

Nittany Mineralogical Society Bulletin

Nittany Mineralogical Society, Inc.

P.O. Box 10664

State College PA 16805

Editor (see page 8):

David C. Glick

November, 2010

Visit our web site: www.nittanymineral.org

November 17th meeting:

Scotia - Lost in History

by Bob Hazelton

Our November meeting will be held Wednesday the 17th in the room 114 auditorium of Earth & Engineering Sciences Building on the west side of the Penn State campus in State College, PA. Maps may be found on our web site.

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

7:30 to 8:00 p.m.: announcements, questions, answers; door prize drawings

about 8:00 p.m.: featured program

*The event has free admission, free parking, and free refreshments, and is open to all – **Bring your friends and learn about local history and mining.*** -Editor

The Scotia area was a significant part of the iron industry history of Centre County spanning from the early 1800s through to the 1940s. Scotia, itself, operated for 30 years beginning in 1880 with 250 workers removing countless tons of iron ore using the latest technology of that era. Scotia was a community as well – company housing, stores, post office, and railroad station. Today it's all but gone. Presenter Bob Hazelton is part of a group currently researching Scotia and trying to keep its history alive.



See more historical photos of Scotia, Pennsylvania, not far from State College, on page 2.

Scotia Field Trip November 20th

Bob Hazelton will lead a hike for NMS members at 1:00 p.m. on Saturday November 20 to visit and discuss the historical sites of Scotia. We'll have an opportunity to see geology too. This will be a guided tour, not a hardhat and steel-toe boots collecting trip. We are planning on about two hours, and although the hiking is not expected to be strenuous, there are some uphill sections and it is not suitable for younger children. We'll discuss details at the Nov. 17th meeting. Please sign up with Dave Glick (see p.8) so that we can contact you concerning the meeting place and late details or changes.

Junior Rockhounds Meet November 17th

Junior Rockhounds meetings are scheduled for Wednesdays this Fall. In November, the meeting will be held at 6:45 p.m. on the 17th, in room 116 Earth & Engineering Sciences Building. That's during the social hour for the regular NMS meeting. The tentative plan for the December 15th meeting is for the same time and place; those attending Junior Rockhounds are invited to come to the Holiday Sale & Social afterwards (see below).

Each month's meeting has a new topic or topics with fun, hands-on learning for the kids. We encourage those who attend to become NMS members, but it's not required. Just \$7.00 covers a whole year (through October 2011) of student membership. Parents may get a lot out of the meetings, too!

Check the web site for news, or contact Dr. Andrew Sicree (see page 8). -Editor

December 15th meeting:

HOLIDAY SALE & SOCIAL

We will hold our annual Holiday Social and Sale on December 15th at Prospector's restaurant on the west side of State College. Members with PA sales tax licenses who want to sell at the event should contact Dave Glick. -Editor

ATTENDING THE NOVEMBER MEETING?

Donations of door prize specimens are invited.

