

Nittany Mineralogical Society Bulletin

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

Editor (see back page):

David C. Glick

March, 2019

Visit our web site: www.nittanymineral.org

March 20th meeting:

Rock-magnetic cyclostratigraphy and the encoding of global environmental change in sediments:

Examples and applications from the Newark Basin, the Calvert Cliffs, and the Italian Apennines

by
Dr. Frank J. Pazzaglia
Lehigh University

Our March meeting will be held Wednesday the 20th in room 116 (the smaller auditorium) Earth & Engineering Sciences Building on the west side of the Penn State campus in State College, PA. Maps are available on our web site.

6:45 to 7:45 p.m.: Social hour, refreshments in the lobby

7:45 to 8:00 p.m.: Announcements, questions, answers about 8:00 p.m.: featured program

*The event has free admission, free parking, and free refreshments, and is open to all; **parents/guardians must provide supervision of minors.** Bring your friends and share an interesting evening!*

The Newark basin in Pennsylvania and New Jersey, the Calvert Cliffs of Maryland, and the Po foreland in northern Italy represent three different kinds of basins where cyclostratigraphy allows for the construction of novel age models in the basin sediments that can be utilized for the interpretation of diverse tectonic and climatic forcings. Cyclostratigraphy is predicated on the climate-sensitivity of the sedimentary record in a wide array of depositional environments, arising from the direct observation of distinct, repetitive patterns or cycles in lithostratigraphic or geochemical characteristics. Many cycles have been shown to have periodicities similar to those predicted by orbitally-driven climate changes when analyzed using spectral analysis. Growing recognition of signal shredding as well as sampling biases, incorrect data smoothing, tuning, and red noise models commonly applied during spectral analysis have justifiably questioned the veracity of some orbitally-driven interpretations; however there are a plethora of studies that demonstrate robust cyclostratigraphic records and interpretations when there is an appropriate age model anchored by numeric ages and correct statistical analysis of tuned data. Rock magnetic cyclostratigraphy measures variations in concentration,

particle size, and mineralogy of ferromagnetic (magnetite, titanomagnetite, hematite, and Fe-sulfides such as greigite) and paramagnetic (Fe-rich silicates and diamagnetic quartz and carbonate) minerals in sediment or sedimentary rock. The sampling and measurements are quick and inexpensive so data can be collected at high resolution to document high frequency cycles. With the exception of diagenetic Fe-sulfides common in marine sediments, the variations in ferromagnetic and paramagnetic concentration and particle size in clastic-sink environments is linked back to the availability of these minerals recruited from the source basin, presumably as they are liberated from rocks by weathering. As a result, the ferromagnetic and paramagnetic concentration and particle size in sediments is a proxy for the efficacy of sediment recruitment in the source and delivery to the sink, a metric that clearly varies with both exogenic and autogenic drivers of surficial processes. In this way, rock-magnetic based cyclostratigraphy offers a superior way to see processes in the source through the lens of the stratigraphic record in the sink. The magnetic minerals are a kind of tracer, with memory of their genesis in the source.

ATTENDING THE MARCH MEETING?

Donations of **a few high quality, labeled door prize specimens** are invited.

Your donated snacks will be welcomed.

Bring a friend!

**Junior Rockhounds
Weekly Meetings:
Now at Boalsburg Fire Hall**
See enclosed flyer and copy on page 2.

**Minerals Junior Education Day
Saturday, March 30, 2019
- Registration Now OPEN -
- Volunteers Needed -**

Registration is now open for NMS's 24th Annual Minerals Junior Education Day. Please:

- Tell anyone who has children about the event, and
- Volunteer to help present the event. Many of the jobs, such as handing out samples, don't require much expertise; of course if you do have minerals or geology expertise we'll put that to use.

See article on page 3 and enclosed flyer.

NMS February Meeting Cancelled

For the first time in 25 years, we had to cancel a regular meeting because of a snow and ice storm. Penn State's University Park campus, where we meet, was closed for the entire day of February 20th, which triggered our cancellation policy (see below). The early warning gave us time to get the word of cancellation out by e-mail and the web site, and we sincerely hope that no one was inconvenienced. We expect to reschedule that presentation for May, so the plan for the rest of Spring Semester 2019 is:

April 17:
Mineral Fluorescence: From Whence Comes the Light?
by Dr. Will White

May 15:
A Quarter-Century of Nittany Mineralogical Society
by David Glick

As usual, no meetings are planned for June or July.

