Nittany Mineralogical Society Bulletin

Nittany Mineralogical Society, Inc.
P.O. Box 10664
State College PA 16805

April, 2008 **www.ems.psu.edu/nms/** *Editor: David C. Glick (see p. 8)*

April 16th meeting:

Upper Paleolithic Caves and the Artists that Used Them

by Dr. Dean Snow

Our April meeting will be held Wednesday the 16th at 7:30 p.m., in the room 114 auditorium of Earth & Engineering Sciences Building on the west side of Penn State's University Park campus in State College, PA.

6:30 to 7:30 p.m.: Social hour, refreshments in the lobby
7:30 to 8:00 p.m.: announcements; door prize drawings about 8:00 p.m.: featured program

The event has free admission, free parking, free door prize drawings and free refreshments, and is open to all – please come and share an enjoyable evening! - - Editor

Caves in France and Spain have been widely known for their prehistoric wall paintings since the nineteenth century. Most of this art was made on the order of 20,000 years ago. The caves are of geological as well as archaeological interest. In addition, the minerals used as pigments by the ancient artists have attracted the interest of modern science.

Among the many motifs of Upper Paleolithic art are stencils of human hands, probably those of the artists that also painted images of game animals on the cave walls. Recent research in biological anthropology has shown that male and female human hands are sexually dimorphic. That raises the possibility of determining the sex of each of the individuals who left hand stencils behind in the caves. Dean Snow's research has shown that contrary to previous assumptions women dominated in the production of at least these examples of cave art. His research also reveals that hand dimorphism was more pronounced 20,000 years ago than it is today. ❄

ATTENDING THE APRIL MEETING?

This event is free and open to all - bring a friend!
Donations of door prize specimens are invited.
Grand door prize drawings will resume.
Your additional snacks will be welcomed.

JUNIOR ROCKHOUNDS

by Dr. Andrew Sicree

Next Meeting: Monday, April 21

Junior Rockhounds will meet in room 117 Earth & Engineering Sciences Building on Monday evening, April 21st, at 7:00 p.m. The **April 21st** program topic will be announced on our web site when we know it.

A **volunteer is needed** to present the program in **May**, on a date of your choice, perhaps Monday May 19, or at 6:30 p.m. on our regular meeting night, Wednesday May 21. We can provide materials and ideas. If you're interested, you could participate in the April meeting as a starting point. ❄

May 21st regular meeting:

Minerals on Postage Stamps

Frank Kowalczyk is preparing an illustrated talk on this interesting subject. Come out and enjoy our final meeting of the spring season! ❄

NITTANY GEM AND MINERAL SHOW
JUNE 28 - 29, 2008
NEW LOCATION
PARK FOREST MIDDLE SCHOOL

By David Glick, Show Chair

Now that other events are over, we will be working hard on preparing for the Show. We are behind schedule. Please help by contacting me to volunteer for some aspect of publicity, transport, set-up/ clean-up, or staffing the food service, registration, silent auction, demonstration, or kids' activity areas. It all depends on you. We can use donations of a few good specimens for the silent auction, and displays to be set up inside our display cases. Suggestions of dealers for us to contact are welcomed. See page 3 on consignment sales.

Our third annual show is set for June 28-29, with set-up all day on Friday the 27th. Please mark your calendars and tell your friends! The location this year is Park Forest Middle School, on the north-west edge of State College, once again not hard to find from the 4-lane US Route 322 (future I-99). ❄

Field Trip Procedures

from Ed Echler

We are looking forward to an active collecting season. Here is a review of our procedures.

1. Get on the notification list

Our procedure is to notify interested members of field trips by e-mail, or by telephone if they don't use e-mail, when the trip schedules become known. If you aren't already on the list, contact NMS Field Trip Chair Ed Echler at eechler@comcast.net (preferred) or 814-222-2642.

2. Sign up for specific trips in advance

Please **let Ed know in advance if you plan on attending** a particular trip, so that he can make proper arrangements with the quarry owner. For insurance reasons, you must be a paid-up NMS member to enter the property on a field trip. Also, quarries require basic safety equipment in order to access the collecting areas; see below for the list. **Gloves** are a very good idea, and specific **hand tools** like sledge hammers and cold chisels are needed depending on the specific location.

