Nittany Mineralogical Society Bulletin

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

March, 2023 **Visit our web site: www.nittanymineral.org** *Editor (see back page): David C. Glick*

March 15th meeting, SPECIAL TIME 6:00 p.m.
IN PERSON at BOAL HALL:

GEODE NIGHT!

by Jeff Smith

Our March meeting will be held Wednesday the 15th in Boal Hall (Boalsburg Fire Hall), 113 East Pine St., Boalsburg, PA 16827. Maps can be found on our web site.
*- **6:00** to 7:10 p.m.: Purchasing & opening geodes*
*- about 7:15 p.m.: featured **program on Mexican geodes***

*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 their kids and share an interesting evening.***

*We hope you will join us in person, but if you can't, we may record the presentation for later posting on our web site. We do **not** expect to Zoom this one in real time. Watch the web site for any updates. -Editor*

NMS is very happy to welcome back Jeff Smith, "the Geode Guy," to present Geode Night to our club. Starting at 6:00 p.m., various sizes of whole geodes will be available for purchase at $5 and up. After you buy, Jeff will crack them open for you and you'll be the first person ever to see the crystals inside. If yours turns out to be solid, you can pick another at no charge.

At about 7:15 p.m., after the geode cracking has been completed, Jeff Smith will present a program on these geodes. He and his family have visited the geode mine in Mexico, and he has slides, good stories and video of the long trip out to the mine and then going underground to mine a few geodes themselves. It's fascinating! The program is family friendly and very interesting!

The Las Choyas geode deposit was described in Jeff's extensive, illustrated article in the March-April 2010 issue of Rocks & Minerals magazine. This NMS Bulletin (available on our web site, www.nittanymineral.org) carried articles about geodes in the December 2011 and January 2012 issues, and Rock & Gem magazine's February 2012 issue included"The Hector Carrillo Family: the human story behind Mexican lapidary treasures," by Brad Cross.

Here's Jeff's report on a 2013 visit:

In 2008, Gem Center suspended underground mining activities due to moderate earthquake activity centered in Chihuahua. At that time, they had been mining between 90 and 125 feet beneath the desert floor. In order to maintain production, Gem Center purchased excavation equipment to begin strip mining along a portion of the deposit outcrop. This decision has been successful and productive. To date, an area approximately 300 feet long has been mined along strike of the deposit, and the resulting high wall measures about 20 feet. The excavation has also exposed the classic room and pillar mining technique that has been employed underground since the 1960's.

continued on page 2

Minerals Junior Ed. Day March 25
Register kids to attend
Volunteers Needed
See page 3

GEODE NIGHT! Continued from page 1

In the summer of 2013, since seismic activity had subsided, two new shafts were sunk down dip to probe the depths of the deposit. The geode-bearing zone was encountered at 150 feet and 210 feet below the surface. The two shafts have been connected with a tunnel and they have been mining along strike. Potentially, the geode zone could be mined down to 600 feet below the desert floor, where the regional water table would be encountered.

Like my last few trips, I was lowered down the 150-foot shaft like a bucket into a well, as I carried my hammer and camera equipment. I was able to shoot videotape and still photos of mining activity, and oh yes, I mined my own geode, which contained amethyst! ❄

Geo-Sudoku

by David Glick

This puzzle contains the letters ACEHLRSTW. One row or column includes a principle of deposition of sediment. 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 12.

C	E		T	W			S	
					S	C		E
	H				E	T		W
L		E						
	R		S	H				
		A	E			W		T
	A	C	L				T	H
		T	A	S				
			C	E	T	A		R

Thank you from the President

David Glick

We had a nice dinner with many NMS members at Outback Steakhouse on February 21, with lots of conversation, good food and an enjoyable time overall. I was honored when the group bought my dinner, and surprised when they gave me a gift in appreciation of my efforts on behalf of NMS. It was an attractive cheese server, appropriately made of stone. For my part, I can only say that it's rewarding and energizing to work with such a group of volunteers. I sincerely thank organizer Charlie Miller and everyone involved.

Picnic at Sterling Hill June 10

from Mike Dunton

The North Jersey Mineralogical Society is inviting all area club members to a barbeque / pot lunch picnic at the Pavilion at Sterling Hill Mining Museum <https://www.sterlinghillminingmuseum.org/>, Ogdensburg NJ, on Saturday, June 10. They want to invite all the local clubs from PA, NY, and NJ. There will be collecting, mine tour, and informal swaps & sales. I will have more information after the New Jersey shows next month. Interested NMS members should contact me at <pocono1mike@yahoo.com>.

NMS Recorded Presentations

David Glick

The majority of the NMS meeting Zoom presentations made during the pandemic were also recorded and may be viewed by using the links on the main page of our web site (scroll down to find them). The February program is now available. Others require more processing, which is in progress.

NMS 2023 Spring Schedule

April 19: Meteorite organics, Asteroid Bennu and the OREX Mission

May 17: Life in the Cambrian: Oxygen and Diversification

Nittany Mineralogical Society presents...

KIDS in grades 1 – 8! Get cool rocks, minerals, and fossils and learn more about nature on March 25, 2023, at

Minerals Junior Education Day

Stations being planned include:

Gold Panning
Caves & Karst
Lapidary – Making Gemstones
Copper
Fossil shells (invertebrates)
Fluorescence (glow in the dark)
Stars & Stripes in Gemstones
Native Americans used Rocks
Sphere Grinding Machine
… and maybe more!

Please **register by** Monday March 20.

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 $6 per student at the event. No checks or cash through the mail.

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

When: **Saturday, March 25, 2023**

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 $6 per child; parents come along for free.

