

Nittany Mineralogical Society Bulletin

Nittany Mineralogical Society, Inc.

P.O. Box 10664

State College PA 16805

January, 2008

www.ems.psu.edu/nms/

Editor: David C. Glick (see p. 8)

January 16th meeting:

Active Volcanoes of Costa Rica

by Bob Altamura

Our January meeting will be held Wednesday the 16th 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 January program will be a picture tour of a past geological field expedition to Costa Rica by NMS member and geologist Bob Altamura. Costa Rica is in Central America and situated along the isthmus of Panama between Nicaragua and Panama.

Costa Rica is a tropical country that is divided by a backbone of mountains and volcanoes that are an extension of the Andes to the south and the Sierra Madres to the north. There are three principal mountain ranges, and Bob visited all of them. In the northwest is Cordillera de Guanacaste; to the southeast is Cordillera Talamanca (12,530 feet). These are separated near the center of the country by Cordillera Central. The capital city, San Jose, sits at the base of Cordillera Central in the shadow of the active Volcán de Poas (8,871 feet). San Jose lies in the middle of the Meseta Central (Central Valley) where almost two thirds of the nation's population resides. Other active volcanoes that were studied included Volcán de Irazú (11,260 feet) and Volcán de Arenal (5,358 feet). Costa Rica is part of the Pacific "Ring of Fire" and has seven of the isthmus's 42 active volcanoes plus numerous dormant or extinct cones. Earth tremors and small earthquakes regularly shake the country. The last major quake hit on April 22, 1991. The epicenter was on the Caribbean side and measured 7.4 on the Richter scale.

Altamura and his former professor Jelle de Boer (author of *Volcanoes in Human History*) of Wesleyan University conducted field study for about two weeks. The purpose of the trip was to investigate the composition of ancient and recent volcanic deposits as a proxy for characterizing the nature of the interaction between the Cocos lithospheric plate and the Caribbean plate which occurs beneath the country. Costa Rica is a relatively small

Continued with color photos on page 2

JUNIOR ROCKHOUNDS

Next Meeting: Monday, January 21

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

Radioactivity in minerals and everyday life:

See some radioactive minerals, learn to use a Geiger counter, and learn about radioactivity and how it occurs in everyday life.

Can you help with Junior Rockhounds programs?

Some adults to help with the program would be appreciated. Anyone wanting to learn to provide help with our Junior Rockhounds program may come to one of the meetings, and we will proceed from there.

MINERALS JUNIOR EDUCATION DAY has been scheduled for Saturday, April 5.

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Important Vote on Jan. 16: Mineral Show? Symposium?

from David Glick, NMS President

Members present at the January meeting will be asked to vote on whether they are in favor of NMS holding a **show on June 28-29, 2008**. The Board has been discussing the possibility of such a third annual Nittany Gem and Mineral Show; the participation of many members would once again be needed. Bernie Pisarchick, who contacted dealers, ran the dealers' room, provided guidance, and organized several other aspects for our first two shows, is unable to participate to that extent this year. Please attend the meeting, hear more, and vote.

Members will also be asked to vote on whether they are in favor of NMS presenting a **symposium in 2008**, probably in early October. Actually making it happen would depend on availability of speakers and a venue, as well as member participation. H

Program Topics Announced

At the February 20th regular meeting, Dr. Ryan Mathur of Juniata College will speak on 'Some odd mineral occurrences in central Chile.' See page 2 for other topics.

ATTENDING THE JANUARY 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.

Continued from page 1

country (the size of New Hampshire) and a substantial amount of land was explored during the expedition. Bob will review the geological nature and fun of the expedition through an informal picture tour. Scenes of mountains and volcanoes, bedrock and soil, jungles, and the wave-cut platform of Costa Rica's Pacific coast will be included. The answer to the question of *how deep* into the crater of an active volcano did Bob go will be revealed. *Why* is another question.

References

De Boer, J.Z. and Sanders, D.T., 2002, Volcanoes in human history: Princeton University Press, Princeton, NJ, 295 p.

Gollo, Carlos, 2007, Vacations in Costa Rica: retrieved from <http://www.carlosgollo.com/costarica.html> on Jan. 2, 2008.

