

Nittany Mineralogical Society Bulletin

Nittany Mineralogical Society, Inc., meeting in State College, Pennsylvania
Contact information on back page

October, 2022

Visit our web site: www.nittanymineral.org

Editor (see back page):

David C. Glick

October 19th meeting,
IN PERSON at BOAL HALL or via ZOOM:

The 1975 Volcanics Cross-Country Geology Field Trip

by Dr. Charles E. Miller, Jr.
The Nittany Mineralogical Society

Our October meeting will be held Wednesday the 19th in Boal Hall (Boalsburg Fire Hall), 113 East Pine St., Boalsburg, PA 16827. Maps can be found on our web site.

7:15 to 7:45 p.m.: Social "hour." We will serve some refreshments - snacks and a few beverages - or feel free to bring your own non-alcoholic beverage.

7:45 to 8:00 p.m.: Announcements, door prizes, sales
about 8:00 p.m.: featured program

The event has free admission and free parking (lot just east of Fire Hall along East Pine St.), and is open to all; **parents/guardians must provide supervision of minors.** Bring your friends and share an interesting evening.

We hope you will join us in person, but if you can't, the **Zoom link** will be e-mailed to all paid members who receive our e-mails. Others are welcome to request it by e-mailing <xidg@verizon.net>. We plan to record the presentation for later posting to our web site. -Editor

In 1975, the author participated on a Penn State volcanics cross-country field trip. Trip leader was the late Dr. Charles P. Thornton. The primary objective of this field excursion was to examine extrusive igneous rocks and volcanic settings in the southwestern USA. To wit, we examined volcanic cones and necks, lava flows, pyroclastic flows, and intrusions. Other topics of interest will be presented at the October 19th meeting, including the Grand Canyon, Hoover Dam, Glen Canyon Dam, Monument Valley, and Meteor Crater. Several of these are discussed in the article on pages 4-6. *

ATTENDING THE OCTOBER MEETING?

Donations of **one or two high quality, labeled door prize specimens** are invited.

Larger quantities can go in a giveaway box.

Bring a friend!

OFFICIAL NOTICE: Annual Meeting and Elections in October

by David Glick, NMS President

The October 19th meeting, to be held at Boal Hall in Boalsburg, will be the **Annual Meeting of the Corporation**. Business will include election of officers. In accordance with our bylaws (available on the web site), the Board of Directors, acting as the Nominating Committee, met in August and nominated the following slate of officers:

President	David Glick
Vice President	Bob Altamura
Treasurer	Stuart Bingham
Secretary	Barry Scheetz

The Board truly needs **additional volunteers** to get involved with running the Society, providing **new energy and fresh thinking** and some new names on the ballot. 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!**

Please Do Pay Your Dues

Our membership year ends on October 31. For NMS members who have not yet renewed, a dues form is included with this issue, either on paper or electronically. The form is also available on our web site at <<http://www.nittanymineral.org/mem.htm>>. You can bring your dues and form to the October meeting, or send them in. Your dues are used for programs and speakers, refreshments, educational activities, Bulletins, and mailing expenses. We look forward to your continuing membership! -Editor

Twenty Years Ago in NMS

In October 2002, our Society had recently concluded a successful Symposium at Sterling Hill Mining Museum in New Jersey. We were preparing to hold our 8th annual Minerals Junior Education Day, before we moved it from fall to spring. Members had attended the then-annual open house collecting days at Winfield Quarry and Meckley's Quarry. At our meeting, Dr. Duff Gold spoke on carbonatite rocks. The next meeting would be a big one with a presentation by Joe Scaffoni, one of the major participants in the successful five-day rescue effort of miners at the Quecreek coal mine in Somerset County, four months earlier. -Editor

