brought a number of items for display and giveaway, and I brought the BMS Maryland mineral collection (were you aware that the Society has such a collection?) for display, supplemented by some specimens from my own collection. Johnny Johnsson, local geologist and mining history buff, gave a great presentation about the history of chromium mining in Maryland. (Did you know that from about 1820 to 1850, Isaac Tyson's mines in Maryland and Pennsylvania were the major source of the world's chromium?) Before and after Johnny's talk, the attendees enjoyed viewing and discussing the minerals displayed, and, in addition to Brad and myself, Jim Hooper and Bernie Emery were on hand to help folks identify specimens that they had brought in with them. Geology teacher and author Martin Schmidt was also available to discuss the state's geology with the attendees.

Events like this are important in getting geology, minerals, and the BMS exposure to the public—particularly to youngsters. At the event, lots of folks picked up information about the Society—let's hope that some of them were interested and intrigued enough to attend one of our meetings. We can also hope that the Society has the opportunity to participate in events like this in the future.

Shoebox Adventures: Selective Incrustation

text and photos by Mike Seeds

Selective incrustations occur when a mineral is deposited on certain faces of a crystal and other faces remain untouched. It can produce some fascinating specimens, and it hints at the atomic forces that determine what we see.

Figure 1 shows a small quartz crystal from the New Street Quarry with deposits of hematite on certain faces. Other faces are clear. This is not really unusual for this quarry. Without really trying, I've acquired four such specimens from that quarry. Evidently, conditions in the quarry were just right for hematite to be a little bit picky about which crystal faces it will attach to.

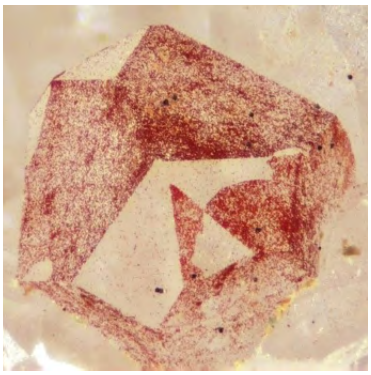

Figure 1. Hematite on quartz. Upper New Street Quarry, Patterson, NJ. The crystal is 1.4 mm in diameter.

It would be fascinating to explore the physics and chemistry behind this phenomenon, but even at a glance it is possible to understand what is happening. A crystal is made of atoms linked together in a rigid lattice, but the lattice isn't the same viewed from different directions. Start by thinking of a platoon of soldiers marching in a square formation. Although the square may seem to be the same on each side, look closely and you will see that the front of the formation is made up of noses, and the back of the formation is made up of backs. Similarly, the faces of a crystal do not necessarily have the same arrangement of atoms exposed on every surface. Under the right circumstances, molecules of hematite can find that the atoms along one face are more attractive than the atoms exposed on another face. Thus the patterns we see in selective incrustations are determined by the atomic forces at the surfaces of the crystal faces.

Of course, different minerals have different atomic structures, and consequently different forces at the surfaces of their faces. Figure 2 shows hematite on magnesite. The pattern of incrustation is different from that on quartz but the principle is the same.

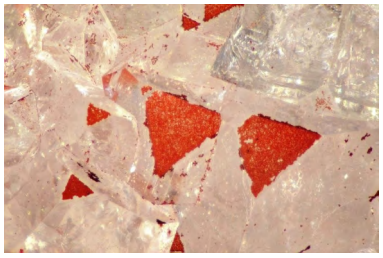

Figure 2. Hematite on Magnesite. Bomba area, Bahia, Brazil. Field of view 7 mm.

Selective incrustation can become quite elaborate. Figure 3 shows a small quartz crystal with a complex pattern of hematite over its faces. Twinning is common in quartz crystals, and many such crystals that look like a single crystal may have a number of different areas in which the atomic structure is different. Thus selective incrustation can cover parts of a single face and leave other parts of the same face clear.

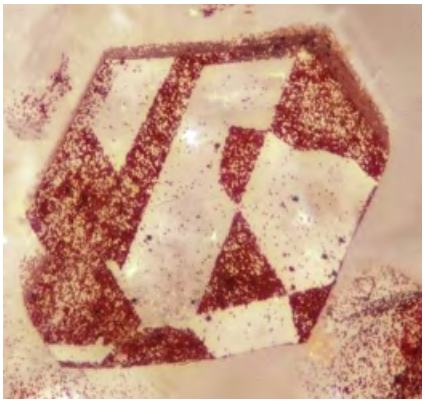

Figure 3. Hematite on quartz. Upper New Street Quarry, Paterson, NJ. The crystal is 1.1 mm in diameter.

