

# 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, 2021

Visit our web site: [www.nittanymineral.org](http://www.nittanymineral.org)

March 17<sup>th</sup>  
Zoom  
meeting  
ONLINE:

## Gembone

by  
Daniel  
Bontempo



This meeting's program, *Gembone*, will introduce gembone (silicified dinosaur bone), discuss its availability in western states, illustrate varieties, and consider gembone's history and current popularity as a lapidary material. Gembone is a kind of dinosaur fossil prized by lapidaries. Dinosaur fossils can be found in many parts of the world, but the late-Jurassic Morrison Formation stretching across multiple US western states has more surface exposure and fossil-bearing outcroppings than many other places across the world. Consequently, some collectors have opined that gembone is a distinctly American gemstone.

*Continued on page 2*

**Please join us online for this presentation!** The

Zoom link will be e-mailed to all paid members who receive our e-mails; others can request it by e-mailing <[xidg@verizon.net](mailto:xidg@verizon.net)>. We'll plan to start at 7:30 p.m.; we can have informal discussions, then we can do any questions & answers and announcements, and plan to start the presentation at 8:00 p.m. We will have some information on the main page of the web site as well. -Editor

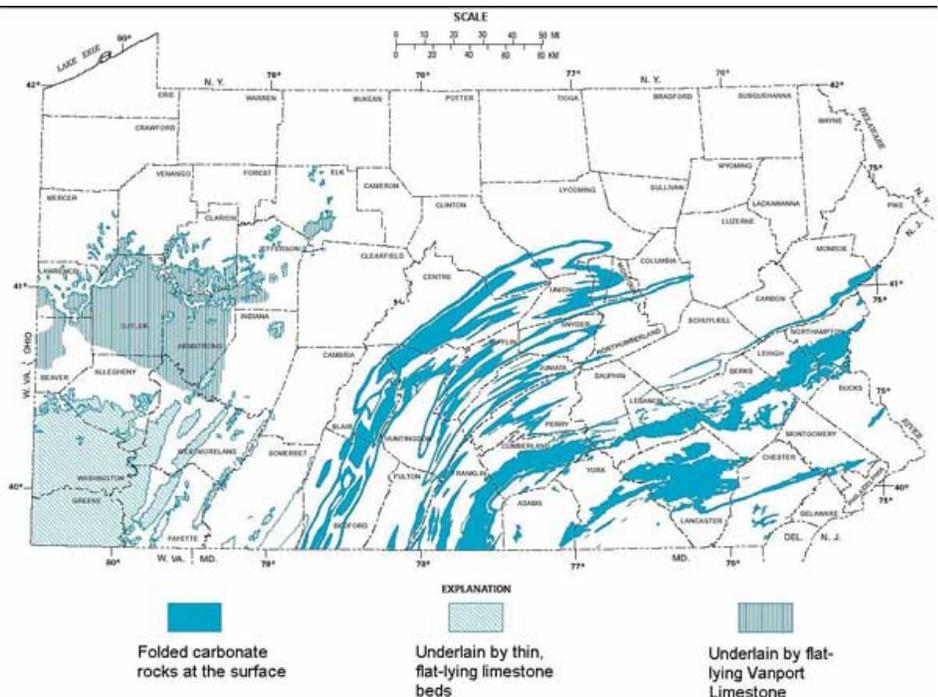
## While We Can't Travel: Virtual Geo-Resources Continue to Expand

Last month's NMS presentation on Caves and Karst: The Crossroads of the Geosciences, by Dr. George Veni, can now be viewed via a link from the main page on our web site, along with earlier ones. Penn State's Earth and Mineral Sciences Museum has been adding many posts to their Facebook page, and videos

to their YouTube channel. There's a link to that Facebook page, and many other online resources, on our web site. -Editor

## Cave Program in August: NMS Seeks Personnel

Planning has begun for the Penn State Arboretum's annual Cave Day, Saturday, August 28, 2021. Patricia 'Ann' Dunlavy of Lincoln Caverns reports that the event, a partnership between Penn State and Lincoln Caverns, will be held from 10:00 a.m. to 3:00 p.m. For 2021, the International Year of Caves and Karst, more community involvement is desired to make it better than ever. Geologists Drs. Will White and Dick Parizek will be presenting throughout the day at the event, and NMS is invited to have some complimentary presentations and/or stations on Pennsylvania geology or some aspect of caves and karst (see carbonate rocks map, below). This might be in the form of our stations at Minerals Junior Education Day, or Spring Creek Day from a few years ago. Please contact Dave Glick (see page 8) if you are interested in staffing a station.