Get more details, updates, and video at

www.nittanymineral.org

Minerals Junior Education Day March 25

Minerals Junior Education Day is coming up fast - Saturday, March 25, 2023! At this event, students in grades 1-8, accompanied by their parents, learn about some aspect of minerals, earth sciences or lapidary, and get specimens to take home. Volunteer station leaders and Coordinator Frank Kowalczyk have made great progress, with nine stations planned, and others possible. We'll have details at the March 15 meeting and on the web site. Please **volunteer to help** at this rewarding event. Donations of minerals, books, etc., for the sales table are also welcomed - make arrangements **in advance** (with Dave Glick; see page 12), so that we can get them organized and priced. To volunteer, contact Frank Kowalczyk: frank.j.kowalczyk@gmail.com or 814-404-9854.

Geology from a Beaker: Student Activities in Earth Science

Dr. Charles E. Miller, Jr.

Preface

On 9-19-18, the author spoke to the Nittany Mineralogical Society on "The 1974 Penn State Cross-Country Geology Field Trip." One topic in that talk discussed same-age Cretaceous sediments from Utah to Kansas. It was an application of Walther's Law. That discussion is parlayed into an article showing its use in earth-science and geology classes. This article parallels a major effort of the Society - i.e., purveying information.

Introduction

Gravel, sand, and powdered clay (mud) stirred in a beaker of water (Figure 1) settle out in a predictable manner. This demonstrates Walther's Law - a geological principle that is the basis of this article. Walther's Law can be stated as: "uninterrupted deposition in the vertical is duplicated in the horizontal."

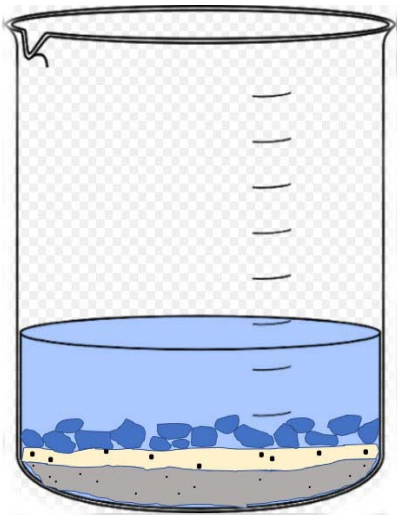


Figure 1: Depositional sequence of gravel (blue polygons), sand (larger black dots in light-tan background, and clay (mud; smallest black dots in brown background) in water.

This article discusses applications of Walther's Law suitable for high-school earth science. These applications provide insight into stream deposition, shifting shorelines, and same-age regional sediments. Discussing shifting shorelines is timely because, in part, it relates to global warming and rising sea level. This article assumes students have been introduced to sedimentary rocks and basic sediments (gravel, sand, and clay) and are aware of global warming. A series of student activities involves additive learning. Each new concept builds on a previous one. These activities are amenable to individual or group learning, can be done remotely, can be done at no cost since the glass beaker and sediments can be shown as a drawing, and are suitable for grades 9-12.

Walther's Law in the vertical

Figure 1 illustrates Walther's Law in the vertical. After stirring, sediments in a beaker of water settle out predictably. Bottom to top, these are: gravel, sand, clay. This sequence is heaviest and, therefore, fastest setting (gravel) to lightest and, therefore, slowest setting(clay). Clay is the last sediment to deposit because individual particles are so small they may remain suspended for a prolonged period.

Walther's Law in the horizontal

Streams reflect Walther's Law in the horizontal (Figure 2a). As streams flow into the sea, their velocity rapidly decreases. This is analogous to the beaker (Figure 1) when velocity from stirring decreases. In both the beaker (Figure 1) and a stream, heavier sediment (gravel) is deposited first, followed by sand, then clay.

- **Student Activity**

Using Walther's Law, match sediments in the beaker (Figure 1) to letters A-C in Figure 2a. Answers are in Figure 2b.

Inverse deposition

The depositional sequence of Figure 1 may be reversed, with coarser sediments deposited on top of finer ones (Figure 3). One cause of this is shifting shorelines (Figure 4). The sandy beach of today (Time 1, Figure 4) is transitory. A million years in the future, it probably will have shifted landward. This is because, as glaciers melt, sea level rises, and coastlines shift landward (Time 2, Figure 4). If sea level falls, as during an ice age, shorelines shift seaward (Time 3, Figure 4). The dashed line of Figure 4 traces shorelines through two million years. An example of shifting shorelines is Florida. During the Ice Age, Florida was about twice as large as it is today. So much water evaporated to form glaciers that sea level dropped 200-300 feet. Shorelines shifted seaward, exposing more land to the air. Presently, global warming is melting glaciers, causing sea level to rise. If that trend continues, Florida's coasts will be flooded, decreasing the size of the state as the shoreline shifts landward.

