

Nittany Mineralogical Society Bulletin

Nittany Mineralogical Society, Inc.
P.O. Box 10664

State College PA 16805

Editor (see page 4):

David C. Glick

October, 2012

Visit our web site: www.nittanymineral.org

October 17th meeting:

Seventeen Years of Eruption on Montserrat

by Dr. Barry Voight
Penn State

Our September meeting will be held Wednesday the 19th in the room 116 auditorium of Earth & Engineering Sciences Building on the west side of the Penn State campus in State College, PA. Maps are available through our web site.

6:30 to 7:30 p.m.: Social hour, refreshments in the lobby

*7:30 to 8:00 p.m.: announcements, questions, answers;
Annual Meeting of the corporation;
door prize drawings*

about 8:00 p.m.: featured program

*The event has free admission, free parking, and free refreshments, and is open to all – **Bring your friends and share an interesting evening.***

This lecture summarizes scientific information acquired on the dangerous volcano on the small Caribbean island of Montserrat, active since 1995, and the strategy of the emergency management response. Understanding the science behind the eruption is used to help manage the emergency. The Soufrière Hills Volcano on Montserrat is a moderate sized complex of several andesite lava domes and associated volcanoclastic deposits. The volcano is dangerous because the lava domes can be unstable and can generate pyroclastic currents, and explosive vertical eruptions and column-collapse pyroclastic currents occur also. The small size of the island enhances the risks.

Continued on page 2



Soufrière Hills Volcano, Montserrat. Public domain image by R.P. Hoblitt, http://en.wikipedia.org/wiki/File:Montserrat_eruption.JPG

Junior Rockhounds Meet Oct. 17th

Junior Rockhounds will meet at 5:00 p.m. on the third Wednesday of October, the fourth Wednesday of November (the 28th), with December plans to be announced later. Those are the same nights as our regular meetings; this month it's October 17th. We'll meet in room 121 Earth & Engineering Sciences Building; from the parking lot, enter the lobby, take the hallway on the left and go all the way to its end.

Each month's Junior Rockhounds meeting has a new topic or topics with fun, hands-on learning for the kids. We encourage those who attend to become NMS members, but it's not required. Just \$7.00 covers a whole year (through October 2013) of student membership. Parents may get a lot out of the meetings, too! Check the web site for news, or contact Dr. Andrew Sicree (see page 8). - Editor

ATTENDING THE OCTOBER MEETING?

Donations of labeled **door prize specimens** are invited. NMS will provide ice and a few drinks for the 6:30 social hour; your donated snacks and drinks will be welcomed.

Bring a friend!

Earth Science Week October 14 - 20

American Geosciences Institute sponsors Earth Science Week <<http://www.earthsciweek.org/>>, which "encourages people everywhere to explore the natural world and learn about the geosciences. 'Discovering Careers in the Earth Sciences,' the theme of Earth Science Week 2012, engages young people and the public in learning how geoscientists gather and interpret data about the Earth and other planets."

This year, the event includes the third annual National Fossil Day <<http://nature.nps.gov/geology/nationalfossilday/>>, co-sponsored by the National Park Service, on Wednesday October 17, and the first Geologic Map Day, on October 19.

-from their press releases and web site

Dues are Due!

by David Glick, NMS President

Our membership year ends this month, so dues should be paid by October 31. We thank those who have already paid. If we haven't processed your payment yet, another form is enclosed (apologies if we haven't yet processed very recent payments). The form and payment can be mailed in or brought to our October meeting. Your **prompt payment helps a lot** in reducing work for our volunteer staff. The rate remains at \$20 for an individual member, with other options available. Forms may also be downloaded from our web site.

The dues form now includes a line for "don't send a printed Bulletin." If you read the Bulletin on the web site anyway, you can help reduce our printing and mailing expenses by checking this line. You can go back to the printed version, or request individual printed issues, at any time.

