



The Apache Junction Rock & Gem Club, Inc.

SMOKE SIGNALS

March 2012

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

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Trustee:	Tom Sundling	402-432-9790 ajroct@gmail.com

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. Veleró St., Chandler, AZ 85225.

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Next Meeting – April 12, 2012

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

ATTENTION

If Ron Ginn does not have your dues by the end of the April meeting, this will be your last newsletter and you will be

removed from the membership list!

General Meeting Minutes

Apache Junction Rock & Gem Club Minutes
 March 8, 2012 Submitted by Mattie Gadd

The meeting was called to order by the President at 7:00 PM. She led the Pledge of Allegiance.

- The secretary's minutes were accepted as published in the newsletter.
- Mattie Gadd presented the treasurer's report: Lapidary checking \$2,249.96, Show checking \$10,426.62, General checking \$1,855.00, Show savings \$2,679.92, Building/Lapidary savings, \$1,927.21, General savings \$121.23, and CD #1 \$10,271.41, CD #2 \$6,097.41, and CD# 3 \$8,556.77.
- Ron Ginn, Membership, reported that we have 451 members, 205 have renewed, 246 have not paid their dues. We had 23 new members sign up at the show, and 10 new members since the last meeting. Members who have not paid will have until March 31 to pay or they will be removed from the "current file". He also announced we are now members of the coalition group. No fees were necessary.
- Phil Gadd, Lapidary Shop, was not present.
- Kelly Iverson gave the show report as dealers were very happy. Gross revenue was

\$14,469.37, expenses were \$7,417.52 with a profit of approximately \$7,000.

- Dorrie offers wire wrapping classes on Friday mornings, but can offer classes other days and evenings.
- Natalie Kirmiel wanted to thank everyone for their donations of snacks.

Field trips planned by Terri Creiglow are on March 10 to Globe for Onyx, March 24 to Safford for Rhyolite, April 8 to Wilcox/Benson for Marble. She will email further information for the trips.

A member (Dave Weber??) made a motion to honor Harry Warren for his years of service to the club. Bill Stasi announced there was a plaque given to him last year for recognition of his service. A suggestion of giving him a gift certificate at the April meeting was made.

There was not a speaker this month. Bill Stasi announced that Arizona has a property tax rebate for those with low income. Red Mountain Library in Mesa files income tax for free if income is less than \$50k.

Doug Caskey was the 50-50 drawing winner for the sum of \$58.00.

There were 7 door prizes given away.

The meeting was adjourned at 7:30 pm.

Article of the Month

How Many Minerals Do You Need?

by Andrew A. Sicree

The necessity of minerals

For every human being on Earth there is a hole in the ground and that hole is a mine. Although few of us think about it, every physical object we own or use in modern life starts out in either plant or animal or "mineral" form. Plant and animal products are harvested from farms, forests, or the sea. But everything else must come out of that hole in the ground.

In the economic world, the term "mineral" is much broader in meaning than its strictly mineralogical definition. In other words, the mineral industries include aggregate mining, oil and gas drilling, coal mining, cement making, tombstone quarrying, etc. Oil, coal, methane, and limestone, granite, and other rocks, are thus "minerals."

Your personal mine

The size of your personal mine depends upon your lifestyle. In 2007, the average

American needed more than 46,000 pounds of minerals to support their lifestyle. Over the course of a lifetime, the average American will require about 3,600,000 pounds of minerals. That is a hole approximately 40 feet deep by 40 feet wide by 40 feet across for every man, woman, and child in the country. Multiply that by the population of more than 300 million people and you can see why mining is important – it keeps our country going!

How do we derive these numbers? Every year, the Minerals Information Institute (MII) in Denver, Colorado, uses data provided by the U.S. Geological Survey and the National Mining Association to determine how much of each commodity such as coal, oil, limestone, cement, natural gas, copper, gold, silver, etc., is being consumed nationwide. The annual amount consumed (for all rocks and minerals) is divided by the total population to determine the annual pounds used per American. Taking the estimated life expectancy (about 77.9 years in 2007) of Americans, the MII then calculates the total pounds of minerals needed to support each American throughout his or her lifetime.

