

Nittany Mineralogical Society Bulletin

Nittany Mineralogical Society, Inc.

P.O. Box 10664

State College PA 16805

Editor (see page 8):

David C. Glick

October, 2015

Visit our web site: www.nittanymineral.org

October 21st meeting:

Joint Meeting with Bald Eagle Archaeological Society

Sourcing of Archaeological Lithics

Dr. Barry Scheetz
Penn State

Our October meeting will be held Wednesday the 21st in room 114 (larger auditorium) of Earth & Engineering Sciences Building on the west side of the Penn State campus in State College, PA. Maps are available on our web site.

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

7:30 to 8:00 p.m.: Annual Meeting and elections

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!

Sources of good quality lithic materials were prized by the early inhabitants of North America. This material would find its way into interregional trade and it has been established that the farther from a source the more value was placed upon the materials. Being able to establish the quarry from which artifacts were manufactured can contribute significantly to the trade pattern of aboriginal populations as well as to cultural pattern and resource procurement patterns. Jasper from the Reading Prong qualifies in this category of exceptionally fine quality lithic materials. Archaeologists have reported finding Reading Prong jasper as far afield as Maine. This methodology will allow archaeologists to identify the source quarry for jasper.

ATTENDING THE OCTOBER MEETING?

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

Your donated snacks and drinks will be welcomed.

Bring a friend!

Upcoming Programs

November 18: Prevention of acid drainage at coal surface mines and highway construction projects through alkaline addition: Lessons learned from Central Pennsylvania. By Michael Smith, P.G., Pennsylvania DEP, Moshannon District Mining Operations

December: Holiday Dinner - details coming soon.

OFFICIAL NOTICE: Annual Meeting and Elections in October

by David Glick, NMS President

The October 21st meeting will be the **Annual Meeting of the Corporation**, and will include election of officers. In accordance with our bylaws, the following slate of candidates was announced last month:

President: David Glick

Vice-President: Robert Altamura

Treasurer: Stuart Bingham

Secretary: Ellen Bingham

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 next year. **All members: please consider volunteering!**

Oak Hall Quarry Open House

reported by Dr. Andrew Sicree

The Hanson Aggregates Oak Hall Quarry will hold an Open House this Saturday, Oct. 17, from 11:00 a.m. to 2:00 p.m. at 850 Boalsburg Road, Boalsburg, PA (between Oak Hall and Lemont). This event is not for mineral collecting, but rather for the company to show what they do. They will have displays related to the quarry, and personnel to answer questions. There will be catered food for attendees, van tours of the quarry, and large equipment such as loaders parked for examination and photos. They will have door prizes, including hardhats, and one bicycle each for a boy and a girl.

NMS members will be present with materials showing features of the geology of the quarry and central PA; information on the uses of limestone; hands-on displays about minerals; a "Mini-Mine" (for kids to find interesting stones); and information on NMS.

Dues are Due!

by David Glick, NMS President

Our membership year ends on October 31. Members will receive a dues form via their usual method (print or e-mail). New members are invited to join using the same form. 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 includes a line for "don't send a printed Bulletin;" you can help reduce our expenses by checking this line. You can go back to the printed version, or request individual printed issues, at any time. ✨

EMS Museum News

Following up last month's article on the restored relief map installed in the Earth and Mineral Sciences Museum, Director Russ Graham reports that there is a feature article on the web:
<http://www.psu.edu/feature/2015/09/03/science-art-and-history>

Dr. Graham also reports that Edward Steidle, former Dean of the College and supporter of the Museum's art and mineral collections, will be inducted into the Mining Hall of Fame in October. The Museum plans a small special exhibit on Dean Steidle for that month.
<http://www.mininghalloffame.org/page/edward-steidle>

The Earth & Mineral Sciences Museum and Art Gallery occupies two large rooms on the ground floor of Deike Building, along Burrowes Road on Penn State's University Park campus. It is open 9:30 a.m. to 5:00 p.m. when the University is open; admission is free.
 - Editor

NEWS FROM THE FEDERATIONS

Nittany Mineralogical Society, Inc., is a member of EFMLS, the Eastern Federation of Mineralogical and Lapidary Societies, and therefore an affiliate of AFMS, the American Federation of Mineralogical Societies. 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 begins with a review of Federation graduate student scholarships and an invitation for clubs and individuals to contribute. The Safety Chair proposes that we encourage safety by applying Goethe's principle "Treat people as if they were what they ought to be and you help them to become what they are capable of being." Steve Weinberger reviews the year's Wildacres sessions (see page 3 of this Bulletin).