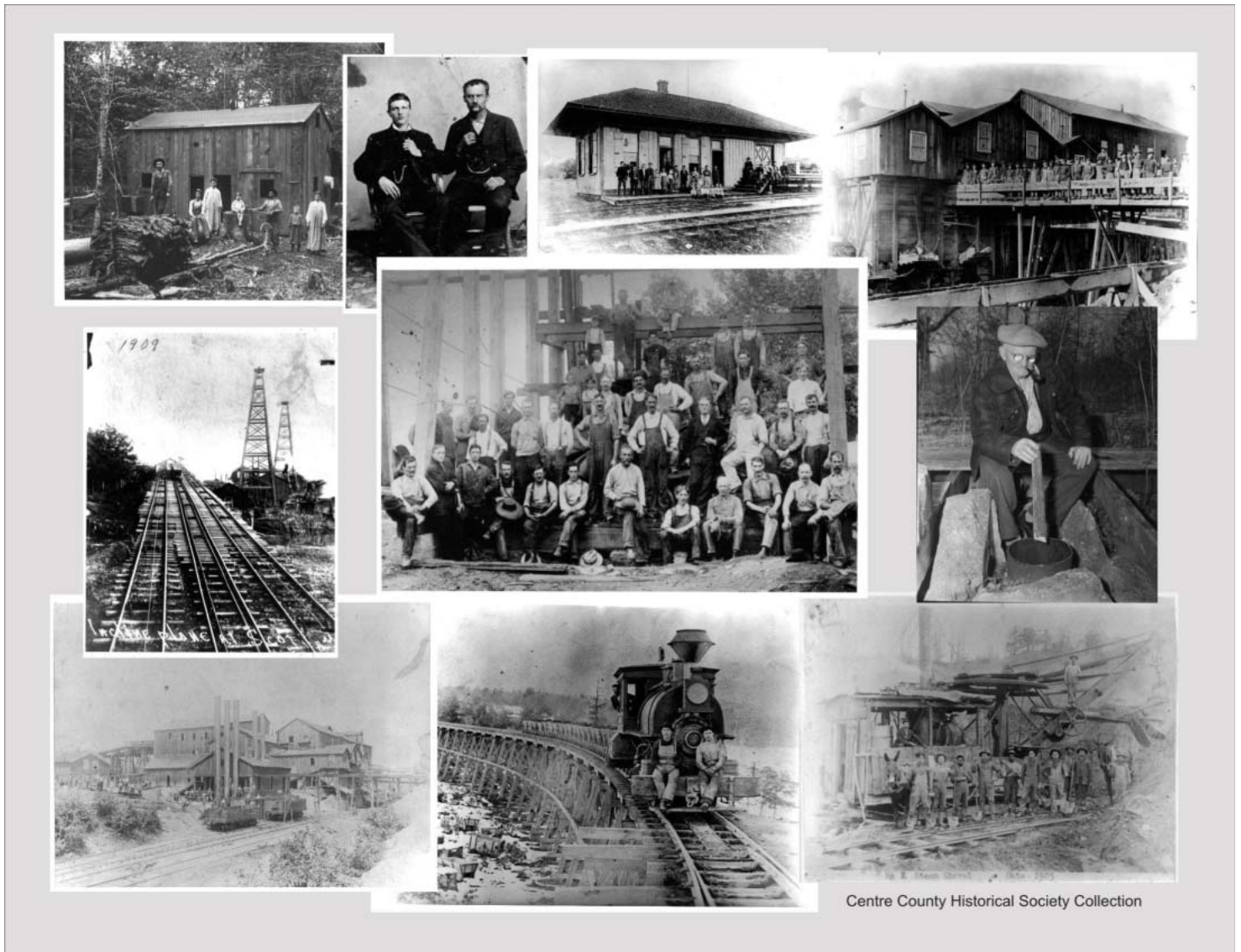
NMS will provide ice, soft drinks, and water; your donated snacks will be welcomed.

DUES FORMS for members are overdue! If a form is enclosed with this Bulletin, we have not processed a dues payment from you. We would like you to continue as a member! Please mail in your form and payment, or bring them to the November meeting. We will not be able to mail further Bulletins unless we receive your renewal.

Tax-deductible donations welcomed

by David Glick, NMS President

NMS received 501(c)(3) status from the IRS during 2008, which means that your donations to NMS are tax-deductible. Your donations will help fund our educational purpose and programs. Please make checks payable to 'NMS, Inc.,' include a memo noting that it is a donation, and send to the P.O. Box (in banner, above), or contact the president or treasurer (see p. 8) for more information.



Historical photographs of the former iron mining area of Scotia, Centre County, Pennsylvania. See the story on page 1.

NMS Donates Books to Libraries

By David Glick, NMS President

NMS has begun a small program of donating books to libraries in our area. We recently donated *Masterpieces of the Mineral World: Treasures from the Houston Museum of Natural Science* to Schlow Library in State College, in memory of Annie Passaneau. It's a big book of excellent specimen photographs, mostly by Jeff Scovil, with some by Harold and Erica Van Pelt; the text is by Wendell Wilson, Joel Bartsch and Mark Mauthner.

We are also donating *The Mines and Minerals of Chester County Pennsylvania* by Ron Sloto to the EMS library in Deike Building at Penn State, in memory of Pennsylvania geologist and Penn State graduate Allen Heyl.

