

# Nittany Mineralogical Society Bulletin

Nittany Mineralogical Society, Inc.

P.O. Box 10664

State College PA 16805

Editor (see page 8):

February, 2011

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

David C. Glick

February 16th meeting:

## Total Gas Shale Potential of the Appalachian Basin

by Terry Engelder  
Professor of Geosciences  
Penn State

*Our February meeting will be held Wednesday the 16th 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 gas shales in addition to the Marcellus.** -Editor*

Potential gas shales of the Appalachian Basin include rocks ranging in age from Ordovician continental margin shales to the Triassic fine-grained lacustrine deposits. The richest section includes as many as six prospective shale formations of Middle and Upper Devonian age. I plan to discuss the architecture of the Appalachian basin relative to the accumulation of these gas shales. \*

## Geode Night March 16th

Our annual Geode Night, with Jeff Smith "The Geode Guy," is planned for our regular meeting on March 16<sup>th</sup>. We won't have a separate Junior Rockhounds meeting on that night; juniors and families are encouraged to come to Geode Night. Please watch for details of starting time, etc., on the web site and in the March Bulletin. -Editor

## Minerals Junior Education Day planned for April 2

Please keep the date open and plan to help present this important NMS event (our 15<sup>th</sup>) for grade-school-aged children.

Donations of specimens for sale: material with locality information is particularly useful. We can especially use fossils and tumbled material.

Stations: If you'd like to organize a station, or have an idea for a topic and the related specimens to hand out, please contact Dave Glick (see page 8).

Also wanted: fabric pieces, 8x11" or larger, to make grab bags which we will sell, and any ribbon, twill tape, string, etc. to make ties for them, minimum length 14 inches. Bring to monthly meetings, or call Ellen Bingham at 814-234-4532 and she will return your call later in the evening.

## Junior Rockhounds Meet February 16<sup>th</sup>, 6:30 p.m.

Junior Rockhounds meetings are scheduled for the third Wednesday of the month this January through May, in room 116 Earth & Engineering Sciences Building. That's during the social hour for the regular NMS meeting, so juniors and their parents can choose to come to the main meeting afterwards as well.

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

### ATTENDING THE FEBRUARY MEETING?

Donations of door prize specimens are invited.

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

Bring a friend!

## NMS Carnegie Museum Tour Bus Trip March 5

### Sign up and pay by February 17

by David Glick

NMS is pleased to accept the invitation for a private tour of Carnegie Museum's recently renovated Hillman Hall of Minerals and Gems (including the new Wertz Gallery of Gems and Jewelry) guided by Marc Wilson, Head of Section of Minerals. For the die-hard mineral collectors he will also provide a behind-the-scenes tour which may include recently cleaned and stabilized specimens received from the Philadelphia Academy of Natural Sciences.

### Schedule

We will depart from the Fullington office near the University Park Airport (2101 Alexander Drive, State College PA 16803, off Fillmore Road at its intersection with Fox Hill Road / Airport Road). Free parking is available there. Be prepared to board the bus at 7:45 a.m.; it will leave at 8:00 a.m. This is a 47-seat motorcoach equipped with lavatory and no stops are planned. We expect to be dropped off at the Museum (4400 Forbes Avenue in the Oakland district of Pittsburgh) at about 10:45 a.m. We expect to start the Hillman Hall tour when we arrive. The schedule for the behind-the-scenes tour (after lunch vs. before a late lunch) will be posted on the web site when it has been decided.

Continued on page 2

## Carnegie Museum Trip *Continued from page 1*

After the group activities, there are many other aspects of the Museum to explore. The group admission is good for both the Museum of Natural History and the Museum of Art. The free Carnegie Library of Pittsburgh is next door and is open until 5:30. Lunch is available in the Museum <http://www.carnegiemnh.org/visit/access.html> or at several restaurants within two or three blocks.

The Museum closes at 5:00 p.m. and the bus will depart from the drop-off location at 6:30 p.m., so participants should eat dinner in Oakland before boarding the bus for the return trip. We expect to be back at the Fullington office outside State College by 9:30 p.m.

Participants may provide their own transportation to the Museum, but all participants in the group admission rate must enter the museum as a group. Those not arriving on the bus should plan to be there early to be sure of meeting the group.

Those who want to take the bus but not go to the Museum are welcome to do so and pay only for the bus trip. Note: this trip is to Oakland, not the Science Center near Heinz Field downtown/ Near North Side.