3. Follow these FIELD TRIP GUIDELINES

1. **The following equipment is MANDATORY** for access into any quarry and most collecting trips. You will not be permitted to enter without these items.

- **a. Hard hat**
- **b. Sturdy leather work boots. NO sneakers. Steel-toed boots are always best and will be REQUIRED at many locations.**
- **c. Long pants. NO shorts.**
- **d. Safety glasses/goggles.**

2. **Be on time, and sign in.** More and more quarries will require us to receive instruction concerning their specific property before we enter. We require our attendees to sign in with the field trip leader.

3. Please stay away from the quarry high walls. Unstable areas in active quarries are common and in most cases not marked. These areas will fail without warning.

4. Please respect the rules and regulations established by the quarry owners. We are their guests.

5. The field trip coordinator, designated safety persons, and/or quarry staff have final say in regards to safety issues. If in doubt about the safety of a collecting spot, please ask.

6. Due to liability, quarries have a minimum age for those entering their property. It's usually 16 to 18, and will be in the individual trip announcements.

Locations:

Our first trips are being set up for Hanson's **Curtin Gap** Quarry near Bellefonte, and National Limestone's **Mount Pleasant Mills** quarry. Contact Ed for more information.

We are working on plans to visit: National Limestone's quarry at Middleburg; Cornwall; Meckley's (spring open house for clubs only, and fall open house which allows children); and Montour Preserve for fossils, a good trip for children.

We also hope to return to other Hanson quarries (Salona, Pine Creek, and Oak Hall) which we have visited in the past. ❄

CONSIGNMENT SALE AT OUR SHOW

Any member who would like to sell a limited number of minerals, fossils, rocks, lapidary, jewelry, equipment, or related items should contact Willard Truckenmiller to make arrangements. Willard will be available after May 22, by e-mail at jowilltruck@aol.com or phone at 814-625-2531.

NMS will collect sales tax and will charge a commission on each sale. Items will need to be priced (including commission) and properly labeled, and NMS will add and collect sales tax when an item is sold. The commission fee will be used for show advertising and expenses. However, any junior member may sell up to 10 items without paying any commission. This will be in the style of a consignment store, with a clerk to help the customers, not mini-booths staffed by their sellers. *-Editor*

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.

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 April issue announces that the 2008 Citation Award recipient is Reivan Zeleznik. The successful convention in Jackson, MS is reviewed, along with the various awards to individuals or clubs which were announced or presented there.

The 2008 AFMS Scholarship honoree for the Eastern Federation region is native Pennsylvanian and Penn State alumnus Prof. Arthur M. Hussey, now retired from Bowdoin College in Maine. Bob Livingston's series of three articles on rejuvenating a club concludes. The dates for the 35th year of EFMLS workshops at **Wildacres** will be April 18-24 and Sept. 8-18, 2008. It's not too late to sign up for the September session. See the schedule and class topics on the web site. Safety chair Jim Doran's article reminds us to obey safety rules, even if others don't always set the best example.

The AFMS Newsletter is available by the same methods. In the April issue, Fran Sick's article has some less common methods for public outreach, notable donation of mineral and geology books to local libraries and school libraries. The six regional honorees for the AFMS Scholarship are noted. The deadline for signing up with your Federation for the Tri-Federation Rockhound Rendezvous and Field Trip (May 21-26 in Nevada) is May 16. Various ways to implement the Future Rockhounds of America programs, including the badge program, are presented.

Please see the web sites for the rest of these articles and many others in both Newsletters. There's a lot there! - *Editor*

Accomplishments!

President's message from Dave Glick

Thank you to all of the volunteers and contributors for your many and varied efforts in making **Minerals Junior Education Day** a success on April 5th. I believe that things went quite smoothly, and we had many positive comments from people on their way out. This event fits perfectly in our mission of providing education and encouraging interest in minerals and the earth sciences, and we can be pleased and proud that we do it well. Look for some new photos of the event on our web site soon.

The count of attendance cards was 305, just a few less than last year, and enough to keep things busy through the day. We had co-sponsorship in various combinations of money, materials and personnel from Junior Museum, GPAA, and Penn State's Earth and Mineral Sciences Museum. Members and non-members contributed a great deal of valuable material to be handed out at the stations and sold at the sales table. We are very grateful for all of that support; again, thank you. Expenses were significant, but we will come out ahead because of the many donations.