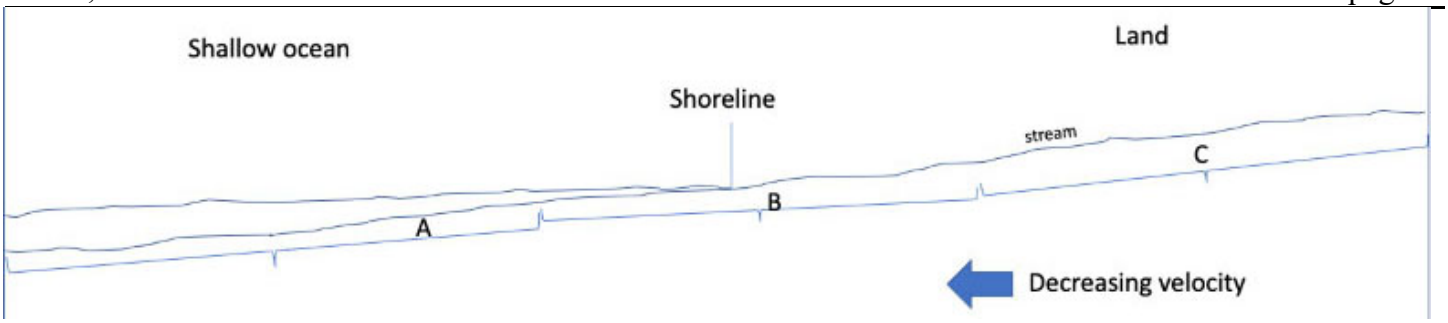


Figure 2a: Diagram showing decreasing velocity as streams flow into the sea.

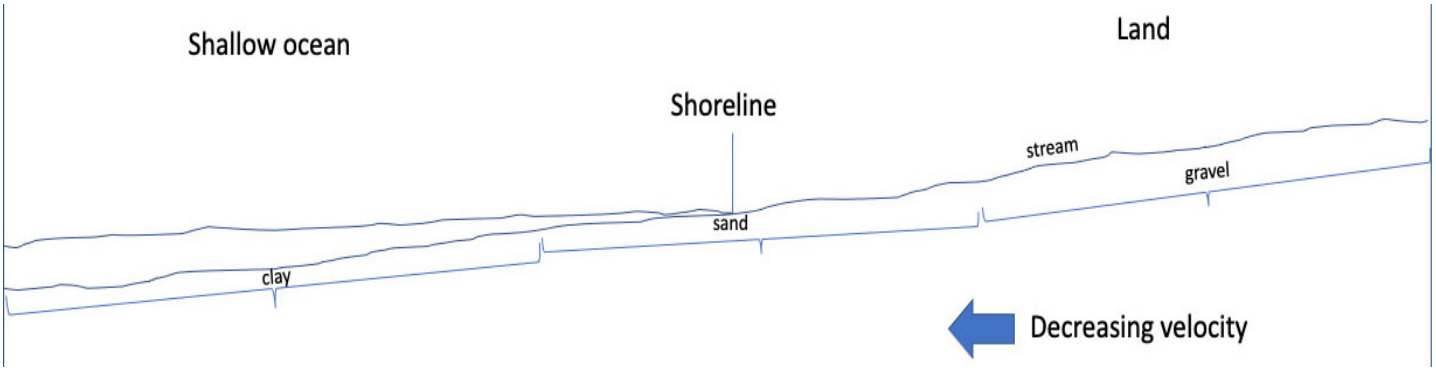


Figure 2b: Sediment deposition of a stream flowing into the sea. This is Walther's Law in the horizontal.

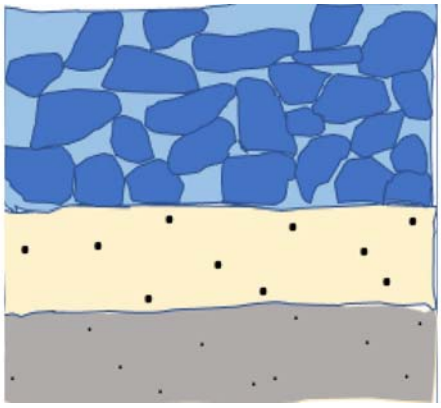
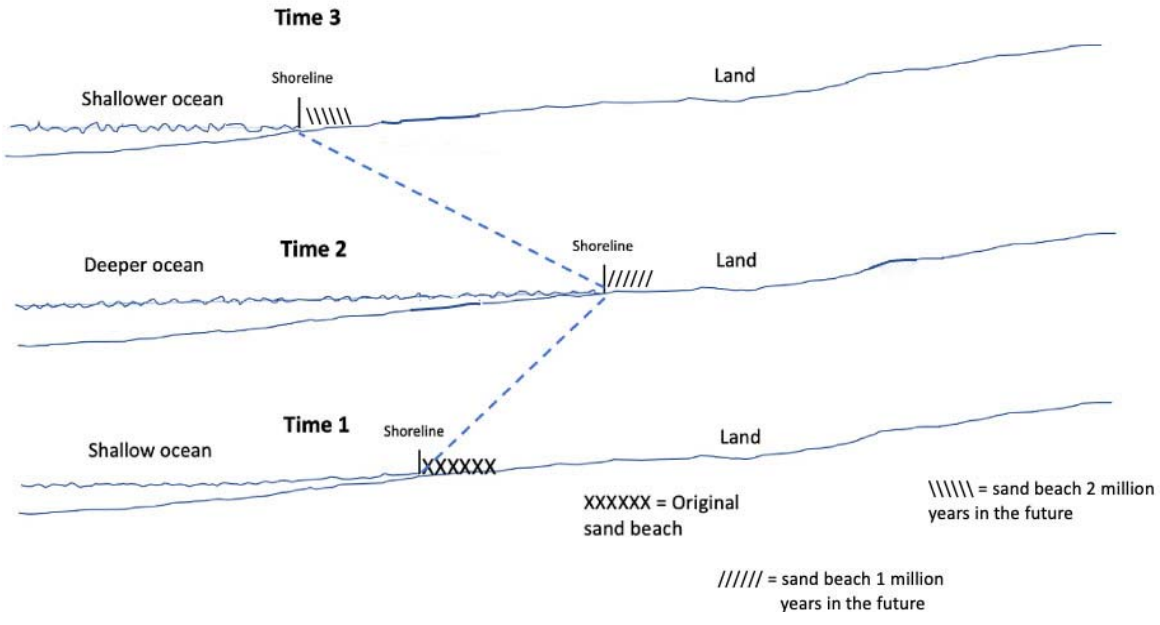


Figure 3: Inverse deposition. Compare to Figure 1.