### Advance Registration and Payment Required by Feb. 17

This trip is open to members and non-members. Please **sign up ASAP (definitely by Feb. 17)** with Ellen Bingham, preferably by e-mail to [emb22@psu.edu](mailto:emb22@psu.edu). Or phone Ellen at 814-234-4532; if leaving a voice message, please speak clearly and slowly, leave your name, address and phone number twice to make sure we receive it clearly, and any other contact information. We need that information for each participant for legal requirements for the bus company. State whether you are signing up for both bus transportation and museum admission, or only transportation, or only admission. We are advertising the trip to other clubs in order to fill the bus, so NMS members should sign up promptly.

Payment is required by to be received by Thursday Feb. 17. Send a check made out to NMS for the full amount of transportation and admissions, and send to

NMS  
2231 West Whitehall Rd  
State College PA 16801

### Cost

The bus (transportation only) will cost \$25 per person.

Museum admission at our group rate will be:

Adults \$13.

Children ages 3-18 and students with ID: \$7.

Senior citizens (65 and over): \$10.

### Policies

Cancellations must notify Ellen Bingham by 5:00 p.m. March 1 to receive a refund.

No alcohol is allowed on the bus.

At the Museum, no pens, food, drink, gum, backpacks, bags larger than 11"x16", or umbrellas are allowed in the museum galleries; there are coin-operated lockers available to leave them. Photography with hand-held cameras (no tripods) for amateur purposes only is generally allowed in permanent exhibits but not temporary or loaned exhibits; if in doubt, ask a guard whether it is allowed. No video cameras are permitted in the Museum of Art. \*

## New Bureau of Land Management "Wild Lands" Policy

In order No. 3310 dated Dec. 22 2010, the Secretary of the Interior directed the Bureau of Land Management to "designate appropriate areas with wilderness characteristics under its jurisdiction as "Wild Lands" and to manage them to protect their wilderness values." This could be expected to include prohibition of motor vehicles.

Opponents say that exclusive control of the public lands lies with Congress, and that this Order violates a 2003 agreement with Utah. Melissa Subbotin, spokesperson for the Western Caucus, posted on the web site [robishop.house.gov/WesternCaucus/](http://robishop.house.gov/WesternCaucus/) of Rob Bishop (R-Utah) on December 23<sup>rd</sup>, "In an 11<sup>th</sup> hour move one day after Congress adjourned for the year, Department of Interior (DOI) Secretary Ken Salazar and Bureau of Land Management (BLM) officials announced a new policy allowing the BLM to designate public lands as de facto wilderness without the approval of states or Congress. The new policy, which overturns the Utah Wilderness Settlement Agreement, will allow the BLM to do an end-run around Congress by designating public lands as "Wild Lands" areas. These new areas would be subjected to similar regulations and restrictions as that of wilderness areas."

A group of opponents in Congress has asked that the policy be rescinded, and jurisdictions in Utah and elsewhere may start legal challenges.

Supporters say that the order reaffirms pre-2003 policy for keeping track of lands under BLM control, and that the BLM "Wild Lands" designation is different from the "Wilderness" designation controlled by Congress.

An internet search for "news BLM policy" will find many articles, including the BLM press release dated Dec. 23, 2010.

-Editor

## How to Write an Award-Winning Article

from Linda Jaeger's Quick Tips for Editors column in the February 2011 A.F.M.S. Newsletter, summarized from Steven Wade Veatch's presentation at the Editor's Workshop in Denver, 9/17/2010

### Write about what interests you.

Before you start writing, choose: the **purpose** of your article, your target **audience**, and what **style** of writing you want to use. Make your writing **concise**.

Once you have your idea, **ask yourself the questions who? what? where? when? how?** and answer them for your readers.

### Make an outline.

It should have "three acts": an opening, the body of the article, and a closing. The **opening** should create interest in your subject. The **body** will cover your subject

and answer the questions mentioned above. Your **closing** is the most important part – make it short!

Use the outline **to focus and narrow your subject**. Decide how to present your ideas: Chronological order? Big picture to individual parts? Putting the parts together to come up with the big picture? Flesh out your article by adding details.

You will also need to consider a **title**. Make it **eye-catching** so your reader wants to continue reading.