Carbonate rocks in Pennsylvania (modified after Pa. Geol. Surv., 2000). From Stuart O. Reese, P.G. and William E. Kochanov, P.G., 2003. U.S. Geol. Surv. Open-File Report 03-471.

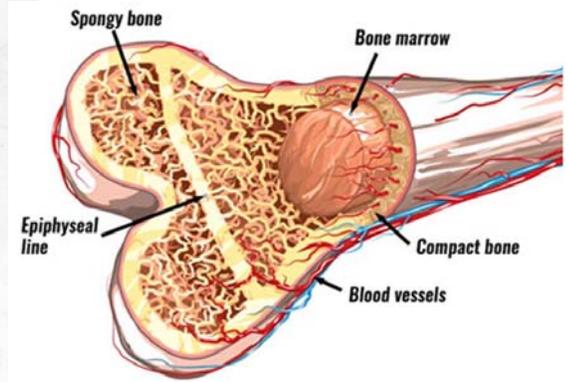
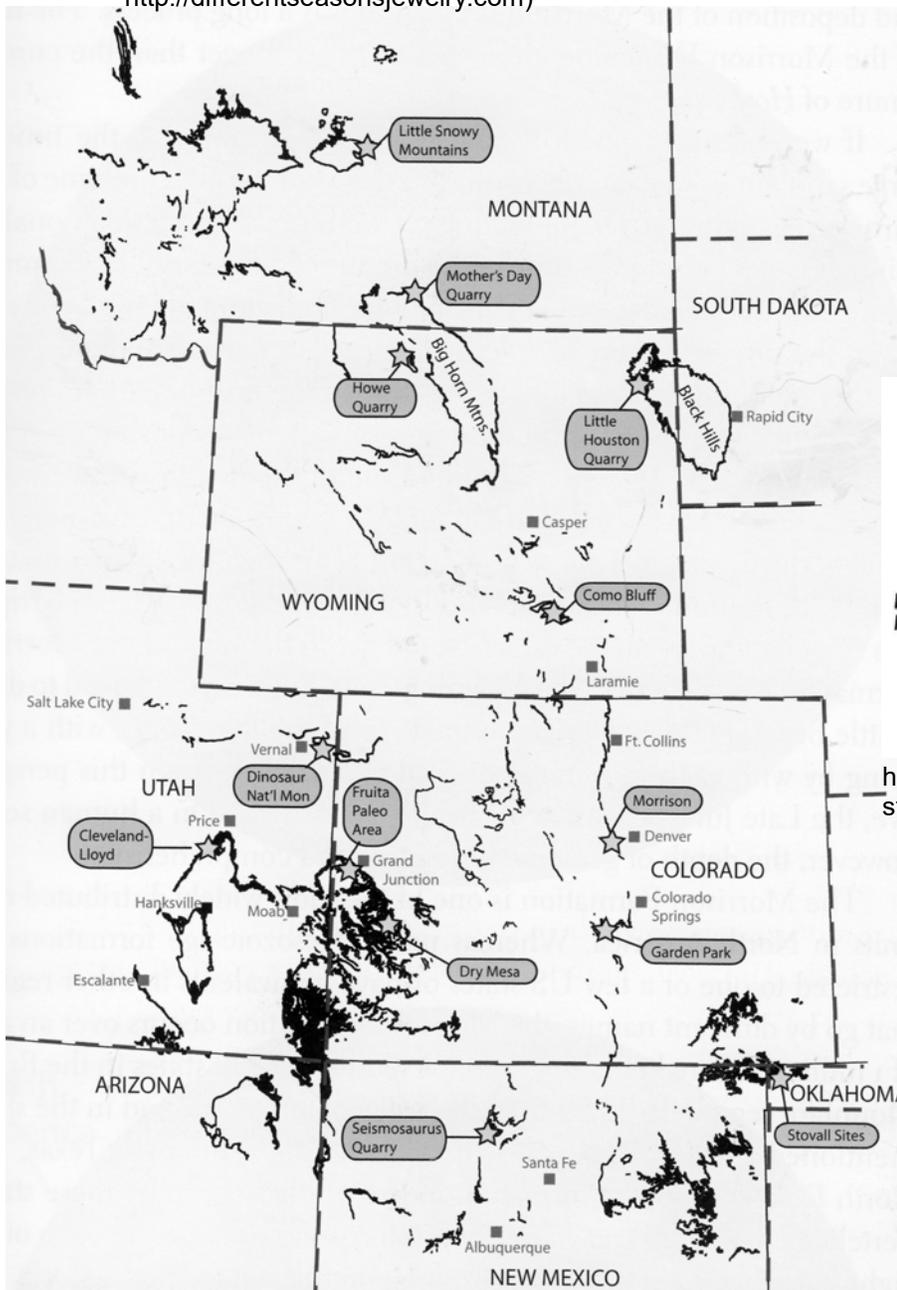
Gembone *continued from page 1*