Eruption on Montserrat *Continued from page 1*

The 1995 to present activity erupted over 1 cubic kilometer of hornblende andesite. The eruption has shown a wide range of eruptive styles, including lava dome growth, dome collapse (including world's largest historical) generating pyroclastic flows and associated surges and ash fall, Vulcanian explosions with pumice fall and pumice flows, volcanic blasts, ash venting, one case of edifice flank collapse, numerous lahars, and cristobalite-bearing toxic ash. Recent active tomography (SEA-CALIPSO project) using airgun shots from a ship encircling the island and deformation and petrological observations, indicate a shallow magma chamber at depths of 5 to >7 kilometers with a volume of several cubic kilometers, likely connected to a deeper magma chamber in the mid crust. Decompression breakdown-rims on amphibole are calibrated to yield magma ascent rates. Cyclic fluctuations in magma flux have been a notable feature of the eruption on four different time scales. Since 1995, five phases of dome extrusion lasting several months up to 3 years have alternated with periods of no surface lava extrusion of up to 2 years. In some periods fluctuations in dome growth are characterized by several week cycles, and major collapses have occurred at the start of such cycles. Shorter cycles of dome growth, sometimes with Vulcanian explosions, typically last several to about 10 hours. Both the multiple-week and multiple-hour cycles, detected by deformation or seismicity, have enabled some predictions of dangerous events. Monitoring and research on the Soufrière Hills Volcano have led to several major contributions to understanding andesite volcanism.

Annual Meeting and Elections on October 17th

by David Glick, NMS President

As announced last month, the brief **Annual Meeting of the Corporation** will be held during the 7:30 business meeting time slot at our October 17th regular meeting. Elections of officers will be held; the Nominating Committee's slate of candidates is:

President: David Glick
 Vice-President: Robert Altamura
 Treasurer: John Passaneau
 Secretary: Ellen Bingham

The Board again requests additional volunteers to get involved with running the Society, providing **new energy and fresh thinking**. In many cases it would be useful to have newcomers spend some time on committees and attending Board meetings before stepping into elected office. All members: please consider volunteering! We could use help in organizing door prizes, refreshments, publicity, the Bulletin, and more. Members are invited to attend Board meetings (generally held on the first Wednesday of the month at 7:30 p.m.), to see how we operate.

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. We present brief summaries here in order to encourage readers to see the entire newsletters.

The **EFMLS Newsletter** is available through the link on our web site www.nittanymineral.org or remind Dave Glick to bring a printed copy to a meeting for you to see. The October issue starts with reviews, awards and thank-yous from the September EFMLS Convention and Show in Harrisburg. The safety article warns against complacency, as in, "I've done this a thousand times before." Focus and stay alert! EFMLS elections were held at the Convention; a photo of the new officers is on page 8 of the Newsletter. Bulletin and web site contest results are presented. The **NMS** web site placed 8th of 17 entries, with about 84% of the highest score, in a crowded and competitive field.

The **AFMS Newsletter** is available by the same methods. The October issue opens with a juniors activities article on educational materials from www.RingofFireScience.com. Outgoing President Lauren Williams says good-bye and thanks, and urges us to be involved and have data to back up our positions. A new "Club Workshop Series" of articles in Rock & Gem Magazine is described. Several Club Rockhounds of the Year are profiled, and news from the American Lands Access Association (including new officers) is presented.

Please see the web sites for the complete Newsletters. There's a lot there!
 - Editor



Amethyst "cathedral" display at the Masters Mineral Gallery, Elizabethtown College (PA), visited during the 2012 EFMLS Convention. *D. Glick photo.*

Vandalism Solved by "Geological Detectives"

By Dr. Charles E. Miller, Jr.