**Research** your subject by checking references at the public library, observing activities, analyzing visuals, using a search engine like Google on the Internet, and making notes from all. Dependable information from the Internet may have .edu, .ppt, or .pdf in its web address. It is a good idea to verify your research in more than one place. Be sure to include your references with your article!

Once you actually begin writing, **use action verbs** to create visual images for your reader. Action verbs are words that do something. Ask yourself if a person can **do** that (giggle, split, reach).

Whatever style of writing you use should be **clear, precise, and concise**. Sentences need to be **fluid** – they read smoothly and easily. Each paragraph covers one idea and leads into the next paragraph. Write the way you talk!

To create more interest in your article, **add tables and/or photographs** that support your ideas. Tables and photos also break up the space on the page and make it easier on the eyes to read the article.

After writing your first draft, **let some time pass before you start to revise**. Perhaps a different word sounds better here or there. Maybe sentences or paragraphs need to be moved around. Feel free to use your newsletter editor as a sounding board and as a resource for checking spelling, punctuation, and grammar.

#### **Steve's basic writing plan:**

The Beginning – clear, clear, clear!

The Middle – interesting, interesting, interesting!

The End – short, short, short!

*Steven Wade Veatch is a member of both the Colorado Springs Mineralogical Society and the Lake George Gem & Mineral Club. He is an adjunct professor in geology and paleontology for Emporia State University, has taught many seminars for kids and adults on how to write science articles, and has won numerous trophies from RMFMS and AFMS in the Adult Articles Advanced category.*

*Steve has a special place in his heart for rock club juniors, and he sponsors both pebble pups and the 12-17 age group. If you are interested in some quick tips on close-up photography, check out his blog at: <[http://pebblepups.blogspot.com/2010\\_08\\_01\\_archive.html](http://pebblepups.blogspot.com/2010_08_01_archive.html)>. ✨*

## 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/](http://www.ems.psu.edu/nms/) or remind Dave Glick to bring a printed copy to a meeting for you to see.

The February issue encourages us to enter a competitive or non-competitive display in the Syracuse EFMLS/AFMS Convention & Show this July. A few dealer booths may also still be available. Betsy Oberheim notes how the federations provide support for member clubs and for the hobby in general. The safety article encourages us to remember common sense in familiar situations, and go to the effort of preparing for unfamiliar ones, such as using maps for new field trips, studying Materials Safety Data Sheets for new materials used in lapidary procedures, etc. The Spring session of the Wildacres Workshops in North Carolina will be April 11-17, and complete class descriptions are found on pages 8-9 of the issue. The Speaker in Residence in April will be Dr. Gene LeBerge, retired professor from the University of Wisconsin. The Speaker for the September 5-11 session will be Dr. Steve Chamberlain, Chairman of the Rochester Mineralogical Symposium, returning by popular demand. For the AFMS Endowment Fund drawing, all clubs are encouraged to donate items and buy tickets (\$5 each or 5 for \$20). The Commemorative Stamp Committee asks that greeters at club shows personally ask attendees to sign the petition for birthstone stamps.

The **AFMS Newsletter** is available by the same methods. The February issue announces that the newest award-winning program, *Iris Agate*, produced by Wayne Sukow using the photography and notes of the late Pete Rodewald, is now available to be borrowed. President Bob Miller encourages us to use our winter time indoors to work on club or federation projects, and donate specimens for the Endowment Fund drawing. The Juniors article asks that clubs help and encourage juniors to create displays for local and federation shows. A summary of Steven Wade Veatch's Editor's Workshop presentation *How to Write an Award-Winning Article* on page 4 provides a guide for all writers, and is reprinted above. Knowing one's location (so that help can be called to the right location) is the focus of a safety article. AFMS Club Rockhounds of the Year from various clubs are introduced.

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

- Editor

# POPULAR MINERALOGY

Fascinating mineralogy and earth science for the amateur mineralogist and serious collector - #39

## *Shakespeare's Perfect Chrysolite*

by Andrew A. Sicree, Ph.D.

### Minerals in Shakespeare

Crystals may be such stuff as dreams are made of, but Shakespeare, tho' greatest of bards, was no mineralist. Kings and princes boldly march across the globe on Shakespeare's stage and his work doth teem with allusions to characters ancient and mythic. And tho' he includeth many a passing remark about plants and the animals – birds, reptiles, and insects – only a few bits of the underfoot world of rock and mineral are found in Shakespeare's plays. In nature, most of these are lapidary.