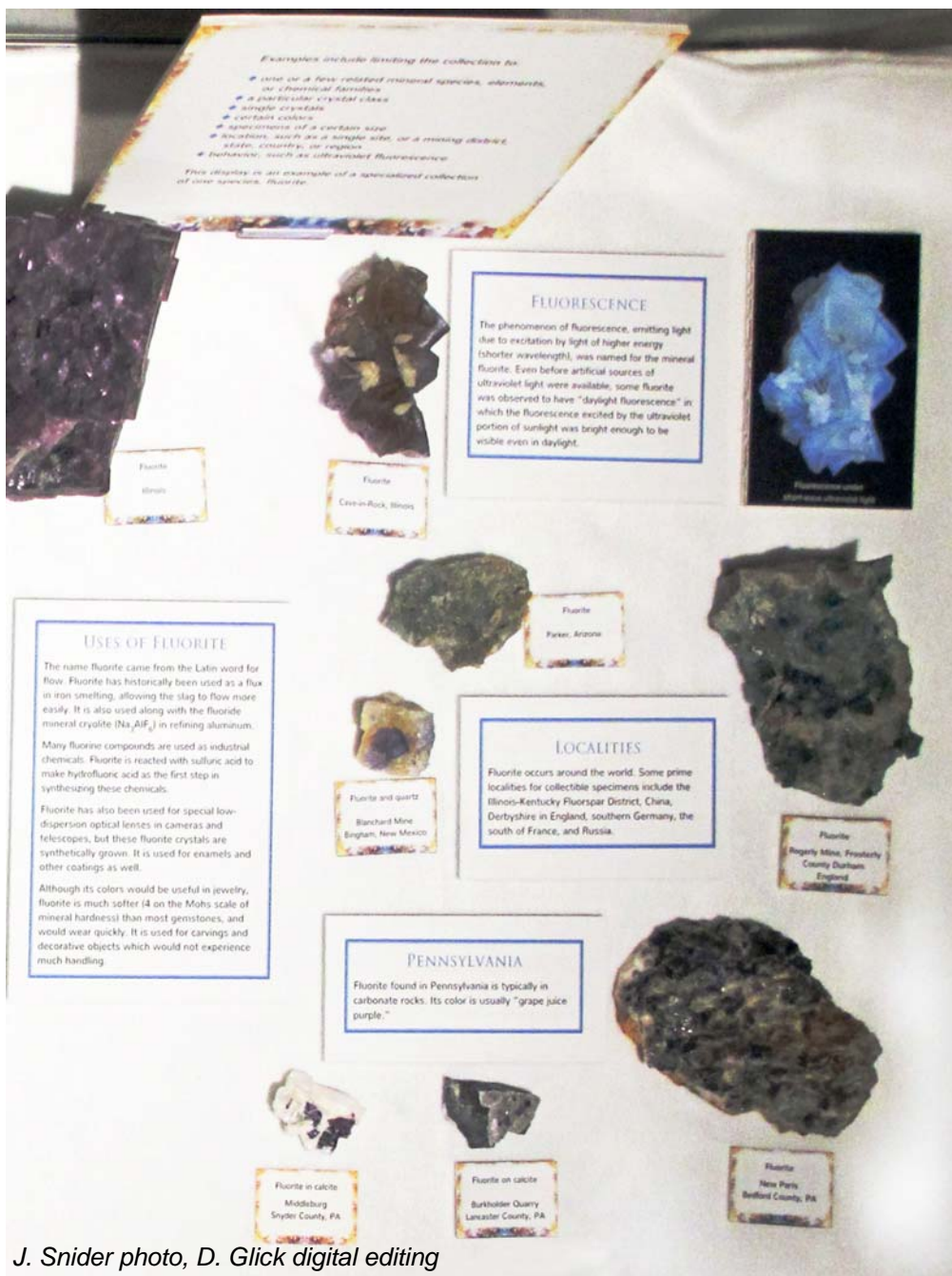
FLUORITE: SPECIALIZATION IN MINERAL COLLECTING

The hobbyist mineral collector faces a dilemma: there are over 5500 minerals recognized by the International Mineralogical Association. Very few individuals will ever be able to collect them all. One solution to assembling a satisfying collection is specialization – limiting one’s scope of collecting.

Examples include limiting the collection to:

- ◆ one or a few related mineral species, elements, or chemical families
- ◆ a particular crystal class
- ◆ single crystals
- ◆ certain colors
- ◆ specimens of a certain size
- ◆ location, such as a single site, or a mining district, state, country, or region
- ◆ behavior, such as ultraviolet fluorescence

This display is an example of a specialized collection of one species, fluorite.