That leaves our third annual **Nittany Gem and Mineral Show**, coming up on June 28-29, as the remaining big event. **Volunteers are needed** for every aspect; see page 1. To volunteer or find out more, please contact Dave Glick at 814-237-1094 or xidg@verizon.net Thank you!

Last month I reported that we had applied for recognition of 501(c)(3) **tax-exempt status** at the end of January. We expected to wait several months before any response. The IRS surprised us by providing that recognition in just under two months! This will allow donors to deduct contributions on their income tax, and allow NMS to apply for various benefits and grants.

Speaking of donations, although it took a while, the NMS Board decided to donate to the American Federation of Mineralogical Societies' Scholarship Foundation, in memory of **Jay Lininger.** Jay's enthusiasm and expertise in Pennsylvania minerals and mining history was of benefit to everyone involved in the hobby. Less than six months before his death in October, 2004, he presented two programs on Pennsylvania mineral localities to the NMS. One was our May program on Charles Wheatley's mines and minerals. The other was as keynote speaker, on some historic collecting localities, at our June symposium on Minerals of Pennsylvania.

The donation is recognized in the April issue of the EFMLS Newsletter. We donated at what they call the 200% level, meaning $2 per member. Other clubs have, by donating over many years, reached levels of thousands or over ten thousand. This was our first donation to this program, and I hope that we will continue to donate. ❄

A Memorial for

DONALD T. HOFF

MINERALOGIST, EARTH SCIENTIST, CURATOR, AND FRIEND

By
Bob C. Smith, II and Bob Ganis

Donald T. Hoff of Harrisburg, Pennsylvania, was the retired Earth Science curator for the William Penn Memorial Museum. During his lengthy tenure, he organized excellent mineral displays as well as an extensive and well referenced collection of minerals from Pennsylvania. However, Don did not restrict his efforts to just mineralogy. He was also well known for the excavation, recovery, and display of a Pleistocene mammoth from a peat bog in Pike County and Triassic reptiles and giant amphibians in York County.

Don was especially interested the native copper and piemontite occurrences in the South Mountain region of Adams County and in uranium minerals from throughout Pennsylvania. Beyond Pennsylvania, he was interested in minerals from Bancroft and Cobalt, Ontario, the "north country" in general, and Franklin, New Jersey. He coauthored a report on copper and uranium minerals in Lycoming and Sullivan counties, Pennsylvania, with Bob Smith that was published by the Pennsylvania Geological Survey. When funding for batteries for his Geiger counter or ultraviolet light were slow in coming, Don was known to have a guard clean out the Carboniferous swamp exhibit in the Hall of Geology and use the coins so retrieved to purchase research supplies. Also with Smith, Don wrote up some articles on Mesozoic copper occurrences in Adams County. Don was widely recognized as the regional guru on such deposits and helped Bob Smith and Sam Berkheiser write them up on a state-wide basis for the U.S. Geological Survey, Smith having been asked by friends at the U.S.G.S., Al Froelich and Dave Gottfried, to do such for a USGS circular. Sam Berkheiser, Don, and Bob proceeded to sample, analyze and write up the occurrences with great haste. At first, Bob was a little disillusioned with a letter that he received from an editor at the USGS that their format wasn't quite what the USGS was used to in its flagship Bulletin series. It seems that Al and Dave's project had escalated a bit, but with editing help from John Barnes of the Pennsy Survey and Art Rose of Penn State the report was accepted into the U.S. Geological Survey Bulletin Series with no less than the auspicious number of 1776! Don also wrote the chapter on mineral resources, such as talc, serpentine, asbestos, feldspar, graphite, corundum, mica, vermiculite, beryl, barite, phosphate, rock salt, metabasalt, and gemstones for the Survey's definitive volume "The Geology of Pennsylvania." Don probably most enjoyed writing his article on the Teeter Quarry, Gettysburg, published by Rocks and Minerals. He was one of the first to recognize a small copper-rich zone akin to a Cornwall-type deposit complete with microscopic trace native gold-electrum. As far as is known,

Don is the first person to have ever recognized such in bedrock in the Commonwealth, a fitting tribute to his powers of observation.