KE Adventure Travel, Costa Rica: retrieved from <http://www.keadventure.com/countries/costarica/> on Jan. 2, 2008.



View of Poas Volcano (Cordillera de Central) from the crater rim. Poas is near San Jose, the capital city, and it represents a constant geological risk to inhabitants of the area. The plume emission was constant the day we investigated this volcano. The yellow area near the throat possibly represents sulfur mineralization.



Pacific coast near the village of Dominical. During 1989 when this picture was taken, the coast was relatively undeveloped with the jungle coming up to the sea. A wave-cut platform is submerged beneath the surf zone. The waves breaking on the platform result in parallel sets of waves of the type sought by surfers.



View of Arenal volcano (Cordillera de Guanacaste) from a blocky lava flow from a major eruption that occurred during 1968. Arenal was active the entire day that we did field work and the relatively faint plume from the crater was always present. Periodically, the volcano would erupt and ejecta and a black cloud would be thrown into the air. These eruptions were accompanied by small earthquakes and tremors. *Costa Rica photos by Bob Altamura*

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NMS Program Topics

February 20: Some odd mineral occurrences in central Chile, by Dr. Ryan Mathur of Juniata College.

March 19th regular meeting:

Geode Night, including sales and opening of geodes, and a program on geodes presented by Jeff Smith

April 16: to be announced

May 21: Minerals on Postage Stamps, by Frank Kowalczyk H



One day too late for the field season... NMS received permission for a field trip to the Skytop road cut site for November 18. Three inches of snow arrived just before we did. Some pyrite crystals, pyrite in sandstone, and iron oxides and sulfates were collected. *Nat Smith photo.*

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. The tuition of \$330 per person is the same as last year. Steve Weinberger writes in the January EFMLS Newsletter: "Registration begins January 1 - and we encourage you to register early in order to ensure being able to take the class or classes you list as choice #1 on your registration. Class size is limited so that students can receive maximum assistance from their instructor. A form is included on page 16 of [the January EFMLS Newsletter], or you can download one from the EFMLS website."

Robert Livingston was awarded the 2007 EFMLS Citation Award. A full-page article describes two decades of service to his local club in Syracuse, NY, and over a decade of service in many positions to EFMLS.

The deaths of Cathy Gaber and L.J. Pursifull are reported. Cathy Gaber was active in Wildacres, the Rochester Symposium, and EFMLS, having been President in 1997. L.J. Pursifull served as EFMLS President in 1958, just 7 years after the federation was founded. Please see the Newsletter for more about each of them, including possibilities for memorial contributions.

The **2008 EFMLS Convention** will be held in Jackson, Mississippi, February 22, 23 and 24. It's hosted by the Mississippi Gem & Mineral Society, which will be celebrating its 50th year as a chartered organization. The theme will be 'Gold' for the 50th anniversary, and some old-time exhibits and equipment will be shown. They also hosted the AFMS Convention for their 50th anniversary. Convention meetings will start on Friday, with the Show on Saturday & Sunday. The Show is at the Trade Mart Building at the State Fairgrounds. The Regency Hotel and Convention Center at 400 Greymount Ave., within walking distance of the show, has been contracted for a double room rate of \$89.00 plus tax; phone the Regency at 601-969-2141 before January 21, 2008.

The Banquet, the Cracker Barrel, and the Editor's Breakfast will be held at the hotel. Advance registration must be received by January 21, 2008.

The AFMS Newsletter is available by the same methods. The December - January issue was covered last month.

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

- Editor

Donald T. Hoff 1930 - 2007

An obituary published in the Harrisburg Patriot-News on December 14 reported that Donald T. Hoff died December 4 at his home in Harrisburg. He was a geologist and had been Earth Science Curator of Pennsylvania's William Penn Memorial Museum, retiring in 1991. He was well known from that position and his many activities as a mineral collector, and was popular among other collectors in the region.