Join the Junior Rockhounds: Rocks, Fossils, and Minerals Club!

Who: You! Best for 3rd through 8th graders WITH their parents.

What: Junior Rockhounds Science Club – Rocks and Minerals Programs.

Where: NEW LOCATION: BOALSBURG FIRE HALL
113 E Pine Street, Boalsburg PA 16827

When: Mondays, 6:15- 7:00 p.m.

Spring 2019 Schedule: Feb. 18, 25; March 11, 18, 25; April 1, 8, 15, 22, 29; May 6.

Cost: Free! (plus students get free mineral samples and a collection box)

Topics:

Feb 18: What is a mineral? (how to tell minerals from rocks, fossils, man-made stuff, etc.)

Feb 25: Dinosaurs

Mar 11: Chemistry of minerals (flame tests, acid reactions, cooking minerals, and more)

Mar 18: Breaking minerals (using hammers and chisels to fracture and cleave minerals)

Mar 25: Glow-in-the-dark minerals (fluorescence under UV light)

Apr 1: Magnets and electricity and minerals (conductive and magnetic minerals)

Apr 8: Radioactive rocks, poisonous/dangerous minerals, and more

Apr 15: Volcanoes and volcanic rocks

Apr 22: Fossils and sedimentary rocks

Apr 29: Gemstones, and more!

May 6: Crystals (how to measure them, how they grow)

Parents: Please accompany your student! All materials provided free of cost. Each student gets a free plastic collection box. At each session students get specimens to add to their personal collection. Hands-on, messy, fun! Science, learning, and family fun!

Collecting Field Trip/ Cave Trip (parents drive/open to all) – More info on time, date, will be announced later.

Sponsored by: Junior Museum and Nittany Mineral. Society

Questions? Contact Dr. Andrew A. Sicree at aas132@psu.edu or (814) 867-6263.

NMS Weather Cancellation Policy

In case we experience active winter weather on a meeting date, our policy is to cancel the meeting only if evening classes at Penn State have been cancelled. That cancellation is publicized in the usual radio and TV service announcements.



Penn State notes that weather-related cancellation / closing information can be found at WPSU-FM, the news site <<http://news.psu.edu/>>, and <<http://www.facebook.com/pennstate>>



- Editor

Groundwater Awareness Week groundwaterawarenessweek.com

“Life as we know it would be impossible without groundwater. It is the world's most extracted natural resource, and it supports our ecosystems. Don't take groundwater for granted. Pay it forward during National Groundwater Awareness Week, **March 10-16, 2019**, by letting others know the importance of groundwater and asking them to pass it along.”

“This year's theme, **Think**, was designed to urge each of us to consider various ways we can protect our most valuable natural resource.”



Nittany Mineralogical Society presents...

KIDS in grades 1 – 8! Get cool rocks, minerals, and fossils and learn more about nature on March 30 2019 at



Minerals Junior Education Day

Stations this year include:

- Gold panning
- Caves & karst
- Petroleum drilling
- Iron ore minerals & iron making
- Fossil shells (invertebrates)
- From Coal to Diamonds
- Face paint: Mineral streak
- Meteorites
- Sphere grinding machine
- Cleavage & fracture
- Ultraviolet fluorescence

Includes specimens to take home, plus a sales table at low prices – bring cash!

When: Saturday, March 30, 2019

Where: Central PA Institute of Science and Technology
540 North Harrison Road
Pleasant Gap, PA 16823
(Just off I-99 North, Exit 80)

Cost: Only \$5 per child; parents come along for free.

Get more details, updates, and video at

www.nittanymineral.org



Please **register by** Wednesday March 27.