The **AFMS Newsletter** is available by the same methods. The October issue includes a farewell from President Marion Roberts, and his welcome to new President Matt Charsky. The Endowment fund drawing will take place October 24th; the 22nd and final prize is illustrated.

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

- Editor

Friends of Mineralogy - Pa Chapter Symposium November 7 - 8

Friends of Mineralogy - Pennsylvania Chapter will hold their annual symposium at Franklin & Marshall College in Lancaster, Pa., on Saturday November 7, with a field trip (for symposium registrants only) on Nov. 8.

Scheduled speakers are listed below. There will also be invited mineral dealers; a give-away table; silent auctions of specimens, books, tools, and more; and plenty of opportunities for fellowship with other avid collectors. Professional geologists can receive professional development hours for lecture attendance. The web site will have any updates and a registration form: <http://www.rasloto.com/FM/>

Preliminary List of Symposium Presentations:

- Phosphate Minerals in Pennsylvania
Michael Stefanic, Pennsylvania DEP
- Preliminary Evaluation of the Mount Pleasant Mills Wavellite Occurrence
Bill Stephens, Stephens Environmental Consulting, Inc.
- The Geology and Mineralogy of the Grace Mine
Ron Sloto, West Chester University
- Evolution of Volcanism in Central America
Ian Saginor, Keystone College
- Mineralogy of the Surface of Mars
Stan Mertzman, Franklin & Marshall College
- Editor

Geo-Sudoku

by David Glick

This puzzle contains the letters ACEILNOST. One row or column spells a feature which influences deposition of sediment (as usual, if you've read this Bulletin's articles, you've seen the word). 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.

			C					
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N		E	A	I	S			
	A	S					T	I
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TWO AMAZING SESSIONS!

by Steve Weinberger

from

EFMLS Newsletter 52:10, October 2015

Our Eastern Federation has been privileged to hold workshops at the Wildacres Retreat since 1973. Although I did not attend the very first workshop, Carolyn and I did attend the 3rd, in 1976 and, in my opinion, each year since our workshops have gotten better and better! This year was no exception!



Some highlights of note. Our two wonderful speakers, Bob Jones and Denise Nelson, kept their audience spellbound as they related tales of helicoptering into a mine, entering the famous cave of humongous crystals at Naica, Mexico, the mines and gems of Minas Gerais, or the world's best gem carvings and the history of the materials, art, tools and people who created them.

Classes were fabulous! We faceted terrific gemstones, cut amazing cabochons, wirewrapped, photographed, learned to identify gemstones, carved

soapstone, made chains and gem trees, learned to make silver and polymer clay jewelry, learned about the geology of the Wildacres area, learned to make intarsia, fused some glass, knotted beads and learned to knit with wire. What an array of classes taught by our ever patient instructors.

Thanks to excellent and generous donations, both our auctions did well, and our May Fun Night saw the reappearance of the "Moosketeers" who made Carol and Bob Jones honorary members of the troupe. In August, Fun Night was replaced with a concert given by Don Pedi, a well-known dulcimer player. Both Show & Tell sessions amazed the group with the wonderful projects completed by all.

As per usual, the food was good, camaraderie among the participants delightful and cooperative weather truly enhanced the Wildacres 2015 experience.

Watch this space in the coming months for information about our 2016 sessions. We'll publicize them here once we receive our dates from the Wildacres Foundation and have lined up our speakers and instructors. In the meantime, do consider joining the fun "on the mountain" next year.



