



The Apache Junction Rock & Gem Club, Inc.

SMOKE SIGNALS

Dec 2013

Officers of the Apache Junction Rock & Gem Club, Inc.

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Trustee:	Ken Perkins	480-343-5617 lperkins18@cox.net
Trustee:	Ted Montague	480-982-1790 coolwater2k@yahoo.com

The Club meets on the second Thursday of every month October thru April at 7:00 pm at the Lapidary Shop, at the corner of Superstition & Ocotillo, 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.

Next Meeting – Jan 9, 2014

Minutes of Dec. Mtg.

- The President called the meeting to order at 7:05 pm and led the Pledge of Allegiance.
- The President reported that all vendor spaces have been reserved for the Feb. 2014 Rock Show. There is a wait list for the vendors for this show.
- The motion was made to accept the Secretary's minutes as circulated. The motion was seconded and the motion passed.
- The Treasurer reported the following: Show Checking account= \$12,524.52, Show Savings account= \$1934.51, General Checking account= \$1525.54, General Savings account= \$171.46, Wells Fargo CD= \$6,340.16, Compass CD= \$10,451.49. Lapidary shop expenses are 10" trim saw for \$305, 14" saw blade for \$219, shipping of items= \$35.61 (total = \$559.61).
- Mr. Montague, Trustee, reported that 50 lbs. of food items have been collected for

the poor. He requests more food items be donated at the Christmas Dinner on December, 14th.

- Mr. Jonas, Lapidary Shop Manager, reported that all saws are running. The monitors are present and willing to assist members. The new shop hours will be 8 am to 5 pm. The Orientation sessions have been well accepted even with seasoned members. Thirty-eight persons have attended the sessions which last about 1.5 hours.
- Mr. Ginn, Membership Chairperson, reported that we have 241 members of the club. The 2014 membership dues are to be given to Mr. Ginn by Jan.1, 2014. A new Membership Chairperson is requested by Mr. Ginn. The Field Trip Survey is due by December 31, 2013. Results of the survey will be presented at the January 9, 2014 meeting.
- Laurie Jonas volunteered to be the new Editor of the Newsletter. We thank Mr. Iverson for his years of being Editor of the Newsletter for the club.
- The Christmas Dinner will be held December 14th at the Carefree Manor Trailer Resort. Please park on the Teepee street area as there is no parking within the resort. Dinner will be at 6 pm with the club furnishing the ham, turkey, water, and coffee. Please bring your plate, silverware, and a side dish or desert.
- The Weekend sales held on Lapidary Shop property have gone well for the vendors. More vendors are requested to participate. Advertisements have been placed in two newspapers, with flyers, and on the

Craig's list. Vendors may have their tables inside or outside of the fenced area. There is a porta potty on the grounds.

- The Jewel Box activity meets on Tuesdays at 10 am at the Lapidary Shop. All are welcome with a fee. Do bring your own tools, materials, and good ideas. Future sessions may be offered on weekends and/or evenings.
- Mr. Frlich, Publicity Chairman, reported that the Feb. Rock Show is the main raiser for the club. He called for volunteers for the first Friday, Saturday, and Sunday of Jan. to distribute coupons at the Flagg Show. Ideally our booth at the Flagg Show would have 4 club members present to answer questions and hand out the coupons. The Flagg Show has proven to be the best advertisement for our show. Five thousand and five hundred coupons were passed out in 2012 for that show.
- The motion was made and seconded that the club investigate ideas for a float in the Lost Dutchman's Day parade in Apache Junction. We need a trailer and ideas for the float. Even though the parade is on our first day of the Feb. Rock Show, participation would be a good advertisement for the show.
- Mrs. Jonas, Lois Perkins, and De Witt Wright, Nominated Committee, presented Ballot of President- Bill Jonas, Vice President- Dave Weber, Treasurer – Lois Perkins, Secretary- Barbara Bayer, and Trustee- Jack Pawlowski. There were no nominations for offices from the floor. These candidates were elected by oral vote.
- Five door prizes were distributed. The 50:50 drawing for \$35.50 was won by Joe Spencer.
- Mr. Fermoyle requests donations of quality rock for the silent auction. He thanks all who donate and all who support the silent auction.
The meeting ended at 8:45 pm.

