The Apache Junction Rock & Gem Club, Inc.

SMOKE SIGNALS

December 2011

Officers of the Apache Junction Rock & Gem Club, Inc.		
President:	Katy Tunnicliff	918-440-9152 katydidnt2007@gmail.com
Vice-President:	Jerry Gervais	480-252-2456
Secretary:	Mattie Gadd	503-705-3933 mmpdg16@msn.com
Treasurer:	Patricia Wallace	480-598-8709 rosebud116@aol.com
Trustee:	Jack Pawlowski	480-288-2642 j6ac5k@calcon.net
Trustee:	Brent Staker	480-298-1359 gbstaker@yahoo.com
Trustee:	Tom Sundling	402-432-9790

The Club meets on the second Thursday of every month October thru April at 7:00 pm at the Carefree Manor RV Park, at the corner of Tepee & Delaware, Apache Junction, AZ

Club Dues - $24 a year per member prorated to first of month of joining. This may be paid at the general meeting or by mail to Ron Ginn, 691 N. Velero St., Chandler, AZ 85225.

In This Issue

Next Meeting – Jan 12, 2012

At the Carefree Manor RV Park, at the corner of Tepee & Delaware, Apache Junction, AZ.

General Meeting Minutes

Apache Junction Rock Club General Meeting Minutes for December 8, 2011

1. Meeting was called to order at 7:10 pm
2. Pledge of Allegiance was performed
3. President's comments:
   Katy reported that there were only one nomination for each board member position as follows: Katy for president, Jerry for vice president, Mattie for treasurer and Barbara for secretary. All club members present agreed to these nominations and will go into effect January 2012. The trustee position held by Brent Staker will be assigned to Brian Fermoyle. Katy introduced Tom & Helen Sandvig, owners of the property for our lapidary shop. We thanked them for all they have done for our club.
4. The winner for the 50/50 ticket drawing was Carlton Moore, he won $65.00.
5. There were several door prizes this month donated by Jerry Gervais, Craig Straun and Ken Peterson.

Treasurer- Pat Wallace
No report.

Committee's:
Publicity- Wally Frlich
Wally needs volunteers to sign up to hand out coupons at the Flagg show in Mesa for our Rock show in February. Also needs volunteers to help make the gem trees for the show.

Membership and Website- Ron Ginn

We now have a total of 402 active members, 15 new members joined at the last meeting. There were 95 members present at the meeting.

Field Trip- Terri Creiglow sent notification of a rock field trip for Saturday, Dec 10 to Fourth of July Peak. In the notifications, the meeting place will be named since some trips don't make sense to drive to AJ when the trip is heading west of the city. So watch for the emails and meeting places. The next trip is to Sycamore Creek on December 17.

Lapidary Shop- Phil Gadd

Phil reported that the lapidary will be open a couple of evenings, Tuesday and Thursday, until 7 pm on a trial basis. If not utilized, then the lapidary will go back to the regular hours. Lapidary hours are Mon 8 to 2, Tue 9 to 4, Wed 8 to 2, Thur 9 to 3 and Fri 8 to Noon.

Hospitality- Natalie thanked everyone for cooking the turkeys and hams for the annual potluck dinner.

Silent Auction- Mattie Gadd

No report

Building chairperson- Sally Stone

Sally was not present.

Jewelry & Arts- Dori Kapki

No report

Since this was our annual Christmas potluck dinner as well, the meeting was kept short and not all departments gave a report. We had wonderful food made by all. Thank you everyone for bring a side dish to share and thank you to those who cooked the turkey and ham.

Submitted by Mattie Gadd, secretary

Article of the Month

The Eye of the Cat

by Andrew A. Sicree

Chatoyancy

Pick up a spool of fine thread and hold it beneath a bright light. Running down the length of the spool, perpendicular to the threads, you will see a bright line. This same optical effect, called chatoyancy, can be observed when some gem minerals are cut and polished with a cabochon (smooth rounded) cut. Chatoyancy is best displayed when a specimen is illuminated by a point source of light.

Chatoyancy is observable in many minerals with a fibrous structure. In veins of asbestos, for instance, the parallel fibrous crystals reflect light in a manner similar to that of a spool of thread. Satin-spar, the fibrous variety of gypsum, displays chatoyancy, as will the tiger's eye variety of quartz.