Back entrance to dining hall
Denise Nelson photo



Gerry Cox photo



Bob & Carol Jones - Honorary Moosketeers
Ellie Pitts photo



Denise Nelson photo



Good Stuff Auction - Denise Nelson photo

Preliminary observations along a section of the Mount Nittany Expressway

Dr. Charles E. Miller, Jr.
Geologist

Nittany Valley at State College is largely underlain with Cambro-Ordovician carbonates. Locally, limestones and dolomites are similar enough in appearance that, to most people, one roadcut looks like another. However, a roadcut along the Mount Nittany Expressway (U.S. Route 322), near the Route 26 intersection (Figure 1), looks conspicuously different, even to casual observers. Here, two middle Ordovician formations are exposed: the Bellefonte Dolomite (Ob) and the Loysburg Formation (Ol). In the Milroy Member of the latter, darker limestones alternate with lighter-colored dolomites (Figure 2). The alternating strata represent shallowing-upward cycles (parasequences) deposited on a carbonate tidal flat (Engelder, 2006). This is the best roadcut in State College for viewing carbonate cycles. These cycles are one of several preliminary observations made of the roadcut.



Fig. 2 Shallowing-upward carbonate cycles in the Loysburg Formation near the Rt. 26 intersection with the Mt. Nittany Expressway. (Image by the author.)

The roadcut is on the expressway's eastern side and begins at the Elmwood Street overpass (Figure 1). From there, the section continues southeasterly for approximately 0.25 miles until it thins out. Dr. Duff Gold and the author measured and described this roadcut. Work is continuing. One objective is to correlate the Loysburg section with its counterpart in the nearby Oak Hall Quarry. Correlation waits until mining exposes more of the formation. The Mt. Nittany synclinal axis intersects the expressway between the Elmwood Street overpass and the Oak Hall Quarry (Figures 1 and 3). A syncline is a fold with two limbs (halves) and youngest rocks at the center of the fold (Figure 3). Strata of the northwestern limb are repeated in the southeastern limb, albeit in reverse stratigraphic order (Figure 3).

Figure 4 shows a clastic dike in the Loysburg. Clastic dikes form from differential compaction of sediments, prior to lithification (turning to stone). When a greater force is exerted in one place, sediment may be mobilized in another. Fluidized injection pushes the sediment into open fractures of adjacent layers. In Figure 4, a sandy dolomite layer is between two dololomite (dolomite mud) layers. The erosion scour may have contributed to forming the clastic dike by acting as a small slope. The mud was pushed into the scour and then upward to form the clastic dike.