Pick your starting time: 9:00 a.m., 9:15, 9:30, 10:00, 10:30, 11:00, 11:30, Noon, 12:30 p.m., or 1:00 p.m. To reserve your starting time, using the website to **register and pay by PayPal is the best way:** www.nittanymineral.org

Otherwise, see the website and reserve your time by sending email to nittanymineral.org@gmail.com or call 814-822-0292; please speak clearly and repeat your message. After receiving confirmation of your time slot by e-mail or phone, you can pay \$5 per student at the event. No checks or cash through the mail.

MINERALS JUNIOR EDUCATION DAY

Our big annual event for children is set for Saturday, March 30, at Central Pennsylvania Institute of Science & Technology at Pleasant Gap, the same location as the last few years. At this event, kids get an empty egg carton when they check in, then go to a series of stations, each concerning a different aspect of mineral properties, rocks, fossils, etc. They learn about the topic from a demonstration or discussion, and receive a properly labeled specimen or educational item related to the topic, so they gather a whole collection in their egg carton. There is also a sales table with kid-friendly prices. **Registration for kids to attend is open until March 27.**

We are **seeking volunteers** to help with various aspects of the event. Many of the jobs, such as handing out samples, don't require much expertise; of course if you do have minerals or geology expertise we'll put that to use. We also welcome advance donations of identified minerals, tumble-polished material, fossils, books, etc. which can be sold at child-friendly prices. To volunteer or get more details, **please contact**

Frank J. Kowalczyk:
frank.j.kowalczyk@gmail.com
or 814-404-9854.

Photos from 2018 Minerals Junior Ed. Day



"Cauliflower" chert or geode?

by

Dr. Charles E. Miller, Jr.

At the Nittany Mineralogical Society's (NMS) January meeting, Jim Garthe provided a rock specimen from Spring Run, PA. After a cursory review, the author identified it as either "cauliflower" chert (Figure 1) or a Keokuk-type geode (Figure 4) usually referenced in mid-Western states. The specimen measures approximately 3.5" x 4" x 6" and has a partially hollow center at least 1.5 inches deep. The surface of the chert, and most Keokuk geodes, consists of aggregated nodules resembling a head of cauliflower. Also common to both is a surface composed of cryptocrystalline quartz. However, "cauliflower" chert differs by having cryptocrystalline chert (quartz) throughout without drusy (macro-crystalline)-quartz infill. In comparison, true geodes are hollow and have drusy-quartz infill (Figure 4). Figure 2 is another "cauliflower" chert specimen, displaying a slightly different surface. Figure 3 shows either a "cauliflower" chert nodule or Keokuk geode. Usually only when it is cracked open can a determination be made. Figure 4 shows a Keokuk geode from Woodbury, Tennessee. Note a surface morphology similar to "cauliflower" chert nodules (4a). Clear, drusy quartz lines the interior (4b).

Cryptocrystalline quartz has individual crystals so small they cannot be identified macroscopically or with an ordinary microscope. This quartz is known as chalcedony. Color variations give rise to agate, chert, flint, and jasper. In



Figure 1: Hand specimen that Jim Garthe collected. Image by the author.

aggregated nodules
Also common to both
is a surface composed of cryptocrystalline quartz.
However, "cauliflower" chert differs by having
cryptocrystalline chert (quartz) throughout without
drusy (macro-crystalline)-quartz
infill.

contradistinction, quartz crystals and amethyst are
examples of macrocrystalline quartz.

"Cauliflower" chert and Keokuk geodes form from
quartz replacement (silicification) of gypsum (calcium



Figure 2: "Cauliflower" chert from the upper part of the Ordovician Beekmantown Limestone. (Stose, G., 1909, Mercersburg-Chambersburg Folio, USGS)