Don did everything he could to support the interests of rock, mineral, and fossil collectors in Pennsylvania. Doing so, he was careful to build on the work of his predecessor at the William Penn Museum, Johnny Whitoff. Don, however, had little truck for pretensions. Thus, when the name of the museum was changed to "The State Museum of Pennsylvania," Don only went along with the change when absolutely required and was not above referring to the institution, with great respect, to the administration and coworkers in other sciences and the arts, as simply the "Willy Penn" museum. In the mid-1970's Don completed his monumental "Hall of Geology" at the Willy Penn, a lasting tribute to his enormous range of geologic interests. Many young collectors and geologists owe their start to Don. Bob Ganis credits Don with restarting his career in geology after a tour in Vietnam. Don gave Bob a summer job helping to excavate Triassic reptiles along Little Conowingo Creek. Their time spent excavating and preserving was the beginning of a long and treasured friendship. It was through the generosity and help of Don that Professor Emily Giffin Buchholtz, Wellesley College, jump started her paleontological career at the Willy Penn. There are countless others that thank Don for his assistance and tireless enthusiasm for all things geologic.

Don was a very active member of the Harrisburg Area Geological Society, also known as HAGS. He helped arrange meeting facilities for them at the museum for many years. He was also instrumental in helping to organize their geological megatrips to Iceland and the Grand Canyon. As long as health permitted, Don attended the annual Field Conference of Pennsylvania Geologists. He was one of the major contributors to the "43th" Field Conference as researcher, writer, and leader.

Don was a geology graduate of Waynesboro College, Pennsylvania, but his interest in mineralogy had begun earlier with collecting in Pennsylvania and Ontario in the company of family. Whether at Waynesboro College or self taught, Don was an expert with qualitative tests used in mineral identifications. When he brought an unknown mineral to the Pennsy Survey for positive identification by X-ray powder diffraction, he typically already knew that it contained Ni, Ca, or whatever. His visual identifications of most minerals was already correct and those for rare minerals typically on the right track for cations and anions.

Don was an enthusiastic story teller and tended to attract an expanding audience once a saga had begun. Working with Bob Smith on the Sonestown Picture Rocks Cu-U project, breakfast was always enjoyed in the partly converted front living room of an elderly woman they referred to as "Ma." Once Don began a story, the rest of the patrons hushed one another so they could all hear. One morning, this particularly impressed Bob as they had just hushed their own discussion about a current Mideast war to hear about a local beehive being knocked over by a bear to immediately hushing themselves again to hear what Don would have to say! Don was always careful about the crowd he fraternized. Once when a local sorority had a dinner meeting at the only available place in reasonable distance for Don and Bob to have an evening meal, and having dispensed with the secret password and oath because of our presence, the ladies came over and asked us to stay for their dance lessons. As soon as they were out of earshot, Don uncharacteristically whispered "Eat fast, Bob, we've got to get out of here." Don's enthusiastic focus wasn't without its dangers. Once while poring over an inaccurate topographic map on the hood of a Jeep CJ-5, Bob S. had to point out to him that: "Don, you know I don't believe in horseplay. … You are standing on a *small* rattlesnake. … Please stay still until I can get my hammer out." In addition to geological expeditions, stories might wax poetic on the high quality of the olive oil on potato salad in Spain where he had toured with a group of singers or the problems encountered dealing with immense quantities of peach fuzz from commercial orchards in Adams County. Don also liked the sounds of certain complex words. He would use them, listen to the sound he had just made, and beam with a smile. His enthusiasm in his field studies for the Museum was contagious and typically resulted in remarkable cooperation. One landowner gave up their collection of dinosaur footprints in their home patio for the museum as a result of him simply chatting while making a purchase of cider at a roadside stand. On another occasion, he extolled the Willy Penn at a stand where he bought a lowly hot dog. The owner invited Don to pan for gold on his property in Canada, which Don did with moderate success. On a few occasions, the extent of cooperation resulting from Don's being an ambassador for the Willy Penn surprised even Don. Don thought an exhibit of gold at the State Museum would help draw youth and be of interest to mineral collectors. Even he was surprised when the Royal Ontario Museum sent their "loaner" samples in an armored car. The U.S. National Park Service couldn't resist Don's enthusiasm for the gold exhibit either. They granted him and two field assistants a one-day permit to dig gold and artifacts for the exhibit at a property near Washington, D.C. The crew found some well used fire assay crucibles, a lot of contaminant mercury, but little gold at the expected spot. Fortunately a 4' x ½' trickle nearby yielded enough fine placer gold. Don was almost fanatical about accurately documenting samples and expeditions. When a later book by others claimed to have some photos of gold panning in Pennsylvania, he was able to provide *triplicate*, fully labeled color slides proving the site was really near Washington, D.C.. Don always seemed happy when discovering something new, but would become happier still when sharing the specimens or data with other institutions and research.

