May 19th meeting (change of topic):

A Collector’s View of Quartz Morphologies
presented by
John Passaneau

Our May meeting will be held Wednesday the 19th in the room 114 auditorium of Earth & Engineering Sciences Building on the west side of the Penn State campus in State College, PA. Maps are available through 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 share an enjoyable evening. -Editor

John writes: “Quartz is a common mineral that every collector is familiar with. But it’s also a complex mineral with many different forms, and the details of its many forms make it an interesting mineral for the collector to study. This overview of the morphology of quartz will help increase a collector’s appreciation of quartz specimens.” Quartz is one of John’s collecting specialties, and the talk will feature some of his excellent, detailed photographs.

Nittany Gem & Mineral Show CANCELED
By David Glick, Show Chair

We regret to announce that our 2010 show, scheduled for June 26-27, has been canceled. Please pass the news along so that no one makes a trip to attend a non-existent show. See page 3.

Junior Rockhounds Meeting May 27

Junior Rockhounds meetings are scheduled for 7:00 p.m. on the fourth Thursday of the month, January through May, so the final meeting for the season will be on May 27. The location is room 118 of Earth & Engineering Sciences Building, on White Course Drive, Penn State’s University Park “West Campus,” with free parking.

We hope to continue Junior Rockhounds in the Fall, depending on the schedules of those involved; please watch our Bulletins and e-mails for news.

ATTENDING THE MAY MEETING?
Donations of door prize specimens are invited. NMS will provide ice, soft drinks, and water; your donated snacks will be welcomed.
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 website [www.ems.psu.edu/nms/] or remind Dave Glick to bring a printed copy to a meeting for you to see.

The May issue reports that there are still openings for the Fall (Sept. 6-12) session at Wildacres. A registration form is on page 11 of that issue, and the detailed descriptions of classes were in their April issue. President Loren Patterson reviews some of the highlights of the EFMLS Convention and Show. The Minutes and Reports of the annual Board of Directors Meeting at that convention are included. Cathy Patterson provides the next installment in her step-by-step series on compiling an All American Club yearbook for the 2010 competition. Roberta Goldsmith, Junior Activities Chair, discusses ways for kids to have a real connection to a club’s adult activities. Nominations from clubs for their Club Rockhound of the Year are invited.

The AFMS Newsletter is available by the same methods. The May issue begins with illustrations of two new prizes in the 2010 Endowment Fund Drawing. President Emerson Tucker reports on the EFMLS Convention and Show in Delaware, the impressive display cases at the Show, the mineral display at the University of Delaware Mineralogical Museum, and the discussions about providing lesson plans and specimens to school teachers. Ideas on welcoming new members and providing complete information on one’s club and the federations in an organized manner are presented. There are reminders about the AFMS Convention (La Habra, CA, June 18-20) and the Blue Forest, WY All-Federation Field Trip (Memorial Day weekend). The Juniors article is about “Attracting Kids to Your Society” and the Safety article reminds us to be prepared for unexpectedly severe allergies in the field. An article on lapis lazuli, which was an entry in the AFMS Advanced Articles Competition, is reprinted. News on AFMS committees and the American Land Access Association is presented.

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

- Editor

MEMBERSHIP CARDS ENCLOSED

A membership card is enclosed with this mailing for each currently paid member in our records. If they are incorrect or missing, please contact Dave Glick (see page 8).