Selective incrustation can occur if conditions are just right, so you won't find it in every quarry and mine. But it isn't so rare that specimens are outrageously expensive. The specimen in Figure 1 came from a trade with Hugh McCullough 15 years ago. The Figure 2 specimen was purchased from a dealer for a few dollars, and that in Figure 3 was a gift from Lou D'Alonzo on the day of his induction into the Micromounter's Hall of Fame. These are all micros, of course, but larger specimens do turn up. A 13-cm cluster of quartz crystals displaying selective incrustation by hematite was offered on the web for $10. Keep your eye out and you can find examples, but look carefully. That 13-cm specimen was identified as "quartz with hematite inclusions." It's clear from the photograph that it's really selective incrustation -- and it's a big bargain.

Five Will Get You Fifteen: Solution

The quarry owner's pretty daughter explained. "It's obvious. Slick's collecting site is near the rest stop on the interstate. It's 5 miles out to the rest stop, but when you are done collecting, you can't just drive back to town. You have to get back on the highway and continue to the next exit. That's 5 miles. Then you loop around and drive 10 miles back to town. So it's 5 miles out and 15 miles back."

Safety Matters: Give Yourself a Hand

by Ellery Borow, AFMS Safety Chair from AFMS Newsletter, March 2016

Give yourself a hand, or at least a rousing round of applause if you are one of the many folks who makes a concerted effort to take care of one of your most important tools --your hands.

There are many folks who earn their living through constant use of their hands. Even if you are not one of those fortunate folks it is likely that your hands are in constant use. If you think that you are one of the folks who does not use their hands all that much, try going even 1/2 an hour with one hand held behind your back, and then going on about your day. The hand behind ones back suggestion might clearly highlight how much we use our hands. If you are still unsure of the amount of your hand usage, try going even 10 minutes without use of either one. Our hands are important, give yourself some applause if you take care of your valuable asset --hands.

Using my trusted, well worn, and tattered, 15th edition of Gray's Anatomy I found the Metacarpus, Carpus, Scaphoid, Cuneiform, Ulna, Radius and 22 other bones of the forearm, wrist, palm and fingers. Counting the bones of the right and left hands that's 60 bones of the body's 200 or so bones. The hands have a high percentage of the body's total bone count and ancillary tissues. It behooves us to take good care of these assets. By being good I do not mean just use of an occasional hand lotion. Indeed, hands do not deserve just good care, they deserve great care.

Soon I will transition from winter's snow shoeing enjoyments to Spring's bicycle riding pleasures. During that transition I will move from using certain muscle/ bone groups to other muscle/bone groups. During that transition I will awaken muscles I have not used in a while. If I do not properly prepare for the transition I will be sore in places. What that demonstrates to me is that I'm not exercising all of me sufficiently well. The same goes for hands. For the hand tasks we do frequently, we keep well exercised, for movements we seldom do, the muscles weaken.

We, on occasion, do bad things to our hands. I have had days when I'm using my rock hammer so much that, at the end of the day, my fingers have frozen in the curl of my hammer handle. When I pull the hammer from my hand my fingers stay frozen in the curl – that is not a good sign. What I should have done would have been to change activity and hand I finger position frequently over the course of the day.

One other way we are bad to our hands is, and this is a really bad one that I have seen innumerable rockhounds do, hold a rock in one hand and, using the rock hammer held in the other hand, strike the rock. This activity sends shivers down my spine when I think of all the small bones in the wrist being whacked by a hammer. After all, just about all of the striking force goes through the rock and into the bones and connective tissues of the hand. Just ask any orthopedic surgeon what they think of such an activity and I'm sure you will get an earful of commentary about the un-wiseness of the act.

Next, for hand calamities, we see the all-too-common near misses of the hammer aiming for the end of the chisel. Ever seen one of those? They are not pretty – and I;m not talking about the resultant air turning a blueish color. Hands do not have an easy life!

What is a hand to do? Yes, lotion for hands is good, but lotion will not help a missed hammer strike on a chisel (or thumb). There are (a ta-da moment) hammer guards available for chisels. A guard on the end of a chisel really can help prevent hand damage during a misplaced hammer strike. There are also numerous chisel holding devices available. There is a plethora of styles, compositions, and sizes of gloves that can prevent the many scratches, scrapes, and cuts we receive on our hands. We have available to us dirt, and flat rocks, and really great holding devices that can support/hold a rock so that it is not held in ones hand to be struck by a hammer. There are many devices and programs that can help stretch, exercise, strengthen, and increase flexibility of our hands. Although I would mention here that some of the exercise devices I have seen for strengthening ones hand can sometimes do more harm than good if used improperly -- so if in doubt about any program or device please consider consulting with a professional. Oh and hand lotion is indeed good for hands to maintain sensitivity, grip, epidermal integrity and so on.