(Mark Anderson, Different Seasons Jewelry <http://differentseasonsjewelry.com>)

The deposition, mineralization, and subsequent weathering of fossils is a complex process. Important features of the fossil depend on the conditions that prevented initial decay (e.g., oxygen, pH, temperature) prior to mineralization occurring, the available minerals, and the later geologic changes that may expose, fracture, or transport/re-deposit the material. The mineralization of the organic material can take several forms from a simple cast to an atom-by-atom replacement called permineralization, which most fully preserves the structure of the organic material.

Prized gembone comes from the "spongy" part of bone structure which has undergone permineralization. This part is less dense and shows small irregular cavities that contained marrow, as well as structural plates (trabeculae) and bars. With the atom-by-atom replacement of permineralization the visually interesting structure of the bone is preserved. In the best gembone the cavities contain chalcedony, jasper, agate or opal, and the trabeculae presents a hard webbing around the cavities. Bright silicate minerals with dark webbing can be visually striking, especially if the mineralization of the webbing is complete enough to prevent undercutting when shaping and polishing. Only a small amount of silicified bone merits the title gembone.



<https://www.teachpe.com/anatomy-physiology/structure-of-bones>



## What the Heck is Pegmatite? (The Basics)

by Bob Carnein

Lake George Gem & Mineral Club News

June 2019

*Now retired to Colorado, Dr. Carnein was an active member of NMS when he was an Associate Professor of Geology at Lock Haven University. NMS is grateful for permission to reprint this and a subsequent article.*

*CONTINUED FROM FEBRUARY ISSUE*



Figure 3. Porphyritic texture, caused by crystallization of magma under changing conditions. Pink and light gray crystals are potassium feldspar and plagioclase; groundmass is dark brown or gray. Vanda Porphyry, Wright Valley, Victoria Land, Antarctica. (Carnein photo and collection)

Some igneous rocks have relatively coarse and fine mineral grains mixed together in the same rock. The coarse grains are called phenocrysts (“feen’-oh-cristis”) and the finer surrounding grains are called the groundmass. Such rocks have a porphyritic

(“pore-fer-it’-ick”) texture (Figure 3). This occurs where the magma began to crystallize slowly beneath the surface (forming the coarser phenocrysts) but then moved upward into cooler host rocks or was ejected at the surface (forming the finer grained groundmass). For example, a porphyritic granite might contain plagioclase crystals that are 2 cm across surrounded by finer grained quartz and potassium feldspar grains that are 5 mm across. So, both mineral composition and texture must be taken into account when naming a rock.

Note: the terms “coarse”, “medium”, and “fine grained” are also used in other ways that are not described here.

**The Pegmatites.** Now, here’s the first problem when defining what a pegmatite is. Pegmatite is the name of an igneous-rock texture, not a rock type. On the average, mineral grains in a pegmatite are more than 1 cm (about ½ inch) across (Bates and Jackson, 1980). They may be huge (crystals more than 10 m or 30 ft across occur at the Devils Hole mine, in Fremont County, Colorado). More typically, they are on the order of 2 to 10 cm (about 1 to 4 in) across.