Bob Smith, Bob Ganis and others are working on a memorial article which will be presented here when it is available. Arrangements have been made for donations to support geology students attending the annual Field Conference. They made be sent in Donald's memory to:

Field Conference of Pennsylvania Geologists

3240 Schoolhouse Road

Middletown PA 17050-2721

-Editor

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NMS Needs Publicity Volunteer

from David Glick, NMS President

We have lots of activities planned and could use a volunteer to publicize them. For most of our regular meetings, this would involve posting announcements on community bulletin boards on the web, and could also include paper posters around town and campus, and contacting other organizations which might be interested in a particular topic. The volunteer could also work on publicity for larger events, which would include newspaper ads, contacting more comprehensive web calendars, and mailings.

The Board of Directors can provide materials which were organized last year by Daniel Bontempo and others, and will provide additional guidance. If you are interested in participating, please contact Dave Glick (see page 8).

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Monthly e-mail announcement

Each month we send out an e-mail announcing the program for the monthly meeting, any other very important announcements, and giving a link to the complete Bulletin on the web site. (We started placing a PDF file of the complete Bulletin on the web site a few months ago; it is available to both members and non-members.)

If you would like to be added to or removed from that list at any time, please contact Dave Glick (see page 8). If your e-mail address changes, please let him know the new address!

- Editor

Popular Mineralogy

Mineralogy and earth science for the amateur mineralogist and serious collector - #8

Fluorite in the Ancient World

by Andrew A. Sicree

Fluorite in Ancient Rome

Fluorite was a first-class gemstone in ancient Rome. One of the persistent puzzles of classical archeology is the nature of the famous *vasa murrina* of the ancient Romans. The *vasa murrina* were fabulously expensive drinking cups. Historians and archaeologists remain uncertain of the identity of the *murra* from which they were made. Scholars have variously proposed that murrine vessels were made of glass, onyx, or Chinese porcelain. Although the English word murrhine or murrine is applied to a type of ancient Roman glass, it is more likely that *vasa murrina* were actually made from fluorite.

The Vasa Murrina

Vasa murrina were first introduced to Rome by Pompey the Great (106-48 BC) who brought them back after his victories in the East and dedicated them to Jupiter Capitolinus, the supreme god of the Roman pantheon. Writers such as Pliny the Elder (*Gaius Plinius Secundus*, AD 23-79) report that huge sums were spent on these vessels. Pliny records that 70 talents were exchanged for a vessel capable of holding three *sextarii* (one *sextarius* is about a pint). He also reports that a murrine *trulla* cost 300 talents.

A *trulla* is a ladle-like nested strainer. One vessel nests neatly inside of the other; the inner vessel is perforated. Wine is poured into the inner vessel when the two are nested. Lifting out the inner vessel separated the wine from any sediment. The sediments were caught in the strainer while the clarified wine remained in the outer vessel. Carving a *trulla* from fluorite would have been a remarkable lapidary feat.

The Value of Fluorite

The Emperor Nero (AD 37-68) spent 300 talents on a *capis* or drinking cup. The Roman *talent* was a unit of weight equal to the weight of a cubic Roman foot of water; it works out to about 60 pounds – because the ancient Roman foot is not identical to the English foot. As in most units of measure used in antiquity, there is some uncertainty in the actual value. As a monetary value, the talent was worth the value of the equivalent weight of silver. In other words, a talent was worth about what 60 pounds of silver was worth. What does this mean in U.S. dollars?

Silver values vary. But in 2006, silver averaged \$12.62 per troy ounce or about \$184 per pound. If the talent is about 60 pounds, then a talent of silver was equivalent to \$11,000 in 2006. Thus, in that year, 70 talents worth of silver had a value of more than \$770,000 and 300 talents of silver was worth \$3.3 million.

Thus, Nero's fluorite drinking cup cost the equivalent of more than \$3 million!

Source of Fluorite

Pliny indicates that murrine vessels came out of the East, mainly from the Parthian empire (modern day Iran), from Carmania in particular. Carmania is roughly equivalent to the present-day Iranian province of Kermân, north of the Strait of Hormuz. He describes them as being multi-colored and made of a substance formed from moisture thickened by heat deep within the earth.

Fluorite purportedly was used in the manufacture of the prized *vasa murrina* because of its rarity, its variety of colors, and the fact that it imparted a special flavor to wine. Apparently, the flavor was due not so much to the fluorite itself, but to resins used to help hold the fluorite crystals together during carving.