Figure 5 depicts the shifting shorelines of Figure 4, but with sediments added. Figure 6 is the same as Figure 5 except three stratigraphic sections (A-C, light blue) are shown. The stratigraphic sections are visual representations of geologic exposures in the field. Geologists study these exposures to gain insight into past geologic processes. Table 1 portrays Sections A-C in a condensed format.

Figure 4 (below) : Shifting shorelines due to rising or falling sea level relative to the land. Dashed line traces shifting shorelines through time.



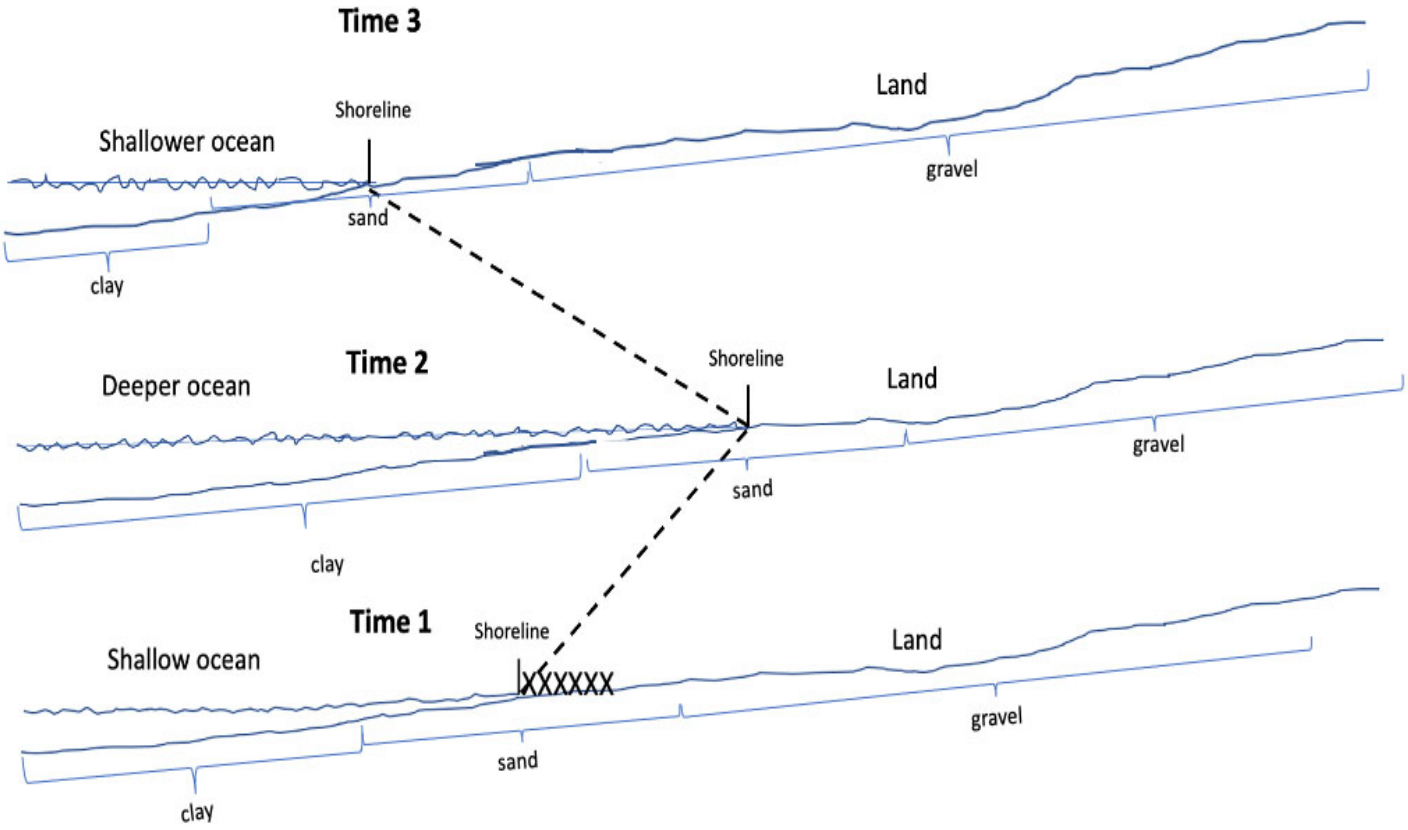


Figure 5: Sediments added to Figure 4.