Article of the Month

The Rare Earth Elements

Of the 118 elements known to mankind, only 91 are stable enough to be found naturally on the Earth.

Many of these elements are plentiful enough to occur as components of minerals – that is, they show up in the mineral's chemical formula – but some elements have no discrete mineral species of their own, either because they are too rare or because they mimic the chemistry of other elements. These elements can only be found as trace constituents within chemically compatible minerals. Included in this trace element group are the so-called "rare earth" elements.

The rare earths are a block of fifteen chemical elements, ranging from lanthanum (element 57) to lutetium (element 71), plus scandium (element 21) and yttrium (element 39) thrown in for good measure. The chemical (and thus mineralogical) behavior of these elements is so similar that they tend to "co-travel" (i.e., when you find one, you find others).

Gadolinite

In 1787, in a quarry at Ytterby, Sweden, Carl Axel Arrhenius discovered a black mineral tentatively called "ytterbite". Johann Gadolin, a professor at the University of Turku, investigated the mineral, chemically extracting a previously-unknown metal oxide compound from it, which he called "ytteria." This was the first production of a rare earth oxide chemical. Ytterbite was later renamed to gadolinite in recognition of Gadolin's pioneering work among the rare earths.

It is interesting to note that the little village of Ytterby, Sweden, has *four* elements named after it. They are yttrium, terbium, erbium, and ytterbium. This reflects that fact that, at the turn of the 18th Century, the Scandinavian Peninsula was the Happy Hunting Ground for scientists seeking new elements.

How Rare Are They?

The rare earths aren't really all that rare. For instance, the rare earth element neodymium is more abundant than gold in the Earth's crust, and cerium, the 25th or 26th most plentiful element, is more abundant than neodymium. The term "rare earth" comes from the now obsolete use of the word "earth" to indicate a metal oxide that couldn't be smelted (reduced) to the pure metal. The first rare earths were discovered in unusual and uncommon (i.e., rare) oxide minerals (i.e., earths) such as the mineral gadolinite ($Y_2FeBe_2Si_2O_{10}$). The various rare earth elements are not equal in their abundance. For instance, the lighter rare earths (elements 57-62), also called the "cerium earths," are more enriched in the Earth's crust relative to what are called "chondritic" abundances than are the heavier rare earths. The heavy rare earths (elements 63-67) are also called the

“yttrium earths” because they mimic yttrium. Chondritic abundances refer to the concentrations of elements in certain types of undifferentiated meteorites. These undifferentiated meteorites are thought to be representative samples of the materials making up the early nebula from which our Sun and the planet Earth formed. By comparing the ratios of elements in crust with their chondritic abundance, scientists can gauge the enrichment or depletion of an element relative to the “starting point,” so-to-speak, for our planet. Slight differences in chemistry between the light and heavy rare earths lead to mineralogical differences. For instance, xenotime (tetragonal YPO_4) incorporates the yttrium earths, while monazite, monoclinic $(\text{Ce,La,Nd,Th})\text{PO}_4$ favors the cerium earths. Note how the chemical formula for monazite has cerium, lanthanum, neodymium, and thorium in parentheses separated by commas – this means that monazite could contain any of these four elements. Monazite from one locality might be predominately cerium phosphate with minor amounts of lanthanum, etc. Other monazites might contain greater concentrations of lanthanum. Other elements, particularly other rare earths such as neodymium, may also be present. Elements present only at trace levels are not listed in the mineral’s chemical formula. Even some non-rare earths can fit into the structure of monazite. Monazite may contain thorium – monazite sands have, in fact, been mined for thorium.