Vasa Murrina Today

Only two Roman fluorite vessels are extant; both are in the collections of the British Museum. They are known as the Crawford Cup and the London or Barber Cup. An Austro-Croat military officer retrieved both vessels from a Roman grave in the Turco-Syrian border region during World War I. He found two fluorite cups and some gold medallions in a lead casket dating to the First Century, AD.

The Crawford Cup is a two-handled *cantharus* or drinking goblet about five inches (13.5 cm) across and four inches (9.5 cm) high. It is made of a strongly-banded fluorite with purple, yellow, white, and orange-red bands.

The Barber Cup is a one-handled cup carved from richly-veined purple, white, green, and yellow fluorite. A little more than four inches (10.7 cm) across, it is decorated with vine leaves and grapes in low-relief and has a bearded head of Dionysus carved under the handle. The cup's shape is unusual and it is likely that the artist originally intended to carve a two-handled cup but was forced to change the cup during the carving process. (Perhaps the other fluorite handle cleaved off – with four perfect cleavage directions, fluorite is notoriously easy to cleave.)

Although it is most likely that the two fluorite cups in the British Museum are the sole surviving examples of the famous *vasa murrina*, one notes that they have dropped considerably in price. The Crawford Cup was purchased for the British Museum in 1971 for only £2,300 (about \$5,600).

An interesting post-script: In the Church of the Gesù in Rome, begun in 1568, the plinth (base) of the altar and two

lateral compartments are made of fluorite, said to be the same material used in the ancient vasa murrina.

Refs: Loewental, A. I., and Harden, D.B., "Vasa Murrina", *Journal of Roman Studies-1*, 39 (1949), pp. 31-37; Williams, D., "Crystalline Matter", *British Museum Magazine-3*, 48 (Spring 2004), p. 4.

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The Discovery of Fluorine

Fluorine is a marvelously dangerous element. It is so dangerous that several of the early scientists who experimented with it were blinded or killed (they are sometimes referred to as the "fluorine martyrs"). It is the most strongly reactive element.

In the mineralogical world, the most common fluorine minerals are fluorite, CaF_2 , cryolite, Na_3AlF_6 and fluorapatite, $\text{Ca}_5(\text{PO}_4)_3\text{F}$.

In 1670, Heinrich Schwanhard, a German glass-worker, treated fluorite with a strong acid and observed wisps of vapor rising from the solution. As he bent down to examine the fluorite more closely, the vapor clouded his eyeglasses. Assuming the vapor had condensed on his glasses, Schwanhard took them off to wipe them clear. He found, however, that the vapor had actually attacked the glass lenses, etching their surfaces. This was quite remarkable because very few chemicals will react with glass.

By reacting fluorite with strong acids, Schwanhard was thus the first to generate hydrofluoric acid (HF). He kept this process proprietary and used it to create a successful glass-etching business.

Eventually, word of the process got out, and scientists realized that hydrofluoric acid contained a new element. Carl Wilhelm Scheele (scheelite) and other scientists such as Joseph Louis Gay-Lussac (gaylussite), Caroline Menard, Humphry Davy, Antoine Lavoisier, and Louis Thenard (thenardite) experimented with hydrofluoric acid. They, and others, failed to isolate elemental fluorine. Henri Moissan (moissanite) finally succeeded in isolating fluorine in 1886 by electrolysis of HF and potassium hydrogen fluoride, an accomplishment that earned him the 1906 Nobel Prize for chemistry.

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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

Mineral Etymologies

Etymology is the study of word origins. From where do some common mineral terms come? As one might suspect fluorspar, fluorine and fluorescence have common roots.

Fluorspar: The mineral fluorite is isometric calcium fluoride, CaF_2 . The older name *fluorspar* (synonymous with fluorite) is still widely used, especially in the mining industry. In 1546, Georgius Agricola translated the German term *flusse*, deriving the name fluorspar. The term *fluor* has its roots in the Latin term for "flowing" and is the result of the use of the mineral in metallurgy as a flux (it lowers the temperature necessary to melt a mix, thus allowing one to get a melt or flowing state more readily).

Fluorine: Fluorine was coined in 1813 by the English chemist Sir Humphry Davy (inventor of the Davy mine safety lamp) who derived the term from fluorspar. Davy realized that fluorine was one of the elements that composed fluorspar.