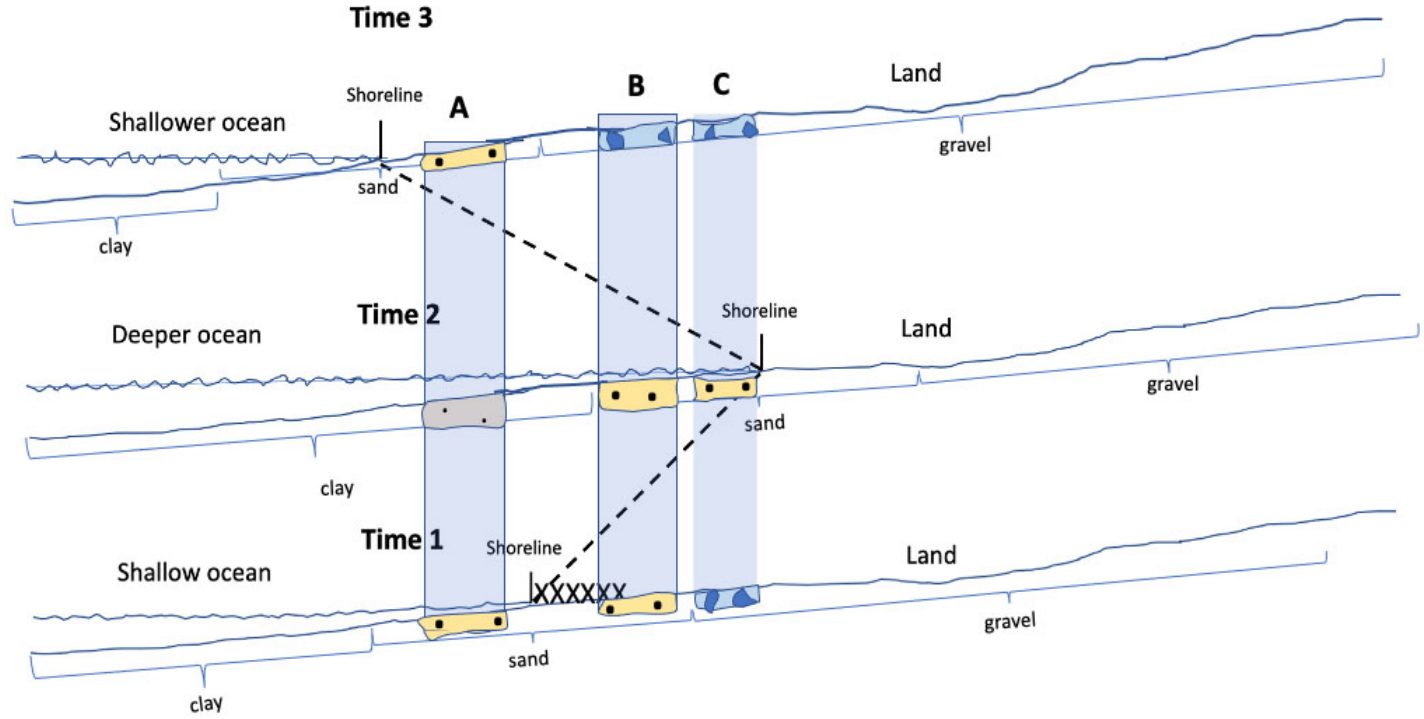


Figure 6: Stratigraphic sections A-C added to Figure 5.

Fining- and coarsening-upward deposition

Uninterrupted sedimentation produces fining-upward and coarsening-upward sequences. Sediments decreasing in size, bottom to top, are fining-upward (Figure 1). Sediments increasing in size, bottom to top, are coarsening-upward (Figure 3). Shifting shorelines (Figures 4-6) and associated stream deposition produce fining- and coarsening-upward depositional sequences. These relate to Walther's Law. When shorelines shift landward, a fining-upward sequence is deposited. When shorelines shift seaward, a coarsening-upward sequence is deposited.

Section A	Section B	Section C
clay	gravel	gravel
sand	sand	sand
sand	sand	gravel

Table 1: Stratigraphic succession in Sections A-C of Figure 6. Arrows indicate fining-upward, or coarsening-upward deposition.

Section A	Section B	Section C
clay	gravel	gravel
sand	sand	sand
sand	sand	gravel

Fining upward (Section A); Coarsening upward (Section B); Coarsening upward (Section C); Fining upward (Section C)

Table 2: Answers to Table 1.

- **Student Activity**

Table 1 shows stratigraphic succession in Sections A-C of Figure 6 in a condensed format. Four arrows are shown. Beside each arrow, identify whether the depositional sequence is fining upward or coarsening upward. Refer to Figures 1 and 3. Answers are in Table 2.

Transgressions and Regressions

A transgression is defined as rising sea level flooding low-lying coastal areas as a shoreline migrates landward to higher elevations. Transgressions are fining-upward sequences. A regression is falling sea level exposing more land as the shoreline shifts seaward. Regressions are coarsening-upward sequences.

- **Student Activity**

On Figure 7 are letters A and B. Identify each as to whether it is a transgression or regression. Answers are on Figure 8.