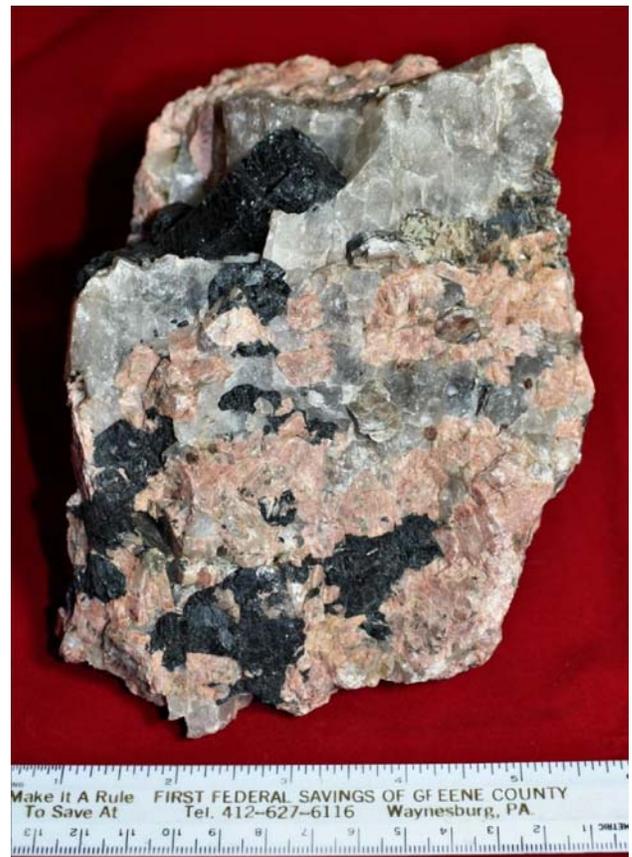


Figure 4. Typical granite pegmatite with accessory schorl (black), muscovite (silvery gray), and garnet (dark brown). Devils Hole mine, Fremont County, Colorado. (Carnein photo and collection)

So, if we have a rock made up of quartz, potassium feldspar, and plagioclase crystals in a certain proportion that are, on average, more than 1 cm across, it's still granite. However, to communicate the fact that the mineral grains are very coarse, we call it granite pegmatite. (It should be obvious that there is no such thing as rhyolite pegmatite.) If the mineral composition is not that of a granite, we have to call the rock some other kind of pegmatite (for example, granodiorite pegmatite or gabbro pegmatite). Luckily for beginners, most pegmatites are granite pegmatites. The reason has to do with things that are beyond the scope of this article.

You should be aware that, although granite pegmatites are very coarse grained, this doesn't imply that they cooled slowly. Laboratory experiments using realistic magma compositions and temperatures and pressures (e.g. London, 2008, 2013) suggest that many pegmatites cool and crystallize in a matter of days or weeks—very rapidly, in geologic terms. How can this be possible? That's a topic I'll talk about in the next installment.

### References Cited

Bates, R.L., and J.A. Jackson, eds., 1980, Glossary of Geology, Second Edition: Falls Church, VA, American Geological Institute.

London, D., 2008, Pegmatites: The Canadian Mineralogist, Special Publication 10, Mineralogical Association of Canada.

\_\_\_\_\_, 2013, Crystal-filled cavities in granite pegmatites: bursting the bubble: Rocks and Minerals, vol. 88, p. 527-538.

Streckeisen, A.L., chairman, 1973, Plutonic rocks: classification and nomenclature recommended by the IUGS Subcommittee on Systematics of Igneous Rocks: Geotimes, vol. 18, no. 10, p. 26-30. ✱

## Types of Granite Pegmatite

by Bob Carnein

Lake George Gem & Mineral Club -  
Lake George, Colorado (RMFMS)

From: Lake George Gem & Mineral Club News, July 2019  
C.R. Carnein & Jerrolynn Kawamoto, Editors  
4<sup>th</sup> place, AFMS Original Adult Article Advanced

When I began my study of geology at Ohio State, nearly 60 years ago, I already had some familiarity with pegmatites, having collected minerals in the mid-1950s in the famous pegmatite deposits of Connecticut and New York. Those localities were the spawning grounds for several generations of geologists. In those days, pegmatites were usually assigned to one of two groups: *simple* and *complex*.

**Simple pegmatites** typically mimic the mineral compositions of the enclosing granitic plutons or high grade metamorphic rocks. Besides quartz and feldspars, they may contain the micas biotite and/or muscovite; a garnet (typically almandine); magnetite; and schorl (the black, iron rich variety of tourmaline). Simple pegmatites range in size from bodies only a few inches thick to masses that may cover dozens of acres (Figure 1). They may be simple tabular bodies (dikes or