Penn State Earth & Mineral Sciences Museum Expands Hours, Open Home Football Saturdays

Penn State’s Earth & Mineral Sciences Museum & Art Gallery reopened to the public over the summer after a renovation of its space on the ground floor of Deike Building.

Fall hours began on August 22; they are:

M, W, F 10:00 a.m. - 4:00 p.m. and T, Th 10:30 a.m. - 4:30 p.m.

The Museum plans to be open on home football game Saturdays. If the game is scheduled for noon or early afternoon, open hours will be 9:00-11:00 a.m. If the game is scheduled for evening, hours will be 2:00-4:00 p.m. Check <https://museum.ems.psu.edu/visit/location-and-hours>

as game times are announced or changed. Special times such as Family Weekend and Welcome Week will also have open hours.

-Editor

J. Snider photo, D. Glick digital editing

The 1975 Volcanics Cross-Country Geology Field Trip

Dr. Charles E. Miller, Jr.

The Nittany Mineralogical Society

In 1975, the author participated on a Penn State volcanics cross-country field trip. Trip leader was the late Dr. Charles P. Thornton. The primary objective of this field excursion was to examine extrusive igneous rocks and volcanic settings in the southwestern USA. To wit, we examined volcanic cones and necks, lava flows, pyroclastic flows, and intrusions. Other topics of interest will be presented at the October 19th meeting, including the Grand Canyon, Hoover Dam, Glen Canyon Dam, Monument Valley, and Meteor Crater. Several of these are discussed in this article.

This trip began in State College, Pennsylvania, but there were no geology stops until Colorado. Therefore, this talk largely focuses on three physiographic provinces: the Southern Rocky Mountains, the Colorado Plateau, and the Basin and Range. The mountainous character of the Rockies is well known by most people. In comparison, the Colorado Plateau is usually less familiar. It is a dissected plateau covering parts of Colorado, Utah, Arizona, and New Mexico. Plateau erosion gives us many national parks such as the Grand Canyon, Bryce Canyon, Canyonlands, Mesa Verde, Zion, and Arches. It also gives us Monument Valley. Remember iconic scenes from "Forrest Gump" and "National Lampoon's Vacation" in Monument Valley? The Basin and Range extends from Oregon to Mexico. It is an area of crustal extension resulting in alternating basins (grabens) and ranges (horsts). Higher heat flow associated with it produces volcanism. This province consists mostly of internal drainage and includes the Sonoran Desert, Great Salt Lake, and Las Vegas.

For many, the Grand Canyon is the outstanding feature of the Colorado Plateau. It is over 6,000 feet deep and 18 miles wide. Straight-line distance between the south and north rims is 12 miles. However, to drive from rim to rim involves a trip of 209 miles (four hours). Canyon erosion is largely attributed to the Colorado River. Consider this: the river is only 300 feet wide in the Canyon and, at one place, it is only 76 feet wide. How can such a narrow river shape a canyon so much wider (Figure

1)? The answer is that it does not do it by itself. This talk discusses faulting, jointing, headward erosion, mass wasting, and weathering as some factors shaping the Canyon. The story also involves a paradox of incised meanders in the Canyon. A river develops well-defined meanders when it has low gradient. At that time, there is little channel downcutting. Most of its energy is lateral flow, as in meanders. It is largely depositing, rather than eroding. Incised meanders within the Canyon reflect increased gradient, rejuvenating of the Colorado River due to uplift and tilting of the Colorado Plateau approximately 10 million years ago. The increased gradient enabled it to down cut preexisting meanders. Acting as a local base level, when the Colorado River erodes deeper, it increases gradient of, and erosion from, its tributaries. Mostly, that downcutting is imperceptible. It is during high flows when prodigious erosion occurs. This is when stream flow moves rocks that act as grinding tools. Evidence of this can be seen in potholes, in which rounded pebbles are common. These pebbles are the cutting tools that erode the riverbed. Average flow in the Canyon is between 12,000 and 15,000 cubic feet per second (cfs). During floods, flow can reach 300,000 cfs. It is thought when glaciers melted at the end of the Pleistocene Ice Age, flow may have been as high as 1,000,000 cfs. As stream-flow volume increases, so does velocity - and the power to erode. To put this into perspective, assume canyon flooding occurs yearly, during which time the Colorado River erodes 1/64" (0.5 mm) deeper. This is a minuscule amount. However, over one million years, that is 0.25 miles. Over 10 million years, it is 2.25 miles.