Fluorescence: In 1852, Sir George Stokes, an English physicist, observed the reaction of fluorspar to ultraviolet light and coined the term "fluorescence" to name the effect. He modeled the word on the term "opalescence" combining *-escence* with *fluor* from fluorspar.

Luminescence: Luminescence has its origin in the Latin *lumen*, which along with the Latin *lux* means light. The ending *-escence* meaning "state of" is derived from *-escentem*, a Latin present participle verb ending. Luminescence first appeared in print about 1896.

Phosphorescence: Phosphorescence has Greek roots. The term comes from *phos* meaning "light" and *phoros* meaning "bearer" (from *pherein* "to carry"). Thus a phosphor is a "light-bearer" and the *-escence* ending of phosphorescence is the same as in the word luminescence. – A. A. Sicree

The Color Purple

Fluorite occurs in a rainbow of colors, but purple is, perhaps, its most characteristic color. We've all seen beautiful, deep-purple fluorite cubes from the Cave-In-Rock District, in Hardin County, Illinois. What causes this color?

Analyses of natural purple fluorites have shown no consistently present trace element impurities that can explain the purple color. In fact, if you take a clear, colorless lab-grown fluorite crystal of the highest purity and irradiate it (i.e., bombard it with atomic radiation), you can induce the same purple coloration.

Purple coloration in fluorite is often attributed to "F centers" and indeed this is correct. But in the term "F center" the "F" simply stands for *Farbe*, the German word for color. Saying that the color is due to a color center provides only very limited information.

The fluorite crystal is a regular cubic lattice of positive calcium cations (Ca^{2+}), and negative fluoride anions (F⁻). However, in even the most perfect crystal, there are defects, typically at the 0.01% level. Some of these defects occur when a fluoride anion is displaced; instead of being in its proper position, the ion is caught in an interstitial site. This leaves an empty site where the fluoride anion should have been. If an electron becomes trapped in this vacant site, it creates what is called an *electron color center*. This gives the otherwise colorless fluorite the ability to absorb light in the green-red portion of the spectrum and the crystal appears purple.

Energetic radiation (such as from a nuclear reactor or from the decay of uranium or potassium-40 in nature) bumps electrons into the fluorite crystal's vacancies and thus turns a colorless crystal purple. It only takes about a hundred F centers for every million fluoride ions to create a deep purple fluorite specimen. No trace impurities are needed. One should also note that it is possible to reverse this process. If you heat a purple fluorite sufficiently, you can change it back to its colorless state. – A. A. Sicree

Ref.: Nassau, Kurt, *The Physics and Chemistry of Color*, (Wiley, New York, 1983) pp. 184-190.

Popular Mineralogy

Mineralogy and earth science for the amateur mineralogist and serious collector - #2

An Introduction to Ore Deposits for Collectors

by Andrew A. Sicree

Ore Deposits: Sources of Minerals

The mineral collector or gold panner may hear words such as “Mississippi Valley-type deposit” or “porphyry copper” or “gold ore” or “gossan” tossed about by fellow collectors or mentioned in articles in *The Mineralogical Record*. These terms may be mystifying: they are something more than the usual name and locality data.

These and related terms refer to the *ore* or the type of *ore deposit* in which a mineral was found. For instance, many fine galena, sphalerite, and calcite crystals come from lead and zinc mines in the Mississippi Valley. Many, but not all, lead (in the form of galena) and zinc (as sphalerite) deposits in Wisconsin, Illinois, Missouri, Kansas, and adjacent states are “Mississippi Valley-type deposits.” The big copper mines at Bisbee and Morenci, Arizona, exploit “porphyry copper” ore deposits and the Climax Mine in Colorado mines a “porphyry molybdenum” deposit. “Gossan” refers to the cap of iron oxide minerals (such as hematite) that forms when an ore containing sulfide minerals (such as pyrite) weathers.

The study of ore deposits is a major field within the geosciences and we can’t cover it all here. But I will try to explain some of the terms and concepts that a mineral collector might encounter. Let’s start with definitions of common terms:

Some Definitions

Ore: An ore is a natural geologic material from which one can extract a mineral or aggregate of some value. The term ore may thus include not only gold ore, copper ore, etc., but also crushed rocks, coal, oil shale, or even petroleum and natural gas. *Value* is the key difference between a rock and an ore. Rock becomes ore when something in it is worth mining or extracting.