Rare Earth Mineralogy

Mineralogically, the rare earths are quite similar in their behavior. Because their ionic charges are typically the same (usually 3+) and their ionic radii are similar, one rare earth element can easily substitute for another in a crystal’s structure. Slight differences exist between the mineralogy of the yttrium rare earths and the cerium rare earths.

The chemical mimicry of the rare earths explains why one does not, for instance, find a “lutetiumite” mineral in nature. Lutetium has to be obtained from minerals such as monazite, a rare earth phosphate mineral that typically contains only about 0.003% lutetium. The rare earths are quite difficult to separate chemically and even Mother Nature appears to have some trouble with their separation. Thus, for example, a yttrium mineral such as gadolinite will also include a raft of other rare earth elements in varying concentrations. These elements are not an essential part of the gadolinite structure, but they are present nonetheless.

Minerals containing yttrium (and thus, minerals that tend to also contain the yttrium earths) include gadolinite, xenotime, samarskite, euxenite, yttrialite, fergusonite, yttrotantalite, yttrotungstite, thalenite, and yttrifluorite (a variety of fluorite). Minerals that contain cerium and the cerium earths include bastnäsite, monazite, allanite, loparite, lanthanite, cerite, and britholite. The principal ore minerals for rare earth elements include bastnäsite, monazite, loparite, and lateritic clays with strong ion absorption properties.

China currently leads the world in rare earth element production – most of the world’s current supplies of yttrium come from the “ion absorption clays” found in southern China. Some pegmatites (extremely coarse-grained igneous rocks with a granitic composition) have high levels of rare earth elements concentrated in their centers in large crystals of usual and rare minerals.

Neodymium

Among the rare earths is the element neodymium (Nd). Neodymium has been in the news recently because of concern about the world’s supplies of the element. Neodymium is never found in nature as the native element; it must be extracted from cerium minerals such as monazite or bastnäsite, $(\text{Ce,La})(\text{CO}_3)\text{F}$.

Neodymium is of interest because it is used in high strength magnets. Neodymium rare earth magnets are the strongest permanent magnets for their weight. This fact makes them desirable for use in computer hard drives, loudspeakers and microphones, and in small, high output electric motors such as those used in model airplanes.

Rare earths are important in the production of electric vehicles and hybrids, too. For instance, every Toyota *Prius* car consumes about 1 kg (2.2 lbs.) of neodymium in the magnets in its electric motor. Additionally, each *Prius* also utilizes 10 to 15 kg (22 to 33 lbs.) of the rare earth lanthanum in its battery. These high-tech uses of rare earths make it apparent that the rare earth elements are going to play an increasingly important role in the more energy-efficient future.

Currently, the major sources of all rare earth production are in China and the Chinese government has been restricting exports. In addition, the Chinese have been attempting to buy controlling interests in other rare earth producing mines around the world. These actions have led to a minor panic that the Chinese may corner the market and establish a rare earth cartel along the lines of OPEC. There are,

however, sources of rare earths in Australia, Brazil, Canada, and California, and other potential sources as well. Given that the rare earths really aren't that rare, it is doubtful in the long run that the Chinese will be able to maintain any type of cartel to restrict and control supplies.

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Neodymium Glass

Add neodymium oxide (Nd_2O_3) to molten glass and the result is a beautiful lavender glass. Neodymium-doped glass finds use in high-power solid state lasers used for nuclear fusion, producing a 351 nm laser beam. But this beautiful glass has an additional feature: under sunlight or incandescent lights it is lavender, but under fluorescent light, the glass appears light blue. And under trichromatic (three wavelength) light, the glass looks greenish. This is a synthetic version of the "alexandrite effect" observed in the alexandrite variety of chrysoberyl.

Volcanic bombs

The Star-Spangled Banner describes the shelling of Ft. McHenry in Baltimore by the British Navy. Francis Scott Key wrote his famous poem describing the "bombs bursting mid-air..." during the bombardment. One might suspect that Key's work also serves to describe the experience of a volcanic eruption. After all, don't volcanoes spit out volcanic "bombs," too?