Memorial contributions may be sent in Don's memory to:
Field Conference of Pennsylvania Geologists
3240 Schoolhouse Road
Middletown PA 17050-2721
where they will be used to subsidize registration fees for students attending the Conference. ❄

POPULAR MINERALOGY

Mineralogy and earth science for the amateur mineralogist and serious collector - #11

Meteors, Meteoroids, and Meteorites: Rocks from Outer Space

by Andrew A. Sicree

Rocks fall from space

Rocks from outer space pelt the Earth's atmosphere incessantly. A small percentage of these rocks survive entry into the atmosphere and land on the Earth. These are the meteorites.

We may confuse the terms meteor and meteorite. A *meteor* is the streak of light made when an extraterrestrial object enters the Earth's atmosphere. A *meteorite* is a rock from outer space that has survived the passage through the atmosphere and has dropped onto the Earth. We use the term *meteoroid* for an asteroid moving through space that is a "meteorite-to-be."

The world's fastest rocks

Moving through space at velocities exceeding 60,000 miles per hour (about 25 kilometers per second), meteoroids hit the upper atmosphere. Friction between the rock and the gas molecules in the atmosphere begins to slow the rock. The meteoroid is rapidly heated to the point of becoming incandescent. We see the glowing rock as a bright, rapidly moving streak of light: a meteor.

Billions of small meteoroids hit the atmosphere every day. Most of these are too small to see. The very smallest objects don't burn up but rather slowly drift downward as a constant rain of cosmic dust. Most meteoroids range from the size of a pea downward to a few thousandths of an inch in diameter. These small meteorites are usually completely burned up upon entry into the Earth's atmosphere.

Some rocks survive the plunge

If a meteoroid is big enough, perhaps the size of a walnut or larger, it might survive the fiery passage through the atmosphere. Because the rock is moving so fast when it hits the atmosphere, its exterior will be heated and charred, and the object will slough off some mass as it slows down. Typically, a thin black "fusion crust" forms.

As the rock slows down, it drops lower in the atmosphere and ceases to glow. Air resistance continues to brake the object. While the rock is moving faster than the speed of sound (about 770 mph), it will produce a sonic boom. Once it is slower than sound it falls to the Earth quietly, although lucky bystanders may hear a "swoosh" or rhythmic sound as it rotates or tumble through the air.

Once on the ground, our rock from outer space officially becomes a meteorite.

Common meteorite types

In broad terms, meteorites can be divided into two groups: the stones and the irons. As the names suggest, the iron meteorites are mostly made up of metal, and the stony meteorites consist of mostly "stone" which in this case means silicate minerals. Other types also exist, such as the stony-irons, or the Martian or Lunar meteorites.

Typical stony meteorites are rocks that consist of mostly of iron magnesium silicate minerals such as olivine, $(Fe,Mg)_2SiO_4$, and pyroxenes, $(Fe,Mg,Ca)SiO_3$, with some small fraction of iron-nickel metal.

The chondrites

The most common stony meteorites are the chondrites. Most meteorites that hit the Earth are "ordinary chondrites." One characteristic of many ordinary chondrites is the presence of small spherical inclusions called chondrules. The chondrules are usually made up of olivine and pyroxenes like the surrounding ground mass. A cut section of an ordinary chondrite shows chondrules as small (usually 1-2 mm in diameter) disks. The abundance of chondrules and the crispness of their edges are used to classify the ordinary chondrites.

, Other chondrite classes include enstatite or carbonaceous chondrites. Carbonaceous chondrites are of particular interest to scientists because they have plentiful carbon and may play a role in the presence of life elsewhere in the Solar System.

The irons

Iron meteorites are mostly iron-nickel. Nickel is the minor constituent and makes up from about 1% to 25% of the mass. A few other minerals such as troilite (FeS), schreibersite, $(Fe,Ni,Co)_3P$, or graphite occur as inclusions within the metal. Iron-nickel is really a mixture of two closely related iron-nickel minerals. Kamacite is the lower-nickel phase and taenite is the higher nickel phase.