DISCOUNTS OFFERED TO MEMBERS

Pennsylvania mineral collectors Skip Colflesh and Scott Snavely are also jewelers and are offering discounts to NMS members: 20% on jewelry and 10% on repair services. They are also avid field collectors and have specimens for sale at 20% discount. Please contact them for details:

The Jeweler’s Bench, Inc.  The Jewel Box, Inc.
428 Hockersville Rd.  17 N 2nd St.
Hershey, PA 17033  Newport, PA 17074
www.jewelrequest.com  www.TJBjeweler.com
1-800-364-3147  717-567-6516

THE ROCKHOUND

by Ernie Hopfinger
via Diana Dare’s compilation on the 2010 SCRIBE CD

My back is tired, my hands are sore.
I’m digging slower than before.
At first I’m kneeling, then I sit,
I begin to think it’s time to quit.
From up the hill there comes a cry.
A new-found rock is held up high.
Whose back is tired? Whose hands are sore?
I’m digging faster than before!
Exploration Day at Penn State

Just a week after our Minerals Junior Education Day, NMS members participated with Junior Museum of Central Pennsylvania in presenting a large booth at the annual Exploration Day. Dr. Andrew Sicree organized the effort which included several different stations on properties of minerals and meteorites. The event’s web site at www.explorationday.psu.edu reports that “Exploration Day is a celebration of the spirit and opportunity of exploration and science at Penn State” with “hands-on activities in science, technology, engineering and math.” - Editor

NMS 15 Years Ago

In May, 1995, our meeting program was on uranium mineralogy and uranium-bearing minerals, by Dr. Deane Smith.

NMS Now! Facebook!

See our public Facebook page at <http://www.facebook.com/group.php?gid=293993550756>

Wood’s Chrome Mine Field Trip

We thank the organizers for including NMS with PESA, Friends of Mineralogy-PA and others in the opportunity to collect at the old Wood’s chrome mine in southwestern Lancaster County. This is one of the classic Pennsylvania localities, in an interesting metamorphic environment.

Participants reported that there was a lot of dirt but some interesting specimens, such as chromite, were indeed found. See the photograph at right.

- Editor

Nittany Gem and Mineral Show Canceled

and other thoughts from the president

by David Glick

Our contract (from October) with the State College Area School District allowed them to pre-empt us for school district-related uses of the same space. After several years of smooth operation of our Show at the District’s facilities, we didn’t imagine they would wait until less than two months before the event to do that, but they did. They informed us on May 7 that we would not be able to have the event at Mount Nittany Middle School as planned. They hoped that we could transfer it to the new and attractive Park Forest Elementary School, but the usable space there was just not big enough for us. The Board of Directors and others put a lot of effort into investigating other venues, but the few places in town suitable for the event were already booked.

Canceling the Show was a big disappointment, but was the only real option. Our immediate job now is to un-do the previous publicity so that no one is disappointed by making a trip to attend a show that isn’t there. If you know anyone who was considering coming to the Show, please help by letting them know that it has been canceled.

We want to sincerely thank the vendors who had paid their fees and made the commitment to be part of our Show, and the members who were working on Show-related projects. We regret this very significant inconvenience and offer our apologies. Of course fees are being returned.

The Board is considering other events which we might sponsor before next summer. We are also working on field trips, and do expect to have some success, but access to quarries has become much more difficult. Those interested should be on Field Trip Chairman Ed Echler’s e-mail notification list (see page 8).

Finally, I hope you’ll excuse the fact that this Bulletin is even later than usual; it’s been a crazy week. If your Bulletin ever comes through damaged, you’d like an extra copy, or a replacement for one that wasn’t printed well by my super-low-budget printing operation, just let me know.
**Survival in the Mines**

by Andrew A. Sicree

Hazards of mining

Mining is hazardous, but it is not nearly as dangerous today as it was a century ago. In the late 1800s and early 1900s, it was not unusual for America to lose thousands of men each year to accidents in the mines. Coal mines have always been particularly dangerous. In 1907, the worst year on record, coal mine fires, explosions, cave-ins, and other accidents claimed the lives of more than 3200 miners.

The U.S. has made tremendous progress in mine safety. Although we still lose miners on the job, the annual rate has dropped to a nation-wide average of about 30 deaths each year over the past decade. By comparison, modern-day China loses approximately 6000 coal miners each year to accidents. The U.S. fatality rate has dropped so low that a single accident can significantly boost the annual death rate. For instance, in 2009 there were only 18 on-the-job deaths in U.S. coal mines, but the recent (April 5th, 2010) explosion in a coal mine near Montcoal, West Virginia, left 29 dead. Thus, the 2010 death rate will be more double that of the year before – a stark reminder that mining is still a dangerous occupation.