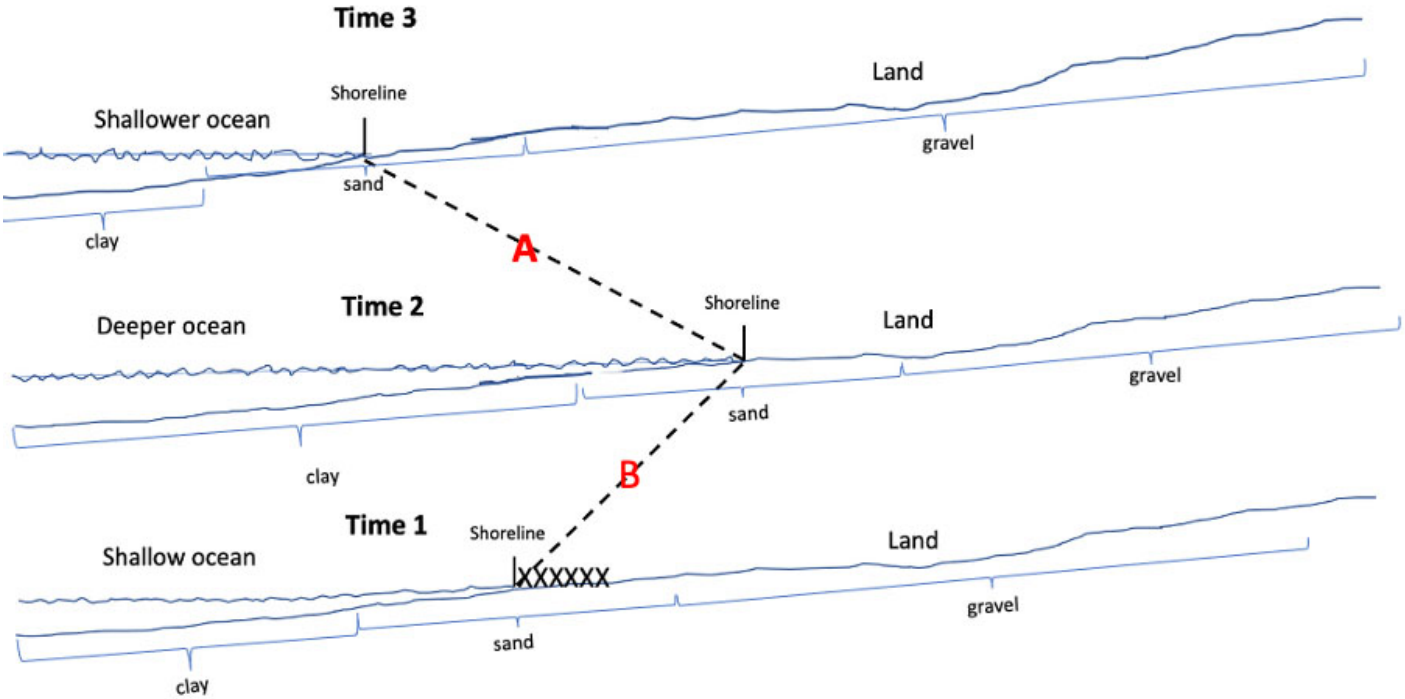


Figure 7: Letters A and B represent transitioning shorelines.

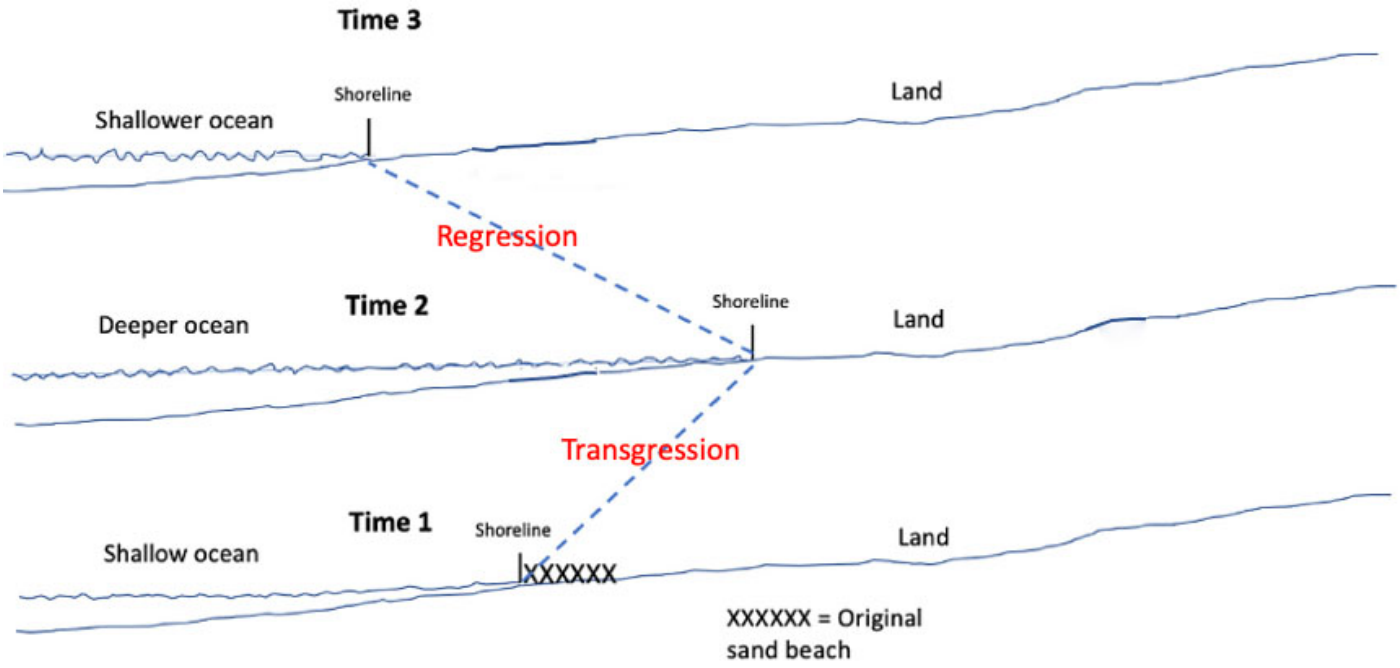


Figure 8: Identification of regression/transgression for Figure 9.

Walther's Law and regional stratigraphy

From 100 to 66 millions years ago, the Western Interior Seaway occupied portions of central Canada and the U.S. At its maximum, the seaway connected the Arctic Ocean to the Gulf of Mexico, bisecting North America (Figure 9). The dark-black section line on Figure 9 traces same-age sediments from the Rocky Mountains in Utah, across Colorado, to southwestern Kansas.