Other general hand maintenance guidelines include watching out for too many repetitive motions, avoiding shocks to the delicate hands and fingers, and taking a break from heavy hand usage tasks. I have even seen issues with too firm a grip for too long a time with hands holding on to dop sticks being used by those dedicated cabbers among us. When tackling a big job, ask for a hand. A helping hand to share a load, or relieve a stress sure can help keep our hands healthy.

With proper maintenance our hands can last a lifetime -- and that is good for the hobby as well as the individual. So, please keep up the good work and give yourself a hand for a job well done. Be safe, stay safe.

Wonderful Wildacres

by Steve Weinberger from EFMLS News, March 2016

In recent days I've spoken to a number of people who tell me that they plan on attending Wildacres this year. "Have you sent in your registration form yet?", I ask. "Not yet" is too often the reply. If you're like the people I'm referring to, my question is

"What are you waiting for?"

We've put together what I think are two dynamite sessions for 2016. The first, May 9 – 15 features Helen SerrasHerman as our "speaker in residence". Helen is a world renowned glyptographer (gem stone carver) a terrific, knowledgeable speaker and a darn nice lady. She'll present several programs during the session which are sure to be of interest to everyone. Her images are always great too. (Take a look at examples of Helen's amazing work on her website .)

The second session, September 5 – 11 will feature Alfredo Petrov as the "speaker in residence". Alfredo has travelled the world and is extremely knowledgeable about minerals. Most recently, Alfredo has been honored by having a newmineral, Alfredopetrovite, named after him. He's a charming and interesting fellow and his photographs and tales about his travels are amazing.

There's nothing like a week at the Wildacres Retreat. Our sessions are always relaxing and enjoyable and you're sure to come away with new skillslearned during class, new friendships made, and a better appreciation for our hobby.

So...What are you waiting for?

Tuition for the entire week is $400 per person including room and board, gratuity for the Retreat employees, and instruction given by our outstanding cadre of teachers. The only extra charge is for the materials that you use in the class or classes you take. Meals are wholesome and tasty, rooms comfortable, the air unpolluted, and the camaraderie among participants always terrific.

So...What are you waiting for?

A complete listing of classes can be found on the web site (efmls-wildacres.org). Come and join the fun at Wildacres in 2016!

From the Mailbox

Editor's note: This letter was sent to Al Pribula by someone who wishes to be known as Slack. Al has forwarded it to The Conglomerate.

Dear editor:

This is in reference to the item in the January, 2016 issue of the Conglomerate in which Slick's girlfriend Suzy claims that there is an error in a statement on Eddie's poster about azurite and malachite. I was at that meeting of the Big Dig Rock Club and saw Eddie's poster. It seems to me that claiming that it is incorrect to say that azurite is "replaced" by malachite it is only a matter of semantics. If by "replace," you mean that the original material is completely removed and another material of totally unrelated composition is substituted in its place, then "replaced" is perhaps not a correct term in this case. However, if you mean that one material was formerly present and a material of a different composition is now present in its place, then "replaced" is a perfectly reasonable term. When minerals first form underground, it is usually at higher temperature and higher pressure than at the surface. When a mineral is exposed to surface conditions (lower temperature {therefore different humidity} and lower pressure), chemical reactions often take place, chemically altering the original mineral into something else. In the case of azurite altering to malachite, the chemical reaction

$$2\ Cu_3(CO_3)_2(OH)_2 + H_2O \rightarrow 3\ Cu_2(CO_3)(OH)_2 + CO_2$$

takes place, with the reduced pressure allowing the carbon dioxide gas to escape. Yes, this is a chemical transformation as Suzy said, and it is in some senses just a rearrangement of the chemical components present, but that doesn't mean that something of a different (admittedly similar, but still different) chemical composition hasn't taken the place of (i.e., replaced) the original material.

However, I am very disappointed in Suzy for not pointing out the real error in Eddie's poster. I have been reading back issues of the Conglomerate (a feller has to do something when he's snowed in), paying special attention to those articles written by Al Pribula (who seems like a right smart feller). In his article titled "Atoms, Molecules, and Ions" in the November/December, 2014 issue, he makes it clear that the real error in Eddie's poster is referring to the components of azurite and malachite as atoms. While all matter is (sort of) made up of atoms, atoms must be electrically neutral. In many cases (including most minerals), the particles have acquired electrical charges by gaining