Mineralization: This term often refers to the occurrence of traces of economically-interesting minerals in a rock. Rocks with small amounts of minerals cannot be called ores because they are not concentrated enough to be mineable, thus they have no immediate value. Prospectors and geologists study mineralization precisely because it may lead to the discovery of ore.

Ore-forming fluid: Many ores are formed when a fluid – typically hot, salt-rich water (i.e., a brine) – passes through the host rocks. Changes in conditions (such as a decline in

temperature) cause an ore-forming fluid to precipitate enough mineralization so that an ore results.

Syngenetic: Ores that form at the same time as their host rocks or sediments are syngenetic. A placer gold deposit is a deposit in which the gold nuggets and grains were laid down by a stream at the same time as the pebbles and sand that encase the gold. Gold found in conglomerate rocks (such as the Witwatersrand gold deposits of South Africa) is thought to be syngenetic.

Epigenetic: Deposits of ore minerals that form after the formation of the host rocks are called epigenetic. For example, a deposit in which galena and sphalerite crystals occur in vugs or chambers in limestone rock is clearly epigenetic. Long after the limestone rock was laid down, vug openings formed when the original limestone was dissolved. Then ore-forming fluids epigenetically deposited minerals such as sphalerite and galena in the open spaces. If crystals are found in veins that cut across the beds of a sedimentary rock those crystals are likely to be epigenetic in origin.

Supergene: Supergene refers to ores or mineralization formed by descending fluids. Weathering of the near-surface part of an ore deposit may cause “supergene enrichment.” For instance, in porphyry copper deposits such as Bisbee, Arizona, the original copper ore minerals were mainly sulfide minerals such as chalcopyrite (copper iron sulfide). The upper, near-surface portions of the ore deposit were exposed to groundwater, which seeped downward through the ore. This groundwater was rich in oxygen and carbonate ions. It dissolved the copper iron sulfide minerals, and the sulfide was “oxidized” to sulfate. The copper and iron were precipitated as copper carbonates (azurite and malachite) and iron oxide minerals (such as hematite and goethite). Some of the upper parts of the Bisbee ore body were very rich in copper and produced fantastic specimens of azurite and malachite.

Hypogene: Hypogene refers to ores or mineralization formed by ascending fluids. At Bisbee, Arizona, the original primary copper ore formed when hot brines, heated by an igneous intrusion (the porphyry), migrated upward depositing chalcopyrite.

Metallogenesis: The formation of an ore deposit is called metallogenesis. Many ores produce metals, hence “metallogenesis.” Note: “orogenesis” refers not to the genesis of ores but rather to “mountain-building” or the genesis of mountains.

