Nittany Mineralogical Society Bulletin

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

Editor (see back page):
David C. Glick

January, 2026 **Visit our web site: www.nittanymineral.org**

January 21st meeting:
IN PERSON at BOAL HALL

Plagioclase Feldspar: Iridescence, Crystal Twinning, and Lapidary Possibilities

by Dr. Robert Altamura
Consulting Professional Geologist

Our January meeting will be held Wednesday the 21st in Boal Hall (Boalsburg Fire Hall), 113 East Pine St., Boalsburg, PA 16827. Maps can be found on our web site.

7:00 to 7:45 p.m.: Social "hour," refreshments
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.***

Working on a relatively large plagioclase cabochon with impressive iridescence, I was inspired to review various aspects of plagioclase. It is a solid solution series, having a range of chemical compositions from $NaAlSi_3O_8$ (albite end member) to $CaAl_2Si_2O_8$ (anorthite end member) depending on the proportion of sodium and calcium in the crystal structure. Plagioclase is divided into six minerals based on compositional range of sodium versus calcium: albite, oligoclase, andesine, labradorite, bytownite, and anorthite. This presentation will cover composition, color, crystal structure and twinning, and the optical phenomena which can make plagioclase so attractive for gemstone uses.

See the complete article on pages 4-5

ATTENDING THE JANUARY 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!

Minerals Junior Education Day Set for March 28, 2026

Minerals Junior Education Day is set to return on Saturday, March 28, 2026! We'll need about eight stations where students in grades 1-8 learn about some aspect of minerals, earth sciences or lapidary, and get specimens to take home. It's time to plan for what station you might present, or to volunteer to help at an existing station (we'll have more information about that coming soon). We have several batches of possible giveaway specimens around which stations could be organized. Donations of minerals, books, etc., to sell at child-friendly prices at the sales table are also welcomed - please make arrangements in advance, so that we can get them organized and priced. Contact Dave Glick (see p. 8). *- Editor*

College of Science Lectures of Interest
Unexpected Pairings - January 24: "Origins"

This semester, Penn State's Eberly College of Science will present paired lectures on topics "Addressing Big Questions" in science. Thank you to Dr Andrew Sicree for bringing these to our attention. See <https://science.psu.edu/frontiers> for more.

The first pair of lectures, on "Origins," will be presented 11:00 a.m. to 12:30 p.m., Saturday, January 24, in 001 Chemical and Biomedical Engineering Building on the University Park campus:

"**Understanding our aquatic ancestors: fish, fossils, and the water-to-land transition**" presented by Tom Stewart, assistant professor of biology
AND
"**From distant stars to living worlds: The path to habitable planets**" presented by Suvrath Mahadevan, Verne M. Willaman Professor of Astronomy and Astrophysics *- Editor*

Following are partial details from that web site.
For Prof. Mahadevan's talk:

The discovery of extrasolar planets enables us to tackle millennia old questions about whether the Earth and our solar system are unique, how they formed, and whether life exists beyond Earth. The 6000 exoplanets now known reveal many of the underlying mechanisms of how planets form and evolve,

Continued on page 3

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, which are linked from the left sidebar of our web site, <http://www.nittanymineral.org>.

The AFMS does not publish a separate January newsletter. "When February 2026 rolls around the AFMS Newsletter will be completely digital" at <https://www.amfed.org/newsletter>.

The Eastern Federation's <https://efmls.org/> January Newsletter includes president Andrew "Rockhound's" column, reprinted at right. Information on the May 11-17 **Wildacres Workshop** session can be found in past newsletters and on the web site at <https://efmls.org/wildacres/>; the registration form is in the current issue. Availability of a new Wildacres Scholarship is announced. - *Editor*

Geo-Sudoku

by David Glick

The puzzle below contains the letters AEILNPRTY. One row or column spells a situation between two entities which can influence both. If you've read all of 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.