The irons can be classified structurally on the basis of the size of their kamacite/taenite grains. For instance, the "octahedrites" range from coarsest through coarse, medium, fine, and finest, to plessitic. Then come the ataxites in which the crystals are so small that the metal appears to be structureless. The famous "Widmanstätten figures" of iron meteorites can be seen when you etch a polished surface with nitric acid in alcohol. Because the low-nickel phase (kamacite) is attacked by the acid more readily than the high-nickel phase (taenite), the acid tends

to etch the surface differentially and thus show the crystal texture of the metal. This is similar to the way an old antique brass doorknob will show a "chunky" pattern; the sweat from people's palms has etched the brass over many years of use.

The stony-irons

The stony-iron meteorites are mixtures of iron-nickel metal with iron magnesium silicate minerals. The pallasites are primarily iron-nickel and olivine – thus they have a texture in which blebs of green or yellow-green olivine crystals are suspended in a matrix of metal. The mesosiderites are breccias of metal mixed with stony minerals such as plagioclase or pyroxenes.

Other types of meteorites

Other types of meteorites have been found. These do not fit neatly into the groups of irons, stony-irons, or stones. Among these are the "SNC" meteorites. The S stands for shergottite (the name of the meteorite that fell in1865 near Shergotty in India), the N stands for nakhlites (after Nakhla, Egypt – the meteorite that fell there in 1911 is reputed to have killed a dog), and the C stands for chassignite (a meteorite that fell near Chassigny France in 1815). Currently, there is general agreement that these meteorites came originally from the planet Mars. How did these Mars rocks get to the Earth? They were lofted into space with enough velocity to escape Mars' gravity when a large asteroid hit the planet's surface. As one might suspect, SNC meteorites can be quite valuable.

It is interesting to note that although meteorites fall onto the Earth's surface more or less randomly, there are some spots where the collecting is better than others. Many meteorites have been recovered from Antarctica. Meteorites that fall on the glaciers tend to be preserved and concentrated in select areas by the flowing ice. Deserts also preserve meteorites. Many hundreds of meteorites have been found in the Sahara Desert by nomad tribesmen.

Weird Geology

Minerals in the Circus Maximus

The ancient Romans really knew how to throw a party. During the Imperial period, one of the occasional extravagances was to blanket the floor of the Circus Maximus in Rome with powders and glitters made from crushed minerals.

They used red lead (also called minium or lead tetraoxide) to get a bright red or orange color, and malachite to give a green color to the arena floor. Even more extravagant was the use flakes of crushed mica to make the floor glitter.

The Circus Maximus is an oval-shaped arena capable of seating about 300,000 people. Given that the floor area is about 80 by 370 meters (or more than 30,000 square yards), it is hard to comprehend the huge amount of mica or malachite needed to color the floor. But it would have been quite spectacular to watch chariot races where clouds of dust kicked up by the horses glittered wildly in the sun.

Ref: *Rome Past and Present*, anon, p 40 (Vision, Rome 1962)

Meteorite or "meteor-wrongs"?

You are out in the desert, the sun is burning down and a cloud of gnats encircles your head. You look down and there is the black rock you've been looking for. "At last," you think, "a meteorite!" With one ear peeled for the buzz of a rattlesnake, you reach down and pick up the rock. The search has been worthwhile, but you wonder, "Is it really a meteorite?"

Do I have a meteorite?

The vast majority of rocks that people pick up thinking they are meteorites are really "meteor-wrongs." Even experts can be fooled by some badly-misshapened chunk off an old miner's sledge pick.

Simple guidelines for determining if that black rock really is a meteorite:

Is it magnetic? Magnetism is one simple test. Because many (not all!) meteorites have some iron-nickel in them, they often are magnetic. I'm not talking about stick-to-the-frig magnetism, but the kind of magnetism that will tug at a small hand-held magnet or deflect a compass needle.

Does it have a black exterior? A fusion crust forms during the passage through the atmosphere. This is typically dark black with a somewhat melted or fused surface texture. If the meteorite has been weathered heavily after landing, the fusion crust may be crumbled or worn away. Be aware: "desert varnish" can give other rocks a dark brown exterior.