- **Student Activity**

Figure 10 is a composite of five images along the section line of Figure 9. Image 1 is sandstone; 2 is chalk (limestone); 3 is gravel; 4 shows coal seams; and 5 is an ammonite in shale. Using Walther's Law in the horizontal (Figures 2, 5, and 6), match an image to its proper place along the section line and enter responses in Table 3. Answers are in Table 4. A few helpful notes:

- Streams flowing from mountains carry lots of sediment. That sediment prevents marine limestone from forming along the section line unless it is deposited far from the shore.
- Coal forms in swamps, especially coastal swamps.
- Shale is compacted clay.

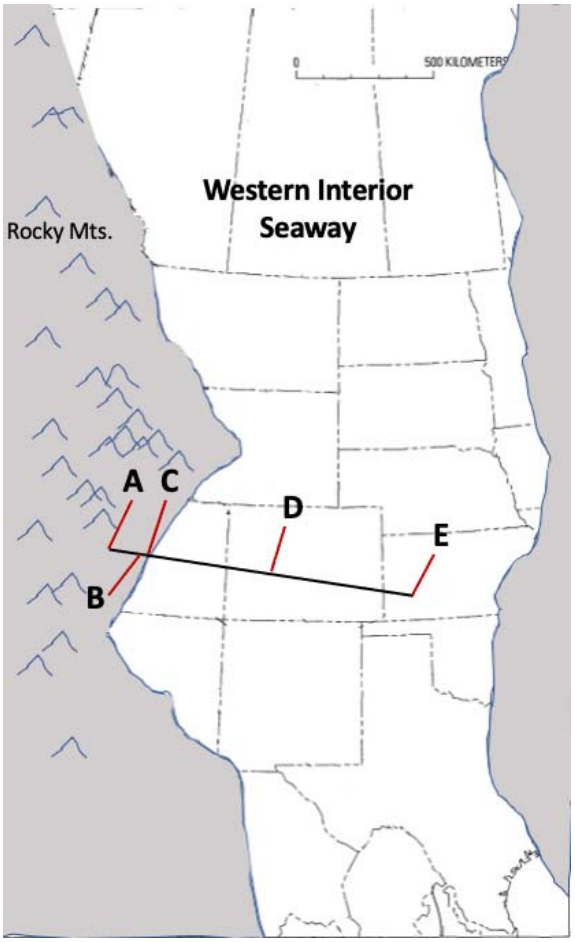


Figure 9: Map showing the Western Interior Seaway. A section line (black) extends from Utah to southeastern Kansas. A-E represent same-age sediments along that section line.

Figure 10: Composite of sediments/sedimentary rocks along the section line of Figure 9. Images by the author.

Section Line of Figure 9		
Station	Image #	Sediment type
A		
B		
C		
D		
E		

Table 3: Stations A-E along section line of Figure 9. Refer to Figure 12.

Section Line of Figure 9		
Station	Image #	Sediment type
A	3	gravel
B	4	coal
C	1	sandstone
D	5	Shale (clay)
E	2	Limestone (chalk)

Table 4: Sediments/sedimentary rocks matched to the section line in Figure 9.

The following is background information for the instructor. Image 1 is the Mesa Verde Sandstone at Mesa Verde National Park, interpreted as a beach deposit (Figures 2b and 5). Image 2 is the Niobrara Chalk (limestone) in southwestern Kansas. It is far removed from the influx of sediments eroding from the Rocky Mountains. Image 3 is gravel eroded from the Rocky Mountains. Of the three sediments discussed with Walther's Law, gravel is the first to be deposited and, therefore, is near the Rocky Mountains (Figure 2b). Image 4 is the Castlegate Formation showing multiple coal seams. The coal was deposited in coastal swamps. Image 5 is an ammonite in the Pierre Shale. The primary constituent of shale is clay. Clay is the smallest-sized sediment, deposited after gravel and sand. Because clay particles are so small, they are transported beyond shoreline (Figure 2b). The sequence along the section line of Figure 9, west to east, is: gravel (Image 3), coal (Image 4), sandstone (Image 1), shale (Image 5), and chalk/limestone (Image 2).

Conclusion

Walther's Law is a geological principle usually introduced in collegiate geology. However, if taught in a simplified, step-by-step manner, it is a good concept for high-school earth science. A series of student activities employs additive learning, with new concepts building on previous ones. For example, observation of sediments (gravel, sand, clay) depositing in a beaker of water provides insight into stream deposition, shifting shorelines, and same-age regional sediments. The discussion of shifting shorelines is timely because, in part, it relates to global warming and rising sea level. Student activities are amenable to individual or group learning, can be done remotely, incur no cost since the glass beaker and sediments can be shown as a drawing, and are suitable for grades 9-12.

NMS BOARD MEETING NOTICE

NMS members are invited to attend Board of Directors meetings, which are generally held at 7:30 p.m., early in the month or as decided by the Board, although we do not meet every month. The next date 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.

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. We encourage our readers to read their monthly newsletters. The AFMS News is linked from our web site, <http://www.nittanymineral.org>, found at <http://www.amfed.org/afms_news.htm>. The Eastern Federation now has its Newsletters on its web site (use Chrome if Firefox does not work). Back issues are also available; for the password, look on the web site or contact David Glick (see back page).

The AFMS March Newsletter begins with President Cheryl Neary noting this year's calendar of events for all of the Federations . The AFMS Convention will be held August 3-6 in Billings, Montana, together with the Northwest Federation Convention. There are some poems from the 2022 bulletin competition, and articles on *Geophilia: Communing with the Rocks* (an interesting extension of the biophilia concept, that humans are attracted to all that is alive), and *When Pyrite Goes Bad!* Many award recipients are introduced.