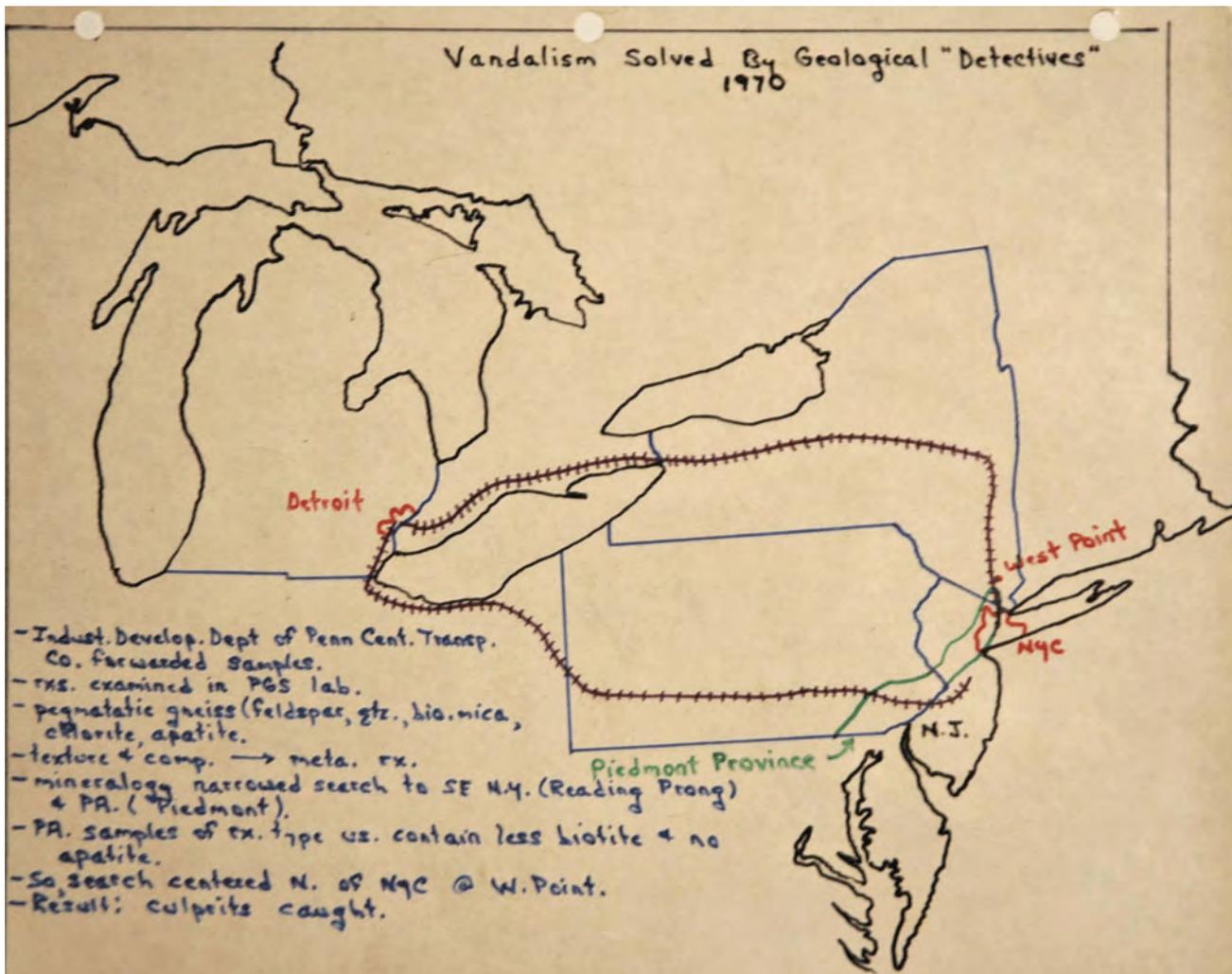
The Industrial Development Department of the Penn Central Transportation Co. submitted two rock samples to the PA Geological Survey with the following problem. New automobiles from Detroit were arriving in New Jersey with smashed windows, dents, and scars resulting from rocks thrown at the passing railroad cars. The problem was whether, from an examination of the rocks found in the automobiles, the Survey could identify the location of the vandalism, so that concentrated policing procedures could be initiated. Obviously, the whole length of track between Michigan and New Jersey could not be policed. In addition, there were two routes that could have been used to transport the automobiles: one through New York and one through Pennsylvania, making any policing job even more difficult.

