Nittany Mineralogical Society Bulletin

Nittany Mineralogical Society, Inc.
P.O. Box 10664
State College PA 16805

February, 2008 **www.ems.psu.edu/nms/** *Editor: David C. Glick (see p. 8)*

February 20th meeting:

Some odd mineral occurrences in central Chile

by Ryan Mathur,
Juniata College

Our February meeting will be held Wednesday the 20th at 7:30 p.m., in the room 114 auditorium of Earth & Engineering Sciences Building on the west side of Penn State's University Park campus in State College, PA.

6:30 to 7:30 p.m.: Social hour, refreshments in the lobby
7:30 to 8:00 p.m.: announcements; door prize drawings
about 8:00 p.m.: featured program

The event has free admission, free parking, free door prize drawings and free refreshments, and is open to all – please come and share an enjoyable evening! - - Editor

Our February program will be presented by Dr. Ryan Mathur, associate professor of Geology at Juniata College. He studies the geochemistry of ore deposits to understand how these anomalous concentrations of metal were made. Dr. Mathur writes:

The talk will center on a field trip that I was part of in 2005 where we toured the central Andes to examine porphyry copper deposit (Chuquicamata) and Fe-oxide mineralization at El Laco. We will discuss how these deposits formed by looking at mineralogy in the field and some other data. The origin of El Laco is still debated and one of the ideas that has received support is that the deposit had Fe-oxide lavas that are the source of iron. We will examine field relationships to explore this idea. We will talk about Chuquicamata, and some of the interesting Cu minerals that originate from one of the largest porphyry copper deposits on earth.

Read more about ore deposits and copper on pages 5 -7.

ATTENDING THE FEBRUARY MEETING?
This event is free and open to all - bring a friend!
Donations of door prize specimens are invited.
Your additional snacks will be welcomed.

March 19th meeting - GEODE NIGHT -
Will start at 6:00 p.m. Tell your friends and kids!

Wednesday, February 13, 7:00 p.m.
Room 117, EES Building
PLEASE ATTEND THE SPECIAL
PLANNING MEETING for the
Nittany Gem & Mineral Show

The members' vote at the January meeting was in favor of holding the Show (June 28-29). Now it's time to make it happen! Please come to this meeting, where we'll discuss budget and advertising, and ask for volunteers for managing silent auction, consignment table, displays, transporting materials, and many other aspects.

If you can't make it to the meeting, please contact Dave Glick before Feb. 13 (xidg@verizon.net or 814-237-1094) to volunteer or communicate your thoughts.

JUNIOR ROCKHOUNDS

by Dr. Andrew Sicree

Next Meeting: Monday, February 25

Junior Rockhounds meet in room 117 Earth & Engineering Sciences Building on the following Monday evenings at 7:00 p.m.: Feb. 25, March 24, April 21, and May 26 (tentatively - that's Memorial Day). The **February 25th** program will be:

Wonderful Varieties of Quartz

Quartz occurs in a rainbow of colors. Rose quartz, amethyst and citrine, chert, flint, rock crystal, onyx and smoky quartz are all varieties of quartz. Join us as we explore these and other interesting quartz varieties.

Adults: Can you help with Junior Rockhounds programs? Please come to one of the meetings, and we will proceed from there.

Junior Ed Day April 5

Our annual Minerals Junior Education Day is set for April 5. Volunteers are needed! A registration coordinator is needed to take phone calls and e-mails in order to schedule the kids through the day. There will be a variety of teaching stations where kids will participate in an activity or discussion and get a specimen related to the topic. You can propose a station, or volunteer to help with an existing one. Please bring your ideas to the February 20th regular meeting or contact Dave Glick (page 8). *- Editor*

NEWS FROM THE FEDERATIONS

Nittany Mineralogical Society, Inc., is a member of EFMLS, the Eastern Federation of Mineralogical and Lapidary Societies, and therefore an affiliate of AFMS, the American Federation of Mineralogical Societies.

The EFMLS Newsletter is available through the link on our web site **www.ems.psu.edu/nms/** or remind Dave Glick to bring a printed copy to a meeting for you to see.

The dates for the 35th year of EFMLS workshops at **Wildacres** will be April 18-24 and Sept. 8-18, 2008. In April, the speaker in residence will be Alfredo Petrov, who will speak on his travels in search of mineral specimens, including Bolivia and Japan. In September, the speaker will be Denise Nelson, jewelry designer and importer of gems and pearls. Bob Livingston's second article on keeping our clubs going is about youth and health. The junior activities column introduces teaching resources available from the National Energy Foundation, www.nef1.org The safety article points out that we need to examine our collecting gear - hardhats, safety glasses, chisels, etc., and make sure it's all in top condition to do its job.