Is the interior metallic? If you break or grind open a fresh interior surface, it may be lighter in color than the fusion crust. If it is metallic inside, you may want to test for the presence of nickel. Etching may reveal the Widmanstätten pattern – only meteorites have it visible to the unaided eye. Stony meteorites will usually have small flecks of metal disseminated in the rock. Don't be fooled by flakes of mica. If you push a knife point into a flake of metal it will bend – mica and other mineral grains will tend to crumble.

Is it unexpectedly dense? An iron meteorite will be much denser than you expect for a rock of its size. A stony meteorite will be closer to the density of the "average" rock.

Does it have a lot of small holes in it? Although meteorites can have some pits and a few holes, a specimen with many fine holes or vesicles in it is usually a "meteor-wrong." Slags and clinkers from smelters and furnaces may be black, dense, magnetic, even metallic, but the presence of many small holes inside the specimen indicates that it came from a furnace. Meteorites are rather compact.

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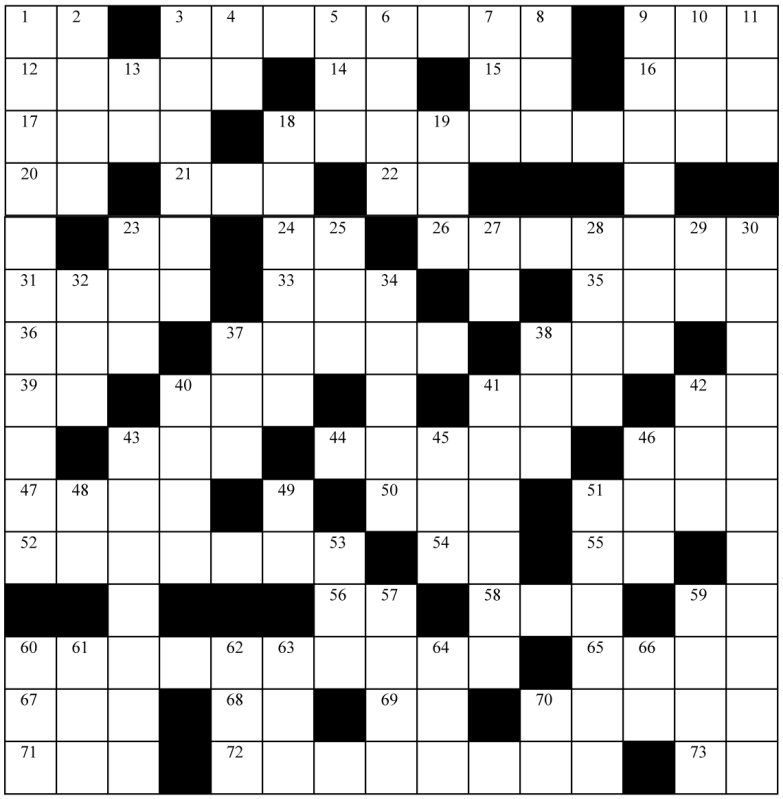
*Dr. Andrew A. Sicree is a professional mineralogist and geochemist residing in Boalsburg, PA.. **Popular Mineralogy** provides technical answers to your general mineral questions. If you have a question you'd like to have answered, please send email to sicree@verizon.net This newsletter supplement may not be copied in part or full without express permission of Andrew Sicree. Write P. O. Box 10664, State College PA 16805 or call (814) 867-6263 for more information.*

Crystal Matrix Crossword

Mineral Properties



ACROSS

1 frequency modulated
3 salts go into _____
9 important road
12 long and slow
14 do, re, mi, __
15 Mesopotamian river
16 Pirate's yes
17 Arab ruler
18 not the most useful property
20 hug, kiss
21 skinny fish
22 car bumper element
23 __ one
24 one again
26 double refraction is an __ property
31 Dana is a good reference ___
33 boxer
35 tribe
36 positive or negative
37 used to roast ore
38 for cooking
39 opposite of right hand
40 day after Monday
41 trendy
42 artificial intelligence
43 calls kettle black
44 inert welding gas
46 son of
47 Russian king
50 ___ the Season
51 a name you can trust
52 like a rare earth element
54 Nova Scotia
55 selenium
56 inert noble gas
58 the tax man
59 Old Country
60 talc is softer than our
65 leader of an abbey
67 the Rebels
68 Mountaineer state
69 not applicable
70 replaced silk
71 cosine
72 Mohs scale of ____
73 the Extraterrestrial