Volcanic bombs, however, in spite of their names, do not typically blow up. Vulcanologists (scientists who study volcanoes) use the term "volcanic bomb" to describe blobs of lava that are thrown out of a volcano during an eruption and cool mid-air forming aerodynamic shapes. The molten state of the lava when the bomb is lobbed upward separates volcanic bombs from rocks, ash, clinkers, pumice, and dust that might also be ejected from a volcano.

Volcanic bombs come in a wide variety of shapes depending upon the viscosity (fluidity), stickiness, and temperature of the lava. Descriptive names are given to them: spherical, ribbon, almond, spindle, and even cow-pie bombs have been described. Cow-pie bombs, for instance, form when the lava is

Articles



Ankle Sprains

Barbara Brillhart RN PhD FNP-BC

Ankle sprains can occur while participating in field trips out in the Arizona deserts especially with our rocky desert areas. Such injuries occur by stepping in a hole, falling, or jumping on an outstretched ankle. This article will focus on the types of ankle sprains, symptoms of ankle sprains, treatment for ankle sprains, and prevention of ankle sprains.

Ankle sprains are classified as first, second or third degree sprains. The first degree sprain is due to a stretching or minor tearing of the ligaments. The symptoms of the first degree sprain include: minimal pain, mild swelling, mild bruising, and mild point (isolated) tenderness. The person still has a stable joint, full range of motion of the joint without pain, and be able to bear weight. This level of injury is treated with RICE which stands for rest, ice, compression (using an ace bandage), and elevation. The person should be able to return to full activity within 2 to 3 weeks using an ankle support.

A second degree sprain is due to a partial tearing of the ligament. It is characterized by mild to moderate pain, moderate swelling, moderate amount of bruising, slightly limited-painful joint motion, isolated tenderness. The second degree sprain also has mild joint instability plus pain plus the inability to bear weight. This level of injury is treated with RICE, partial weight bearing, an air cast or joint taping, and a gradual return to full activity.

The most serious or third degree sprain is due to a complete tear of the ligament. Symptoms of the third degree sprain include: severe pain, rapid (within 30 minutes) swelling, a larger amount of joint swelling, severe bruising (usually within 30 minutes), severe isolated tenderness, limited or loss of motion of the joint, very unstable joint, and the inability to bear weight. Many experience a "pop" sensation with this sprain. Immediately, the person should apply the treatment of RICE in the field then refer to care by an orthopedic specialist. The treatment of this serious injury often requires surgery, casting, no weight bearing, and rehabilitation. X-rays are often taken to rule out a fracture.

Prevention of ankle sprains is as follows:

- Wear laced- hiking boots which extend above the ankle and are in good condition. Avoid worn tennis shoes or sandals.
- Be aware of the terrain for conditions as loose stones or gravel, holes, wet rocks, mossy ground.

Show Dates

Jan 1- Feb 28—Quartzsite, AZ: Wholesale and retail show; Desert Gardens RV Park; Desert Gardens RV Park; 1064 Kuehn St., I-10 Exit 17; Daily 10-6; free admission; Arkansas quartz crystals, rough and polished minerals, fossils, jewelry, gifts, lapidary equipment; contact Sharon (manager), 1055 Kuehn St., Quartzsite, AZ 85346, (928) 927-6361; e-mail: info@desertgardensrvpark.net; Web site: www.desertgardensrvpark.net

Jan 3-12—Quartzsite, AZ: Annual show; Tyson Wells Enterprises Inc.; Tyson Wells Show Grounds; 100 W. Kuehn St.; Daily 9-5; free admission; dealers from around the world; contact Kym Scott, PO Box 60, Quartzsite, AZ 85346, (928) 927-6364; e-mail: tysonwells@tds.net; Web site: www.tysonwells.com

Jan 16-18—Globe, AZ : Gila County Gem & Mineral Society; Gila County Fairgrounds; Hwy 60 east of Globe towards Show Low;