Along those two railroad routes there is an incredible variety of rock types and many of them can be found at several different places along the two routes. Here though, the Survey had a bit of luck. The rocks that caused the damage were examined microscopically in the Pennsylvania Geological Survey laboratory. Both were found to be a coarse-grained (pegmatitic) gneiss containing feldspar, quartz,

biotite mica, chlorite, and slender crystals, probably of apatite. These minerals and the rock texture provided the critical clue that the rock specimens were from a metamorphic terrain.

The mineralogy of the rock samples permitted the search to be narrowed to southeastern New York and Pennsylvania. These areas, known as the Reading Prong in New York and the Piedmont in Pennsylvania, both contain metamorphic rocks. Could the Survey narrow the problem area further? They thought so. The rock type of the thrown samples occurs along the Penn Central Railroad in Pennsylvania, but there it usually has less biotite and almost never any apatite. On the other hand, rocks containing these minerals are common in a limited area of southeastern New York. Therefore, the Survey suggested that the most likely source of the thrown rocks would be along a stretch of tracks in the vicinity of West Point, north of New York City. This was confirmed by Penn Central's own geologists in an independent study of only the northern route.

The results came in. Policing action by the Penn Central Railroad was initiated in the West Point area. Sure enough, several of the culprits were spotted there in action, and appropriate measures were taken by the railroad. Case closed.



POPULAR MINERALOGY

Fascinating mineralogy and earth science for the amateur mineralogist and serious collector - #43

Phyllosilicates

by Andrew A. Sicree, Ph.D.

Minerals between the sheets

Atoms are much too small to see, but crystals allow us to see the effects of many atoms arranged into repeating patterns. Cleavage – the tendency of crystals to break into flat-sided fragments – offers us evidence that atoms do, indeed, exist. And you can find this evidence without an electron microscope.

Take a knife with a sharp blade and attack a mica specimen (I suggest using one you don't care for much). If you try to slice the mica crystal through its flat end face, the knife will have tough going. But, if you attack the side of the specimen, the knife allows you to peel off flat sheet after flat sheet of thin, transparent mica. You are cleaving the mica crystal – the micas offer an excellent example of one-directional or planar cleavage. We see this peculiar cleavage behavior regardless of which mica species – muscovite, biotite, phlogopite, etc. – we are attacking. What causes this dramatic difference in cleavage direction?

The phyllosilicates

The mica minerals belong to a class of minerals called the phyllosilicates. Phyllosilicates are silicates, meaning they are made up of tetrahedral silica (SiO_2) units. Most of the Earth is made up of silicate minerals and there are a great number of silica-containing mineral species.

James Dwight Dana classified the minerals according to their chemical compositions. He started with the native elements, then processed through the periodic table from sulfides, to oxides, halides, carbonates, and so forth. Dana's system works well with non-silicates, but breaks down among the silicates because the many silicates minerals just don't differ very much from each other chemically. They are mostly composed of silicon and oxygen, with greater or lesser amounts of aluminum, potassium, magnesium, calcium, sodium, etc. For instance, muscovite mica has the formula $\text{KAl}_2(\text{AlSi}_3\text{O}_{10})(\text{F,OH})_2$, whereas topaz is $\text{Al}_2\text{SiO}_4(\text{F,OH})_2$. Not much of a difference in chemistry (some potassium) but there are huge differences between topaz and muscovite.

Other silicate structures

What really makes mica so different from other silicates, such as quartz or topaz, is the arrangement of those silica tetrahedra. For instance, in quartz every corner of each silica tetrahedra is connected to another silica tetrahedron, forming an extensive, three-dimensional framework. We call quartz a "framework silicate" or tectosilicate. In topaz, on the other hand, each silica tetrahedron is completely isolated from all others (separated by aluminum, fluoride and hydroxyl ions). Thus topaz is an "island silicate" or a nesosilicate.