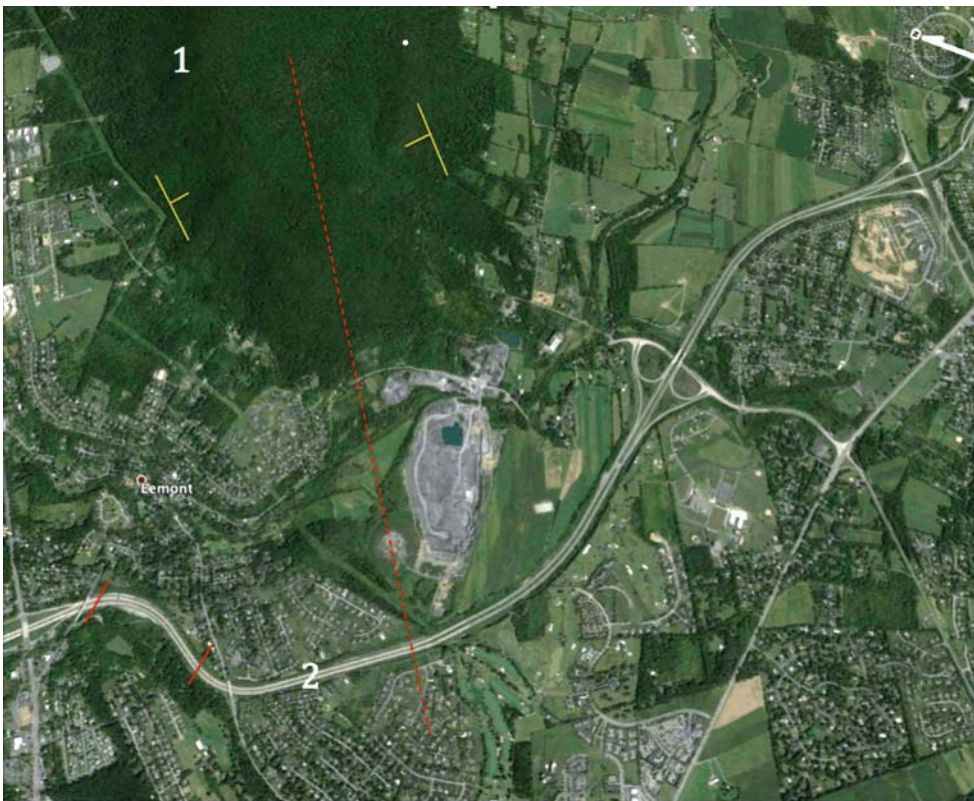


Fig. 1. Aerial image showing Mt. Nittany (1), the Mt. Nittany Expressway (2), the referenced roadcut (short red lines), and the Mt. Nittany synclinal axis (dashed red line).

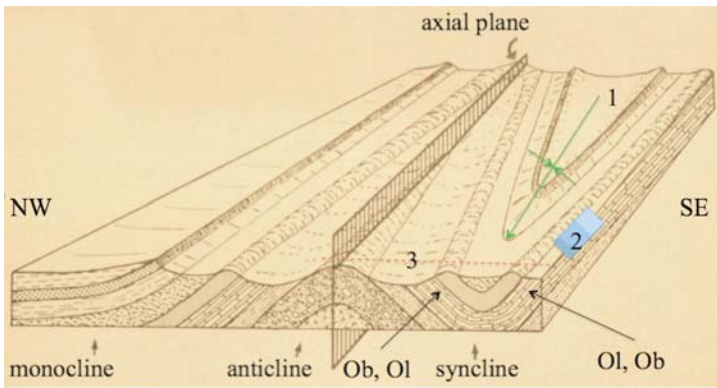


Fig. 3. Block diagram depicting the Mt. Nittany synclinal axis intersecting the Mt. Nittany Expressway. (1) Mt. Nittany. (2) Hanson Bros. Oak Hall Quarry. (3) Mt. Nittany Expressway.



Fig. 5. Disconformity in the Loysburg. (Image by the author.)



Fig. 4. Clastic dike in the Bellefonte Dolomite. (1) Clastic dike. (2) Dololulite. (3) Erosion scour. (4) Sandy dolomite. (Image by the author.)

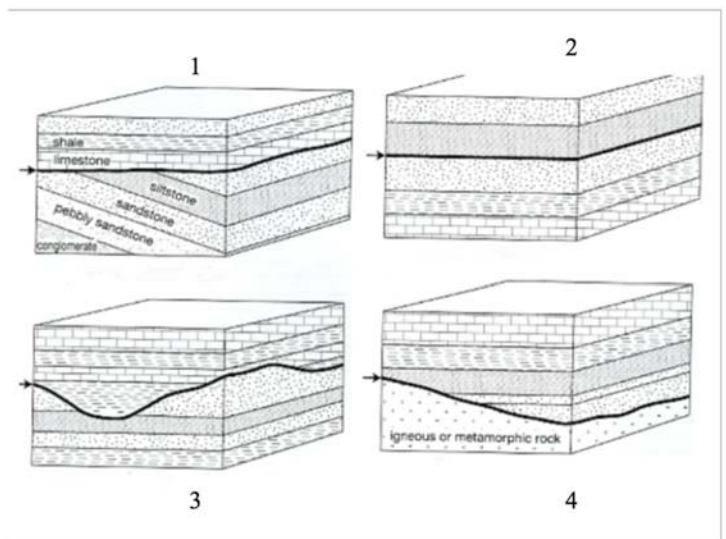


Fig. 6. Four basic types of unconformities. (1) Angular unconformity. (2) Disconformity. (3) Paraconformity. (4) Nonconformity.