	L		R	Y				
		P	L			T		
	I					L	Y	
	N					R		
L		I		T			N	
E					P			I
				N		E		Y
Y		L		I			R	
N		T	P	R			A	L

EFMLS President's Message

from Andrew Rockhound

EFMLS News v. 73 no. 1 January 2026

Happy New Year and welcome to 2026! I hope you all had a warm and wonderful holiday season, while we here at the EFMLS were working hard for our clubs. I am proud to announce the BEAC awards have a new committee, with myself as chair, and have an extended deadline of January 15th for submissions. We have new committee members, mixed with experienced, to help administrate the awards as a strong team for the future.

We also worked hard to bring you the best insurance rate possible, despite an overall increase in rates. I thank those of the board who voted with me to approve the measure, using funds to reduce the cost per person by 25 cents. As clubs saw in the email announcement, the new rate for 2026 is $4.83 per person. Special thanks to treasurers Sylvia Eppig and Diane Beckman for their work getting this done for our clubs! Next year, please expect the rate to be at least the $5.08 pp we were charged this year, as we may not be able to continue subsidizing cost increases into the future.

You will also see later in this [EFMLS] newsletter, we now have the Wildacres Scholarship! This is exciting to bring to clubs, and I hope every club submits a worthy candidate for a chance to win the Scholarship to Wildacres 2026! Donations and contributions help fund this scholarship, so we thank all those who have made this possible, and encourage everyone to contribute to keep this going into the future...

We thank everyone across the EFMLS for a great 2025, and look forward to what 2026 holds! Stay warm and happy everyone!

2026 Tucson Mineral Symposium

In conjunction with the Mineralogical Society of America and the Tucson Gem & Mineral Society®, Friends of Mineralogy is pleased to announce the 44th Annual Tucson Mineral Symposium

Red, White & Blue – Celebrate the Spirit of Minerals!

Saturday, February 14, 2026

from 10:00 a.m. to 3:30 p.m. **MST**

Tucson Convention Center, Tucson, AZ
or attend **ONLINE**
Professional Geologists: earn 6 credits

See www.friendsofmineralogy.org for their December Newsletter with abstracts of presentations and, **coming soon**, registration form ($15 for online attendance).

Presentations:
John Stuart McCloy, Cuprorivaite: Egyptian Blue, humanity's first inorganic pigment.

Johan Maertens, Heaven and Hell in Ohio [about Celestine].

Donald A. Dallaire, New Hampshire's Red, White & Blue Minerals.

John Rakovan, Pleochroism in minerals.

Markus Raschke, An ocean within – new insights into structure and phases of water in minerals.

Bruce Kelley, Finding Art in Minerals: How an interest in color and form ignited my passion for minerals.

College of Science Lectures *continued from page 1*

and the complex interplay between stars and planets that sculpt the atmospheres of planets and the architecture of planetary systems.

In this talk, Suvrath Mahadevan will discuss the techniques used to discover exoplanets, the challenges of detecting terrestrial planets like the Earth — those capable of hosting liquid water on their surface — and how the coolest most numerous stars in the galaxy are potentially attractive targets. New precision instruments developed at Penn State are now beginning to discover and characterize rocky planets around the coolest stars and discovering ways to mitigate the noise from the stars themselves that currently limit our ability to discover planets like our own around the nearest sun-like stars.

The talk will also discuss how these discoveries pave the way for NASA's next flagship mission, the Habitable World Observatory, which will be capable of observing these new worlds in reflected light, and analyzing this light to search for biosignatures in their atmosphere. The ability to answer the age-old question of whether life exists outside the solar system is now within our reach!

"Understanding our aquatic ancestors: fish, fossils, and the water-to-land transition" presented by Tom Stewart, assistant professor of biology

In this talk, Stewart will discuss how his laboratory investigates one of the most transformative events in the history of life: the water-to-land transition of vertebrates. This transition set the stage for the rise of tetrapods, the group of animals that includes amphibians, reptiles, birds, and mammals. In the first part of the talk, Stewart will focus on the fossils of *Tiktaalik roseae* and its close relatives. Through paleontological expeditions to Arctic Canada, museum-based research, and high-resolution 3D reconstructions, his lab uses these fossils to reveal the anatomy, movement, and behavior of animals that were evolving to live at the water's edge and transitioning from swimming to walking. These discoveries illuminate how the skeleton was reconfigured as fins evolved into limbs and how our own ancestors first adapted to life on land roughly 375 million years ago.