A significant feature in the Canyon is the Great Unconformity (Figure 1). This erosion surface represents a

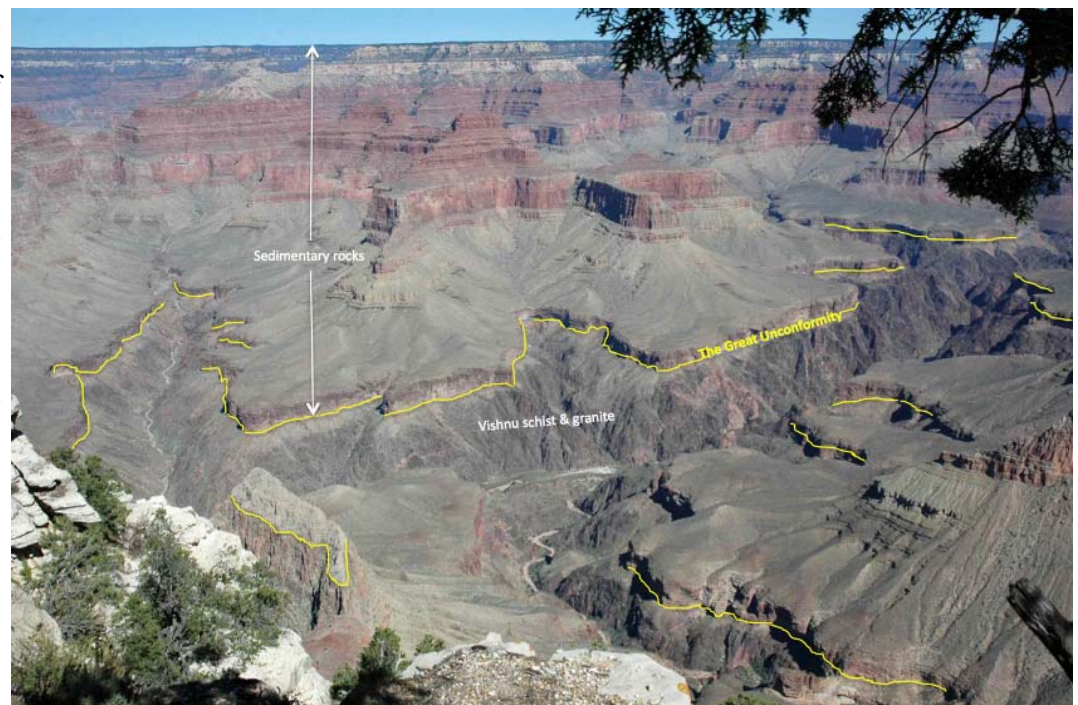


Figure 1: Image of the Inner Gorge of the Grand Canyon showing the Great Unconformity (yellow line).
Image by the author.

hiatus in time ranging from 1.2 to 1.6 billion years. It separates metamorphic and granitic rocks at the Canyon bottom from overlying sedimentary rocks.

The Colorado River and its tributaries are the major drainage system of the Colorado Plateau. Water in this drainage is completely allocated, and it is considered among the most controlled and litigated rivers in the world. Its two largest dams are Hoover and Glen Canyon.

Hoover Dam, 726 feet tall, forms Lake Meade. The dam is a major engineering feat. When geology is considered, the dam seems even more impressive. There are 26 mapped faults in the abutments at Hoover Dam (Figure 2). All are less than 4 million years old. None have been precisely dated to determine their state-of-activity or recurrence frequency. Five hundred mapped faults cut through the Lake Meade area. Lake Meade is the largest reservoir (by volume) in the United States, stretching 112 miles in length. Large reservoirs, like this one, are essentially geologic agents. They induce earthquakes. Their sheer weight can significantly increase pore pressure that may reactivate old faults and cause fractures to extend and dilate. Lake Meade-generated earthquakes have reached magnitudes of 4.0, strong enough to do local damage. Most of those earthquakes were on previously unknown faults.