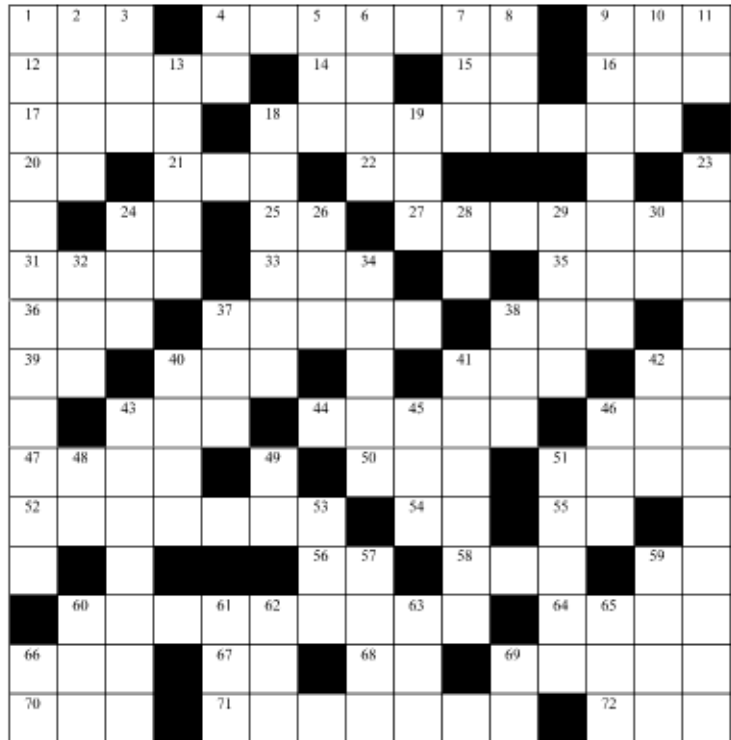
To be continued in a future issue

Crystal Matrix Crossword

Carbonates

ACROSS

- 1 suite
- 4 makes up limestone
- 9 gossan is a oxide ____
- 12 silicate gem with very large xyls.
- 14 each
- 15 in Mesopotamia
- 16 atomic mass unit
- 17 where buffalo ____
- 18 barium carbonate mineral
- 20 where the wind rushes down
- 21 brother, monk
- 22 element used in rectifiers
- 24 that is
- 25 Dominican initials
- 27 Kenyan capital
- 31 Norse god with rock hammer
- 33 girl's name
- 35 anonymous
- 36 boy's name
- 37 rock used by Indians
- 38 ____ the Season
- 39 Anno Domini
- 40 to talk
- 41 avoid ____ company
- 42 Neon
- 43 January
- 44 B-mineral
- 46 a film
- 47 italics
- 50 neither or
- 51 ____ phone
- 52 formed by meteorite
- 54 bismuth
- 55 out of
- 56 yes
- 58 Sn
- 59 Idaho
- 60 polymorph of calcite
- 64 all
- 66 to do
- 67 public relations
- 68 emergency room
- 69 noble gases are ____
- 70 ocean
- 71 Tsumeb Cd carbonate
- 72 Live and Let ____



DOWN

- 1 strontium carbonate min.
- 2 Hobbit family
- 3 govt. agency
- 4 cubic zirconia
- 5 Hawaiian gift
- 6 more than one feline
- 7 day after Monday
- 8 to ____ is human
- 9 positive ions
- 10 African-American church
- 11 plutonium
- 13 fossil resin
- 18 rhinos and mammoths
- 19 opposite of rooster
- 23 magazine carbonate
- 24 charged particle
- 26 famous architect
- 28 _____ and Old Lace
- 29 to attack
- 30 woman's name
- 32 to have yesterday
- 34 negative ion
- 37 alluvial ____
- 38 unavoidable
- 40 halite
- 41 barium sulfate mineral
- 42 nothing
- 43 city in Indonesia
- 45 to steal
- 46 for Communion Hosts
- 48 combines with Au

- 49 mountain
- 51 noble gas
- 53 long time
- 57 city in Ukraine
- 59 above Jesus on Cross
- 60 has five victories
- 61 General Post Office
- 62 comets from ____ Cloud
- 63 three
- 65 Mediterranean
- 66 arsenic
- 69 ipso est

LAST MONTH'S SOLUTION – Minerals



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.

Jan. 27, 2008: Annual Auction, by The Mineralogical Society of Northeastern Pennsylvania. Moosic Presbyterian Church Annex, 625 Main St., Moosic, PA. Featuring rock & gemstone rough, finished gemstones, faceted, cabochons, crystals, jewelry, fossils, mineral specimens, rockhounding tools, books, & much more. Free parking, free admission, public welcome. 1:00 p.m. - 4:00 p.m.

February 22 - 23 - 24, 2008: EFMLS Convention; see p. 3.

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 -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> H

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!

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.

For sale: Equipment & Materials

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

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. H

SOCIETY OFFICERS

David Glick (President) 237-1094 (h) xidg@verizon.net

Dr. Bob Altamura (Vice-President) 814-234-5011 (h)

e-mail: raltamur@fccj.edu

John Passaneau (Treasurer) 814-863-4297 (o),

e-mail: jxp16@psu.edu

Frank Kowalczyk (Secretary) 238-8874 (h, 8-9 p.m.)

e-mail: fjk12@scasd.org

OTHER CONTACTS

Field Trips: Ed Echler 814-222-2642

e-mail preferred [new]: eechler@comcast.net

Junior Rockhounds: Dr. Andrew Sicree 867-6263 (h)

e-mail: sicree@verizon.net

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