### The meaning of mineral

The Elizabethan world in which Shakespeare wrote had a more flexible, but less clear concept of the mineral. Natural history "cabinets" found homes in the mansions of the wealthy and they might house true minerals as well as rocks, fossils, cut stones, "freaks of nature" (which might include natural stones that *looked* like something – a man's face, for instance), and a plethora of biological specimens. Shakespeare uses two different senses of the word "mineral" with meanings that the modern reader might not now readily grasp.

For instance, in *Hamlet*, Queen Gertrude states that Hamlet's madness is pure, "like some ore Among a mineral of metals base...." (*Hamlet*, IV, i, 25) because he weeps after killing Polonius. Here Shakespeare uses "mineral" to indicate a mine and "ore" to mean gold. Base metals are those that oxidize readily, as opposed to the noble metals (like gold and silver) that do not rust. Iron, nickel, lead, copper, and zinc are the common base metals. Thus, Queen Gertrude's line might be better understood as "like some gold found in a lead mine...."

Alternative meanings of "mineral" occur in *Othello*, *The Moor of Venice*. Upon finding that his daughter Desdemona has eloped with Othello, Barbantio accuses the Moor of having "Abus'd her delicate Youth, with Drugs or Minerals, That weakens Motion" (*Othello*, I, ii, 91-92). Here Shakespeare uses "Mineral" to mean some type of drug that, given to Desdemona, has impaired her

mental faculties, clouding her judgement and weakening her resistance to Othello's advances.

A "Mineral" might also be a poison; mineral poisons were thought to corrode their victim's guts. We hear the word used in this fashion when, later in the play, Iago describes his own envy of Othello as a corrosive "The thought whereof, Doth (like a poysonous Minerall) gnaw my Inwardes" (II, i, 329-330).

### The perfect chrysolite

One mineral about which Shakespeare talks most specifically is the "Perfect chrysolite" cited in *Othello*, but it is unfortunately unclear to exactly which gemstone he is referring. The chrysolite (meaning "gold stone") of the ancient Greeks and Romans may have been our modern-day topaz, while the topaz of the ancient Greco-Roman world was probably our modern-day chrysolite (a variety of olivine or peridot, a green stone, sometimes with a yellow tint). Although *Othello* was first performed before 1605, the first folio edition of the play was published in 1622. Thus, Shakespeare could have known about a "chrysolite" mentioned by Simon Maiolus in his *Dierum Caniculares* (1615-1619) which mentions an earlier work, *De Sculpturiis*, by Thetel the Jew, in which a "chrysolite" in the form of a woman is described as being a potent charm against fascination. Whether that particular stone was in reality an olivine or a topaz or some other mineral remains unclear. But Shakespeare may well have been alluding to Thetel's stone when he has Othello, speaking of Desdemona's purported unfaithfulness, claim that "had she been true, If heaven would make me another world, Of one entire and Perfect chrysolite, I'd not have sold her for it." (*Othello*, V, ii)

### Of agates and men

Agates make their appearance in several Shakespeare plays. In *Romeo and Juliet* (I, iv), Mercutio speaks of an "Agate stone on the forefinger of an alderman." In *Henry IV Part 1*, (II, iv, 70), Prince Henry mentions an "agate-ring" meaning a ring set with an agate, looking

expensive, but in reality cheap. He employs it as a derogatory term.

In the 1600s, it was fashionable to wear agates, which were carved into human form and set in gold or silver. Typically, they were worn stuck into one's cap. Shakespeare mentions this fashion in *Henry IV Part 2* (I, ii), when Falstaff derides his Page for his stiff and stony service proclaiming that the page was "fitter to be worn in my cap than to wait at my heels. I was never manned with an agate till now..."

## The carbuncle

Believed to glow with its own light, the "carbuncle" gets passing mention in several plays. Allusions are made to its self-illumination in *Titus Andronicus* (II, iii) and *Henry VIII* (II, iii). This glinting gemstone is specifically mentioned in *Hamlet* (II, ii) when Hamlet describes the sack of Troy during which "With eyes like carbuncles, the hellish Pyrrhus, Old grandsire Priam seeks." If we understand that "carbuncle" applies to any cabochon-cut red gemstone, we see in Shakespeare's lines the Greek warrior Pyrrhus as a frenzied, possessed fanatic with red eyes glowing in the flames of burning Troy, seeking out the elderly Trojan King Priam and slaying him in cold blood.