The AFMS Newsletter is available by the same methods. The February issue includes more on birthstones and gems on postage stamps; nominations are sought for the National Rockhound and Lapidary Hall of Fame. There is news on the Endowment Fund, Uniform Rules (competitive displays), and Program Competition. The safety article is on footwear and foot safety. The 2008 annual AFMS show is announced; it will be in Houston, Texas, September 26-28 (Friday-Sunday). Federation meetings will be on the 24th and 25th (Wed. & Th.). Quick Tips for Editors has an interesting change of pace: it discusses acrostic and cinquain forms of poetry, with some rockhound examples. There is a memorial article on Cathy Gaber, who was active in EFMLS and AFMS; it includes news of an Endowment for Education in Mineralogy in her name. Shirley Leeson's presidential address at last November's convention is printed; she recounts some of her history, and covers various activities and committee projects which are under way. Once again the Paleontological Resources Preservation Act is being considered, and is discussed in the conservation and legislation column (also covered in the EFMLS Newsletter).

Please see the web sites for the rest of these articles and many others in both Newsletters. There's a lot there! - *Editor*

Dr. H. Reginald Hardy Jr., 1931 - 2008

We regret to report that long-time NMS member Reg Hardy passed away on January 22. He is survived by his wife Margaret and their two sons. The NMS extends its sincerest sympathy to Margaret and the family.

Reg and Margaret attended NMS meetings and many of our special events through the years. He was Professor Emeritus of Mining Engineering at Penn State, where his work was concentrated in acoustic emission and microseismic techniques. An obituary with much more information was printed in the Centre Daily Times on January 24 and is available on their web site. - *Editor*

photo and concept by J. Gathe. digital editing by D. Glick

by Pat Garthe

My husband is, pure and simple, a rockhound. Lately it seems he eats, breathes, and sleeps rocks. As a little fellow in school, when asked to write an essay about hobbies, number one on his list was "collecting rocks… from the head". Well, he was little after all, but that was the start of the obsession.

When he is gazing longingly into space, I know it's not me he's dreaming of. I suppose I shouldn't be jealous of my competition for she is a stunning sample of puddingstone, chert, or my latest competitor, metarhyolite. Or maybe I should be just a wee bit concerned since *her* creases, lines and imperfections are quite desirable. *Her* age is a non-issue; the older the better.

I admit for quite some time I tried to resist the pull of the earth. After tripping over assorted rocks in the house and on our property I decided to designate a room for rocks and other naturally occurring curiosities. The room was painted a welcoming natural color, plants were incorporated to enhance the setting, and the rocks were brought in. I proudly included a sample I had personally found. Silly me; I thought my problem of "too many rocks in too many places" was solved. But that's another story.

Back issues of Rock and Gem magazine could almost use a room of their own. It's just not right to ever discard them and this is one of the non-negotiable issues in our household. Initially, it was rather disconcerting to see him so engrossed in the latest issue. I just didn't quite get the appeal.

I began to wonder if there wasn't something to this hobby. Rather than fight it any longer, I decided to accompany my favorite rockhound to some of the NMS meetings. I'd been to a couple in the past but found I had to be pretty selective since some of the topics were too scientific for a non-science sort of gal like me. One thing I'd noticed, however, was that NMS rockhounds were a rather friendly lot. And the snacks were always tasty. But could I do it? Could I learn a little more about this passion for the sake of my sanity?

Well, I'm happy to report that although not a rockhound in the truest sense, I have been able to enjoy the club presentations and other activities like Junior Education Day. And winning a stunning chert pendant necklace donated as a grand door prize helped to cement my bond to the NMS. After all this, I guess I'll have to become a dues-paying member! T

Popular Mineralogy

Mineralogy and earth science for the amateur mineralogist and serious collector - #9

Isinglass

by Andrew A. Sicree

Isinglass and muscovite mica

Not so terribly long ago, in the days before Pyrex®, a baker couldn't look into his oven to see how his bread was baking without opening the oven door. Pot-bellied stoves and high temperature ovens didn't have glass windows because thermal expansion caused the glass to shatter. Modern stoves have windows of Pyrex®, but if an old-style wood-burner had a window, it was made of a mineral: muscovite mica.

The micas are a group of closely related minerals. The mica group includes the common micas, muscovite, biotite, and phlogopite, as well as lesser-known species such as zinnwaldite and lepidolite.

Micas are sheet silicates – that is, the silicate units that make up the mica are arranged in flat sheets, with weak bonds between the sheets. Under stress, these weak bonds are easier to break than are the bonds within the silicate sheets. Thus, micas tend to break (or cleave) into sheets. One can cleave mica into sheets so thin that they are both flexible and see-through. Crystals of mica have been found that were big enough to produce sheets more than two feet square (60 cm x 60 cm).