Smithsonian Handbooks - Rocks and Minerals by Chris Pellant was donated to Centre Learning Community Charter School earlier in the year. Next on the list are some of the middle school libraries in the area.

This helps fulfill our mission of educating the public in our areas of interest, and memorial bookplates also let the reader know that there is a local mineral and gem club. If you have an idea for an affordable book, and/or a library that could use a book on minerals, lapidary, earth science, etc., please contact Dave Glick.

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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.ems.psu.edu/nms/ or remind Dave Glick to bring a printed copy to a meeting for you to see.

The November issue starts with Ellery Borow describing how volunteers can be recognized through the American Club Rockhound of the Year program. Betsy Oberheim, new EFMLS President from The Central Pennsylvania Rock and Mineral Club in the Harrisburg area, introduces herself and her collecting and jewelry-making interests. Carolyn Weinberger adds AFMS 4th Regional VP to her list of job titles, and describes what that involves. Jim Doran's column covers general safety guidelines for the lapidary shop

The **AFMS Newsletter** is available by the same methods. In the November issue, Pam Hecht discusses the AFMS Endowment Fund and invites communication regarding contributions for the raffle drawing at the 2012 Syracuse convention. President Bob Miller thanks bulletin editors and Federation volunteers, and discusses advantages of displays at shows and the ALAA. The Safety article reminds us to be aware of hunters in the field in the autumn. The current Future Rockhounds of America badge program is reviewed, and suggestions for new badge activities are sought. A 2011 Inter-Regional Rockhound Rendezvous will be held in central Oregon May 27-30, with three official sites for petrified wood and obsidian and the opportunity for many other self-guided trips. The AFMS Program Competition is open to video, digital still and slide entries in several categories; entries are due by April 15, 2011.

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

115 Years Ago in *The Mineral Collector*

The November 1895 issue contained a variety of articles. There were installments in the series on Quartz and Its Varieties and on The W.W. Jefferis Collection. A report from the Philadelphia club described many crystalline Pennsylvania specimens discussed at meetings, and a report from Maynard Bixby on topaz localities in Utah was printed. The club went on a collecting trip to the Phoenixville Mines; with permission from the caretaker, they set off about seven blasts with moderate success, and found some good specimens.
- Editor

General Lapidary Safety Guidelines

by Jim Doran, EFMLS Safety Chair
from November 2010 EFMLS Newsletter

I was trying to decide what my topic would be for this article, and I got some ideas from the Silversmithing class I took two weeks ago at Wildacres Retreat. These are some general safety practices that you should follow in your own lapidary shop or your club's shop:

1. Safety procedures for all equipment should be given before every class, it doesn't matter how experienced someone is, accidents may still happen.
2. Newer students may need to be watched more closely while they're using the equipment because there will be many operational and safety procedures and techniques that they need to get familiar with.
3. Always use safety glasses or goggles when using grinding wheels, rock or trim saws, laps, faceters, or torches.
4. You should use dust masks or respirators with rock or trim saws, and grinding wheels. Some saw lubricants are toxic and masks should always be used when using saws with chemical lubricants.
5. The shop should have adequate ventilation.
6. Hearing protection should be used if the equipment is loud or you'll be using it for a long time.
7. Always have a working, recently inspected, fire extinguisher rated for chemical, electrical and other fires. Know how to use it.
8. Keep your workplace clean. The cleaner it is, the less chance you'll have for fall injuries, chemical or fire injuries.
9. If using chemicals, know how to use them correctly. Never mix chemicals. Always use eye protection.
10. Keep all liquids away from electrical equipment.

I hope that these guidelines will be helpful to you. These are not all the safety procedures that you may need for your lapidary shop, but I think they will a good start to build on.

40 Years Ago in *Pennsylvania Geology*

The Pennsylvania Geologic Survey announced the publication of Bulletin G59, *Geology of the Pittsburgh Area*. A new roadcut for Interstate 81 at Swatara Gap was reported to show a good example of a disconformity. Limonite concretions on a coal mine property in Clearfield County were described, as were rosette or cabbage head quartz near Mechanicsburg, Cumberland County.