Amounts of minerals you use

Using this method, one can determine the average amounts of individual mineral commodities (such as copper, cement, or coal) needed by a typical American as well as the sum total amount of all mineral products. Here are some of the lifetime amounts of various minerals needed for each American:

Copper	1,309 lbs.
Lead	928 lbs.
Zinc	671 lbs.
Iron ore	29,608 lbs.
Bauxite (aluminum ore)	5,677 lbs.
Salt	28,412 lbs.
Clays	19,245 lbs.
Phosphate rock	19,815 lbs.
Stone/sand/gravel	1.61 million lbs.
Cement	65,480 lbs.
Petroleum	82,034 gallons
Natural gas	5.68 million cubic ft.
Coal	587,288 lbs.
Other minerals	67,695 lbs.

It is interesting to note that a similar analysis shows that the average American uses 1.57 troy ounces of gold during his or her lifetime.

Stone, sand, and gravel make up the bulk of the tonnage. This is because of the huge quantities of rock needed in road construction and the foundations of buildings. Fuels (coal, natural gas, and petroleum) and industrial minerals such as clay, salt, and phosphate rock (used in fertilizer) make up another large portion.

The minerals that produce lead, copper, zinc, iron, and aluminum, while lower in tonnage, are still very important for modern life. It is important to note that these numbers say little about the actual amounts of rock that must be moved to produce each pound of metal. For instance, if a copper mine exploits an ore that is 0.1% copper, one must mine 1000 pounds of waste rock for each pound of copper produced.

The economic minerals

There may be more than 4,000 known species of minerals, but we rely upon a relatively small number of “economic minerals” to produce commodities such as copper, fluorine, gold, aluminum, lead, zinc, etc. Sphalerite (zinc sulfide, ZnS) is the primary ore mineral for zinc. Gold is mostly recovered in the form of native gold although gold telluride minerals such as calaverite are important in a few mining districts (such as Cripple Creek, Colorado). Chalcopyrite (copper iron sulfide, CuFeS_2) is a primary ore mineral for copper, although other minerals, such as bornite and malachite, may also contribute to production at some mines. The primary ore mineral for lead is galena (lead sulfide, PbS).

There is an entire field within the mineral sciences called “economic geology” which involves the study of economically-important minerals and their origins.

Most mineral species have little to no economic importance, although they still may have value to scientists and mineral collectors. The economic minerals, however, are valuable precisely because they are crucially important to modern society.

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The Importance of Polymorphism

Three important rock-forming minerals share exactly the same chemical composition: Al_2SiO_5 . These three aluminosilicate minerals are andalusite, kyanite, and sillimanite, and they are *polymorphs*. Kyanite belongs to the triclinic crystal system, while sillimanite and

andalusite are orthorhombic (they have different “space groups” – meaning that the atoms, although the same, are arranged slightly differently).

These three minerals are of interest to petrologists (guys who study rocks) because they can be found in many aluminum-containing metamorphic rocks. The particular Al_2SiO_5 species present tells us something about the degree of metamorphism to which the rocks have been subjected. For example, kyanite tends to form in metamorphic rocks that have been subjected to great pressures. Buried at great depths, rocks feel pressure of about 1000 times atmospheric pressure for each 2 miles of burial depth (thus rocks at 20 miles down feel pressures of about 5000 atmospheres). Sillimanite, on the other hand, tends to form at temperatures above 500 °C.

You may hear a geologist talk about the “sillimanite zone” or “kyanite zone.” This is because kyanite, sillimanite and andalusite can be used as index minerals to the grade of metamorphism. Kyanite, sillimanite and andalusite are relatively common minerals and are easy to recognize in hand specimens. Thus, a field geologist can walk across a region of metamorphic rocks and examine rocks for the presence of index minerals. When our geologist passes from rocks that contain kyanite to rocks that contain sillimanite, he knows that he has passed from the “kyanite zone” to the “sillimanite zone” and that the rocks have been heated to more than 500 °C. Boundaries between these zones can be plotted on a geological map and are referred to as isograds (lines of the “same grade”).