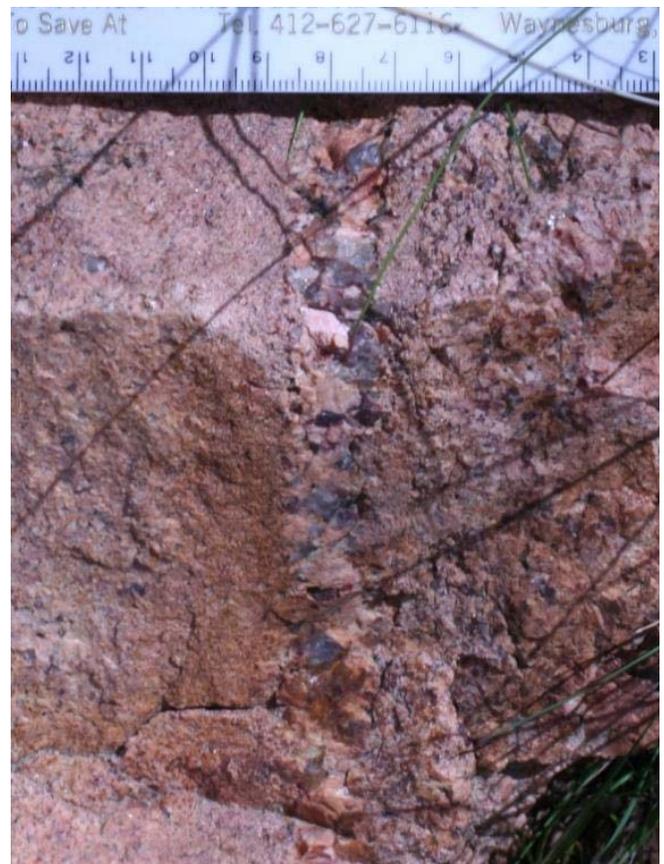


Figure 1. Narrow pegmatite dike surrounded by aplitic granite (Pikes Peak Granite). (Carnein garden rock and photo)

sills) or lens shaped or irregular. Contacts with the enclosing rocks are often gradational but may be sharp, and aplite (fine grained “sugary” textured granite) and graphic granite may occur near the margins (Figures 2 and 3).



Figure 2. Aplite dike (fine grained, left of center) surrounded by “common” pegmatite. Pikes Peak Granite. Carnein specimen and photo.



Figure 3 (right). “Graphic Granite” pegmatite consisting of oriented intergrowths of quartz (gray) in microcline (white). Carnein specimens and photos.

**Complex pegmatites** are especially interesting to mineral collectors because of the variety of odd minerals that occur in them. They generally occur in granitic igneous host rocks, and it’s thought that the odd minerals represent chemical elements that were originally widely dispersed in tiny amounts in the magma. The idea is that, as crystallization proceeded, these substances, along with water, fluorine, and other volatile elements, were expelled into a smaller and smaller volume of remnant fluid. As the bulk of the magma cools and crystallizes, they concentrate in the final residue, where they form the minerals that we love to collect.

**Pegmatite Classes and Families.** Like most things, the classification of pegmatites has become much more complicated since I was in college. Although it’s still useful to talk about simple and complex pegmatites, recent workers, including Černý and Ecart (2005), London (2008), and Simmons, *et al.* (2003) use other criteria to subdivide granitic pegmatites into *classes* and *families*. So, for example, Černý and Ecart (2005) recognize abyssal (high pressure and temperature), muscovite, muscovite-rare element, rare-element, and miarolitic (pocket forming) **classes** of granitic pegmatites, in order of decreasing pressure and temperature. Rare-element pegmatites have minerals containing such elements as beryllium, cesium, lithium, niobium, rubidium, tin, tantalum, zirconium, uranium, and rare-Earth elements. Examples include some common minerals (e.g. beryl and spodumene) as well as exotic minerals that even geologists can’t identify without the aid of X-ray diffraction, X-ray fluorescence, or other analytical techniques.

Based on their chemistry, pegmatite classes are further subdivided into **families**. Although there are only two families of granitic pegmatites, I have a hard time keeping them straight. This is because petrologists use a shorthand notation to name them, and I’m frankly not good at remembering acronyms. The two groups are the NYF and LCT families. NYF refers to pegmatites containing significant *niobium, yttrium, or fluorine* minerals; LCT refers to pegmatites containing significant *lithium, cesium, or tantalum*.

**Examples.** Let’s look at a “close to home” example of how all this works. Most central Colorado collectors have spent time looking for “pockets” in the Pikes Peak Granite. The technical term for such pockets is *miarolitic cavities* (Figure 4).



Figure 4. Typical well formed (euhedral) crystals of smoky quartz, microcline, fluorite, and goethite from a miarolitic cavity. Pikes Peak Granite. (Carnein specimen and photo)

Thus the Pikes Peak pegmatites belong to the miarolitic class, which means that they formed at relatively shallow depths and low temperature-pressure. Well formed crystals are typical of miarolitic pegmatites.