Chatoyancy also occurs in those mineral specimens that have swarms of parallel thread-like mineral inclusions, or those that have needle-like cavities (either fluid-filled or empty). The key criteria are that the cavities, inclusions, or fibers must be numerous, long and thin, and occur in parallel. To produce chatoyancy, many thousands of thin reflecting surfaces must be aligned in parallel.

Cat's eye gems

Some gem minerals, cut and polished as cabochons, will exhibit the highly desirable "cat's eye" effect. In a polished cabochon, the narrow band of chatoyant sheen resembles the eye of a cat. It even appears to move, as though the cat is watching you, when the gemstone is moved. Chrysoberyl is one of the most valuable gem minerals to produce "cat's eye" gems. Other gems that can display the "cat's eye" effect include sillimanite, albite, orthoclase, scapolite, quartz, and some varieties of beryl.

Minerals and stars

Asterism is the result of multiple chatoyancies within a single stone. A mineral can have multiple swarms of inclusions, each oriented in a different direction. Each direction produces its own "cat's eye" but the intersecting sheens produce a "star crystal." For instance, in some ruby (gem corundum), the bright lines intersect at 60° to each other. Thus, "star rubies" typically display a six-pointed star. It is important to note that care must be taken when cutting a star gem. The cut must be made with the proper alignment to allow the axis of the star to rise out of the center of the finished gem. The star effect is also best observed when the stone is illuminated by a point source light. (This is one reason jewelers use pin-point lighting.)

In ruby, the star effect is due many very fine thread-like crystals of rutile. These rutile "threads" are really very thin, long crystals that are aligned in parallel.

How do you get so many thin, thread-like crystals in alignment? The answer is found in a geochemical process called "exsolution." When the ruby forms at very high temperatures, some "foreign" elements may be caught up in the crystal. Ruby is corundum, aluminum oxide (Al_2O_3), but it can contain a small amount of titanium, too. Rutile is titanium dioxide (TiO_2). When the ruby is hot, a small amount of titanium is dissolved in the aluminum oxide. But when the ruby cools, the titanium is no longer tolerated by the crystal structure of ruby and it gets pushed out, or exsolved. The titanium forms the mineral rutile within the ruby, and the orientation of the rutile crystals is controlled by the crystal structure of the ruby. Because ruby/corundum is a hexagonal mineral, the orientation of the rutile crystals is also controlled by the ruby crystal structure. Thus, the rutile inclusions follow a hexagonal pattern and six-pointed star results.

©2008, Andrew A. Sicree, Ph.D.

Why is Native Gold Native?

Native gold was probably one of the first metals ever used by man. Gold can be found in its elemental or "native" form – it is one of only a handful of elements to occur in nature in an uncombined form (other native element minerals include copper, silver, lead, iron, and carbon as diamond or graphite). Gold's unwillingness to react with water, oxygen, or salt means that it will survive as nuggets in streams and rivers. Native gold, recovered from stream sediments or lode deposits, can be readily hammered or melted and cast into useful or decorative items.

But why doesn't gold react? Why don't we find, for instance, gold oxide minerals or gold carbonate minerals?

The noblest metal

Gold is called a "noble" metal because it is non-reactive – it holds itself aloof from reaction with most chemicals. But gold is not "noble" for the same reason that the noble gases such as helium, argon, and xenon are. The noble gases have filled outer electron shells. Thus, they have little tendency to give up electrons or to accept electrons – electron pairing being the prerequisite for chemical reaction. But the gold atom does *not* have a filled outer shell of electrons.

Gold is non-reactive because, in order to react with gold, a chemical must first break bonds on the surface of the gold and then form new bonds between the chemical and the gold. Gold's non-reactivity rests on the inability of most molecules (such as oxygen or water) to adequately fill gaps in the orbits of the outer-most electrons of the gold atoms on the surface of a gold specimen. Thus, gold will not oxidize and polished gold surfaces will remain bright and shiny indefinitely.

Gold will not react with highly corrosive fluids such as saliva, blood, urine, nitric acid, hydrochloric acid, or even hydrofluoric acid. This is why hydrofluoric acid can be used to prepare gold specimens. Hydrofluoric acid will dissolve the quartz encasing a native gold specimen but leave the gold largely unaffected.