The sheet structure

In the micas, however, the silica tetrahedra are arranged in flat sheets, and the flat sheets are stacked one on top of the next. Three of the four oxygen atoms in each silica tetrahedron are connected to neighboring tetrahedra – this creates a flat planar structure. These sheets of tetrahedra are stacked on top of each other like the pages of a book. The "glue" that holds the silica sheets together is a layer of cations (positive ions) such as potassium (K^+) ions. Different species of micas have different cations. And micas will also have layers of octahedrally-coordinated aluminum atoms – just to make the picture complicated.

But the key idea is that, in the micas, the silica tetrahedra are arranged in flat sheets. Thus, micas belong to the silicate class known as phyllosilicates, which are also quite appropriately called "sheet silicates."

Properties

This phyllosilicate sheet structure produces minerals that are radically different from other classes of silicates. One major property difference is the fact that phyllosilicates tend to cleave – in many cases quite easily – parallel to the sheets. Micas can be cleaved into sheets that are thinner than a sheet of paper (you may have heard the term, "a book of mica" when you were out collecting) and they tend to break apart in that manner upon weathering. This ready cleavage means that phyllosilicates tend to be quite soft. Talc, the softest mineral, is a phyllosilicate.

Muscovite mica, with its planar cleavage and silver color, is quite distinctive. We readily recognize it when we find it. But we may not realize that much of the ground beneath our feet is composed of phyllosilicates. The clay minerals (such as smectite and montmorillonite), formed by weathering of feldspars, are also phyllosilicates. Clay minerals don't form large crystals like muscovite does, but you will see the familiar "book-like" structures if you examine clays under an electron microscope. Because each sheet has a large surface area, the sheet structure of the clays helps clays absorb and retain water and exchange dissolved ions – thus the clay minerals play a critical role in soils.

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Dr. Andrew A. Sicree is a professional mineralogist and geochemist residing in Boalsburg, PA. This **Popular Mineralogy** newsletter supplement may not be copied in part or full without express permission of Andrew Sicree. **Popular Mineralogy** newsletter supplements are available on a subscription basis to help mineral clubs produce better newsletters. Write to Andrew A. Sicree, Ph.D., P. O. Box 10664, State College PA 16805, or call (814) 867-6263 or email sicree@verizon.net for more info.

Mineral Whiz Quiz

Are you a Mineral Whiz? Take our Quiz! For each of the following mineral science questions, fill in the blank with a short answer. Then check your work against the answer key to find out how you stack up mineralogically.

- Which trace element gives the Hope Diamond its distinctive blue color? _____
- Which element causes the characteristic green color of emerald? _____
- Which element causes the characteristic bright red color of ruby? _____
- What is the cleavage angle (dihedral angle) between calcite cleavage planes? _____
- Which volcano destroyed the cities of Pompeii and Herculaneum, in Italy? _____
- Give two names for a mineral named for the volcano that destroyed Pompeii: _____
- In what year did a volcano destroy Pompeii and Herculaneum? _____
- What is the densest mineral? _____
- What color is a ruby when crushed to a fine powder? _____
- What is the hardest mineral? _____
- What somewhat rare, useful element do spodumene, lepidolite, eucryptite, and triphylite have in common? _____
- What is the silicate structure class of beryl? _____
- Which is the baby powder mineral? _____
- What type of fracture does quartz display when broken? _____
- What is the chemical formula of the iron mineral hematite? _____
- What is the chemical formula of the halide mineral fluorite? _____
- In halite, what is the angle between the a-axis and the b-axis? _____
- In beryl, what is the angle between a-axes? _____
- Why is hemimorphite given the name hemimorphite? _____
- What element is common to smithsonite, franklinite, zincite, sphalerite, and willemite? _____
- What color is hematite when it is reduced to a powder? _____
- What two metals are critical to making bronze? _____
- What mineral is "wood tin"? _____
- Which of the following, Pb, Pt, Al, C, or S, does not occur as a native element? _____
- In which part of the world did the Hope Diamond originally occur? _____
- Apatite belongs to which chemical class of minerals? _____
- What is the name Hawaiians give for smooth, ropey lava? _____