Jan 30-Feb 16—TUCSON, ARIZONA: Annual show; Eons Expos; Tucson 22nd Street Show; intersection of I-10 and 22nd Street; Daily 9-6; free admission; minerals, fossils, dinosaurs, meteorites, gems, jewelry, rough rock; contact Christine Perner, 38 Fox Ridge Rd., Sparta, NJ 07871, (516) 818-1228; e-mail: Christine@EonsExpos.com; Web site: www.22ndStreetShow.com

Feb 1-15—TUCSON, ARIZONA: Wholesale and retail show; Martin Zinn Expositions, LLC; Hotel Tucson City Center; 475 N. Granada; Daily 10-6; free admission; 300 dealers, Gallery of Artists displays; contact Regina Aumente, PO Box 665, Bernalillo, NM 87004, (505) 867-0425; e-mail: mzexpos@gmail.com; Web site: www.mzexpos.com

Feb 1-15—TUCSON, ARIZONA: Wholesale and retail show; Martin Zinn Expositions LLC; Ramada Ltd.; 665 N. Freeway; Daily 10-6; free admission; fossil dealers and displays; contact Regina Aumente, PO Box 665, Bernalillo, NM 87004, (505) 867-0425; e-mail: mzexpos@gmail.com; Web site: www.mzexpos.com

Feb 7-10—TUCSON, ARIZONA: Annual Westward Look Show; Fine Mineral Shows; Westward Look Resort; 245 E. Ina Rd.; Fri. 10-6, Sat. 10-6, Sun. 10-6, Mon. 10-5; free admission; Al and Sue Liebetrau collection display; contact Dave Waisman, Fine Mineral Shows, PO Box 8543, Spokane, WA 99203, (509) 998-5987; e-mail: dave@finemineralshow.com; Web site: www.finemineralshow.com

Feb 13-16—TUCSON, ARIZONA: Annual show; Tucson Gem & Mineral Society; Tucson Convention Center; 260 S. Church Ave.; Thu. 10-6, Fri. 10-6, Sat. 10-6, Sun. 10-5; adults \$10, seniors and active military get \$2 off on Fri., children (under 14) free; contact TGMS Staff, PO Box 42588, Tucson, AZ 85733, (520) 322-6031; e-mail: tgms@tgms.org; Web site: www.tgms.org

Feb 14-16—QUARTZSITE, ARIZONA: 1st Quartzsite Gold, Treasure and Craft Show; Quartzsite Improvement Association, Miners Depot, Natures' Nuggets, Quartzsite Metal Detector Club; QIA Bldg.; 235 E. Ironwood St.; Fri. 9-5, Sat. 9-5, Sun. 10-4; adults \$5, children free; dealers, Quartzsite Metal Detector Club hunt, gold panning contest, speakers, author table, demonstrations, metal detecting and prospecting equipment Q&A; contact Richard Trusty, PO Box 4051, Quartzsite, AZ 85359-4051, (928) 927-5479; e-mail: QuartzsiteGoldShow@gmail.com; Web site: QuartzsiteAZGoldshow.com

Feb 22-23—MESA, ARIZONA: 48th Annual Jewelry, Gem and Rock Show; Apache Junction Rock & Gem Club; Skyline High School; 845 S. Crismon Rd.; Sat. 9-5, Sun. 10-4; adults \$3, students \$1, children free; dealers, jewelry, gems, cabochons, beads, rocks, specimens,

slabs, fossils, lapidary equipment and supplies, door prizes, silent auction, gem tree-making activity, wheel-of-rocks, raffle; contact Katy Tunnicliff, (918) 440-9152; e-mail: katydidnt2007@gmail.com; Web site: www.ajrockclub.com

Mar 6-9—DEMING, NEW MEXICO: Retail show; Deming Gem & Mineral Society; SWNM State Fairgrounds; Raymond Reed Blvd.; Daily 9-5; free admission; contact Shirley Krasinski, PO Box 1459, Deming, NM 88031, (575) 494-5971; e-mail: nmbound@gmail.com; Web site: DGMS.bravehost.com