Aqua regia

It is possible, however, to attack gold with *aqua regia*. Aqua regia (Latin, "royal water") is a mixture of concentrated nitric acid and concentrated hydrochloric acid – usually they are combined in a ratio of one volume nitric to three volumes of hydrochloric acid. This mixture is "fuming," meaning that it will generate noxious gases, and must be freshly mixed up for maximum potency. Aqua regia is one of the few reagents that will attack gold and platinum.

Under certain conditions in nature, gold will react with a few chemicals. For instance, gold telluride minerals are known. Calaverite (gold telluride) and sylvanite (silver gold telluride) are two minerals in which gold has formed a chemical compound with tellurium. In the famous gold deposits of Cripple Creek, Colorado, much of the gold occurs in the form of gold telluride minerals such as calaverite and sylvanite.

Gold will also react with anions such as cyanide. Thus, cyanide is used to leach gold from gold ores. Cyanide solutions will literally dissolve small flecks of native gold from the ore and the dissolved gold must later be recovered from the cyanide solution.

Right vs. Left in Quartz

Quartz, as every mineral collector knows, has the chemical formula SiO_2, which is read as "silicon dioxide." This empirical formula means that, for every silicon atom in a quartz crystal, there are two oxygen atoms. Simple enough, but it doesn't tell us anything about how the atoms are arranged.

In quartz, each silicon atom is surrounded by four oxygen atoms in a tetrahedral arrangement. "Now wait one minute," you say, "you just told us that there are only two oxygen atoms for each silicon atom!" The one-to-two silicon-to-oxygen ratio applies to the entire crystal, but on the atomic level four oxygen atoms surround each silicon atom. Each of those oxygen atoms is shared by another silicon atom – each of the oxygen atoms forms the corner of two different silica tetrahedra. Thus, each silicon atom really only "owns" one-half of each of the four oxygen atoms. One-half each times four equals two and so the empirical formula is satisfied.

The shared corners of these silica tetrahedra are what hold the quartz crystal structure together – like a three-dimensional jigsaw puzzle. But unlike a jigsaw puzzle, there is more than one way to arrange the pieces (i.e. to connect the silica tetrahedra). In quartz, the silica tetrahedra are arranged in a spiral (or helix) around the c-axis (the c-axis is the long six-fold axis found in most natural quartz crystals). Think of them like spiral staircases. There are two ways to make spiral staircases: one can build them so they spiral up to the right or up to the left. Similarly, quartz can be made up of tetrahedra in left-handed or right-handed spirals. This results in "right-handed" or "left-handed" quartz.

"That is all very fine and interesting," you say, "but, lacking X-ray vision, how do I tell one from the other?"

If a quartz crystal displays certain minor crystal faces, it is possible to easily tell left-handed from right-handed quartz. These minor faces occur at the edges between the side faces and the end or terminal faces of the crystal. Look at the crystal perpendicular to the c-axis. If the minor faces follow an upward spiral to the right, you have right-handed quartz; if they follow an upward spiral to the left, the quartz is left-handed. Checking out the quartz crystal diagrams in most mineralogy texts will help you distin guish left- from right-handed quartz. Unfortunately, most of the crystals you find in nature do not display the necessary minor faces, so it is difficult to determine the "handedness" of those quartzes. Still, handedness is a characteristic you should try to observe every time you collect a quartz crystal.

©2008, Andrew A. Sicree, Ph.D.

Weird Geology

Pica: let them eat dirt

Psychologists recognize a great number of mental disorders, most of which have little to do with geology. However, one unusual practice that makes its way into the psychological literature is called "Pica." Technically, Pica is the eating of things that have no nutritive value. Persons suffering from Pica may eat dirt, rocks, clay, and other mineralogical materials.

Other Pica sufferers may eat grass, wax, buttons, rubber bands, glue (remember that tasty paste you used in kindergarten?), or chalk. They may even eat harmful materials such as nails, glass shards, or paint chips.

Behavior modification therapy is usually prescribed for Pica sufferers, but until they are cured you might want to keep an eye on your mineral collection when they are around!

©2008, Andrew A. Sicree, Ph.D.

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. Write P. O. Box 10664, State College PA 16805 (814) 867-6263 or email sicree@verizon.net for more info.*

Rock Shows in December

None