28. What is a silica-rich, intrusive igneous body with very large crystals called? _____
29. Albite is a sodium-rich, calcium-rich, or potassium-rich feldspar? _____
30. The plagioclase feldspars are a solid solution between which two end-members? _____
31. How do orthoclase and microcline differ?

32. How many faces would a perfect cuboctahedral galena crystal show? _____
33. What is the symmetry of the 111 axis of a cubic fluorite crystal? _____
34. Which of these minerals, pyrrhotite, chalcocite, proustite, tetrahedrite, or enargite, is not a sulfosalt?

35. What mineral makes up steatite? _____
36. If you strike a mineral, and a flash of light (not a spark) occurs, what is this property called?

37. What is another word for double refraction?

38. What is a mineral that shows three different colors when looked at from three different directions called?

39. "Ruby jack" is a miners' term for what ore mineral?

40. An old-fashioned calcium carbide miners' headlamp burned what gas? _____
41. What mineral makes up the thin, gold-colored whiskers found in some quartz crystals? _____
42. What trace element must be present in quartz to get smoky quartz? _____
43. What trace element must be present to get the green color of amazonite? _____
44. A mineral's chemical formulaic name may contain the prefix "sesqui", such as in sodium sesquicarbonate dihydrate (trona). What does "sesqui" mean?

45. What are three minerals known to sometimes display natural fiber optic behavior? _____
46. If you use a propane torch to heat a sample of green fluorite from Wise Mine in NH, the sample will glow with a greenish-blue light that persists after the heat is removed. What is this property called? _____
47. Some minerals, such as tugtupite and the hackmanite variety of sodalite, will change their actual color upon exposure to ultraviolet light. What is this property called?

48. Obsidian displays sharp-edged, dish-like fractures when broken. What is this type of fracture called?

49. Why does soapstone feel soapy? _____
50. If all graphite has a hardness of 1.5, and pencils are made of graphite, how do they make pencils with different hardnesses? _____

Answers: (1) boron; (2) chromium; (3) chromium; (4) 74 degrees 55 minutes, about 75 degrees; (5) Vesuvius; (6) vesuvianite and idocrase; (7) 79AD; (8) gold; (9) white; (10) diamond; (11) lithium; (12) cyclosilicate; (13) talc; (14) conchoidal; (15) Fe_2O_3 ; (16) CaF_2 ; (17) 90 degrees; (18) 60 degrees; (19) different forms on each end; (20) zinc; (21) red; (22) tin and copper; (23) cassiterite; (24) aluminum; (25) India; (26) phosphate; (27) pahoehoe; (28) pegmatite; (29) sodium-rich; (30) sodium-calcium; (31) different crystal systems; (32) 14; (33) 3-fold; (34) chalcocite; (35) talc; (36) triboluminescence; (37) birefringence; (38) trichroic; (39) sphalerite; (40) acetylene; (41) rutile; (42) aluminum; (43) lead; (44) "one and one-half"; (45) gypsum, ulexite, trona; (46) thermoluminescence; (47) tenebrescence; (48) conchoidal; (49) it is softer than your skin; (50) add clay.

Scoring (Number Correct): 49+ = Mineralogist of the Year; 45-48 = You Should Be the Professor; 40-44 = Class Expert; 35-39 = Good, But Don't Brag; 30-34 = Amateur Mineralogist; 25-29 = Rockhound Level; 24 down = Back to School!

Geo-Sudoku

by David Glick

This puzzle contains the letters EINOPRSTU, and one row or column spells the volcanic phenomena which release lava (see *Montserrat* on page 1). Each block of 9 squares, each row, and each column must contain each of the nine letters exactly once. The solution is on page 8.