Death in the air

Underground fires and explosions are major causes of mining fatalities. Both underground fires and explosions can fill a mine with dangerously high levels of carbon monoxide (CO), a colorless, odorless and very poisonous gas. Typically, a mine fire or explosion occurs because coal dust or methane in the mine atmosphere ignites. But combustion us typically incomplete so that carbon monoxide (CO) is produced along with carbon dioxide (CO₂), the more typical combustion product. Carbon monoxide can reach out strike down underground miners even though they may be a mile or two distant from the site of an underground fire or explosion.

Each year, about 1500 Americans are accidentally killed by exposure to dangerous levels of carbon monoxide. Only a small percentage of carbon monoxide victims are miners. Many fatalities happen in homes with blocked, leaky, missing, or improperly installed vents for furnace or fireplace flue gases.

The problem for the miner lies in the fact that there are no underground windows to open and jump out; a miner has to breathe whatever is in the air in the mine.

How does a miner breathe in a fire?

You have to breathe, and it is a long walk (or climb) out of the mine. If you survived the initial explosion or fire, can you make it out alive? A variety of “rescue” devices have been invented to save miners in this situation. The primary danger comes from carbon monoxide, but miners may also face an oxygen-depleted atmosphere as they escape from a burning mine.

Why not simply carry an air tank the way SCUBA divers or fire-fighters do? The primary problem is weight: an hour-long supply of air in a heavy metal tank simply weighs too much for the miner to carry it around all day. (A SCUBA diver can do this because the buoyancy of water makes the tank feel lighter.) A 30-minute air supply tank weighs more than 33 pounds (15 kg) and it can take two or three hours to walk out of many coal mines.

Early light-weight “self-rescuers” were essentially catalytic converters that worked similarly to the catalytic converter in your automobile. They contained a catalyst that promoted oxidation of carbon monoxide in the air into carbon dioxide. This strategy worked because the danger level for carbon dioxide – 4% or 40,000 ppm (parts per million) in air – is much higher than that of carbon monoxide – about 400 ppm in air for 15 minutes of exposure. Escaping miners breathed in mine air after it passed through the catalyst that changed carbon monoxide to carbon dioxide. For instance, air with 1000 ppm carbon monoxide, a dangerously high level, would get converted to about 1600 ppm carbon dioxide – a breathable concentration.
One significant drawback of these self-rescuers was that they got extremely hot when working. The heat could scorch a miner’s lips as he breathed through the mouthpiece. Not at all pleasant, but the miner dared not take the mouthpiece out of his mouth even if it was burning hot because he knew it was saving his life. Another drawback of the catalyst-based self-rescuers was that they could not produce oxygen. These earlier self-rescuers only worked if the mine air still had enough oxygen to support life even after a fire.

Sources of oxygen

Modern miners rely on the “self-contained self rescuer” (SCSR) to both protect them from carbon monoxide and provide them with an emergency oxygen supply. A typical SCSR weighs provides one hour of breathable air but only weighs about 5.7 lb (2.6 kg). The SCSR employs a fascinating chemical reaction that employs the miner’s own breath to produce breathable air.

The oxygen source for the SCSR is potassium superoxide, a rare and interesting chemical compound with the formula KO₂. You are very unlikely to find it in a jar on a shelf in your local chemistry laboratory because it reacts very rapidly with carbon dioxide, water, and even water vapor. This reactivity makes it uniquely useful.