The Eastern Federation's March Newsletter includes a message from president Bill Stephens on his extended trip to the Tucson Show, the Annual Symposium of the Friends of Mineralogy, and collecting at the Red Cloud and North Geronimo mines. He notes the EFMLS has a new Facebook page (linked from the top right of the EFMLS web site), "EFMLS Mineral Shows and Events." He continues his call for volunteers to chair various EFMLS committees. Advance Registrastion forms for the July EFMLS Convention are provided; this includes registration for the three field trips, notably the July 10 Herkimer "diamond" field trip to Mohawk Valley Mineral Mining (cost $75). There's more about Syracuse, site of the July 7-9 2023 EFMLS Convention. Donations for the Eastern Foundation Fund fundraising auction at the convention are invited.

Photo by Rob Lavinsky, iRocks.com CC-BY-SA-3.0 https://creativecommons.org/licenses/by-sa/3.0

Quartz, var. Herkimer diamond, 1".

The Howe Amethyst Brooch

From EFMLS News, March 2023

Last year, when beginning to read Jane Perham's Maine's Treasure Chest, I did not expect to find it to be a page turner, but surprisingly it was! Learning the history of the quarries I've visited, not to mention the ones I'd like to visit, was captivating. Then I came to the chapter titled People Who Made This History and was again surprised to see the name George Howe. Being an amateur astronomer, I became aware of that name soon after moving to Maine because the Howe telescope is located in the Twitchell Observatory which now resides in Norway. I had no idea he was also a major mineral collector of the early days, which makes him the first "rocks n stars" guy of Norway!

Following the People chapter, Jane lists what she calls the Superlative Pieces, twelve "outstanding gemstones, jewelry and art objects which have been created from the mineral wealth of the Oxford County area." They include such well known objects as the Peary Necklace and the Hamlin Necklace, with some not so well known ones, including perhaps the Brooch, all of which truly are superlative.

The photo below, which immediately caught my eye when perusing the images in Maine's Treasure Chest, was scanned from the book. Reading that George had the brooch made, for his mother, entirely with material he collected in Oxford County, it became, to me, the most superlative piece of all. The amethyst, which he collected on Pleasant Mountain, was faceted by Knox Bickford of Norway (Maine), the fresh water pearls were found in the Cold, Crooked and Nezinscot Rivers, while the gold was panned from the East Branch of the Swift.

Naturally my hope was to see the real thing, but I soon found out the photo was taken sometime in the 1950s, after it was lost somewhere around Faneuil Hall! Surely someone soon noticed it and picked it up, so hopefully someone has it, someone who has no idea what it is.

If you have any information on this wonderful piece of jewelry, please send an email to rocksnstars@gmail.com. The stoneis thought to be about 7 carats but it could be larger.

Thank you.
Tom Hoffelder, President
Oxford County Mineral & Gem Association

UPCOMING EVENTS

Confirm details of events before attending.
https://efmls.org/events/list/
See other show calendar links on our web site.

March 25, 2023: NMS Minerals Junior Education Day, best for kids in grades 1-8 with their parent(s). See page 3.

March 25-26, 2023: 43rd Annual Franklin County Rock, Gem, Mineral and Jewelry Show, by Franklin County Rock and Mineral Club. Eugene C. Clark Jr. Community Center, 253 South 3rd St., Chambersburg PA 17201. Sat. 10:00-5:00, Sun. 10:00-4:00.

March 25-26, 2023: 53rd Annual Show, by Che-Hanna Rock and Mineral Club. Wysox Vol. Fire Hall, 111 Lake Rd., Wysox, PA. Sat. 9:00-5:00, Sun. 10:00-4:00. See http://www.chehannarocks.com/show.html

March 25-26, 2023: Mineral Treasures and Fossil Fair, by Philadelphia Mineralogical Society and Delaware Valley Paleontological Society, with demonstrations by Leidy Microscopical Society. Lulu Temple, 5140 Butler Pike, Plymouth Meeting, PA., (PA Turnpike, exit 333; or I-476, exit 20) Sat. 10 a.m. - 5 p.m., Sun. 10 a.m. - 4 p.m. See www.phillyrocks.org

May 6-7, 2023: Treasures of the Earth rock and mineral show, by Mineralogical Soc. of NE PA. St Joe's Oblates, 1880 Hwy 315, Yatesville, PA 18640 (just outside of Pittston, PA). Sat. 10-5, Sun. 10-4. See http://msnepa.org/gem---mineral-show.html

May 15-21, 2023: Wildacres 2023 session, North Carolina. See https://efmls.org/wildacres/

June 3, 2023: Spring Mineralfest, by PESA. Macungie Memorial Park, Macungie, PA 18062. Sat. only, 8:30 -3:00. See http://www.mineralfest.com

July 7-9, 2023: EFMLS Annual Convention in Syracuse, NY hosted by Gem & Mineral Society of Syracuse, NY.

July 22-23, 2023: Gem, Mineral and Fossil Show, by Monongahela Rockhounds. West Mifflin Vol. Fire Co. #4, 660 Noble Dr., Pittsburgh PA 15122. Sat. 10-6, Sun. 10-4. https://www.monongahelarockhounds.org/events-shows

Geo-Sudoku Solution

C	E	R	T	W	L	H	S	A
W	T	L	H	A	S	C	R	E
A	H	S	R	C	E	T	L	W
L	C	E	W	T	A	R	H	S
T	R	W	S	H	C	E	A	L
H	S	A	E	L	R	W	C	T
E	A	C	L	R	W	S	T	H
R	W	T	A	S	H	L	E	C
S	L	H	C	E	T	A	W	R

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:
Nittany Mineralogical Society, Inc.
c/o S. Bingham, Treasurer
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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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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.

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