- Editor

POPULAR MINERALOGY

Fascinating mineralogy and earth science for the amateur mineralogist and serious collector - #37

Pyrite Mirrors

by Andrew A. Sicree

The first mirrors

If you lived during the Stone Age, how did you know what you looked like? In modern life we take mirrors for granted. Indeed, mirrors are everywhere: in the bathroom, over the dresser, by the front door, hanging from the windshield of your car. Most of these mirrors are glass with a silvered backing. Some might be metals such as polished chrome-plated steel. But if you lived in a culture that didn't have glass and had metallurgy limited to copper and goldsmithing, what could you use for a mirror? You could, of course, examine your reflection in a pool of still water, but the reflection isn't very bright and you can't hang a pool of water on your wall.

Some ancient cultures had metallurgical technologies sufficient to make mirrors of polished brass or bronze. One classical account reports that, as Rome laid siege to Syracuse during the Second Punic War (214-212 BC), the Greek scientist Archimedes used bronze mirrors to reflect sunlight, focusing it on the attacking Roman fleet setting their ships on fire. Bronze is an alloy of copper and tin (brass is copper and zinc).

But what does a pre-Bronze Age culture use for a mirror? The oldest known mirrors were manufactured from polished obsidian. Many of these mirrors were simply obsidian cobbles one side of which was ground to a flat surface and then polished. Such a mirror would reflect light but any image would appear against a black background. Obsidian mirrors found in Anatolia (in Turkey) range back in age to 6000 BC. Obsidian mirrors were also used in Central and South America beginning at about 2000 BC. Mirrors made from polished anthracite coal have also been found in South America. The ancient Egyptians used mirrors of polished copper beginning approximately at 3000 BC. Metal-coated glass mirrors were invented in the first century AD.

Olmec mineral mirrors

Other ancient cultures solved the mirror problem in an ingenious manner: they created mirrors of polished minerals such as pyrite (FeS₂, cubic) or iron oxide minerals such as

magnetite (Fe₃O₄, cubic), hematite (Fe₂O₃, trigonal), and ilmenite (FeTiO₃, trigonal).

The Mesoamerican Olmec culture (1500 – 400 BC) produced note-worthy numbers of mineral mirrors. Many Olmec mirrors were made from pyrite. Others were made from iron oxide minerals such as hematite, magnetite, and ilmenite. One extraordinary Olmec mirror from Las Bocas, Mexico, is a mosaic of several hundred faceted fragments of pyrite. Another Olmec mirror was made from a large nodule of pyrite – a flat surface was ground into one side.

Experienced mineral collectors may be surprised to hear that pyrite mirrors survive to be found in archaeological sites. After all, it is not unusual for pyrite specimens in mineral collections to decompose in a few decades or even a few months. Some pyrites oxidize rapidly, releasing sulfuric acid, and some pyrite mirrors uncovered at Mayan or Olmec sites are indeed corroded. The fact that many are found unoxidized may be attributable to the fact that when buried in a grave, the pyrite is sealed in an anoxic (oxygen-free) reducing environment. Also some pyrites are much more stable than others – it is likely that Mesoamerican artisans knew this and chose their raw materials from sites known to produce more stable pyrites.

Large numbers of concave mirrors of hematite, ilmenite, and magnetite have been unearthed in Guerrero, Mexico, and are attributable to cultures akin to the Olmec. Massive hematite was sliced and ground to a convex shape with an unfinished back. A round or oval convex mirror was cut into the center of the front and finely polished. The optical quality of these mirrors attests to the extraordinary skill of the lapidaries who manufactured them. Many mineral mirrors have holes drilled in their edges and were hung around the neck by a cord.

Such a mirror was not used as an ordinary “looking glass,” but rather it probably was thought to possess magical properties. Close up, a convex mirror would distort and magnify one's image. Then as one drew back from the mirror, your image would flip upside down. Convex mirrors may also have been used for fire-starting.

Mirrors among the Maya and Aztecs

Mineral mirrors were popular among the ancient Maya (whose Classical period ranged approximately 250 AD to 900 AD). Mayans can be seen primping themselves in front of mineral mirrors in Classical Mayan artworks such as pottery decorated with scenes from life in the royal court. Like the Olmec, the Maya cut mirrors from blocks of massive hematite and pyrite. These “uniform” mirrors undoubtedly took many hours to cut and polish and were thus quite valuable. The Maya also manufactured less expensive “composite” mirrors that have a stone base, a clay binding layer, and a reflective surface made from pyrite grains.