The term mica is derived from the Latin *micare*, "to shine" and "Muscovy" was used to refer to Russia in general or Moscow in particular. Use of sheets of mica for windows in Russian houses led to the common use of "Muscovy Glass" to refer to sheets of mica. In 1850, the American mineralogist James Dwight Dana, derived the name "muscovite" from "Muscovy Glass" to refer to the particular species of mica commonly used in making windows.

Why is it called isinglass?

Another common term for "Muscovy Glass" is "isinglass." The term "isinglass" is derived from the Middle Dutch term *huusblase*. The *huso* is a large sturgeon and *huus* or *huizen* (sturgeon) + *blas* (bladder) means "sturgeon's bladder." The swim bladder of the sturgeon was used to prepare a gelatin or glue that could be spread out in a thin glassy layer. A sheet of muscovite mica resembles this gelatin so the term isinglass came to refer to thin sheets of mica (or muscovite mica in general).

Uses of isinglass

Isinglass found use in windows in ovens and stoves because, being a mineral it would not burn, and it could withstand high heat without breaking. An isinglass window allowed light from a pot-bellied stove's interior to light an otherwise darkened cabin. On naval man-of-war ships isinglass found use as windows, as well. Here the flexibility of mica was a benefit. Under the shock and vibration produced when the ships fired its guns, normal glass would crack and shatter. Isinglass windows would bend and remain intact.

Other uses of mica include use in cosmetics. Finely ground mica serves as a glitter in lipstick, rouge, and eye-shadow. The same principle applies to the use of mica in automobile paint. In paint, flakes of mica reflect light and give the paint a "metallic" look. Ground mica has also been used as a dry lubricant.

Mica is an excellent electrical insulator. Old-style fuses often had mica windows. The mica was a good transparent insulator that wouldn't shatter when the fuse burnt out. Vacuum tubes used mica as a non-conductive substrate to hold the elements of the vacuum tube. (Because of the importance of mica to the manufacture of vacuum tubes used to radios and radar sets, the U.S. government once built a huge stockpile of isinglass. After solid-state electronic components displaced vacuum tubes in most equipment, the government sold off the stockpile.)

Mica finds use in toasters, and clothes irons. The electric heating elements are wrapped around lightweight "chipboard" made of fragments of mica pressed firmly together.

Ancient North American Indians also made use of isinglass. In Ohio, for instance, artisans of the Hopewell culture (100 BC – 500 AD) manufactured an elegant effigy of a human hand out of mica. The uses of this mica effigy (recovered from a burial mound) are unclear, but western North Carolina is thought to be the source of the Indians' mica.

Dr. Andrew A. Sicree is a professional mineralogist and geochemist residing in Boalsburg, PA. ***Popular Mineralogy*** *provides technical answers to your general mineral questions. If you have a question you'd like to have answered, please send email to* sicree@verizon.net

Weird Geology: Rocks that Bend

Think of a rock and you think of something hard and rigid, inflexible. Yet there is a rock that can easily be bent: itacolumite. Also known as flexible sandstone, itacolumite is a true sandstone. The name comes from the town Itacolomi, in southern Minas Gerais, Brazil, where substantial deposits occur.

Typically a fine-grained tan, brown, or yellowish sandstone, itacolumite from Brazil or North Carolina usually displays shiny flakes of mica. Itacolumite from India may be lighter in color, coarser-grained, and show less mica.

Origins of the flexibility

Itacolumite's flexibility is best demonstrated when it is split or cut into long thin strips parallel to the bedding layers. Good quality North Carolina material can be cut into laths more than two feet long, two inches wide, and thinner than one-half inch in thickness. A lath of such dimensions can be bent so strongly that the middle of the lath is displaced more than three inches from a straight line between the ends.

Some debate arises over the origin of itacolumite's flexibility. Mica flakes within the sandstone are oriented parallel to the bedding planes. Because mica is a flexible mineral, these flakes were thought to make the itacolumite flexible. This explanation cannot be complete because other sandstones with mica are not flexible, and some itacolumite has less mica. Also, the flexibility of itacolumite appears to be related to weathering. A bed of itacolumite that is near the surface produces a friable rock that crumbles as it is bent. On the other hand, the deeper a bed of itacolumite lies, the more inflexible it is.

Sandstones require a mineral to glue the sand grains together. Typically this cement is calcite or quartz. Near-surface weathering may lead to dissolution of the cement holding the sand grains together. If only a fraction of the cement is removed, grains can act like hinges. If some sand grains remain cemented together in strings, and the ends of strings are uncemented but trapped by other grains, the strings could function as tiny hinges. The cumulative effect of many of these tiny hinges would be to produce a flexible rock.

Perhaps itacolumite's flexibility is due to a combination of both the presence of mica flakes and the removal of inter-granular cements.