The volume of concrete at Hoover Dam presented an engineering problem. There was enough concrete to pave a two-lane highway from San Francisco to New York City. Curing concrete is an exothermic reaction generating heat. To dissipate heat, the concrete was emplaced into individual columns as opposed to a single pour. Had that

not been done, it would have taken 125 years for the concrete to cool to ambient temperatures

Upstream is the Glen Canyon Dam. It is 710 feet high, and its impoundment of the Colorado River creates Lake Powell. The dam is the second highest concrete-arch dam in the U.S. and Lake Powell is the second largest reservoir. There is an ensuing debate about the dam. In 2017, the Government committed to another 20 years of operation. Critics call it obsolete and Lake Powell too porous and wasteful.

In 1983, early snow melting and a wet spring resulted in Lake Powell coming within inches of topping the dam's spillway. This necessitated water releases as high as 38,000 cfs. One quick, emergency solution was rigging plywood to extend spillway gates. Before this event was over, cavitation from the released water gouged house-size holes in the dam's spillways and tunnels. The more water that was released, more was the damage from cavitation. The cavitation demonstrates the power of the Colorado River during flood stage, as in eroding the Grand Canyon.

Shiprock, in northwestern New Mexico, is an exposed volcanic neck (central feeder pipe) with dikes extending from it (Figure 3). Emplacement was about 27 million years ago. Since then, less resistant layers of the volcano cone and surrounding bedrock have been eroded away. Shiprock is commonly included in introductory geology textbooks.

One field-trip stop was near Taos, New Mexico, where U.S. Route 64 crosses the Rio Grande Trench (aka Rio Grande Rift). There, the river cut a narrow canyon 800 feet deep in basalt (Figure 4). The canyon is part of an intracontinental rift extending from Colorado to Mexico. Approximately 35 million years ago, the rift began separating the Colorado Plateau from the interior of the North American craton. Alluvial fans and basalt flows largely fill the rift. For most of its length, the Rio Grande River follows this natural corridor. Albuquerque, Santa Fe, Taos, and El Paso are located within this rift.

In the Southwest, there are many examples of igneous deposits from pyroclastic flows. In action, the flows are chaotic mixtures of fragmented rocks, gas, and ash from a volcanic vent or collapsing flow front of certain explosive eruptions. They are the deadliest volcanic hazards, virtually destroying everything in their path. Think of Pompeii and Herculaneum in AD 79. Temperatures can reach 1000° C



Figure 2: En echelon normal faults in the abutment at Hoover Dam.

Image by the author.



Figure 3: Shiprock and dike.

Image by the author.

(1830° F), and flows average 60 mph but sometimes reach hundreds of miles per hour. Such high temperatures produce a welded texture (welded tuff), usually called an ignimbrite. In Nevada, some cover 7,000 square miles. This is an area larger than Rhode Island, Delaware, Connecticut, or Hawaii.

Meteor Crater (aka Barringer Crater) is the best-known astrobleme, or meteorite impact, in this country. The crater formed approximately 50,000 years ago from an iron-nickel meteorite 160 feet across. Impact energy was estimated to be of the order of 10 megatons TNT (as calibrated by underground nuclear tests). In 1896, G.K. Gilbert, chief geologist for the U.S. Geological Survey, concluded it to be the result of a deep-seated, volcanic steam explosion, based on an inaccurate description he had been furnished. He correctly deduced lunar craters to be



Figure 4: Rio Grande Rift at Taos, New Mexico.

Image by the author.

impact in origin. In the 1960s, coesite and stishovite confirmed an impact origin. These rare silica forms are found where quartz-bearing rocks have been severely shocked from instantaneous overpressure. They are not formed from volcanic activity. The only known mechanisms for creating these forms are meteorite impact and nuclear explosion.

SOURCES:

Author's notes from the 1975 Penn State Department of Geosciences field trip

D'Anna, John. "For a while in 1983, sheets of plywood were all that kept the mighty Glen Canyon Dam from overflowing." AZCentral.com, 18 July 2019, <<https://www.azcentral.com/story/news/local/arizona-environment/2019/07/18/1983-arizona-glen-canyon-dam-lake-powell-almost-overflowed-colorado-river/1662234001/>>. Accessed 11 October 2022.