Mayan mirrors were used for more than checking one’s hair and makeup. They were imbued with mystical and magical powers and used for divination.

The name of Tezcatlipoca, a major deity in the Aztec pantheon, translates from Nahuatl as “Smoking Mirror,” a title that alludes to his connection with the obsidian used by the Mesoamerican to make mineral mirrors. Tezcatlipoca is often depicted with his right foot replaced by an obsidian mirror – an allusion to Aztec creation myths in which he loses his foot in a battle with the Earth Monster. Other depictions of Tezcatlipoca place the obsidian mirror on his chest and some have smoke emanating from the mirror.

An extraordinarily well-made Aztec mosaic mask preserved in the British Museum shows another use for pyrite. Made in the 15th or 16th Century, this mask is based on a human skull and is covered with alternating bands of black lignite and bright blue turquoise. The whites of the eyes are made from white conch shell. But the pupils are orbs of polished pyrite.

Reflectivities of minerals

How reflective are these mineral mirrors? Some minerals are shinier than others. Finely polished surfaces of magnetite have *average* reflectivities of 21% while hematite surfaces have reflectivities of about 28%. Pyrite has a much higher reflectivity of up to 57%. This means that a highly polished pyrite surface will reflect back as much as 57% of the light that hits it. (Modern mirrors are much more reflective than pyrite – astronomical mirrors, for instance, reflect 95-99% of incident light.)

But the story on reflectivity is a bit more complicated because the amount of light reflected depends upon the color (or wavelength) of the incident light. Hematite, for instance, reflects 34.5% of purple light (wavelength = 400 nm), but less than 23% of red light (wavelength = 700 nm). Magnetite is less reflective but more consistent reflecting 22.3% of purple light (400 nm), 21% of red light (700 nm). Ilmenite is even less reflective, reflecting 21.2% of purple light (400 nm), and 18.6% of red light (700 nm). Not only is pyrite more reflective than these other iron minerals, its range

is reversed. Pyrite reflects 38.2% of purple light and 57.0% of red light. The brassy yellow color of pyrite results from the fact that the mineral is much more reflective in the yellow, orange, and red portions of the spectrum than it is in the purple and blue end.

For comparison, a gold surface reflects 24.9% of purple light (400 nm) and 83.6% of red light (700 nm) and polished silver reflects 69.8% of purple light and 86.5% of red light.

Refs.: Nelson, Z., et al., 2009, “Composite Mirrors of the Ancient Maya: Ostentatious Production and Precolumbian Fraud,” *The PARI Journal*, 9(4), p. 1-7.; and Stirling, M. W., 1981, *The Olmec & Their Neighbors*, Dumbarton Oaks, Washington DC. 351 p.

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*Dr. Andrew A. Sicree is a professional mineralogist and geochemist residing in Boalsburg, PA. This **Popular Mineralogy** newsletter supplement may not be copied in part or full without express permission of Andrew Sicree. **Popular Mineralogy** newsletter supplements are available on a subscription basis to help mineral clubs produce better newsletters. Write to Andrew A. Sicree, Ph.D., P. O. Box 10664, State College PA 16805, or call (814) 867-6263 or email sicree@verizon.net for more info.*

AS BLACK AS KOHL

More than five thousand years ago, Egyptian Queens darkened their eyelids with black or deep green cosmetics. They made green eyeshadow by crushing malachite and mixing it with a greasy binder. Black pigments were obtained by using galena, crushed to a dark gray-black powder. The resulting black cosmetic produced in an eyeshadow and eyeliner known as kohl that is still used today. Ancient Egyptians got their malachite from the mountains of the Sinai Peninsula while galena was mined near Aswan or brought to the Nile Valley from the Red Sea coast.

Kohl was used for more than reasons of fashion. It made an effective sunshade, protecting and cooling the eyes of a people who lived and worked under bright, cloudless desert skies. It was also thought to guard the wearer against eye ailments and, in some cultures, to protect one against the “Evil Eye.” Use of kohl persists to the present day.