Most collectors know that, besides such common minerals as microcline feldspar (or “amazonite”), smoky quartz, albite, goethite, and biotite, the Pikes Peak pegmatites may also contain fluorite [CaF<sub>2</sub>] and/or topaz [Al<sub>2</sub>SiO<sub>4</sub>(F,OH)<sub>2</sub>]. Note that both these minerals contain essential fluorine (F). As a result, our local pegmatites are assigned to the NYF family of the miarolitic class.

Recently, some of you were fortunate enough to collect in the Eight Mile Park pegmatite district, near Royal Gorge in Fremont County. You probably noticed that, unlike the pegmatites of the Lake George or Wigwam Creek areas, those of Eight Mile Park contain abundant muscovite. Another difference is that they don't contain pockets with well-formed quartz and microcline crystals, though both of these minerals are abundant. Other common minerals in the district include beryl (beryllium aluminum silicate), garnet, and schorl. Although you may not have found any, the Eight Mile Park deposits also contain lepidolite (a lithium mica), elbaite (a lithium tourmaline), and montbrasite (a lithium phosphate) (Anonymous, 2016). Put all of this together and the Eight Mile pegmatites can be placed into the LCT family of the muscovite-rare element class.

**The Bigger Picture.** Interestingly, geologists are now recognizing connections between kinds of pegmatites and plate-tectonic cycles. For example, Bradley and McCauley (2016) found that, world-wide, of 66 LCT pegmatites that have been accurately age dated, many were formed late in the cycle of igneous rock formation that peaks as supercontinents, such as Pangaea, come together. Four such cycles are recognized, starting over 2.5 billion years ago. In detail, the LCT pegmatites, which are often the most economically

valuable types, form in several specific geologic settings related to the “supercontinent cycle”. This may be important for people looking for economic mineral deposits.

**Why Study Pegmatites?** Considering the thousands of books and articles about pegmatites available in university and government libraries, it's obvious that these rocks are clearly significant to many people besides mineral collectors. They are or have been important sources of several industrial minerals, including feldspar, clay, muscovite mica, and crushed stone. In addition, they have produced significant amounts of beryllium, lithium, and rare-Earth elements (e.g. yttrium, scandium, neodymium, cerium, europium, etc.). Finally, pegmatites are major sources of several important semiprecious gemstones, among them aquamarine and other colored beryls, topaz, kunzite, garnet, and tourmaline.

**The Pegmatite State.** Colorado is a wonderland of pegmatites. In fact, E.W. Heinrich, who published many articles about our pegmatite heritage in the mid-20<sup>th</sup> Century, noted that Colorado should have been named The Pegmatite State (Jacobson, 2018). For more information about Colorado's pegmatite districts, I encourage you to read recent articles by Lake George Gem and Mineral Club member Marc Jacobson (1986; 2018). I hope to see you on a pegmatite near home!

#### References Cited

- Anonymous, 2016, Field trip guide to the Eight Mile Park pegmatite field, Fremont County, in M.I. Jacobson, compiler, Field Trip Guidebook for the Second Eugene E. Foord Pegmatite Symposium: Colorado School of Mines Geology Museum and others, p. 10-22.
- Bradley, D.C., and A. McCauley, 2016, Tectonic settings of LCT pegmatites in the context of the supercontinent cycle: in M.I. Jacobson, M. Raschke, F. Barnard, and P.J. Modreski, editors, *Second Eugene E. Foord Pegmatite Symposium, Abstracts, Short Papers, Posters, and Program*: Denver, Colorado School of Mines Geology Museum and others, p. 14-17.
- Černý, P. and T.S. Ercit, 2005, The classification of granitic pegmatites revisited: *The Canadian Mineralogist*, vol. 43, p. 2005-2026.
- Jacobson, M.I., 1986, Granitic pegmatite districts of Colorado: an overview, in P.J. Modreski, editor, *Colorado Pegmatites—Abstracts, Short Papers, and Field Guides from the Colorado Pegmatite Symposium, May 30-June 2, 1986*: Denver, Colorado Chapter Friends of Mineralogy and others, p. 7-15.
- \_\_\_\_\_, 2018, The pegmatites of Colorado: a survey of localities: *Colorado Mineral Society Mineral Minutes*, January, 2018, p. 4-7.
- London, D., 2008, *Pegmatites*: Couronne, Quebec, Mineralogical Association of Canada, The Canadian Mineralogist, Special Publication 10.
- \_\_\_\_\_, 2016, Rare-element granitic pegmatites: *Geoscience World*, <https://pubs.geoscienceworld.org>, accessed June 24, 2019.
- Simmons, W.B., K.L. Webber, A.U. Falster, and J.W. Nizamoff, 2003, *Pegmatology, Pegmatite Mineralogy, Petrology and Petrogenesis*: New Orleans, Rubellite Press.