Itacolumite and diamonds

Itacolumite comes from Brazil and India. Early researchers noted that itacolumite was found in association with diamonds. That is, alluvial diamonds in Brazil and India occurred near known deposits of itacolumite. Before the discovery of kimberlite volcanic pipes in South Africa, some geologists believed that itacolumite was the source rock of diamonds.

Although we now know that diamonds can only form in the Earth's mantle, the idea that itacolumite might contain diamonds is not entirely preposterous. It is possible that the sands that formed itacolumite sandstones were deposited downstream from long-ago eroded-away diamond-bearing kimberlites. If so, diamonds could have been caught up in the sandstone. However, no one has yet actually found a diamond in a piece of itacolumite.

In North America itacolumite is found in North Carolina, South Carolina, and Georgia. Interestingly enough, a few "anomalous" diamonds have been found in a belt stretching across Georgia – in the same area in which itacolumite occurs.

Why are stalactites brown?

Take a cave tour. Ask the guide a simple question: "Why are these cave formations brown?" Typically, your guide will pipe up and answer, "Oh, they're brown because of iron staining from the groundwater." Sounds like a reasonable explanation? After all, we've all seen rust stains on concrete sidewalks or white shirts.

But brown stalactites are a case in which common wisdom is incorrect.

Stalactites, and other cave formations such as stalagmites, dripstones, and flowstones, are typically built of calcium carbonate. Pure calcium carbonate, whether in the form of the mineral calcite or the mineral aragonite, should be snow white. Yet cave formations, or speleothems, often are brown, tan, or yellowish-brown.

One clue to the mystery of brown-coloring is provided by the fluorescence of speleothems. A simple experiment you can do yourself casts some "light" on the problem. The next time you are in a cave, and your guide turns out the lights to show you what total darkness looks like, you can conduct a simple experiment (you might want to ask your guide for permission first). In the dark, hold your camera flash up to a cave formation and then close your eyes tight. When everyone has their eyes closed tight and is looking away, trigger the flash unit. After the flash goes off, quickly open your eyes and look at the cave formation. In the dark, you'll see a glowing white patch where you held the flash. This white phosphorescence is common in cave formations.

This is a clue. If the speleothem were full of iron oxide it wouldn't phosphoresce. Iron oxides tend to block or "quench" fluorescence.

The white phosphorescence you observe is caused by fulvic acids and related compounds incorporated into the calcium carbonate speleothems. Fulvic acids are large molecules (macromolecules) composed of hundreds or even thousands of atoms. Mostly carbon, oxygen, and hydrogen, fulvic acids are the result of decomposition of organic matter (primarily plant debris) in the soil horizons above the cave. Descending groundwater carries fulvic acids and dissolved calcium carbonate into caves. When a droplet of groundwater

deposits a bit of calcium carbonate on a cave formation, traces of fulvic acids will also be caught up in the formation.

One important characteristic of fulvic acids is that they don't have a nice neat single chemical structure. Slight differences exist between one fulvic acid molecule and the next. These differences aren't great – the different molecules all still behave pretty much the same – but they can cause slight differences in the color of the fulvic acids. Thus, the color of a bunch of fulvic acid molecules is really the result of the combination of a wide array of colors. What color do you get when you mix a bunch of colors of paint? Brown! What is the color of a bunch of fulvic acid molecules? Brown!

The same array of slight differences in fulvic acid molecular structures that gives you a brown color also gives produces a white fluorescence. Recall that a mixture of lights of all different colors gives you white light, while a mixture of paints of all different colors produces a brown color. When slightly different molecules are hit with ultraviolet light (and most camera flashes produce some ultraviolet light as well as visible light), they fluoresce slightly different colors. All these colors of light combine to make a speleothem glow with a white light.

Ref.: White, W. B. and Brennan, E. S., 1989, Luminescence of speleothems due to fulvic acid and other activators, Proceedings of the 10th International Conference of Speleology, August 13-20, 1989, Budapest, 1: 212-214.

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An Introduction to Ore Deposits for Collectors

(Popular Mineralogy #2, continued from last month)

Province: A geographical area characterized by a particular set of ore deposits is termed a metallogenic province. The terms "district," "trend," or "belt" are sometimes used to denote a portion of a metallogenic province. For example the Mississippi Valley lead/zinc province contains the "Upper Mississippi Valley Lead/Zinc District" in Illinois and Wisconsin and the "Viburnum Trend" in Missouri. Zambia's famous "Copper Belt" in central Africa is a major source of malachite for collectors.

Hydrothermal ore deposits: Many ore bodies form when ore minerals precipitate from hot or warm waters or brines. These hydrothermal fluids may range from the mildly warm (lower than 50°C or 120°F) to the very hot (greater than 400°C or 750°F). Typically, they are kept from boiling by the great pressures encountered at depth.