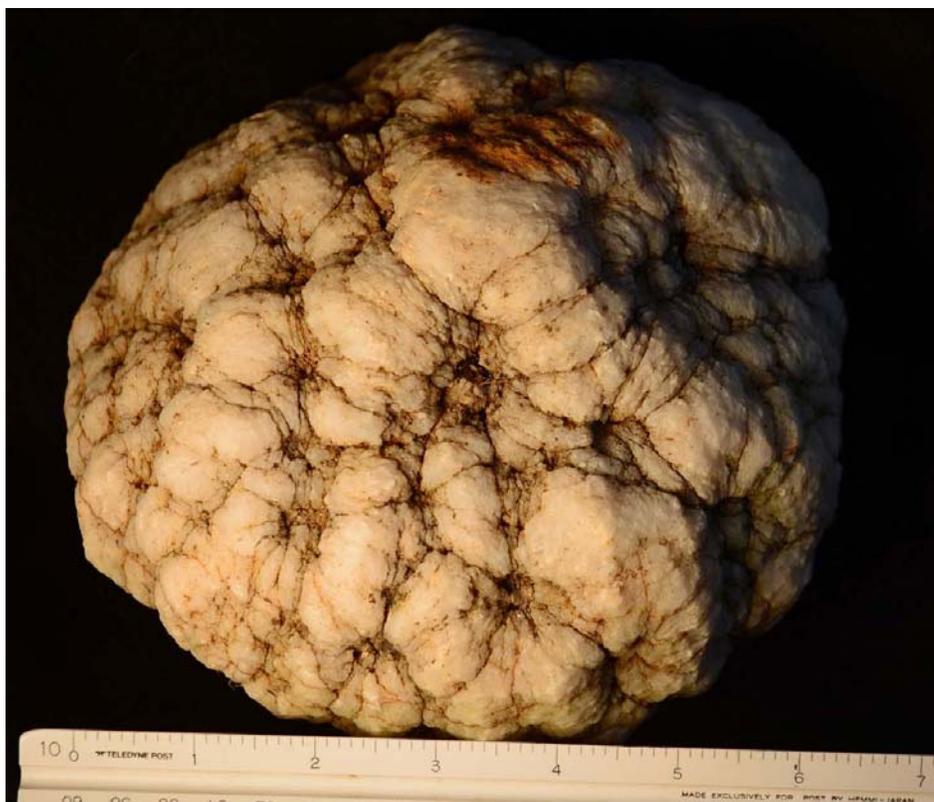


Figure 3: Knobby surface morphology of either "cauliflower" chert or a Keokuk geode. Because it has not been cracked open, it is not known whether it is hollow and lined with drusy quartz. Specimen from Duff Gold, collected in the Beekmantown Group near Williamsburg, Blair County, PA. Image by the author.



Figure 4: (a) Knobby surface texture of Keokuk geode from Woodbury, TN. (b) Internal character showing hollow center and drusy quartz. Specimen collected and photographed by the author.

sulfate: $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$) and anhydrite (anhydrous calcium sulfate: CaSO_4) nodules. The cauliflower morphology is due to coalesced knobby anhydrite and/or gypsum nodules and, sometimes, expanding-outward growth of these minerals during silicification. Gypsum and anhydrite are evaporites - minerals deposited from hypersaline solutions due to intense evaporation and usually associated with dolostone (dolomite) and limestone. For this article, this usually is a tropical coastal arid setting known as a sabkha (an evaporitic mudflat).

"Cauliflower" chert and Keokuk geodes are commonly associated with stratigraphic/sedimentologic studies of limestone and dolostone deposited on sabkhas. It is in this depositional setting that the original gypsum and anhydrite nodules are formed. Ergo, both these cherts and these geodes have potential as shoreline indicators, aiding in the interpretation of certain paleodepositional environments, specifically marginal carbonate facies. These cherts also serve as paleoclimate indicators. As previously mentioned, the original nodules were evaporites produced in a hot, arid climate. In addition, these cherts and these geodes are useful in sedimentological/stratigraphic studies. For example, presence or absence of either might be used to distinguish one member of a formation from another. Similarly, identification of a formation boundary may rely on the presence/absence of either. Finally, the appearance of "cauliflower" chert and/or these geodes, in situ or in float, can be used as a mapping clue to a particular formation known to have these sedimentologic features.

All local samples represent "float" in soils overlying Beekmantown dolostones. Presently, it is uncertain whether these samples were originally in situ, later weathered from bedrock (Nittany and Bellefonte Formations), or they may be residual in origin, forming in the soils.