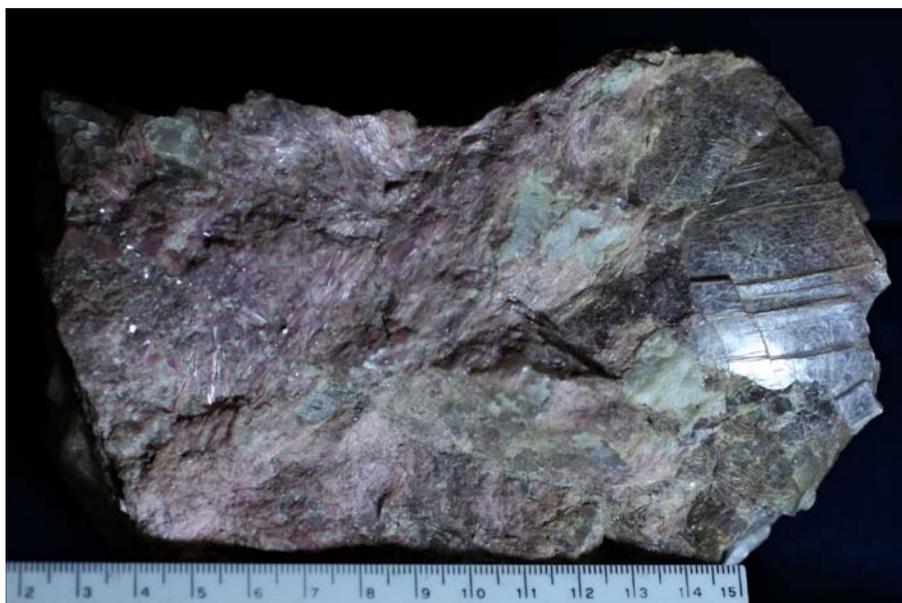


Figure 5. LCT pegmatite from the Brown Derby mine, Gunnison County, Colorado. Pink crystals are Elbaite; whitish gray is albite; curved lavender plates are lepidolite. (Carnein collection and photo)

## 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. The AFMS News is linked from our web site, [www.nittanymineral.org](http://www.nittanymineral.org).** EFMLS is not currently posting its newsletters on its web site.

The February AFMS Newsletter starts with President Judy Beck looking forward to activities in the New Year. An article describes successful efforts by a Montana club to increase their membership. Ellery Borow starts a series of articles on getting minerals pictured on US postage stamps.

The March issue's safety article covers the general starting points for safety. ALAA will present a program on the National Environmental Policy Act and its 2020 regulations, which concern public input on decisions regarding access to public lands, at the June AFMS Convention in Wyoming. The AFMS 2021 Video/ Slide Program Contest is announced, with a submission deadline of December 1, 2021.

Please see the AFMS Newsletters at [http://www.amfed.org/afms\\_news.htm](http://www.amfed.org/afms_news.htm). *-Editor*

## 10 Years Ago in NMS

In March 2011, NMS members took a bus trip to enjoy a tour of the recently renovated Hillman Hall of Minerals at the Carnegie Museum of Natural History in Pittsburgh. Marc Wilson, Head of the Section of Minerals, guided the tour (**photos at right**). Our March meeting program was Geode Night, by Jeff Smith of Pittsburgh, and we were also planning for Minerals Junior Education Day to be held in early April.

### 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 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.

**Update:** No meetings are planned during COVID restrictions.

## Geo-Sudoku

by David Glick

This puzzle contains the letters EFILMNORU; one row or column includes an element that may be concentrated in pegmatites. 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.

		E						R
I			R	E			U	N
				O		E	F	
		L	U	I	E			
		F				I	O	U
M				R			L	E
F		O	E		I	L		
	E		O			F		
							E	



Early in the Hillman Hall tour, Marc Wilson explains the four-part exhibit on crystal twinning. *D. Glick photo*



Marc Wilson pulled out many drawers and specimens for our behind-the-scenes tour. *D. Glick photo*

## 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](http://www.mineralevents.com) for more.

Many events have been canceled.