Figure 5 is an unconformity in the Loysburg at the roadcut. An unconformity is a hiatus in the rock record, due to erosion or non-deposition. There are four major unconformities (Figure 6). An angular unconformity is a discontinuity between dipping and horizontal strata. A period of erosion separates the two sets of strata. A disconformity is an erosion surface within essentially parallel strata. A paraconformity is a missing section of strata between essentially parallel layers. It is not obvious that erosion is responsible for the missing section. Instead, the section may be missing due to non-deposition. A nonconformity is an erosion surface over igneous or metamorphic rock. The type of unconformity in Figure 5 is a disconformity. Strata above and below the erosion surface are essentially parallel and the erosion surface, itself, is obvious.

The Loysburg represents carbonate tidal flats - nearly flat coastlines where tides dominate. These are divided

(top-to-bottom) into supratidal, intertidal, and subtidal zones (Figure 11a,b). Supratidal zones are subaerially exposed (exposed to air) except during storm surges and spring tides. Intertidal zones range from high to low tide. Subtidal zones are below wave base, permanently covered with water. Each zone produces lithologies, sedimentary features, and fossils distinctive enough to differentiate one from the other. One fossil associated with tidal flats is the stromatolite. Living and fossil stromatolites consist of blue-green algae and cyanobacteria. Calcium carbonate particles deposited onto a mucilaginous (sticky) surface preserve the organism as a fossil. Stromatolites are one of the oldest fossils, ranging back 3.5 billion years. They were responsible for producing much of Earth's early oxygen, enabling aerobic organisms to evolve (Cloud, 1968). Stromatolite morphologies reflect their distribution in modern tidal flats (Figure 7). Supratidal forms consist of laterally-linked hemispheroids with continuous laminae (LLH). They are commonly referred to as algal mats. Intertidal stromatolites develop larger, more

distinct domes or hemispheroids forming columns or club-like “cabbage heads” (SH, LLH-SH). Subtidal forms (SS) are diminutive in comparison, consisting of discrete spheroids. The stromatolites in Figure 8 are interpreted as intertidal, based on a variety of sedimentary observations in the Loysburg.

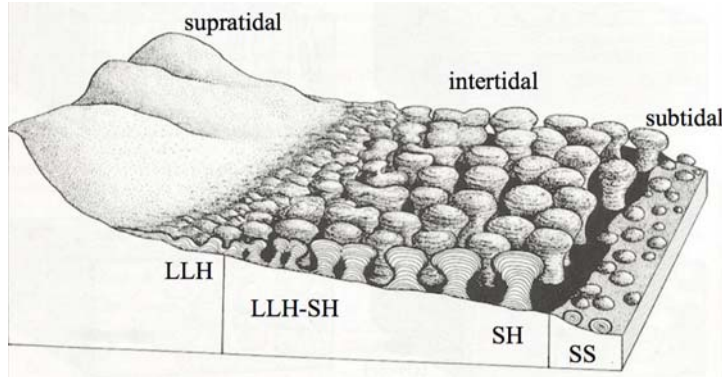


Fig. 7. Generalized distribution of stromatolites in tidal-flat environments. (Anstey and Chase, 1974; used with permission.)



Fig. 8. Two stromatolites in the Loysburg. The one on the left is mostly concealed. (Image by the author.)

Figure 9 shows faulted black chert in the Bellefonte. Faults are breaks in rocks along which there has been differential movement of the two sides. In this example, the hanging wall (above the fault) has moved upward relative to the underlying footwall (below the fault). This is relative motion. The hanging wall – or footwall – could have remained stationary while its counterpart moved. Or, both the hanging wall and foot wall could have moved relative to each other. The fault is discontinuous below the chert. Above the chert, the fault transitions into a fracture – a break in rock along which there has been no differential movement. These observations suggest the mechanism for faulting of the chert is soft-sediment deformation due to differential compaction. This occurred prior to lithification of the sediments.



Fig. 9. Soft-sediment induced faulted black chert in the Bellefonte. (Image by the author.)