Epithermal: Hydrothermal ore deposits formed at shallow depths, typically less than 4500 feet, and at modest temperatures (typically 50-200°C or 120-390°F) are termed epithermal. Mississippi Valley-type deposits are epithermal ore deposits.

Reduced zone: At the depths where many mineral deposits form, the lack of free oxygen allows the formation of minerals that would not be stable in the presence of free oxygen. Many of these "reduced" minerals are sulfides. Many ores are reduced when they are originally formed.

Oxidized zone: As weathering exposes the upper parts of an ore body, free oxygen, carried downward in the groundwater, will react with the primary sulfide minerals of the original reduced ore. These reactions will alter minerals such as chalcopyrite to minerals like malachite and azurite. In an open pit mine, mining moves downward from the oxidized zone into the reduced zone and changes occur in the minerals available to be collected. Thus, you may hear of a mineral collector or a geologist referring to chalcopyrite collected from the reduced zone or malachite collected from the oxidized zone.

Paragenesis: Although there is some confusion in the use of the term, paragenesis typically refers to the association minerals that characterize a particular deposit. Examination of specimens will yield clues to the paragenetic sequence (order of formation from oldest to youngest) of the deposit. For instance, if you collect a sample of a rock cut through by a calcite vein and notice that as you start from the wall rock, the vein is lined by calcite, then dolomite, and has fluorite and quartz in the center of the vein; the sequence is then reversed as one moves from the center of the vein toward the wall rock. The paragenetic sequence for this vein would be calcite-dolomite-fluorite/quartz. This reveals that the calcite is older than the dolomite, which in turn is older than the fluorite and quartz.

Examples of Important Ore Minerals

Many of the brightly colored minerals favored by collectors are in reality, ore minerals. For example, at the big copper mines operating in Arizona or Utah, the primary ore mineral is the copper iron sulfide *chalcopyrite*, $CuFeS_2$, a brassy golden mineral. Closely related copper sulfide minerals such as *bornite*, Cu_5FeS_4, will also be present. When processed, these sulfide minerals yield copper. Similarly, the bright green copper carbonate mineral *malachite*, $Cu_2(OH)_2CO_3$, and the bright blue copper carbonate mineral *azurite*, $Cu_3(OH)_2(CO_3)_2$, yield copper.

Native *copper* (Cu), a reddish metal, itself was mined in the Upper Peninsula of Michigan. Other "native" elements (that is, elements that are found in nature uncombined with other elements) include *gold* (Au), *silver* (Ag), and *graphite* (C).

An important ore mineral for molybdenum (used in specialty steel manufacture) is *molybdenite*, MoS_2, molybdenum disulfide. Interestingly, molybdenite is known in the car repair business as "Moly Di-S" a blue-gray paste that is used to quiet noisy old automobile transmissions. *Rutile*, TiO_2, is mined for use as a paint pigment and as a source of titanium metal.

Scheelite, $CaWO_4$, calcium tungstate, is an ore mineral for tungsten, used in making bulb filaments. *Beryl*, beryllium aluminum silicate, $Be_3Al_2Si_6O_{18}$, is a source of beryllium. *Fluorite*, CaF_2, calcium fluoride, is an important source for fluorine. There are many other ore minerals.

Some Deposit Types

Porphyry copper/molybdenum deposits: Porphyry is an igneous rock in which large crystals of feldspar or quartz are embedded in a fine-grained matrix mostly of small feldspar grains. Porphyry copper (or porphyry molybdenum) deposits form as a large igneous intrusion (sometimes called a "stock") occurs – magma is forced upward deep within the Earth's crust and heats the surrounding rocks. Hot fluids flow through the cooling igneous stock and through the surrounding rocks, depositing copper minerals (primarily chalcopyrite) and/or molybdenum minerals (mostly molybdenite). The huge open pit at Bingham Canyon, south of Salt Lake City, in Utah, is a porphyry copper mine. The Climax Mine in Colorado is an example of a porphyry molybdenum deposit.

Mississippi Valley-type (MVT) deposits: The mines of Joplin, Missouri, are excellent examples of MVTs. Many lead-zinc (galena-sphalerite) deposits are called "Mississippi Valley-type" but not all really are. A true MVT has a simple mineralogy (galena-sphalerite-calcite plus a few other minerals), occurs in sedimentary rocks, and has no nearby igneous heat source to heat the ore-forming hydrothermal fluids. Mildly-warm fluids flowing through sedimentary rocks form MVTs.