As a powder, potassium superoxide is yellowish. It will react with either water or carbon dioxide to generate oxygen. Potassium superoxide reacts with water as follows:

\[ 2 \text{H}_2\text{O}(l) + 4 \text{KO}_2(s) \rightarrow 3 \text{O}_2(g) + 4 \text{KOH}(s) \]

Thus water plus potassium superoxide yields breathable oxygen gas and solid potassium hydroxide waste. (Incidentally, this vigorous reaction with water is one reason why SCUBA divers cannot use potassium superoxide as an oxygen source – it is practically impossible to keep the stuff dry underwater.)

When potassium superoxide reacts with carbon dioxide, the reaction is written:

\[ 2 \text{CO}_2(g) + 4 \text{KO}_2(s) \rightarrow 3 \text{O}_2(g) + 2 \text{K}_2\text{CO}_3(s) \]

In this reaction, carbon dioxide reacts with potassium superoxide to generate solid potassium carbonate and breathable oxygen. These reactions also release some heat, so the SCSR gets warmer if it is working properly, but not nearly the scorching heat of the earlier catalytic self-rescuers.

Use of the SCSR

After a mine fire or explosion, a miner should expect that poisonous carbon monoxide will be present in the mine air. He must put on the SCSR immediately. He clenches the breathing tube between his teeth and pinches his nose closed with a nose clip. After the miner blows his first breath into the SCSR, carbon dioxide and water vapor in his breath begin to generate breathable oxygen according to the above reactions. (Each SCSR also has a small supply of oxygen, but that only serves the miner during the first few breathes until the potassium superoxide kicks in.) Each exhalation causes the SCSR to produce more oxygen. To extend the range of the SCSR, oxygen is caught in a large air-tight bag which hangs in front of the miner and allows him to “rebreathe” the air.

Each SCSR will support a miner for about one hour. The actual amount of time the miner has varies based on body size, breathing rate, and physical exertion. If miners are working more than one hour’s walk from the mine entrance, the mine will have to place caches of additional SCSRs distributed throughout the mine. Miners walk to the caches, switch to fresh SCSRs, and continue walking toward the mine exit.

It is vitally important the every miner know how to use the SCSR properly. After carbon monoxide killed 13 miners in 2006 at the Sago Mine in West Virginia, some reports claimed that some of the SCSRs were not working properly. Subsequent investigations suggested that better training in their use was needed. Federal Mine Safety and Health Administration (MSHA) regulations were strengthened to require that each underground miner complete four practice sessions with the SCSR annually. Most miners will go through entire careers without ever having to deploy their SCSR, so these practice sessions are critical for keeping miners prepared to use their SCSRs if necessary.

Mineral collectors underground

Explosions and fires occur in mines because of the presence of methane gas, coal dust, diesel fuel, wood supports, and other flammable materials. Miners are required to carry SCSRs when underground, and visitors going underground must also carry SCSRs provided by the mine (SCSRs are rather expensive, and it is unlikely that visitors will have their own). Mine visitors undergo a training session that alerts them to hazards present down in the mine and also teaches them how to use the SCSR in an emergency.
Obviously, if a mineral collector goes underground into a closed or abandoned mine, he faces a number of dangers. Rock fall is a major danger. Bad air (oxygen depleted) is another danger. Mine fires may be less likely in an unoperating mine, but if an explosion or fire should occur while collectors are underground, it will probably prove fatal because they lack protective gear such as self-contained self-rescuers.

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Underappreciated Wollastonite

Because it is common enough, and is usually found in massive form, wollastonite is one of the less appreciated minerals. Wollastonite is a calcium silicate mineral (CaSiO$_3$, triclinic), although small amounts of iron, manganese, or magnesium may substitute for calcium in its structure. Although wollastonite crystals are found, its most common habit is in the form of bright white fibrous or cleavable masses.

The formation of wollastonite provides an excellent example of how metamorphism alters one mineral to produce another. It chiefly forms during contact metamorphism when hot silica-rich fluids encounter limestone country rocks. Calcite (CaCO$_3$, hexagonal) in the limestone reacts with the silica according to the equation:

$$\text{CaCO}_3 + \text{SiO}_2 \rightarrow \text{CaSiO}_3 + \text{CO}_2$$

Note that the reaction also produces carbon dioxide. This is one reason why carbon dioxide “springs” and “seeps” are often found in regions where metamorphism is currently occurring (such as tectonic collision zones and near volcanoes).