## Turquoise

The turquoise, or turkey-stone, was valued particularly because of its supposed talismanic properties, including its supposed ability to brighten or pale depending upon whether the health of the wearer was good or poor. It also had the virtue of keeping peace between a husband and wife. In *The Merchant of Venice*, (III, I), Shylock mentions that "It was my turquoise; I had it of Leah when I was a bachelor; and I would not have given it for a wilderness of monkeys."

## Sea-coal

Mistress Quickly, in *Henry IV, Part 2* (II, I), reminds Falstaff of "sitting in my Dolphin-chamber, at the round table, by a sea-coal fire..." The English used "sea coal" to distinguish true coal from charcoal; it was also used for high-grade coal brought by ship from across the sea – which would be worthwhile only for very high quality coal. In Scotland, sea coal indicates coal gathered along the beaches of the Firth of Forth. Coal beds extend out under the seabed and, upon being eroded by wave action, fragments of coal are continuously washed up on the beaches. Locals gather this coal which burns excellently and leaves little ash residue. Which of these three meanings of "sea coal" Shakespeare intended remains unclear.

## Of the stones

A variety of stones and metals make their appearance in the plays. Some are simple and common, such as the whetstone, used to sharpen a sword, mentioned in *Macbeth* (IV, iii). The "London-stone" is mentioned in *Henry VI, Part 2* (IV, vi). Originally set up by the Romans, the London-stone was used as a reference point for distance measurements. (It is now built into the wall of St. Swithin's Church in London.)

References are made to gemstones such as in *Richard III* (I, iv) where Clarence talks of a nightmare in which he saw "Inestimable stones, unvalued jewels, All scatter'd in the bottom of the sea." Later in the same play, Richmond calls Richard "A base foul stone, made precious by the foil Of England's chair, where he is falsely set" (*Richard III*, V, iii).

Gemstones are likewise mentioned in Shakespeare's poetry. For example, in *Lover's Complaint*, he speaks of diamonds, emeralds, sapphires, and opals, saying

"The diamond?-why, 'twas beautiful and hard,  
Whereto his invised properties did tend;  
The deep-green em'rald, in whose fresh regard  
Weak sights their sickly radiance do amend;  
The heaven-hued sapphire and the opal blend  
With objects manifold: each several stone,  
With wit well blazoned,  
Smiled or made some moan."

Other references to stones are more hypothetical. In *All's Well That Ends Well*, Lafew tells the King of France that Helena, the heroine, has a medicine "That's able to breathe life into a stone, Quicken a rock" (II, I, 72). The fabled Philosopher's Stone is alluded to in *All's Well That Ends Well* (V, iii) and other plays. Prince Arviragus in *Cymbeline* (IV, ii) speaks of the "all-dreaded thunder-stone," the fall of which was thought to accompany lightning and thunder. Whether the "thunder-stone" meant a hailstone (hail-storms often are accompanied by thunder) or a fulgurite (sand or soil fused into a glass by the heat of a lightning strike) or some other phenomenon is uncertain.

## Geology in the age of Shakespeare

If any character in Shakespeare could be said to have geological intentions it is Hotspur in *Henry IV*. First, he speaks of "villanous salt-petre...dugged out of the bowels of the harmless earth..." in *Henry IV, Part 1* (I, iii). And then when Owen Glendower cites an earthquake as proof of his supernatural exceptionality claiming that "at my birth the frame and huge foundation of the earth shaked like a coward," Hotspur ripostes with a more natural, if somewhat anthropomorphic explanation for the earthquake, saying

“O, then the earth shook to see the heavens on fire,  
 And not in fear of your nativity.  
 Diseased nature oftentimes breaks forth  
 In strange eruptions; oft the teeming earth  
 Is with a kind of colic pinch'd and vex'd  
 By the imprisoning of unruly wind  
 Within her womb; which, for enlargement striving,  
 Shakes the old beldam earth and topples down  
 Steeples and moss-grown towers. At your birth  
 Our grandam earth, having this distemperature,  
 In passion shook”

As a young man, Shakespeare (born in 1564) undoubtedly experienced the earthquake of April 6th, 1580, which was felt throughout England. This experience may be responsible for the quakes mentioned in several of his plays, including *As You Like It* (III, ii), *Romeo and Juliet* (I, iii), and *Macbeth*'s “the earth feverous” (II, iii).