The second part of the talk highlights how living fishes offer insights that fossils alone cannot. By studying behaviors — from blinking in mudskippers to the foraging habits of juvenile cichlids—his group investigates how behavior shapes development and drives evolutionary innovation. This work shows that behaviors like blinking, which now seem mundane, were once pivotal adaptations that made terrestrial life possible. Together, fossils and living species provide a powerful, complementary perspective on how vertebrates first ventured onto land and the deep history of the human lineage.

Plagioclase Feldspar: Iridescence, Crystal Twinning, and Lapidary Possibilities

by Dr. Robert Altamura
Consulting Professional Geologist

Working on a relatively large plagioclase cabochon with impressive iridescence, I was inspired to review various aspects of plagioclase. Plagioclase feldspar is referred to as a solid solution series, meaning, a compositional variation ranging between end member minerals that share a similar chemical formula, but with substitution of elements in one or more atomic sites. Substitution can most easily occur when an element in the mineral formula can be replaced by another element of similar atomic diameter and electrical charge. In the case of plagioclase, there is a range of chemical compositions from $NaAlSi_3O_8$ (albite end member) to $CaAl_2Si_2O_8$ (anorthite end member) depending on the proportion of sodium and calcium in the crystal structure. Plagioclase is divided into six minerals based on compositional range of sodium versus calcium: albite, oligoclase, andesine, labradorite, bytownite, and anorthite.

All plagioclase is triclinic, has a Mohs scale of hardness of approximately 6, and a specific gravity ranging from 2.62 to 2.76. Plagioclase is a major component of the most common plutonic igneous rock and the most common volcanic rock on our planet. In Pennsylvania, plagioclase is a crucial component of the granites of the Proto North American terrane and the diabases of the Gettysburg terrane.

The color of plagioclase can vary depending on sodium/calcium content and can range from white to yellow to bluish to gray in color. The optical phenomenon of iridescence in labradorite (~50-70% Ca in the formula) and peristerite (~0-25% Ca) (fig. 1) is believed to be due to immiscibility of plagioclase subspecies that occurs during the solid state as temperatures cool to less than 1,200°C depending on exact pressure (Klein and Philpotts, 2013; Bowen, 1913; Weill et al., 1980). This talk will provide a phase equilibria model using an integration of plagioclase chemical composition and temperature at fixed pressure.

Mineral grains occur over a wide range of sizes. These grains are individual crystals that generally are interlocked with neighbor grains. They are considered mineral grains and not crystals, because they lack well-developed crystal faces, because of their close intergrowth with adjacent grains. Well-formed crystals of considerable size are relatively rare in nature because they mainly occur in coarse-grained assemblages found in pegmatites or quartz veins. Rarer are well-formed twinned crystals or twins. Primary or growth twins are the result of atoms attaching on the outside of a growing crystal in such a way that the original pattern of the crystal structure is interrupted but in a regular way.

Figure 1: Photographs of cabochons (~1.25" except d, ~ 1.75") illustrating iridescence and polysynthetic twinning in peristerite and labradorite. a. Oval cabochon carved from peristerite ("moonstone") plagioclase showing iridescence. b. Tear-drop cabochon carved from peristerite illustrating polysynthetic twin lamellae. c. Heart cabochon carved from labradorite variety of plagioclase showing iridescence (schiller effect). d. Oval cabochon carved from labradorite clearly showing iridescence overprinted by polysynthetic twin lamellae.
D. Glick photos, 2023.

Secondary twinning is a process that causes twinning intergrowth after crystal growth is completed. Secondary twinning can result from mechanical deformation and also from the displacive transformation of one polymorph into another.

Classification of twinning (see figure 2 for mineral example line drawings):
- Contact twins: have a definite compositional surface separating the two individuals.
- Penetration Twins: comprise interpenetrating individuals having an irregular composition surface.
- Multiple or repeated twins: 3 or more crystals twinned. A polysynthetic twin results if the composition surfaces are parallel (see figures 1c and 1d for plagioclase cabochon photographs).

Examples of plagioclase illustrating both peristerite range intergrowth and labradorite range (Bøggild) intergrowth immiscibility (iridescence) overprinted by later polysynthetic twinning (fig. 1d) will be discussed.