### Verify show schedule before traveling!

Che-Hanna Rock & Mineral Club show planned for March 27-28, 2021, has been cancelled:  
<http://www.chehannarocks.com/show.html>

April 10, 2021: Zoom meeting - Atlantic Micromounters' Conference sponsored by the Micromineralogists of the National Capital Area. [www.dcmicrominerals.org](http://www.dcmicrominerals.org)  
Contact: Kathy Hrechka [kshrechka@msn.com](mailto:kshrechka@msn.com)

April 15-17, 2021: Tom's Mineral and Rock and Fossil Garage Sale. 10 Roger Ave, Shippensburg, PA 17257. Rain or Shine. Thurs. 4/15 4 pm to 6 pm; Fri 4/16 9 am to 6 pm; Sat 4/17 9 am to 1 pm. Or by appointment. 2.1 miles from center of Shippensburg  
Start on Earl Street, go pass Ship. University  
At Middle Spring Motor sign take right onto Roger Ave 4th house on left. Contact [tsmith1012@comcast.net](mailto:tsmith1012@comcast.net)

May 1-2, 2021: World of Gems & Minerals show, by Berks Mineralogical Society. Leesport Farmers Market Banquet Hall, 312 Gernant's Church Rd., Leesport PA 19533. Sat 10-5, Sun 10-4; Sat. ONLY tailgate section.  
<<https://berksmineralsociety.com>>

May 8, 2021: South Penn Rock Swap. South Mountain Fairgrounds (1.5 miles West of Arendtsville, PA on Rt 234). By Central PA & Franklin Cty R&M Clubs. Admission: \$1.00. Tables for swappers: \$5.00 each. 8:00 – 3:00 PM. Contact: [tsmith1012@comcast.net](mailto:tsmith1012@comcast.net)

May 8, 2021: Mont Clare, Penn., Mineral Treasures sponsored by the Philadelphia Mineralogical Society, 10:00 AM to 6:00 pm, One day, outdoor show, free parking, Adults \$5, kids under 13 and scouts wearing uniforms are free. [www.phillyrocks.org/mineral-show/](http://www.phillyrocks.org/mineral-show/)  
Contact: Karenne, [minerals.fossils.rocks@gmail.com](mailto:minerals.fossils.rocks@gmail.com)

July 9-11, 2021: EFMLS Annual Convention, at Gem & Mineral Society of Syracuse, NY, show. Tentative, depending on pandemic restrictions.

## Geo-Sudoku Solution

O	F	E	L	N	U	M	I	R
I	L	M	R	E	F	O	U	N
R	U	N	I	O	M	E	F	L
N	O	L	U	I	E	R	M	F
E	R	F	M	L	N	I	O	U
M	I	U	F	R	O	N	L	E
F	N	O	E	U	I	L	R	M
U	E	R	O	M	L	F	N	I
L	M	I	N	F	R	U	E	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](http://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  
145 Goddard Cir.  
Penna. Furnace PA 16865

### SOCIETY OFFICERS

David Glick (President) 814-810-2116 (h)  
e-mail: [xidg@verizon.net](mailto:xidg@verizon.net)  
Dr. Bob Altamura (Vice-President) 814-234-5011 (h)  
e-mail: [raltamura@comcast.net](mailto:raltamura@comcast.net)  
John Dziak (Secretary) e-mail: [jjd264@psu.edu](mailto:jjd264@psu.edu)  
Stuart Bingham (Treasurer)  
e-mail: [sebing145@comcast.net](mailto:sebing145@comcast.net)

### OTHER CONTACTS

Field Trips: Dale Kephart  
e-mail: [beckdale2@comcast.net](mailto:beckdale2@comcast.net)  
Junior Rockhounds: Dr. Andrew Sicree  
814-867-6263 (h) e-mail: [aas132@psu.edu](mailto:aas132@psu.edu)  
Membership Chair: David Glick (see above)  
Programs: Dr. Duff Gold 865-7261(o), 238-3377(h)  
e-mail: [gold@ems.psu.edu](mailto:gold@ems.psu.edu)  
Door Prizes: Dr. Bob Altamura (see above)  
Facebook & Publicity: John Dziak: [jjd264@psu.edu](mailto:jjd264@psu.edu)

The **Bulletin Editor** will welcome your submissions of articles, photos, drawings, cartoons, etc., on minerals, fossils, collecting, lapidary, and club activity topics of interest to the members. Please contact:

David Glick E-mail: [xidg@verizon.net](mailto:xidg@verizon.net)  
425 Armagast Rd. phone: (814) 810-2116 (h)  
Bellefonte, PA 16823-9762

Newsletter submissions are appreciated by the first Wednesday of the month. Photographs or graphics are encouraged, but please do not embed them in word processor files; send them as separate graphics files (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](http://www.nittanymineral.org)