If Hotspur is a geologist, Henry Bolingbroke (King Henry IV), on the other hand, laments his own inability to understand the geological world, saying “O God! that one might read the book of fate, And see the revolution of the times, Make mountains level, and the continent, Weary of solid firmness, melt itself Into the sea!” *Henry IV, Part 2* (III, I).

Some mineralogically-sounding terms in the plays of Shakespeare are most decidedly not mineralogical. The carbonado is an unusual black form of diamond, but Shakespeare uses the word as a verb, a cooking term, meaning “to slice and score for broiling.” The verb is used as a threat in *King Lear* (ii, 2): “I'll so carbonado your shanks,” or as an insult in *All's Well That Ends Well* (iv, 5): “it is your carbonadoed face,” and appears in *Henry IV, Part I* (v, 3), and *Coriolanus* (iv, 5) as well.

The advent of modern science swept away many of the more fabulous and colorful beliefs about gems, minerals, and rocks that abounded during the Elizabethan era, but Shakespeare's works, although limited in their mineralogical references, preserve for us a taste of the mix of fable and fact that surrounded minerals in those bygone days.

**Refs.:** T. F. Thiselton Dyer, *Folklore of Shakespeare*, 1883 (Kessinger Publishing, 2004); *A New Variorum Edition of Shakespeare, VI, Othello*, ed. by H. H. Furness (Philadelphia, J. B. Lippincott, 1886).

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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.*

## Back from the Gold Rush

In 1849, the “Forty-Niners” trekked across the west headed for Sutter's Mill on the banks of the American River in California. Once there, the gold pan was the principal weapon in the search for gold-laden stream sediments. A Forty-Niner would swirl his sediment-laden pan in the waters of a local stream and if a goodly amount of gold showed up as a yellow streak in the pan, he'd say that it “panned out well.” This is the origin of the modern phrase “panned out” meaning “it gave good returns.” For example, an investor might say that his purchase of a company's stock “panned out” when the market price takes a sharp rise.

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## Geo-Sudoku

by David Glick

This puzzle contains the letters AEHILNOST, and one row or column spells out one of the possible meanings of Shakespeare's “thunder-stone.” 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.

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

# Crystal Matrix Crossword

## Minerals & Shakespeare

- 1 silicon carbide grit used by lapidaries
- 11 a stratigraphic layer
- 14 thick-leaved plant
- 15 metamorphic form of coal
- 17 a line of light passing through a crystal
- 18 educational (ab)
- 19 where a sabertooth tiger lives
- 20 small round metal bullet
- 21 wrote many fairy tales
- 23 lead (ab)
- 24 "Ay, there's the \_\_\_" - Hamlet
- 26 a spy named Mata
- 27 state in Upper Miss. Valley Pb-Zn district
- 29 "every man will do his \_\_\_"
- 30 "What \_\_\_ we fear who knows it..."
- 32 "\_\_\_ not what your country can do..."
- 33 pile of wind-blown quartz
- 34 part of the engine of a car
- 35 a metastable iron sulfide mineral
- 39 light (ab.)
- 40 used by a 49er
- 41 color of topaz: \_\_\_-blue
- 42 famous for flint
- 43 a magnetic spinel mineral
- 47 what a bill is
- 48 Indian dress
- 49 Army Air Force (ab)
- 50 used in a rock tumbler
- 51 used in science
- 52 thallium
- 53 what feldspars weather to
- 55 yes
- 56 element named for Poland
- 58 montmorillonite, smectite, etc.
- 60 state that produces Pd and Pt
- 61 volcanic island in Pacific
- 63 one kind of hail
- 64 also
- 65 means olivine today
- 69 native metal found in meteorites
- 70 lent by countrymen
- 71 the Bard of Avon

**DOWN**

- 1 red, cabochon gem
- 2 where scientist works
- 3 name for a king
- 4 element in emerald
- 5 sizes of atoms
- 6 E Pluribus \_\_\_
- 7 Northern Territories
- 8 express delivery company
- 9 Russian Mts.
- 10 a young girl in Shakespeare
- 11 makes up bismuthinite
- 12 guy from outer space
- 13 a horse race
- 16 found in chromite
- 18 to \_\_\_ is human
- 21 a rock chisel
- 22 miscellaneous
- 24 symbol carved in stone