DOWN

1 mica has ____
2 send me a ____
3 test for the true color
4 sound of surprise
5 flying saucer
6 soft silicate
7 yours and mine
8 gun guys
9 asbestos needs a ____
10 square state
11 Japanese dollar
13 in backwards
18 a way minerals break
19 gold
23 long time
25 a good beer
27 precious silvery metal
28 alligator clothes
29 common light metal
30 heated fluorite is _____
32 exclamation
34 noble gases are
37 not in
38 Greek god of shepherds
40 vacuum unit
41 preserved animal
42 anti-ballistic missile
43 rusts on native silver
45 goes with tonic
46 solid water mineral
48 street
49 copper
51 used to find gold content
53 "see the ___"
57 South African coin
59 deep wind instrument
60 radio control group
61 film speed
62 ethyl alcohol (ab.)
63 like DNA
64 boy's name
66 black
70 not seen

LAST MONTH'S SOLUTION: Egypt

***CORRECTION:** The March crossword grid had an error. 1-across should have had two letters, followed by one black square with 13-down below it, followed by 3-across with 8 letters. A corrected blank grid is in the March issue on the web site.*

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

Some Upcoming SHOWS AND MEETINGS

Our web site http://www.ems.psu.edu/nms/ has links to more complete lists and details on mineral shows and meetings around the country.

April 19 - 20, 2008: Gem, Mineral & Fossil Show, by Monongahela Rockhounds. Sky View Fire Hall, 640 Noble Dr., West Mifflin, PA. 15122 (near Century III Mall and the Allegheny County Airport). Dealers, faceting demonstration, food and beverages, door prizes. Children's activities 12:00 - 2:00 each day; free mineral identification 10:00 - 11:00 and 2:00 - 3:00 each day. Sat. 10:00 - 6:00, Sun. 10:00 - 4:00. Free admission! See http://www.monongahelarockhounds.org/

April 26 - 27, 2008: 36th Annual New Jersey Earth Science Assn. Gem & Mineral Show, by Franklin- Ogdensburg Mineralogical Soc., NJ Earth Science Assoc. & Sterling Hill Mining Museum. Franklin Sch./Washington Av; Franklin, NJ.

May 3 - 4, 2008: Annual Show & Sale by The Mineralogical Society of Northeastern Pennsylvania. Oblates of St. Joseph, 1880 Hwy. 315, Pittston, PA 18640. Sat. 10:00 - 5:00, Sun. 10:00 - 4:00.

May 21 - 26, 2008: Tri-Federation Rockhound Rendezvous, Texas Springs, Nevada. 4 to 6 different sites: pink limb casts, small limb casts and bogwood, snakeskin agate, jasp/agate limb casts, geodes, and more. Daily collecting trips, potluck dinners, daily Happy Hours, evening campfires, map exchange and tailgate displays. All AFMS members welcome. See Nov. AFMS News, www.amfed.org

June 28 - 28: Nittany Gem and Mineral Show, State College, PA. See page 1.

Sept. 24-28, 2008: AFMS and South Central Federation Convention and Show, Humble, TX. www.amfed.org/show2008.htm

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INVITE A FRIEND TO JOIN THE SOCIETY

The Nittany Mineralogical Society prides itself on having the finest line-up of speakers of any earth sciences club in the nation. 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, 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!

For sale / trade: Equipment & Materials

TRADE for ROCK/MINERAL SPECIMENS (or free if you ask nicely ahead of time!): 35 mm film canisters, clear or black and great for storing small stuff. E-mail with the color and quantity you'd like (I've got 3 buckets full) and I'll bring them to the next meeting. Tim Holtz, stamprockcoin314@hotmail.com

Mineral Business and personal collection for sale (hundreds of specimens plus supplies and equipment included). Call Terry at 570-672-2325 Mon. - Sat. 9:00 a.m. - 11:00 p.m. If I'm not there, leave a message.

For sale: Very large collection of gemstone material, prefer to sell as one lot; including much 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 570 748-3201 after lunch every day, or e-mail: dreinhold@suscom.net ❄

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Publicity: Volunteers needed

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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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 the name of the photographer or artist