I		E		S		N		
	N		I	P	T			U
P			E	O		R		
					E	I		
		T	N					
N	E	I	T		P			
	P		R					
U			O	E	S			
T		S	P				I	E

Fairfax, Virginia

21st Annual Gem, Mineral & Fossil Show November 17 & 18, 2012

Sponsored by the Northern Virginia Mineral Club
and The Dept. of Atmospheric, Oceanic and Earth
Sciences at George Mason University.

by Jim Costa, Show Co-Chair

Show site

George Mason University, Fairfax Virginia
Student Union Bldg II (The Hub)

GMU Campus is located at the intersection of Rte 123 &
Braddock Rd, Fairfax, VA

Hours: Saturday 10:00 a.m. - 6:00 p.m.,
Sunday 10:00 a.m. - 4:00 p.m.

Features

20 plus Dealers selling Minerals, Fossils, Crystals,
Gems, Jewelry, Carvings, Meteorites & more!
Also, Demonstrations, Exhibits, Door Prizes & Kid's
Activities including Mini-mines & Fossil Dig.
Silent Auction on Sunday afternoon.

Admission

Adults \$5, Seniors \$3, Teens (13-17) \$3.
FREE - Children (12 & under), Scouts in uniform, GMU
Students w/valid ID.

Parking: On campus use GMU's parking Lot A
Enter Lot A from Nottaway River Lane off Braddock Road
Courtesy shuttle provided from Parking Lot A to the
Mineral show.

GMU Campus map:
<http://eagle.gmu.edu/map/fairfax.php>

SYMPOSIUM ON PENNSYLVANIA MINERALOGY AND GEOLOGY

Mineral Collecting Enthusiasts Meet and Learn

November 3-4, 2012

Franklin and Marshall College, Lancaster, PA

Please Register in Advance

from their press release

The **Friends of Mineralogy – Pennsylvania Chapter** will hold their 2012 symposium and field trip on the first weekend in November. Mineral collectors in attendance on Saturday will meet in the Hackman Physical Sciences Building at Franklin & Marshall College, Lancaster, PA., to hear five talks by experts on Pennsylvania minerals, geology and mining. On Sunday, a field trip for those registered for the symposium will provide an opportunity for mineral collecting.

The program planned for the symposium includes these speakers:

Bob Donley, co-author: *Cornwall Mines* (Arcadia Press)
Ron Sloto: The Marcellus and Utica Shale Gas Play in
Pennsylvania

William Kochanov: Occurrences of tosudite and
associated sulfide minerals in the Anthracite region
of Pennsylvania

LeeAnn Srogi: Birdsboro Diabase Sheet

Howell Bosbyshell: The age of detrital zircon from the
Wissahickon Schist and Gneiss, southeast
Pennsylvania and northern Delaware: Implications
for regional tectonic history

All interested mineral collectors are invited to register and attend. As usual, select mineral dealers will be present, and there will be a silent auction, give-away table, and refreshments. Lunch is available at restaurants within walking distance. A special feature this year will be the display of specimens from a Cornwall Reference Collection, which was assembled in the days when the Cornwall, Pennsylvania, iron mines were still active. Please see the web site <http://www.rasloto.com/FM/> for details, updates, and the registration form.

The mineral collecting field trip on Sunday is planned for a quarry in Berks or Lancaster County. Details will be given at the symposium. The trip is open only to symposium registrants. Safety equipment will be required.

Dates: Saturday & Sunday, November 3-4, 2012

Location: Saturday Nov. 3: Hackman Physical Sci.
Bld., F&M College, Lancaster, PA

Sunday, Nov. 4: to be announced

Registration: \$20 for non-members, \$5 for current
FM-Pa members; form on web site

Web Site: <http://www.rasloto.com/FM/>

Contact: Arnold Mogel e-mail: Pioche@verizon.net
phone: (570) 739-4034

Some Upcoming Shows and Meetings

Our web site <http://www.nittanymineral.org> has links to more complete lists and details on mineral shows and meetings around the country.