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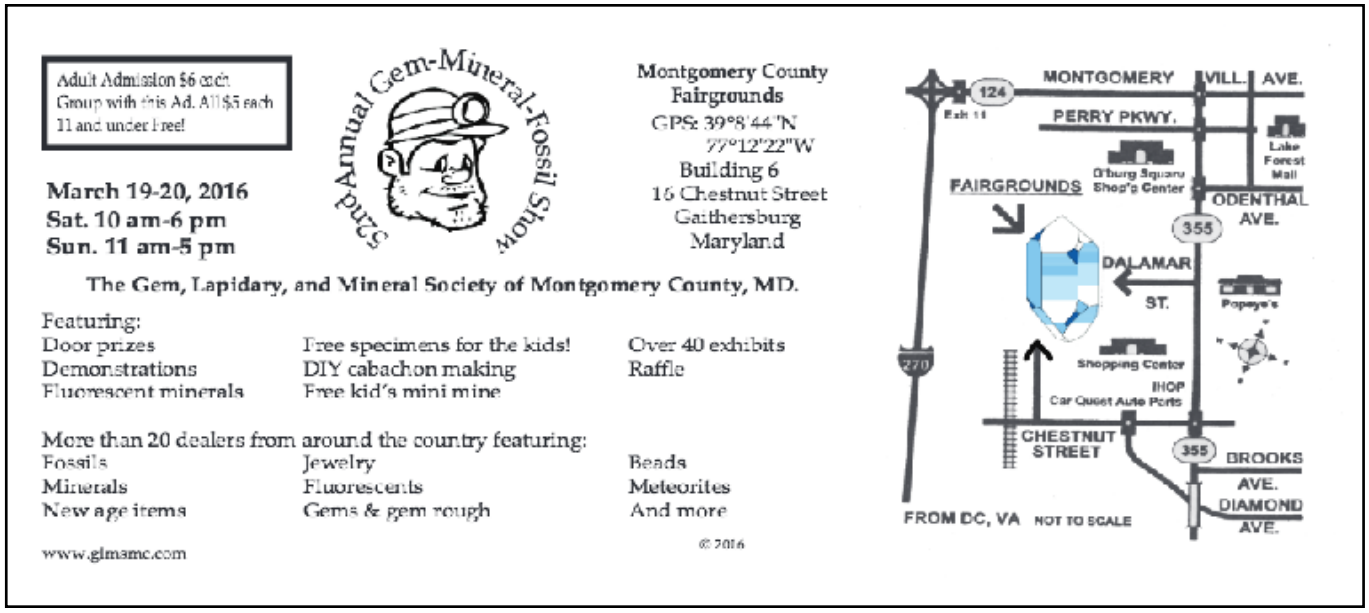
Field Trip Ideas

Spring is when our thoughts turn to rock collecting. If you are interested in collecting trips, contact the Field Trip Coordinator Bob Eberle with ideas and suggestions for collecting sites. Do you know someone at a quarry or a property owner of a good location? Give your suggestions to Bob at 410-661-8436. Let him know that you are anxious to dig and he will keep you on his list.

BMS Webpage

Brad Grant, our BMS Web Master, reminds everyone to check the BMS website (www.baltimoremineralsociety.org/) for information about upcoming meetings and activities and to submit photos and articles for inclusion on the web site. Brad's email address is <info@baltimoremineralsociety.org>.



43rd Annual Atlantic Micromounters' Conference

April 22-23, 2016

SpringHill Suites by Marriott Alexandria, VA

Presented by The Micromineralogists of the National Capital Area, Inc.

Friday 22, 6-9 pm Saturday 23, 8:30 am – 9pm

Featured speaker: Tony Nikischer, Excalibur Minerals of Charlottesville, VA

Speaker Biography:

Tony's interest in minerals was stimulated by an early visit to Franklin, NJ in the 1960s. Today, he is founder and president of Excalibur Mineral Corp., arguably the largest provider of systematic minerals in the United States. The company has specialized in rare minerals for researchers, museums and private collectors worldwide since 1974. He operates an in-house analytical laboratory and is also the publisher of the monthly periodical, *Mineral News*.

Download Registration form and Hotel Informatiopn at the Club website
www.dcmicrominerals.org

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

Upcoming Events

March:

19-20: Montgomery Co. Gem & Mineral Show. Mont. Co. Fairgrounds. Discount coupon on page 9.

23: BMS meeting at Natural History Soc. of Maryland - 7:30 pm. Talk by Fred Parker on Maryland minerals. Refreshements: Jim Hooper

April:

5: Gem Cutters Guild of Balto. meeting at Meadow Mill at Woodberry - 7:30 pm.

8: Chesapeake Gem & Mineral Society meeting - probably a talk on meteorites. Westchester Community Center, Oella, MD (chesapeakegemandmineral.org).

14-17: Rochester Mineralogical Symposium, Henrietta, NY. Info and registration <www.rasny.org/minsymp/>

22-23: 43rd Atlantic Micromounters' Conference. Info and registration <dcmicrominerals.org>

Last Laugh

cartoonist unknown

Whatever you do, don't mention his new diamond saw.

From the Mailbox

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or losing one or more electrons, making them ions rather than atoms. So, neither azurite nor malachite contains any atoms per se. Rather, both consist of copper(II) ions, carbonate ions, and hydroxide ions. Being a chemistry teacher, Suzy should have known better and pointed to the word "atoms."