1	2	3	4		5	6	7	8	9	10		11	12	13	
14					15							16			
17					18				19						
20					21				22			23		24	25
					26				27	28		29			
30	31										32				
34					35	36					37				38
39					40						41			42	
					43				44	45	46			47	
					48				49					50	
51									52			53	54		
55					56	57			58	59					60
					61				62			63		64	
65	66	67							68					69	
70					71										

- 25 native of Utah area
- 26 lower edge of a costume
- 28 alias
- 29 "sense of his state is his first \_\_\_"
- 31 done with food
- 32 diamond state
- 33 thin wall of aplite
- 35 wise men from the East
- 36 Shakespeare's wife
- 37 Supersonic Transport (ab.)
- 38 stone mentioned in Shakespeare
- 40 what an actor wants
- 42 si, da, yes, amen, right-on
- 43 weapon like a club
- 44 manger (French)
- 45 baby powder mineral
- 46 "\_\_\_ music be the food of love"
- 47 where miners change clothes
- 48 "yet if thou \_\_\_ Antony lives"
- 50 methane, propane, butane
- 51 an improbable comedy
- 53 form in dissolved limestone
- 54 made from oak leaf ashes
- 56 a gap in the mountains
- 57 a mistake
- 59 toward the end
- 60 what Othello was

- 61 Yiddish exclamation of chagrin
- 62 a type of pie
- 64 \_\_\_ la la la
- 66 expression of disbelief
- 67 seen at crossing
- 68 expression of disgust
- 69 that is

**SOLUTION to last month's Famous Mines**

C	A		S	T	E	R	L	I	N	G	H	I	L	L
R	U		W	A	D	E		O		O	N		A	
I	G	N	E	O	U	S		S	W	E	E	T	E	N
P		Y	E	S		H	S		I	T		E	E	G
P	B		T			A	C		H	O	R	E	B	
L	I	T	H	O	S	P	H	E	R	E		R	A	
E	D		O	H		E	E	L	S		N	E	O	N
			E	M	M	A		E		A	P	E	D	
R	O	M	E		B	A	L	I		U	P		D	C
E		E		S	E	D	I	M	E	N	T	A	R	Y
F	O	R	C	E		T	P			U	Y	A		
U		A		A	X		E	E		L	U	N	O	N
S	O	L	U	B	L	E		A	P	R	I	O	R	I
A		D		E		A		C	A	S	A		A	D
L	O	S	T	D	U	T	C	H	M	A	N		T	E

## 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.

**March 26-27, 2011:** 42nd Annual Gem & Mineral Show sponsored by the Che-Hanna Rock & Mineral Club, Athens Township Volunteer Fire Hall, Sayre, PA  
[www.chehannarocks.com/show.html](http://www.chehannarocks.com/show.html)

**March 26-27, 2011:** 33rd Annual Gem-Mineral & Jewelry Show sponsored by the Franklin County Rock & Mineral Club. Shalom Christian Academy, Chambersburg, PA.

**April 2-3, 2011:** Annual Mineral Treasures and Fossil Fair sponsored by the Philadelphia Mineral Society & Delaware Paleontological Society. LuLu Temple, Plymouth Meeting, PA.

**April 14-17, 2011:** Rochester Mineralogical Symposium, Radisson Hotel Rochester Airport. Discounted registration before March 15.

[www.rasny.org/MinSymposium/MineralSymp.htm](http://www.rasny.org/MinSymposium/MineralSymp.htm)

**April 30- May 1, 2011:** 39th Annual NJESA Show sponsored by the Franklin-Ogdensburg Mineralogical Society in conjunction with the NJ Earth Sciences Assoc. and Sterling Hill Mining Museum. Franklin School, Franklin, NJ

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

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

## 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](mailto:dreinhold1@comcast.net) \*

### GeoSudoku solution from page 6

N	L	H	T	A	E	S	I	O
O	S	A	N	I	L	T	H	E
T	E	I	O	S	H	A	L	N
I	O	L	E	N	T	H	S	A
A	N	S	L	H	I	O	E	T
F	H	T	A	O	S	I	N	I
L	T	O	H	E	N	I	A	S
H	I	N	S	T	A	E	O	L
S	A	F	I	L	O	N	T	H

### 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!

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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. 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.