Rio Grande rift. (19 July 2022). In *Wikipedia*. https://en.wikipedia.org/w/index.php?title=Rio_Grande_rift&oldid=1099255072

FEDERATION NEWS

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 AFMS News is linked from our web site, <<http://www.nittanymineral.org>>, found at <http://www.amfed.org/afms_news.htm>. While the Eastern Federation is working on its web site, its newsletters are available on the NMS web site (link in left sidebar of main page). Please take a look!

The AFMS October Newsletter is available on their web site. Historian Jennifer Haley has some thoughts on large volumes of archives created by clubs over the decades. Program and Bulletin competition procedures are reviewed.

The Eastern Federation's recent newsletters are available on the NMS web site. The October issue includes reports on the EFMLS Convention Sep. 23-25 in Harrisburg PA, and a message from newly elected President Bill Stephens on ongoing progress. Dates for the 2023 Convention in Syracuse NY are announced as July 7-9.

-Editor

FLUORESCENT MINERAL SHOW

33rd Annual Show on OCT. 29!



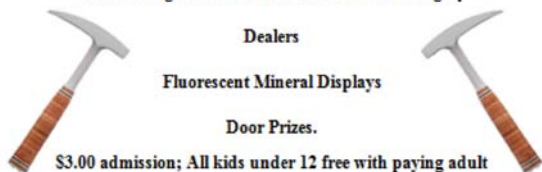
ULTRAVIOLIATION 2022

First United Methodist Church,
840 Trenton Rd. in Fairless Hills, PA 19030.

Only 2 miles from the new Route 295 and 10 miles from the Philadelphia/Rt 1 exit of the Pa Turnpike

Saturday, October 29, 2022
9am to 4pm

Alternating Periods of Room Darkness and Light



Dealers

Fluorescent Mineral Displays

Door Prizes.

\$3.00 admission; All kids under 12 free with paying adult

For Dealer information call Lee McIlvaine at 215.713.8020
or email uvgeologist@yahoo.com; \$30 per 8 ft table

Geo-Sudoku

by David Glick

This puzzle contains the letters CHIKOPNRS. One row or column includes a well-known volcanic feature. If you've read this issue, you've seen it. 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.

H				I	S			
						P	S	
	P	I		R	O	N		
	C	N		S	K	I	O	
		K	R					S
I	O			N			K	R
N								K
C	I	O	S					
				H	C	S		

Come and see the colors!

Mount Bethel Gem, Mineral & Fossil Show

at the Mt. Bethel Firehouse
2341 Rt.611
Mt. Bethel, Pa.
(only 2 miles from Rt.80/46 in NJ)

Oct. 22 & 23, 2022
Admission:
Adult \$5
\$1 off w/flyer
Kids FREE

See amazing treasures from the Earth! Our show features Gems, Minerals, Fossils, Meteorites, Crystals, Stones, and MORE!!

Ample FREE parking!
FREE Mineral specimen for kids!
Giveaways and Door Prizes all day!
Food and Refreshments available.
Hours: Sat. 9-5, Sun. 9-4

SYMPOSIUM & FIELD TRIP
Friends of Mineralogy - PA Chapter November 12-13, 2022 Lancaster, PA
Attend ONLINE -OR- IN PERSON at Bright Side Opportunities Center, 515 Hershey Ave., Lancaster PA 17603

Symposium for mineral enthusiasts on **Saturday Nov. 12** Doors open 8:30 a.m.; Symposium 9:00 - 4:15
Sales by Select Dealers – Silent Auction – Give-away Table – Meet Fellow Collectors

Talks by knowledgeable speakers on **Pennsylvania Mineralogy and Geology**, and more:

William Kochanov, PG Pa. Geol. Survey, Retired Reconnaissance of mineral collecting sites in Southeastern Pennsylvania	Ronald A. Sloto, West Chester Univ. Classic Mineral Localities of Bucks County, Pennsylvania	Stephen R. Lindberg U. Pittsburgh at Johnstown Geology of the New Paris Limestone Quarry, Napier Township, Bedford County, Pennsylvania	C. Lee McIlvaine, IV PG Professional Geologist Journey to Greenland Ilimaussaq Alkaline Complex Kujalleq, South-west Greenland	Bill Stephens, PG Stephens Environmental Report on Re-opening the Mount Pleasant Mills, Snyder County, Pennsylvania, Wavellite Occurrence
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Registration form on website. Register online or by mail (or on-site, cash/check only).