Figure 10 shows a stratum within the Bellefonte, consisting of sharp-edged, broken rock fragments (clasts) and a more rounded, much larger clast. The former are examples of intraformational breccias/rip-up clasts. The sharp-edged clasts began as fragments when mudcracks shriveled from desiccation. A storm swept the fragments into shallow water where they were deposited. The larger, more rounded rock fragment (center right) obstructed currents that flowed right to left. Draping over this fragment is dololomite (dolomite mud). It can be seen fanning to the left after having been carried right to left over the pebble.. These observations provide clues to the depositional environment for this layer. The water was warm and shallow. Upper tidal flats were subaerially exposed, forming mudcracks. Storms punctuated the setting, washing mudcrack fragments into the subtidal part of the tidal flat. These fragments are allochthonous (transported) because they moved from the supratidal to subtidal part of the tidal flat. Distance of transport was short because the smaller fragments are angular. A longer transport distance would have rounded the sharp edges of the fragments, constituting an intraformational conglomerate instead of a breccia.



Fig. 10. Stratum in the Bellefonte showing intraformational breccias and transport (right to left) of dolomite mud over a rounded rock fragment. (Image by the author.)

The shallowing-upward carbonate cycles (Figure 2) are of much interest. These result from changes in eustatic (world-wide) sea level relative to the land. Each cycle records a transgression and regression (Figure 11). A transgression is when sea level rises (as is happening today) and on-laps land, shifting the original shoreline farther inland. The net effect is flooding of coastal areas and subtidal sediments deposited on top of supratidal ones. In a regression, the sea retreats from the land, exposing more land. This shifts the original shoreline farther seaward. The net effect is exposure of more land above the sea and supratidal sediments deposited on top of subtidal ones. These shoreline shifts are shown in Figure 11.

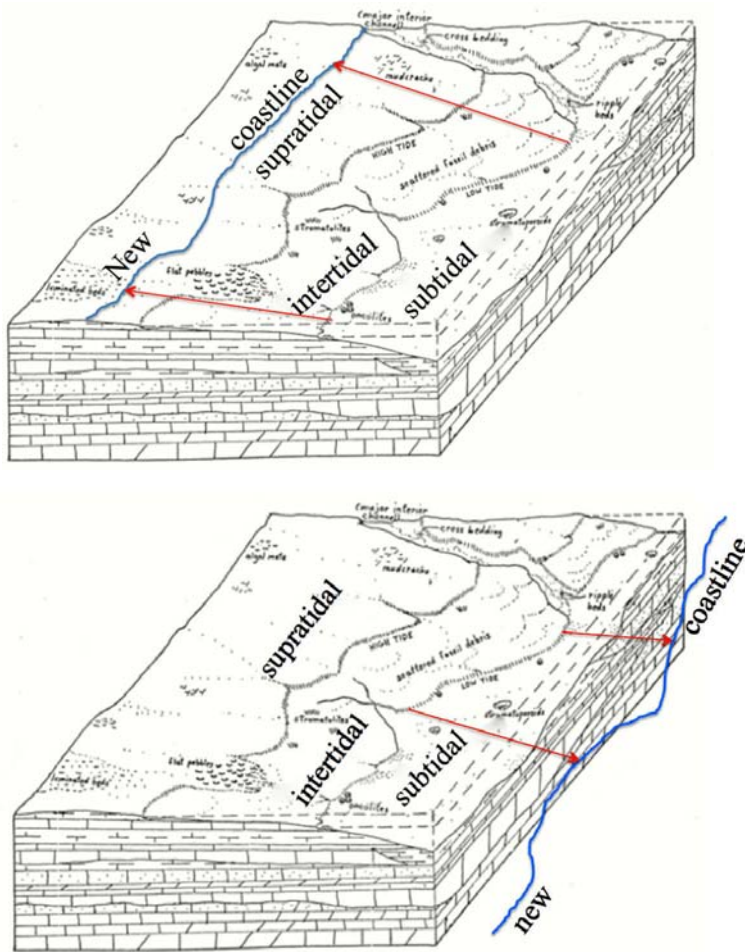


Fig. 11. Block diagrams showing transgression (11a, top) and regression (11b, bottom) of a carbonate tidal flat. Modified from Miller, 1971.