Galena-based preparations of kohl can pose a health threat, especially if the method of processing the galena manages to reduce some of the galena (lead sulfide) to lead metal (elemental lead). Even today the use of galena-based cosmetics persists in spite of efforts to replace the galena with less-poisonous alternatives. Across a broad sweep of Northern Africa from Morocco to Egypt and stretching into Saudi Arabia, lead-containing cosmetics are a source of elevated levels of lead in blood.

Some alternative preparations of kohl used stibnite as the black pigment (which exposed the wearer to high levels of antimony), but more modern formulations use charcoal or carbon black (i.e., soot). Tourists who buy cosmetics while visiting North Africa should be aware of the dangers posed by lead-based cosmetics and try to avoid them, if possible.

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Give Me That Old-Time Nomenclature

Chipping away at hard rock down in the mines, old-time miners had names for the ore minerals that aren't exactly those approved by International Mineralogical Association. Our modern desire to be ever so exact with our nomenclature, has stripped us of most of these colorful and sometimes funny old-fashioned names.

You'll still hear the term "yellow boy" used for the yellow coatings of ferric hydroxide ($\text{Fe}(\text{OH})_3$) found in streams flowing from old abandoned mines. "Ruby jack" was a miners' term for the red variety of sphalerite (ZnS , cubic); the name was used for sphalerites from the Tri-State District around Joplin, Missouri. To the hard rock miner "black jack" meant an iron-rich black sphalerite, while it denoted a variety of cannel coal among coal miners.

Early German miners and mineralogists are noteworthy for giving a host of colorful names to ore minerals. *Zinkblende* is a still-used term for sphalerite, but *honigblende* ("honey blende") was used for the honey-yellow variety of sphalerite. Some names were highly appropriate. *Himbeerspat* meaning "raspberry spar" is descriptive of rhodochrosite (MnCO_3 , trigonal) while *schwerspat* or "heavy-weight spar" gives you a feel for the heft of barite (BaSO_4 , orthorhombic), a mineral noted for its high density.

Related ore minerals might have similar names. Thus, wulfenite (PbMoO_4 , tetragonal) was *gelbbleierz* ("yellow lead ore"), pyromorphite ($\text{Pb}_5(\text{PO}_4)_3\text{Cl}$, hexagonal) was called *grünbleierz* ("green lead ore"), *rotbleierz* ("red lead ore") denoted crocoite (PbCrO_4 , monoclinic).

The German tendency to string nouns together yielded names like *kieselkupfersmaragd* or "silicic copper emerald" for bright green diopside ($\text{CuSiO}_2(\text{OH})_2$, trigonal), noting the mineral's similarity in appearance to emerald. Hemimorphite ($\text{Zn}_4\text{Si}_2\text{O}_7 \cdot \text{H}_2\text{O}$, orthorhombic) bore the name *kieselzinkerz* ("silicic zinc ore"), while the lithium-iron mica, zinnwaldite ($\text{KLiFeAl}(\text{AlSi}_3)\text{O}_{10}(\text{F},\text{OH})_2$, monoclinic), earned the appropriately longer name *lithiumeisenglimmer* or "lithium iron mica," *glimmer* being the German term for the micas.

Although banned from today's scientific literature, these terms had one advantage over those in modern glossaries: they were more descriptive of the mineral itself.

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Geo-Sudoku

by David Glick

This puzzle contains the letters DGHILMOST, and one row or column spells out a person who might make a precious metal mirror. 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.

		D	H					M
L						O		
				T	M			S
	H	M	G		S			T
					O		L	I
			D					G
O			T				M	D
			S			T		
	I							O

15 Years Ago in NMS: Early Pennsylvania Mineral Collecting

Our November 1995 program was by Jay Lininger, editor of Matrix magazine and avid collector of Pennsylvania mineral specimens. His talk was entitled *Early Pennsylvania Mineral Collecting: Copper before Michigan*.
-Editor

10 Years Ago in the NMS Bulletin: The Alpine Tunnel of Colorado

In November 2000, Dr. Frank Aplan gave a slide and video presentation on *A Century Past: The Denver, South Park and Pacific Narrow Gauge Railroad and Its Alpine Tunnel*. The tunnel, 1772 feet long at 11000 feet elevation earned a place in history as an engineering feat of its time, and the first to cross the continental divide in Colorado.