Current members \$ 15.00/person Non-members \$ 25.00 College Students free

Professional Geologists: Five Professional Development Hour credits available for full lecture attendance

Field Trip on Sunday Nov. 13 Mount Pleasant Mills, PA. Open only to symposium registrants. Register now!

Visit our web site for details, registration form, changes and updates: www.rasloto.com/FM

UPCOMING EVENTS

Confirm details of events before attending.
See other show calendar links on our web site.

Oct. 22-23, 2022: NEW SHOW! Mount Bethel Gem Mineral & Fossil Show. Mount Bethel Fire Hall, 2341 N Delaware Dr. (Rt. 611), Mt Bethel, PA 18343. Sat 9:00-5:00 Sun 9:00-4:00. See page 7 and <https://www.facebook.com/groups/574701857546267/?ref=share>

Oct. 29, 2022: ULTRAVIOLATION Fluorescent Minerals Show, by The Rock and Mineral Club Of Lower Bucks County. First United Methodist Church, 840 Trenton Rd, Fairless Hills, PA. Sat. only, 9:00 a.m. to 4:00 p.m.

ULTRAVIOLATION, the ULTIMATE annual show for the fluorescent mineral enthusiast, highlights fluorescent minerals exclusively and is the next best thing to night collecting (periods of room lights on and off). See p. 7 and <https://sites.google.com/view/lowerbucksparocks/shows>

Oct. 29, 2022: South Penn Rock Swap, by Franklin County Rock and Mineral Club. South Mountain Fairgrounds, near Arendtsville, PA: 615 Narrows Rd, Biglerville PA Sat. only, 8:00 a.m. to 3:00 p.m.

Minerals-Rocks-Fossils-Local polished Rocks-Jewelry: In a pavilion and outside -if weather permits. Food truck - Peculiar Pizza!!! Contact Tom Smith for details: tsmith1012@comcast.net or use FB Messenger.

Nov. 5-6, 2022: Gemarama, Theme: A Rainbow of Possibilities, by Tuscarora Lapidary Soc. HALL D at the Greater Philadelphia EXPO Center, 100 Station Avenue, Oaks, PA 19456. Sat. 10 a.m. - 6 p.m., Sun. 10 a.m. - 5 p.m. Full details at <https://www.lapidary.org/gemarama/>

Nov. 12-13, 2022: Symposium on Pennsylvania Mineralogy and Geology (and more), by Friends of Mineralogy-Pennsylvania Chapter. Sat. Symposium at Bright Side Opportunities Center, 515 Hershey Ave., Lancaster, PA 17603. Five talks by knowledgeable speakers; sales; silent auction; giveaway table. Sunday: field trip to Mount Pleasant Mills, open only to symposium registrants. Please register in advance. See page 7 and <https://www.rasloto.com/FM/>

Geo-Sudoku Solution

H	N	C	P	I	S	K	R	O
O	K	R	N	C	H	P	S	I
S	P	I	K	R	O	N	H	C
R	C	N	H	S	K	I	O	P
P	H	K	R	O	I	C	N	S
I	O	S	C	N	P	H	K	R
N	S	H	I	P	R	O	C	K
C	I	O	S	K	N	R	P	H
K	R	P	O	H	C	S	I	N

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 in as directed, or bring your dues to the next meeting.

We want to welcome you!

CONTACT INFORMATION

mailing address:

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c/o S. Bingham, Treasurer
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Penna. Furnace PA 16865

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e-mail: se6@psu.edu
Stuart Bingham (Treasurer)
e-mail: sebing145@comcast.net

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e-mail: gold@ems.psu.edu
Door Prizes: Dr. Bob Altamura (see above)
Facebook & Publicity: John Dziak: jjd264@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
425 Armagast Rd. phone: (814) 810-2116 (h)
Bellefonte, PA 16823-9762

Newsletter submissions are appreciated by the first Wednesday of the month. Photographs or graphics are encouraged, but please do not embed them in word processor files; send them as separate graphics files (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