The primary market for wollastonite is for the manufacture of ceramics. Because of its high brightness wollastonite finds use in paint fillers and plastics. Wollastonite is named after the English chemist and mineralogist Sir William Hyde Wollaston (1766-1828), the discoverer of the elements palladium and rhodium.

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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.

Geo-Sudoku

by David Glick

This puzzle contains the letters BCDEMOSTU, and one row or column spells out the what happened to coal as it formed carbon dioxide. 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.

This puzzle contains the letters AEOQRSTUZ, and one row or column spells out a description of a sandstone with 95% or more of this month’s program topic mineral. 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.
More Zeolites

ACROSS
1 found as cruciform twins
9 an element in emeralds
11 drives down the roads
12 written to remind
13 source of metal
14 rare earth element
15 the devil’s element
16 what a phantom crystal is doing
18 favorite as poison
19 found in the home
20 chalcosite state
21 enthusiastic mineral collector
26 horizontal mine entrance
28 ___ the Season to be Jolly
29 said in Pittsburgh
30 Sn
31 boat doc
32 tree-filled valley
34 radon
36 written to remind
37 politically correct
38 ball ___ hammer
39 rich kids school
41 the maid not SEAn
42 where the fox lives
44 a young boy
45 a hole in the ground
46 violet U oxide mineral
48 iridium
49 ___ ammoniac
51 lake (ab)
52 a zeolite
56 indium
57 twelve
58 to request
59 what mine trucks carry
61 sediment on river bottom
62 acidity scale
63 another zeolite

DOWN
1 related to natrolite
2 colors of minerals
3 the end of minerals
4 not hi
5 cubic zirconia is an ___ diamond
6 physical education (ab)
7 Soc. of Mining Engineers
8 what halite is
9 English minerals source
10 Scots eyes
13 osmium
15 north east (ab)
17 zeolite from Luck Goose Creek Q in Virginia
19 an English mine
20 to triumph
22 old lady exclamation
23 man from Tel Aviv
24 Russian no
25 down (ab)
27 lots of noise
31 prefix for before
32 measures the Earth
33 local area network
35 alert, frisky
36 mightier than the sword
38 color of stilbites
40 tit for ___
41 Russian diamond pipe
43 anti-aircraft
45 one-thousandth
47 not sane
50 anorthite (ab)
51 found in Irish voice
52 to triumph
53 large boulders: rip ___
54 sand calcite state
55 long time
56 sediments on river bottom
57 Latin twelve

LAST MONTH’S SOLUTION:
Crystal, Time and Space

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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.


2011: EFMLS & AFMS July 7-10, Syracuse, NY
2012: EFMLS Sept.16-17, 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

GeoSudoku Solutions from page 6

| D | S | E | Q | T | C | M | B | U | O | R | S | Q | T | E | A | U | Z |
| U | T | B | M | E | D | S | C | O | E | T | A | U | S | Z | O | Q | R |
| C | O | M | B | U | S | T | E | D | Z | Q | A | R | O | T | S | E |
| B | D | C | E | O | M | U | T | S | Q | E | Z | R | O | S | U | A | T |
| O | U | T | S | D | B | E | M | G | S | U | R | T | E | A | Z | Q | O |
| E | M | S | T | C | U | O | D | B | A | O | T | Z | O | U | R | E | S |
| M | B | O | C | S | E | D | U | T | T | S | U | O | Z | Q | E | R | A |
| S | E | D | U | B | T | C | O | M | R | A | E | S | U | T | Q | Z | O |
| T | C | U | D | M | O | B | S | E | Z | Q | O | E | A | R | S | T | U |

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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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.