Is it possible that ten years ago, the year 2000 was almost over?

Crystal Matrix Crossword

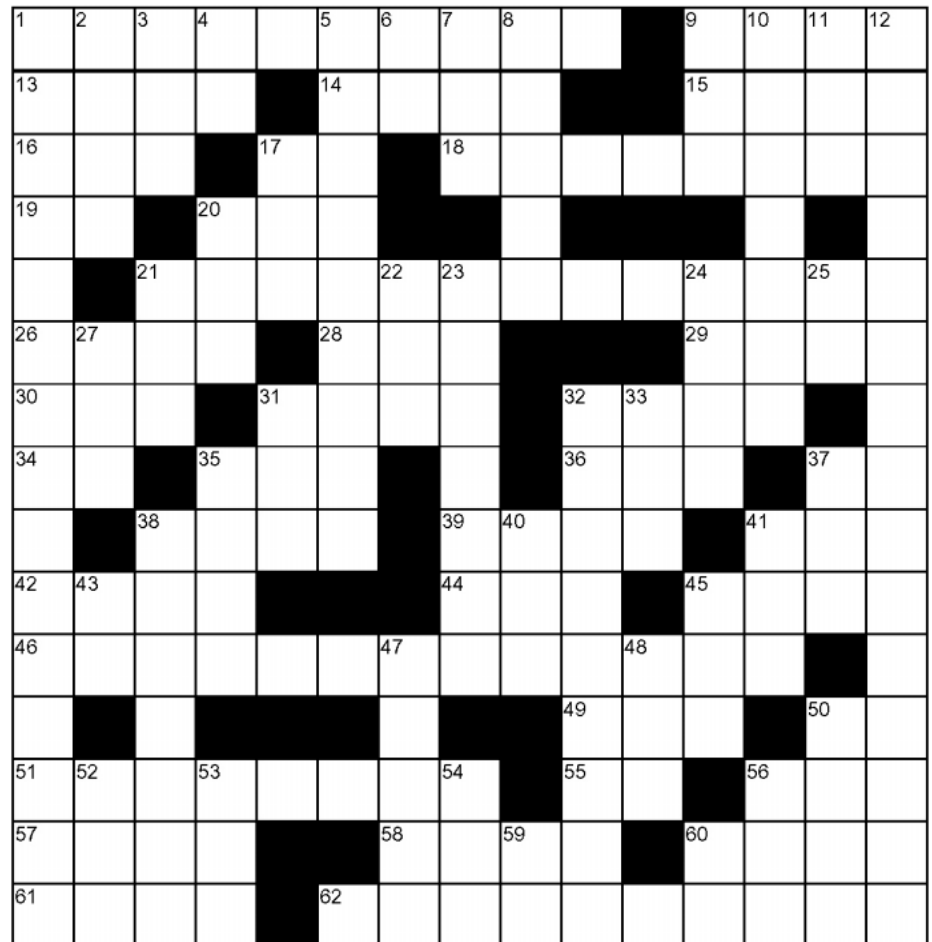
Spinels

ACROSS

- 1 lodestones
 9 what ruby is
 13 copper state (ab)
 14 fisherman's winch
 15 produces basalt
 16 tangy coldness
 17 a soldier
 18 small English mammal
 19 gadolinium
 20 one
 21 germanium iron spinel
 26 noble gas in lights
 28 Gilbert; unit of EMF
 29 Utah's namesake Indians
 30 organization (ab.)
 31 _____ Fitzgerald; singer
 32 Spanish baby
 34 element found in calcite
 35 opposite of hello
 36 a narrow Irish spade
 37 found in cobaltite
 38 what bishops have
 39 found in franklinite
 41 a clumsy guy
 42 totally engrossed
 44 Emergency Nursing World (magazine ab.)
 45 jadeite or nephrite
 46 studies a different C
 49 charged particle
 50 element in strontianite
 51 resident of Panama
 55 found in pyromorphite
 56 French yes
 57 found on a haul truck
 58 what geologist takes
 60 to aid
 61 test, quiz, etc.
 62 iron vanadium spinel