October 27, 2012: 28th Annual South Penn Rock Swap - AUTUMN SWAP by Franklin County & Central PA Rock and Mineral Clubs. General Admission \$1.00; tables for swappers \$10.00. South Mountain Fairgrounds, 1.5 miles West of Arendtsville, PA on Route 234. Saturday only, 8 a.m. to 3 p.m.

October 27, 2012: "Ultraviolation" Fluorescent Mineral Show, by the Rock & Mineral Club of Lower Bucks County. "If Your Rock Don't Glow You're at the Wrong Show." \$2 donation, kids under 12 & under free. Many dealers, food and beverages available, raffles and other exciting give-aways. Alternating periods of darkness and room light provide the perfect environment to experience these beautiful and colorful minerals. First United Methodist Church, 840 Trenton Rd, Fairless Hills, PA. Saturday only, 9 a.m. to 4 p.m. Flyer at <http://www.mineralfest.com/calendar.html>

November 3-4, 2012: Friends of Mineralogy, PA Chapter Symposium and Field Trip, at Franklin & Marshall College, Lancaster, PA. Five expert speakers, silent auction, give-aways, refreshments; Sunday field trip. Please register in advance. See page 7 and <http://www.raslo.com/FM/>

November 3-4, 2012: Gemarama by Tuscarora Lapidary Society, at CFS The School at Church Farm, Exton, PA. Show theme: Patterns Galore. Many dealers and displays; demonstrations, children's table, exhibits for the visually impaired. "We teach the journey from rocks to gems to jewelry." Saturday 10-6, Sunday 10-5. Discount coupon at <http://www.lapidary.org/GEMARAMA/Gemarama.html>

November 17-18, 2012: Gem, Mineral & Fossil Show by Northern Virginia Mineral Club and Dept. of Atmospheric, Oceanic and Earth Sciences, George Mason Univ., Fairfax, Virginia. See page 7. *

Geo-Sudoku Solution

I	T	E	U	S	R	N	P	O
O	N	R	I	P	T	E	S	U
P	S	U	E	O	N	R	T	I
R	O	P	S	U	E	I	N	T
S	U	T	N	I	O	P	E	R
N	E	I	T	R	P	U	O	S
E	P	O	R	T	I	S	U	N
U	I	N	O	E	S	T	R	P
T	R	S	P	N	U	O	I	E

For sale / trade:

will return after we update the listings.
Submissions are welcomed.

INVITE A FRIEND TO JOIN THE SOCIETY

The Nittany Mineralogical Society prides itself on having among the finest line-up of speakers of any earth sciences club in the nation. Everyone is welcome at our meetings. 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). Those joining in March or later may request pro-rated dues. Your dues are used for programs and speakers, refreshments, educational activities, Bulletins, and mailing expenses. Please fill out a membership form (available at www.nittanymineral.org), 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!

SOCIETY OFFICERS

David Glick (President) 814-237-1094 (h)
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Dr. Bob Altamura (Vice-President) 814-234-5011 (h)
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John Passaneau (Treasurer) 814-231-0969 (h),
e-mail: jxp16@psu.edu

Ellen Bingham (Secretary) e-mail: emb22@psu.edu

OTHER CONTACTS

Field Trips: Ed Echler 814-222-2642
e-mail preferred: eechler@comcast.net

Junior Rockhounds: Dr. Andrew Sicree
814-867-6263 (h) e-mail: sicree@verizon.net

Membership Chair: David Glick (see above)

Programs: Dr. Duff Gold 865-7261(o), 238-3377(h)
e-mail: gold@ems.psu.edu

Door Prizes: *volunteer needed!*

Facebook: Mike Zelazny e-mail: maz166@psu.edu

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 name of photographer or artist.

Visit us at www.nittanymineral.org