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The Simple Flame Test

The widespread use of x-ray diffraction and electronic elemental analytical equipment may lead one to believe that you can't do mineralogy without a lot of very expensive equipment. But famous mineralogists such as James Dwight Dana did their work long before the days in which fancy XRF (x-ray fluorescence) units became available. They used their eyes, noses, and some simple apparatus to conduct tests and make observations about minerals.

One simple test that you can easily do at home is the flame test. Essentially, the flame test involves holding a small sample of a

mineral in a flame and observing any colors produced. The color produced can be related to the composition of the mineral. For instance, in the flame, copper minerals will produce blue or green colors.

Classically, flame tests involve use of an alcohol lamp, a blowpipe, and a platinum loop to hold the mineral sample. This equipment can be purchased from some mineralogical supply houses, but you can do a simple version of the flame test using cheaply-acquired common equipment.

To get started performing simple flame tests all you need are some sets of cheap tweezers, a dropper bottle of 10% hydrochloric acid, some small plastic pans, and a propane torch. You can use your rock hammer to crush small samples of minerals to be tested.

Begin by selecting a mineral that you know will produce a strongly-colored flame. A sample of malachite or azurite, or strontianite or celestine, will work well for practice and for demonstrations. After you have practiced with a known mineral, you can attempt flame tests with unknowns.

Ignite your propane torch and set it upright in the center of a sturdy table where it cannot be knocked over. Adjust the flame to obtain a one- to two-inch long cone of flame. If the flame is highly colored, chances are good that the flame is too long or that the nozzle is contaminated – you may need to buy a new nozzle.

Crush a pea-sized piece of the mineral into a pile of small chips and powder. Then put the powder in a plastic pan. Put a drop of the acid solution in the pan as well next to the pile of powder. Use a clean tweezers to pick up a small chip of mineral, dip it in the acid, and then rub the dampened mineral in the mineral's powder. Note any reactions (carbonate minerals will fizz, for example).

Now insert the tweezers tips into the flame of the propane torch. You will have to move the tips into the center of the flame (experiment to find the best spot). The flame will be colored briefly (for a few seconds at most) so note the color. Don't leave the tweezers in the flame too long or they will begin to conduct heat back to your fingers. After using the tweezers clean them using a bit of clean acid, and rinse them well with water.

This method is not quite the same as the method used when you employ a proper

platinum wire loop to hold the tested mineral. Platinum will not react with the acid and the flame. Cheap tweezers will corrode at the tips after use. Cleaning them will help prolong their usefulness.

Minerals such as barite, malachite, azurite, celestine, and strontianite can all be used in flame tests. For instance, strontianite contains strontium, which gives a crimson color in the flame. The flame test can be used to differentiate strontianite from calcite (both of which will "fizz" in contact with acid). You can find tables of elements and their flame test colors in many mineralogy texts.

Another good candidate for flame test demos is the salt substitute sold in your local grocery store. Salt substitutes contain potassium chloride (sylvite) rather than sodium chloride (halite). The substitutes taste the same but are purchased by health-conscious shoppers because they contain no sodium. Salt substitutes provide a cheap way to demonstrate the lavender color of a potassium-tinged flame. Note that sodium produces a strong yellow flame – so strong that when it is present it tends to over-power any other colors produced by other elements. You can test salt substitutes for the presence of sodium: if you see the lavender flame, there is very little to no sodium present.

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Dr. Andrew A. Sicree is a professional mineralogist and geochemist residing in Boalsburg, PA. This [Popular Mineralogy](#) newsletter

Rock Shows in March

17-18—COTTONWOOD, ARIZONA: Retail show; Sharon Szymanski; Mingus Union High School; 1801 E. Fir St.; Sat. 10-5, Sun. 10-4; adults \$3, children (under 12) free with adult; dealers, custom and fine jewelry, gold and silver, rocks, slabs, cabochons, beads, rough, unset gemstones, crystals, lapidary machinery and supplies, wirewrapper; contact Sharon Szymanski, 1792 E. Laddos Ave., San Tan Valley, AZ 85140, (480) 215-9101; e-mail: goldcanyon2@yahoo.com