DOWN

- 1 manganese chrome spinel
 2 like a desert
 3 short Gipper
 4 island nation
 5 faces of magnetite crystal
 6 that is
 7 dumb the
 8 French student
 9 like a beer?
 10 zinc aluminum spinel
 11 Slavic placename suffix



- 12 magnesium iron spinel
 17 wildebeest
 20 stone vase
 21 marshy source of peat
 22 petroleum
 23 river of ice
 24 crimson corundum
 25 combines with gold
 27 Paleozoic, Cenozoic, etc.
 31 big on giant squid
 32 used for flame tests
 33 Phanerozoic, Proterozoic
 35 electron particle radiation
 37 a shallow fellow
 38 light wavelengths pattern
 40 like DNA
 41 scull
 43 alternating current
 45 Jennifer
 47 source of phosphates
 48 small troubling spirit
 50 kidney fat
 52 sides of quartz
 53 edge of dress
 54 new (Romanian)
 56 Kimono sash
 59 thallium
 60 anorthite (ab)

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.

Nov. 20 - 21, 2010: 3rd Annual Show and sale, "Gem Miner's Holiday Festival" by MAGMA - Mid-Atlantic Gem & Mineral Association. Jewelry, minerals, fossils; 40-plus vendors. Lebanon Expo Center, Rte. 72 and Rocherty Rd., Lebanon, PA. Sat. 10-5, Sun. 11-4. www.gem-show.com

2011: EFMLS & AFMS July 6-10, Syracuse, NY. Conventions July 6-10, show July 9-10.

2012: EFMLS Sept. 15-16, Harrisburg, PA

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For sale / trade: Equipment & Materials

For sale: Large mineral collection; will sell all or part. Tumble polisher with three 12-lb. and one 6-lb. drum plus grits, polishes and pellets. My phone number is (570) 672-2325. Leave a message if I'm not in.

For sale: Jade in various types & colors; mostly rough, plus some slabs; some fine Coober Pedy opal. Also equipment and jewelry making supplies from jewelry studio and production shop. Contact Daniel G. Reinhold in Mill Hall, PA; phone 570 726-8091 after lunch every day, or e-mail: dreinhold1@comcast.net

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GeoSudoku Solution from page 6

T	O	D	H	S	L	G	I	M
L	M	S	I	D	G	O	T	H
H	G	I	O	T	M	L	D	S
I	H	M	G	L	S	D	O	T
D	T	G	M	H	O	S	L	I
S	L	O	D	I	T	M	H	G
O	S	L	T	G	H	I	M	D
M	D	H	S	O	I	T	G	L
G	I	T	L	M	D	H	S	O

**NEW
WEB
SITE:**

www.nittanymineral.org

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). Your dues are used for programs and speakers, refreshments, educational activities, Bulletins, and mailing expenses. Please fill out a membership form (available on the web site), make checks payable to "Nittany Mineralogical Society, Inc." and send them to

Nittany Mineralogical Society, Inc.

P.O. Box 10664

State College, PA 16805

or bring your dues to the next meeting.

We want to welcome you!

SOCIETY OFFICERS

David Glick (President) 814-237-1094 (h)

e-mail: xidg@verizon.net

Dr. Bob Altamura (Vice-President) 814-234-5011 (h)

e-mail: raltamur@fscj.edu

John Passaneau (Treasurer) 814-231-0969 (h),

e-mail: jxp16@psu.edu

Ellen Bingham (Secretary)

e-mail: sebing145@comcast.net

OTHER CONTACTS

Field Trips: Ed Echler 814-222-2642

e-mail preferred: eechler@comcast.net

Junior Rockhounds: Dr. Andrew Sicree

867-6263 (h) e-mail: sicree@verizon.net

Membership Chair: David Glick (see above)

Programs: Dr. Duff Gold 865-7261(o), 238-3377(h)

e-mail: gold@ems.psu.edu

Door Prizes: Mike Zelazny

Facebook: Mike Zelazny e-mail: maz166@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

209 Spring Lea Dr.

phone: (814) 237-1094 (h)

State College, PA 16801-7226

Newsletter submissions are appreciated by the first Wednesday of the month. If you include photographs or graphics, 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.