Pegmatites: A favorite of mineral collectors and gemstone hunters, pegmatites are zoned silicate deposits that may contain beryl, tourmaline, columbite, or any of a host of other rare minerals; they are noted for their large crystals. Pegmatites may form when a silica-rich igneous melt cools slowly from the outside inward resulting in a zoned body. The outer-most portions of the pegmatite are often fine-grained mixtures of feldspar, quartz, and mica. As one progresses toward the center of the pegmatite, one notices a distinctly progressive increase in the sizes of the crystals of these minerals. At the center of the pegmatite one may encounter very large crystals (sometimes more than 10 inches across!) of beryl, tourmaline, topaz, and other even rarer minerals. Pegmatites tend to concentrate certain elements in their centers. Thus, pegmatites may be mined to produce lithium, beryllium, cerium, etc. Some produce gem-quality crystals of topaz, tourmaline, and morganite beryl. The famous tourmaline mines of Pala, California, are in pegmatites.

Skarn: A skarn forms when carbonate rocks (limestone and dolomite rock) are subjected to metamorphism. Heated by a nearby igneous intrusion, carbonate rocks react with a silicate-bearing fluid producing calc-silicate minerals such as garnets, pyroxenes, amphiboles, and epidote.

Volcanogenic massive sulfides (VMS): The famous "black smokers" that occur on the bottom of the ocean in mid-ocean trenches form when hot hydrothermal fluids rise up through the ocean floor and encounter sea water. The "black smoke" is really a cloud of fine mineral grains, mostly sulfide minerals of copper and zinc, precipitated by sudden cooling. These smokers are one modern analog used to explain the formation of the "volcanogenic massive sulfide" deposits. VMS deposits are typically hosted by rocks of volcanic origin and are sources of copper and zinc and minor amounts of gold and lead. Examples of VMS deposits include the sulfide ores of the Troodos Massif on Cyprus, and at Outokumpu in Finland.

Many other deposit types exist and the mineral collector does not have to master all of the types and terms. It is helpful, however, to know a little about the ore deposits, so one can begin to understand how minerals form.

- A. A. Sicree

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Mineral Etymologies

Etymology is the study of word origins. From where do some common minerals' names come?

Copper: Because of its malleability, native copper was used by many early cultures for ornaments, and later, for coins. Its softness made it a poor choice for weapons, but alloyed with tin, bronze is produced. In the Bronze Age, the alloy was used to make swords, spear points and other weapons. The Romans called copper *aes* and in Greece it was termed *chalkos* ("copper pyrite" is thus *chalcopyrite*). The term *aes* came to include bronze (the alloy of copper and tin) as well as pure copper, thus the need arose for a term that meant copper by itself. Much Roman copper was derived from the Mediterranean island of Cyprus and called *aes cyprium*, or "copper of Cyprus." First *Aes cyprium*, then *cyprium*, then *cuprum* came to be used to indicate a pure copper. (It is interesting to note that the Latin *aes* eventually became the source of the English word *ore*.) The shortened term *cuprum* is the source of the scientific symbol *Cu*, used for copper on our periodic tables and in chemical formulae. In English, the Latin term *cuprum* became *coper* and then *copper*. T