A primary objective of this article is to indicate that the subject specimen (Figure 1) is not a fossil. Specifically, it is not a stromatolite, as had been suggested. At the most, it could be considered a pseudofossil - an inorganic object mistaken for a fossil. Absence of macroscopic fossils in association with gypsum and anhydrite deposits is expected because of hypersalinity in which the evaporites are deposited. Such elevated salinities are not suitable to most macroscopic marine organisms.

Closer inspection of the specimen reveals the hollow center is lined with drusy quartz. Based on that observation, one would conclude the specimen is a Keokuk geode. However, resolution is not as simple as it may appear. It is sometimes a matter of semantics. In the October, 2011 NMS Bulletin, the author had an article on concretions. "When discussing concretions, it is usually necessary to distinguish them from geodes and nodules. But, distinction between geodes and nodules is not always clear. The American Geological Institute (AGI) defines a geode as being hollow or partly hollow. This definition precludes solid "geodes. Instead, those are concretions. However, one of AGI's definitions of a concretion is: 'A collective term applied loosely to various primary and secondary mineral segregations of diverse origin, including irregular nodules, spherulites, crystalline aggregates, geodes, septaria, and related bodies.' Note this definition includes geodes and irregular nodules. Some obfuscation is added when one considers that septarian nodules are generally defined as concretions and, in Mazon Creek (Illinois), one finds fossil-bearing rounded nodules of rock. These nodules are concretions. "

In conclusion, the specimen is identified as a Keokuk geode, but having surface attributes of "cauliflower" chert. This identification is based on a hollow center lined with drusy quartz.

Using GPS coordinates and a geologic map, the hand specimen is from the Ordovician Bellefonte Dolomite of the

Beekmantown Group. This is consistent with the origin of "cauliflower" chert and Keokuk geodes because both associate with tropical, arid coasts. The author and Duff Gold interpret the Bellefonte as tidal-flat deposits in an arid, tropical setting. Figures 2 and 3 show "cauliflower" chert from the Beekmantown.

Rosette chert (Figure 5) is similar to "cauliflower" chert. These have a crude rosette structure and are sometimes referred to as "cabbage head" quartz. Like the "cauliflower" chert specimens of this article, Figure 5 indicates the rosette chert is also from the Beekmantown. For more information on rosette chert, the reader is referred to the following Internet link describing these cherts in Pennsylvania:

Quartz roses for your rock garden, page 11 of:

http://docs.dcnr.pa.gov/cs/groups/public/documents/document/DCNR_20027571.pdf

The specimen in Figure 5 may be inorganic in origin. Alternatively, it may have an organic affinity. The concentric shapes could represent silicification replacing carbonate (calcite and/or dolomite) laminations of small stromatolites or oncolites (algal nodules).



Figure 5: Rosette chert from the top of the Ordovician Beekmantown Limestone. (Stose, G., 1909, Mercersburg-Chambersburg Folio, USGS)

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 Federations and our Society strongly encourage all members to read the monthly Federation Newsletters, available on their web sites**, which are linked from our web site, www.nittanymineral.org. We present brief summaries here in order to encourage readers to see the entire newsletters. There's a lot there!

The **EFMLS Newsletter** is now being distributed electronically; a link is available on our web site www.nittanymineral.org. Their editor has been in the hospital and plans to catch up on the newsletter soon.

The **AFMS Newsletter** is available by the same methods. The February -March issue has been received on paper but is not yet on the web site. The Safety Chair writes on "All it takes is one" club or member or even non-member to get a club or all clubs banned from a collecting site. President Doug True reports that the Northern California Camp Fire, which was in the news in November, destroyed the homes of almost every member of the Paradise Gem and Mineral Club. The American Lands Access Association is looking for people for leadership positions to get things moving again; see the 2019 newsletters at <www.amlands.org>. The juniors article is on "Help Your Club Kids Find Fun in Communicating" by writing articles for club bulletins and contests. Photos of recent donations for the AFMS Endowment Fund Drawings are shown. Club Rockhounds of the Year are introduced *-Editor*



Geo-Sudoku

by David Glick

This puzzle contains the letters ACEGINOTU; one row or column includes a concept of having developed under local conditions. As usual, 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.