These carbonate cycles formed in a sabkha – a supratidal depositional environment under arid or semiarid conditions on restricted coastal plains. Evaporites, lack of fossils other than laminated stromatolites, and desiccation features characterize a sabkha. The Persian Gulf and the Gulf of California are modern examples. Intense evaporation draws seawater upward through lime deposits. Magnesium (Mg) from

seawater is deposited, altering the lime sediment (CaCO_3) to dolomite (MgCaCO_3). This paradigm is consistent with the observation that when these cycles were made, State College was at 20 degrees south latitude. This location was within the tropics. The cycles were deposited over hundreds of thousands of years (Engelder, 2006).

Figure 12 shows hardgrounds in the Bellefonte. A hardground is a lithified (cemented) seafloor. Characteristics include encrusting marine organisms, borings of organisms, and discoloration from iron oxide or other minerals. Carbonate cement precipitated in primary pore spaces led to lithification of the sediments. The figure shows borings of infauna (living within the sediment) organisms preserved in dolomite.



Fig. 12. Hardgrounds in the Bellefonte. (1) Hardground surfaces. (2) Organism burrows. (Image by the author.)

References

Anstey, R., and Chase, T., 1974, *Environments Through Time*, Burgess Pub. Co., Minneapolis, p. 80.

Cloud, P., 1968, *Atmospheric and hydrospheric evolution on the primitive Earth*, In: Cloud, P., 1970, *Adventures in Earth History*, W.H. Freeman and Co., San Francisco, p. 446-457.

Engelder, T., 2006, *Geology Field Trips in the Appalachian Mountains*, The Pennsylvania State University, p. 72-74.

Miller, M.B., 1971, *A paleoenvironmental study of the Tonoloway and Lower Keyser Limestones at four localities in Hardy and Pendleton Counties, West Virginia*: The George Washington University, unpublished senior thesis.

Classifieds

Ads may be submitted to the Editor (see p. 8)

FOR SALE: 2 Homemade Lapidary saws for sale - 14" and 18". Both come with working motors, arbor, belt, pulley, rock clamp/carriage, and a blade. Both are mucked-out and ready to move. Both could use a little TLC. For more info contact Mike Zelazny at fabricatefilm@yahoo.com

FOR SALE: Microscope & Accessories, Mineral Specimens, Crystal Models.

Avid collector wants these to be purchased by someone who would appreciate them. Contact Frank & Gail Beall, 724-789-7290. See much more complete listing at www.nittanymineral.org/beall.pdf and in earlier NMS Bulletin issues.

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.

Oct. 24, 2015: (Note this correct date) Ultraviolation, All Fluorescent Minerals Show, by Rock & Mineral Club of Lower Bucks County. Saturday only, 9-5. <http://rockandmineralclub.wix.com/lowerbuckscountypa>

Oct. 31, 2015: (Note this correct date) South Penn Fall Rock Swap, by CPRMC & Franklin Cty RMC. South Mountain Fairground, 1.5 mi W of Arendtsville PA on Rt 234. Sat. only, 8:30-3:00. For GPS, use address 615 Narrows Road, Biglerville, PA 17307. General admissions \$1.00/person. Table for Swappers \$5.00/table. Contact: tsmith1012@comcast.net

Nov. 7-8, 2015: Friends of Mineralogy -Pa. Symposium, Lancaster. See page 2. Five expert speakers; invited mineral dealers; give-away table; silent auction; and opportunities for fellowship with other avid collectors. Field trip Sunday. Please register in advance. <http://www.rasloto.com/FM/>

Nov. 7-8, 2015: Gemarama, by Tuscarora Lapidary Soc. NEW LOCATION: Hall C at the Greater Philadelphia EXPO Center, 100 Station Avenue, Oaks, PA 19456. Sat 10-6, Sun. 10-5. Full information & discount coupon at <http://www.lapidary.org/GEMARAMA/Gemarama.html>

Geo-Sudoku Solution

L	I	O	C	N	T	E	A	S
A	S	C	L	E	O	T	I	N
N	T	E	A	I	S	L	C	O
O	A	S	E	L	C	N	T	I
I	C	L	T	O	N	S	E	A
E	N	T	I	S	A	O	L	C
S	L	I	N	C	E	A	O	T
T	E	N	O	A	I	C	S	L
C	O	A	S	T	L	I	N	E

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!

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 Door Prizes: *volunteer needed!*
 Refreshments: *volunteer needed!*
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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:
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 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