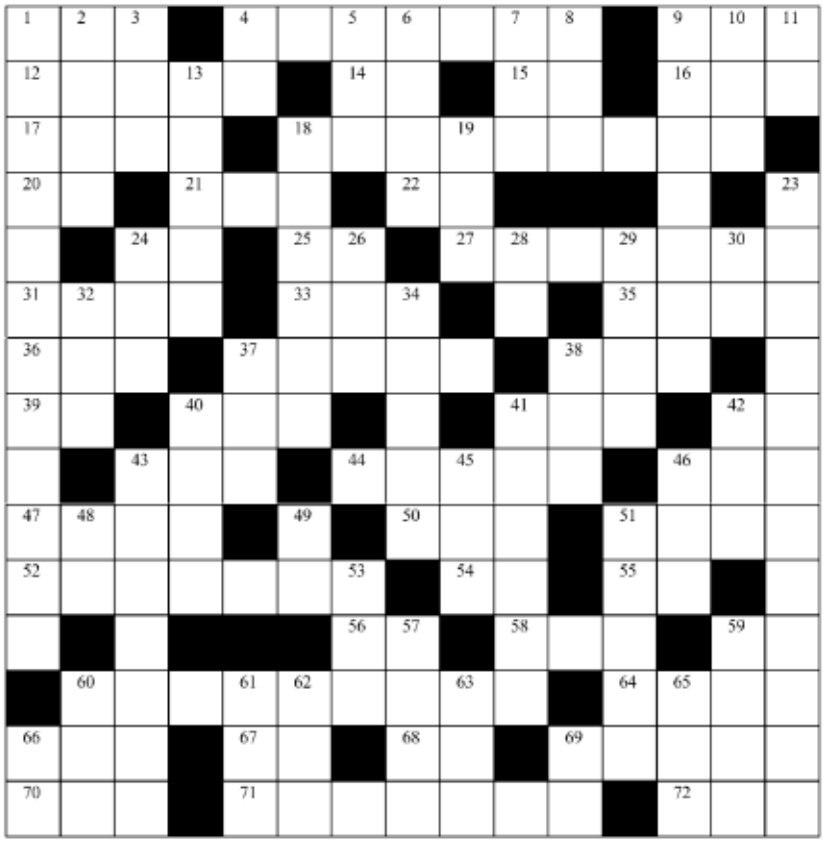
The Society's Schedule

We generally meet on the **third Wednesday** of each month, August through May, in the Earth & Engineering Sciences Building on the west end of Penn State's University Park campus, off White Course Drive. (Always check our web site for a specific month's meeting.) Social hour with refreshments starts at 6:30 p.m., and the meeting starts at 7:30 p.m. Everyone is welcome!

Board Meetings are now generally held on the first Wednesday of the month at 7:00 p.m. Please contact the President to verify time and location for a particular month. Board meeting minutes may be requested from the Secretary.

Crystal Matrix Crossword

Copper minerals



ACROSS

1 Civilian conservation group
4 mix of U minerals
9 mining engineers group
12 what a crystal shows
14 Order of the Arrow
15 roll on
16 miners' union
17 too
18 red garnet cabochon
20 liquid chromatography
21 new
22 south
24 state near CT
25 please (ab)
27 copper carbonate mineral
31 petroleum cartel
33 lbs. per square foot
35 having to do with ideas
36 used to heap leach Cu
37 Cu is a native _____
38 a transient mineral
39 year
40 sticky weed seed
41 place for zebras
42 state and river
43 valuable mineral
44 big sea
46 rocks full of metal
47 surrounded by water
50 ___ Kippur
51 smallest chemical unit
52 radioactive element
54 niobium
55 gas chromatography
56 what is its definition?
58 defines mineral names
59 bachelor
60 beneath a layer of rock
64 not sweet
66 buddy
67 alcoholics
68 ancient city
69 pH _____
70 hairy ___
71 copper oxide mineral
72 on the ground

DOWN

1 copper iron sulfide min.
2 calcite (ab)
3 TV network
4 great (ab)
5 extinct flightless bird
6 has same symbol as Cu
7 not false
8 long time
9 anilite is a Cu _____
10 madam (ab)
11 east-west
13 opposite of covalent
18 red metal
19 snake
23 mineral chemistry
24 color of copper
26 landing ship, tank
28 zinc
29 rich
30 tellurium
32 golf term
34 _____ cut diamond
37 flower
38 missing an electron
40 good to drink
41 copper mining country
42 gold (Spanish)
43 small ball of copper
45 long time
46 over the counter
48 shale (ab)
49 plutonium
51 banded gem
53 diamond pipe in Russia
57 lizard
59 La ____ Tar Pits
60 amber is this
61 Strategic Air Command
62 Greek T
63 three
65 atl__
66 protactinium
69 not you

Last month's solution: Carbonates

S	T	E	■	C	A	L	C	I	T	E	■	C	A	P
T	O	P	A	Z	■	E	A	■	U	R	■	A	M	U
R	O	A	M	■	W	I	T	H	E	R	I	T	E	■
O	K	■	B	R	O	■	S	E	■	■	■	I	■	M
N	■	I	E	■	O	P	■	N	A	I	R	O	B	I
T	H	O	R	■	L	E	A	■	S	■	A	N	O	N
I	A	N	■	F	L	I	N	T	■	T	I	S	■	R
A	D	■	S	A	Y	■	I	■	B	A	D	■	N	E
N	■	J	A	N	■	B	O	R	A	X	■	P	I	C
I	T	A	L	■	M	■	N	O	R	■	X	Y	L	O
T	E	K	T	I	T	E	■	B	I	■	E	X	■	R
E	■	A	■	■	■	O	K	■	T	I	N	■	I	D
■	A	R	A	G	O	N	I	T	E	■	O	M	N	I
A	C	T	■	P	T	■	E	R	■	I	N	E	R	T
S	E	A	■	O	T	A	V	I	T	E	■	D	I	E

Some Upcoming SHOWS AND MEETINGS

Our web site http://www.ems.psu.edu/nms/ has links to more complete lists and details on mineral shows and meetings around the country.

February 22 - 23 - 24, 2008: EFMLS Conv., Jackson, Miss.

March 1 -2, 2008: Earth Science, Gem and Mineral Show, by Delaware Mineralogical Society. Delaware Technical & Community College, Churchmans Rd (Rt 58) (I-95, exit 4B), Newark (Stanton), DE.