	G	E		A	U			
U	O			E			T	
	C		G	I				
A		T	O	G				
	E	G			A			
O	I					G		
		O				U		I
E			U	O	C			T
G				T	I	C		

25 years ago in NMS

In March 1994 we were having our second regular meeting, on Ghost Mines and Mining Camps of the Old West, presented by Dr. Frank Aplan, with many photographs he had taken on his travels. We were preparing for our first speaker from outside Penn State to speak in April - Kurt Nassau, speaking on Gems: Science, Synthesis, Beauty and Deception. We were also preparing for our first field trip and a logo contest.

NMS BOARD MEETING NOTICE

NMS members are invited to attend Board of Directors meetings, which are generally held at 7:00 p.m. about two weeks prior to the general monthly meeting, although we do not meet every month. **The next date for a full Board meeting has not been set.** Members who would like to attend should contact president David Glick to verify time and place; those who would like to have their discussion item placed on the agenda should contact him at least one week in advance of the meeting.

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. See www.mineralevents.com for more.

March 23-24, 2019: Gems-Minerals & Jewelry Show by Franklin County Rock & Mineral Club. Hamilton Heights Elementary School, 1589 Johnson Rd., Chambersburg PA 17202. Sat. 10-5, Sun. 10-4

March 23-24, 2019: 50th Annual Gem & Mineral Show, by the Che-Hanna Rock & Mineral Club. Wysox Vol. Fire Co Social Hall, 111 Lake Rd; Wysox, PA 18854. Sat. 9-5, Sun. 10-4

March 23-24, 2019: AFMS and Midwest Federation Convention, Cedar Rapids, Iowa.

March 30-31, 2019: Philadelphia Mineral Treasures & Fossil Fair, by Phila. Mineralogical Soc. & Delaware Valley Paleontological Soc. Lulu Temple, 5140 Butler Pike, Plymouth Meeting PA 19462. Sat. 10-5, Sun. 10-4. <http://www.phillyrocks.org/mineral-show/>

March 30-31, 2019: North Jersey Gem, Mineral & Fossil Show, by North Jersey Mineralogical Society. Midland Park High School, 250 Prospect St., Midland Park NJ. Sat. 10-5, Sun. 10-4. <http://www.nojms.webs.com>

April 11-14, 2019: 46th Rochester Mineralogical Symposium. Rochester, NY. <https://www.rasny.org/minsymp/>

April 13-14, 2019: Lehigh Valley Gem, Mineral & Jewelry Show 2019, by Saucon Valley Lions Club, Saucon Valley High School, Hellertown PA 18055. Sat 10-6, Sun 10-5.

April 27, 2019: Super Digg, 32 Evans Street, Franklin New Jersey 07416. 9AM to 11PM rain or shine, no age restrictions. Liability insurance & pre-registration Required. See <http://superdiggg.com/>.

April 27-28, 2019: Monongahela Rockhounds Gem, Mineral & Fossil Show, West Mifflin Volunteer Fire Hall Number Four, Skyview Hall, 660 Noble Drive Pittsburgh PA. Sat 10-6 Sun 10-4, free admission.

May 18, 2019: Earth Science Show & Sale, by The Rock & Mineral Club of Lower Bucks County, PA. Christ United Methodist Ch., 501 Wistar Rd., Fairless Hills PA. Sat. only, 9-3.

May 18-19: "World of Gems & Minerals" by Berks Mineralogical Soc. Leesport Farmers Market Banquet Hall, 312 Gernant's Church Rd. Leesport, PA 19533. Sat 10-5, Sun. 10-4. Tailgate section Sat. only.

June 1-2, 2019: EFMLS Convention and Orange County Mineral Club Show, Monroe, New York. (EFMLS meeting Friday evening May 31)

Geo-Sudoku Solution

I	G	E	T	A	U	O	C	N
U	O	A	C	E	N	I	T	G
T	C	N	G	I	O	E	U	A
A	U	T	O	G	E	N	I	C
N	E	G	I	C	A	T	O	U
O	I	C	N	U	T	G	A	E
C	T	O	A	N	G	U	E	I
E	N	I	U	O	C	A	G	T
G	A	U	E	T	I	C	N	O

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

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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. Photographs or graphics are encouraged, but 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