Plagioclase Feldspar var. Moonstone. Pili Mine, Sonora, Mexico. 6.1 x 4 x 2 cm. Photo by Rob Lavinsky, iRocks.com – CC-BY-SA-3.0 license. https://commons.wikimedia.org/wiki/File:Plagioclase-mz126a.jpg

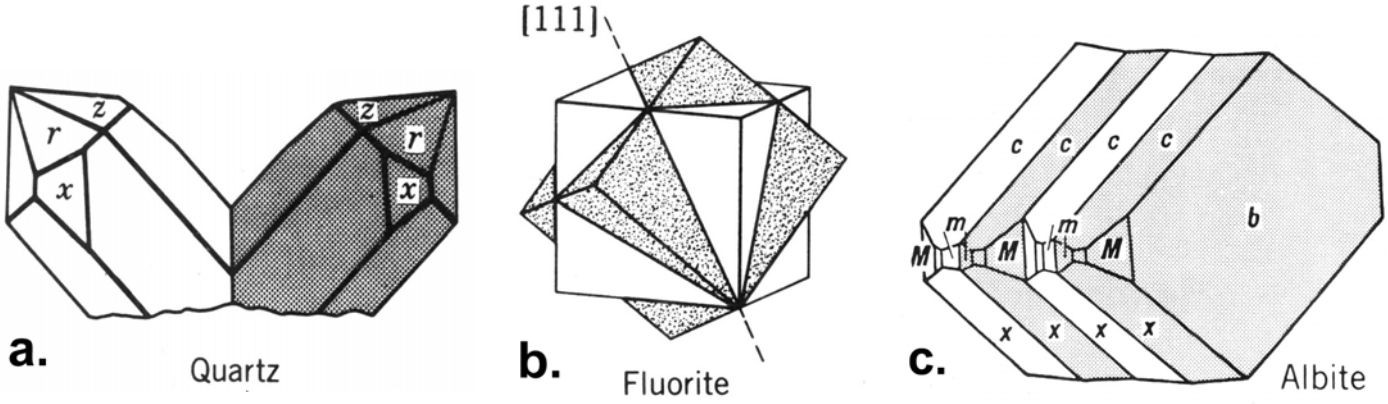

Figure 2: Line drawings showing examples of a contact twin, a penetration twin, and polysynthetic twins. (modified from Klein and Hurlbut,1993). (a) Right- and left-handed contact twinned quartz crystals (twinned along a contact plane). (b) Two penetrating cubes of fluorite (twinned along a axis). c. Polysynthetically twinned plagioclase (twinned by mirror planes).

References Cited

Bowen, N.L., 1913, The melting phenomena of the plagioclase feldspar, American Journal of Science, Vol 34, pages 577-599.

Klein, C. and Hurlbut, C.S., 1993, Manual of mineralogy (after James D. Dana): John Wiley & Sons, Inc., New York, 681 pages.

Klein, C. and Philpotts, A.R., 2013, Earth Materials: Introduction to Mineralogy and Petrology: Cambridge University Press, New York, NY, 536 pages.

Weill, et al., 1980, The igneous system $CaMgSi_2O_6$-$CaAl_2Si_2O_8$-$NaAlSi_3O_8$: variations on a classic theme by Bowen, *in* Physics of Magmatic Processes, Hargraves, R.B.,ed., Princeton University Press, Princeton NJ, pages 49-92.

Friends of Mineralogy - Pennsylvania Chapter Symposium and Field Trip Report

by David Glick

Friends of Mineralogy Pennsylvania Chapter (FM-PA) and West Chester University Earth and Space Sciences Department held their 2025 Symposium and Field Trip for Mineral Collectors on November 8 and 9. The Symposium, with informative talks by knowledgeable speakers on minerals, geology and mining in Pennsylvania and beyond, was a hybrid meeting with attendance both in person and via Zoom. As usual, it included morning refreshments, a silent auction, give-away table, and plenty of opportunities for visiting with fellow enthusiasts. The West Chester University Geology Museum (see page 7) and the Interactive Periodic Table, in connecting buildings, were available all day.