March 29 and 30, 2008: Franklin County Rock & Mineral Club 30th Annual Gem & Mineral Show. Quality Inn & Suites, Interstate 81 at Exit 14, Wayne Avenue, Chambersburg, PA. Saturday 10 am to 6 pm, Sunday 10 a.m. to 5 p.m.

March 29 -30, 2008: Annual Rock & Mineral Show , by Che-Hanna Rock & Mineral Club. Athens Twp. Volunteer Fire Hall, 211 Herrick Ave., Sayre, PA.

March 29 -30, 2008: Philadelphia Mineral Treasures and Fossil Fair, by Phila. Mineralogical Soc. & Delaware Valley Paleontological Soc. Fossils, minerals, gems, more dealers, exhibits, learning activities incl. fossil dig for children and kid's corner. Food, raffle, door prizes. Lulu Temple, 5140 Butler Pike, Plymouth Meeting, PA. 2 miles from Norristown exit of PA Turnpike.

April 19 - 20, 2008: Gem, Mineral & Fossil Show, by Monongahela Rockhounds. Sky View Fire Hall, West Mifflin, PA.

April 26 - 27, 2008: 36th Annual New Jersey Earth Science Assn. Gem & Mineral Show, by Franklin- Ogdensburg Mineralogical Soc., NJ Earth Science Assoc. & Sterling Hill Mining Museum. Franklin Sch./Washington Av; Franklin, NJ.

May 3 - 4, 2008: Annual Show & Sale by The Mineralogical Society of Northeastern Pennsylvania. Oblates of St. Joseph, 1880 Hwy. 315, Pittston, PA 18640. Sat. 10:00 - 5:00, Sun. 10:00 - 4:00.

May 21 - 26, 2008: Tri-Federation Rockhound Rendezvous, Texas Springs, Nevada. 4 to 6 different sites: pink limb casts, small limb casts and bogwood, snakeskin agate, jasp/agate limb casts, geodes, and more. Daily collecting trips, potluck dinners, daily Happy Hours, evening campfires, map exchange and tailgate displays. All AFMS members welcome. See Nov. AFMS News, <www.amfed.org> T

INVITE A FRIEND TO JOIN THE SOCIETY

The Nittany Mineralogical Society prides itself on having the finest line-up of speakers of any earth sciences club in the nation. If you'd like to be part of our Society, dues are $20 (regular member), $7 (student rate), $15 (seniors), $30 (family of two or more members, names listed). Your dues are used for programs and speakers, refreshments, educational activities, Bulletins, and mailing expenses. Please fill out a membership form, make checks payable to "Nittany Mineralogical Society, Inc." and send them to

Nittany Mineralogical Society, Inc.
P.O. Box 10664
State College, PA 16805

or bring your dues to the next meeting.

We want to welcome you!

For sale / trade: Equipment & Materials

TRADE for ROCK/MINERAL SPECIMENS (or free if you ask nicely ahead of time!): 35 mm film canisters, clear or black and great for storing small stuff. E-mail with the color and quantity you'd like (I've got 3 buckets full) and I'll bring them to the next meeting. Tim Holtz, stamprockcoin314@hotmail.com

For Sale: Covington wet belt sander. Takes a 3"x 24" belt, uses 1/3 HP motor. 8" deep, 10" wide, 13" high. Without motor $65; with motor (recently cleaned and serviced) $115. Willard Truckenmiller, 814-625-2531

Mineral Business and personal collection for sale (hundreds of specimens plus supplies and equipment included). Call Terry at 570-672-2325 Mon. - Sat. 9:00 a.m. - 11:00 p.m. If I'm not there, leave a message.

For sale: Very large collection of gemstone material, prefer to sell as one lot; including much jade in various types & colors; mostly rough, plus some slabs; some fine Coober Pedy opal. Also equipment and jewelry making supplies from jewelry studio and production shop. Contact Daniel G. Reinhold in Mill Hall, PA; phone 570 748-3201 after lunch every day, or e-mail: dreinhold@suscom.net T

SOCIETY OFFICERS

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Membership Chair: David Glick (see above)
Programs: Dr. Duff Gold
Publicity: Volunteers needed

The **Bulletin Editor** will welcome your submissions of articles, photos, drawings, cartoons, etc., on minerals, fossils, collecting, lapidary, and club activity topics of interest to the members. Please contact:

David Glick E-mail: xidg@verizon.net
209 Spring Lea Dr. phone: (814) 237-1094 (h)
State College, PA 16801-7226

Newsletter submissions are appreciated by the first Wednesday of the month. If you include photographs or graphics, please do not embed them in word processor files; send them as separate graphics files (TIF, or good to highest quality JPEG files, about 1050 pixels wide, are preferred). Please provide captions and the name of the photographer or artist