24-25—YUMA, ARIZONA: Annual show; Sharon Szymanski, Val Latham; Yuma Civic Center; 1440 Desert Hills Dr.; Sat. 10-5, Sun. 10-4; adults \$3, children (under 12) free with adult; dealers, fine and costume jewelry, gems, beads, slabs, cabachons, fossils, lapidary

supplies and machinery, wire wrapping on the premises; contact Sharon Szymanski, 1792 E. Laddos Ave., San Tan Valley, AZ 85140, (480) 671-6191; e-mail: goldcanyon2@yahoo.com

Rock Shows in April

14-15—KINGMAN, ARIZONA: Annual show; Mohave County Gemstoners; Kingman Academy of Learning; 3420 N. Burbank St.; Sat. 9-5, Sun. 9-4; free admission; educational displays, kids' activities, raffle, door prizes, silent auction, dealers, demonstrations, rough rock, slabs, minerals, jewelry, silver- and goldsmithing, fire agates, artwork; contact Mary Gann, PO Box 3992, Kingman, AZ 86402, (928) 757-8121; e-mail: quadpol@aol.com; Web site: www.gemstoners.org

SHOW WORKERS

Kelly, Katy, and Wally want to thank and recognize everyone who volunteered and worked at our 2012 February 17-19 show at Skyline High School. Our volunteers did a wonderful job to help make our show another success for our club. The show attendance was 1,759, not counting the kids who were admitted free. The following list of show workers may have a few errors. The number in the parentheses after each name represents the number of two-hour shifts that the club member worked. Set-up and tear-down each counted as a separate shift. It was difficult to figure the number of shifts each member worked if their name wasn't on the master sign-up list. If we have made errors on the list, please call Wally Frlich 480-982-7760 or e-mail him at wjfrlich@gmail.com to correct the errors.

Don Raker (2)	Dorrie Kapki (2)
Eloise Kimball (1)	Floyd Kimball (1)
Frank Bishop (1)	Gary Moore (1)
Gary Sellinger (2)	Harlan Jones (1)
Herve Desrosiers (2)	Jack Pawlowski (3)
Jeanette Porrett (8)	Jerry Ciptak (1)
Jim (Hollie) Decaire	Jim Leonard (3)
John Mattson (1)	John Shackelton (3)
Judy Fagen (2)	Karen Webber (2)
Karin Ciptak (1)	Katy Tunnicliff (9)
Kelly Iverson (10)	Ken Perkins (2)
Lance Berrisford (2)	Leonard Lesko (1)
Lois Perkins (1)	Martha Montague (3)
Mattie Gadd (5)	Natalie Kirmiel (5)
Norma Decaire (2)	Norma Norwood (5)
O.J. Perala (2)	Oma Frlich (9)
Pam Saunders (3)	Pat Wallace (1)
Paul Stearns (1)	Phil Gadd (5)
Ray Krell (9)	Ron Ginn (7)
Richard Porrett (5)	Sharon Jones (1)
Shirley Nessen (1)	Ted Montague (3)
Terri Creiglow (3)	Tiny Baughman (2)
Tobia Eaks (3)	Tom Gerken (1)
Tom Osborn (1)	Tom Sundling (8)
Trent Wood (1)	Troy Breham (8)
Wayne Munster (1)	Whitey Kroll (5)

Ann Wood(1)	Anne Berrisford (2)
Barbara Bayer (5)	Bill Stasi (2)
Bob Kusek (1)	Brian Fermoyle (2)
Carol Buzinski (2)	Carol Leonard (3)
Carolyn Sillings (1)	Cheryl Stearns (1)
Chuck Fagen (2)	Claude Koontz (9)
Connie Mace (4)	Connie Sundling (2)
Craig Strawn (10)	Cynthia Koontz (9)
Dave Webber (2)	David Bayer (4)
De Witt Wright (9)	Del Carlson (4)
Denise Rohwedder (1)	Dennis Pikul (2)
Don Mace (4)	Don Milam (2)