The Saturday Symposium schedule covered 8:00 a.m. to 5:00 p.m., with six speakers, the annual meeting, and breaks with time for refreshments, lunch, discussions, and visiting the silent auction and the geology museum. Presentations were invited on the theme of Red, White, and Blue Minerals; several, but not all, were on that theme, or colonial / revolutionary connections pertinent to the United States' 250th anniversary.

In-person attendance was about 44; another 26 people attended via Zoom, for a total of 70. About 16 registered professional geologists and five students were among the attendees. More about FM-PA can be found on their web site, <https://rasloto.com/FM/>.

D. Glick photo

Field Trip to Phoenixville Sites

The Symposium field trip went to the Phoenixville lead-zinc-copper mines (Brookdale and Southwest Chester) at Pickering Valley Golf Club on Sunday, November 9. A mini-excavator exposed some new material just before the event, but not as successfully as hoped. Still, the weather wasn't bad, there was a good turnout, and specimens were found. These dumps are known for pyromorphite, cerussite, wulfenite, galena, and drusy quartz.

Collecting on the Brookdale Mine dumps.

Ronald Sloto photograph, used with permission

West Chester University Geology Museum

Above and right: WCU Geology Museum. Below: Display of "Minerals from Pennsylvania's Active Quarries" specimens donated by the late Skip Colflesh, in the WCU Geology Museum. *D. Glick photos.*

UPCOMING EVENTS

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

Jan. 31, 2026: Rutgers Geology Museum 58th Annual Open House; theme: Minerals! New Brunswick NJ 08901See web site for admission, parking, and more. https://geologymuseum.rutgers.edu/annual-open-house

Feb 14, 2026: FM National - Tucson Gem & Mineral Society - Mineralogical Society of America Annual Symposium, Tucson, AZ. Attend ONLINE or in person - see page 3. https://www.friendsofmineralogy.org/

Mar 7-8, 2026: 62nd Annual Earth Science, Gem and Mineral Show, by Delaware Mineralogical Society. Doubletree by Hilton, Wilmington, DE 19803. Sat. 10-5, Sun. 11-5. www.DMSrocks.org

Mar. 28-29, 2026: Gem & Mineral Show by Che-Hanna Rock & Mineral Club. Wysox Vol. Fire Co. Social Hall, 111 Lake Rd., Wysox PA 18854. Sat. 9-5, Sun. 10-4. http://chehannarocks.com/show.html

Mar. 28-29, 2026: Mineral Treasures and Fossil Fair, by Philadelphia Mineralogical Society. Lulu Temple, 5140 Butler Pike, Plymouth Meeting, PA 19462 (PA Turnpike, exit 333; or I-476, exit 20). www.phillyrocks.org

May 2-3, 2026: 57th Annual World of Gems & Minerals: Gemstones, Jewelry, Rock, Mineral & Fossil Show, by Berks Mineralogical Society. Leesport Farmers Market Banquet Hall, 312 Gernant's Church Rd. Leesport PA 19533. Sat 10-5, Sun 10-4. berksmineralsociety.com

May 11-17, 2026: EFMLS Wildacres Workshop, Little Switzerland NC. www.efmls.org/wildacres

May 15-17, 2026: New England Mineral Conference, Newry, Maine. www.nemineral.org/annual-conference/

Geo-Sudoku Solution

T	L	N	R	Y	**I**	A	E	P
A	Y	P	L	E	**N**	T	I	R
R	I	E	A	P	**T**	L	Y	N
P	N	Y	I	L	**E**	R	T	A
L	A	I	Y	T	**R**	P	N	E
E	T	R	N	A	**P**	Y	L	I
I	R	A	T	N	**L**	E	P	Y
Y	P	L	E	I	**A**	N	R	T
N	E	T	P	R	**Y**	I	A	L

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 $25 (regular member), $10 (student rate), $18 (seniors), $35 (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 and form to the next meeting.

We want to welcome you!

CONTACT INFORMATION

Come to our meetings on the third Wednesday of the month - see page 1

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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; please send them as separate graphics files (high quality JPEG files, about 1050 pixels wide, are preferred). Please provide captions and name of photographer or artist.

Visit us at www.nittanymineral.org