EARTHQUAKE

e-Newsletter about what's movin' and shakin' at the Earth Science Museum

Earth Science Museum, 3215 W. Bethany Home Rd., Phoenix, AZ 85017
www.earthsciencemuseum.org, scote@earthsciencemuseum.org, 602-973-4291

December 2013
Volume 2, Issue 12

ESM PARTICIPATION EVENT

By Shirley Coté, Ray Grant and Harvey Jong

42nd Annual Flagg Gem & Mineral Show

January 3, 4, 5, 2014 @ Mesa Comm. College
Free Admission and Parking

The name Flagg stands for Arthur L. Flagg, the first curator of our beloved, but now closed, Arizona Mining and Mineral Museum. (To satisfy your curiosity about the closure of the museum, go to http://www.minmumad.blogspot.com/ (mineral museum madness) and start at the earliest post from 2010). Arthur Flagg was a geologist, mining engineer and author. He founded the Mineralogical Society of Arizona in 1935, Rocky Mountain Federation of Mineralogical Societies in 1941 and the American Federation of Mineralogical Societies in 1947. The A.L. Flagg Foundation for the advancement of Earth Sciences was established in his honor in 1962 and is now the Flagg Mineral Foundation.

Join the Flagg Mineral Foundation, along with the Earth Science Museum, Cave Creek Museum, Superstition Mountain Museum, Mineralogical Society of Arizona and several other local rock, gem and mineral organizations and over 100 dealers at this very popular family event.

As always, the Flagg Mineral Foundation booth will have rocks, minerals and fossils for sale at very reasonable prices along with free samples for teachers and children.

You will want to check out the spectacular colors fluorescent minerals produce under ultraviolet (UV) light at the Earth Science Museum booth.

At the Cave Creek Museum booth, there will be a working model of a stamp mill. (What is a stamp mill? You will have to come to the show to find out). And, members of the Gold Prospectors Association will be on hand to help you try your hand at "gold" panning.

The Superstition Mountain Museum staff will bring the Peralta Stones (the legendary stone maps indicating the supposed location of the famed Lost Dutchman Gold Mine). At their booth, will be a working model of a stamp mill and volunteers will be on hand to answer your questions.

The Mineralogical Society of Arizona and Maricopa Lapidary Society will have spinning wheels where you can acquire a mineral, rock, or fossil specimen for as little as twenty-five cents.

Bring your children, grandchildren, nieces and/or nephews to the Leaverite Rock & Gem Society booth and get them their very own mini rock collection by purchasing an empty egg carton and have them pick out their 12 favorite specimens from a wide selection of rocks, minerals and fossils for only $1.

Peralta Stones and folks enjoying selecting specimens for their mini collection (S. Cote photo), fluorescent minerals (Wikipedia photo)

ROCK WALK OPENS IN CONGRESS, AZ

Text by Susan Celestian and photos by Debra Keiser

Dale and Debra Keiser of the Wickenburg Gem and Mineral Society volunteered their time, toil and expertise to develop an interactive geological experience for the students of the Congress Elementary School.

The Keiser's have installed 80 large, numbered rock, mineral and fossil specimens, with 47 metal "labels". A 24-page written narrative describes each specimen and puts them in geological perspective. In the future, students will be trained to lead tours for their peers, parents and visiting school groups.

Dale Keiser explains to students the significance of one of the rocks on the Congress Elementary Rock Walk. In the foreground, is a large ventifact from Palm Springs, California.

Students at Congress Elementary School help install signage along the Rock Walk.

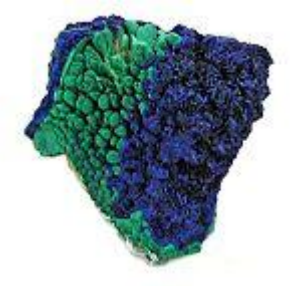
On December 12, Lynne & Terry Dyer, Earth Science Museum outreach program volunteers and members of the Mineralogical Society of Arizona, set up a display of their rocks, minerals & fossils at the Cotton Boll Elementary School Science Fair. They provided attendees with information about rocks and minerals and their uses in everyday life.

Terry Dyer answering a parent's question at the Cotton Boll Elem. Science Fair. Lynne Dyer photo

For more information on the Earth Science Museum's Outreach Program, please visit our website at www.earthsciencemuseum.org.

◊ ◊ ◊

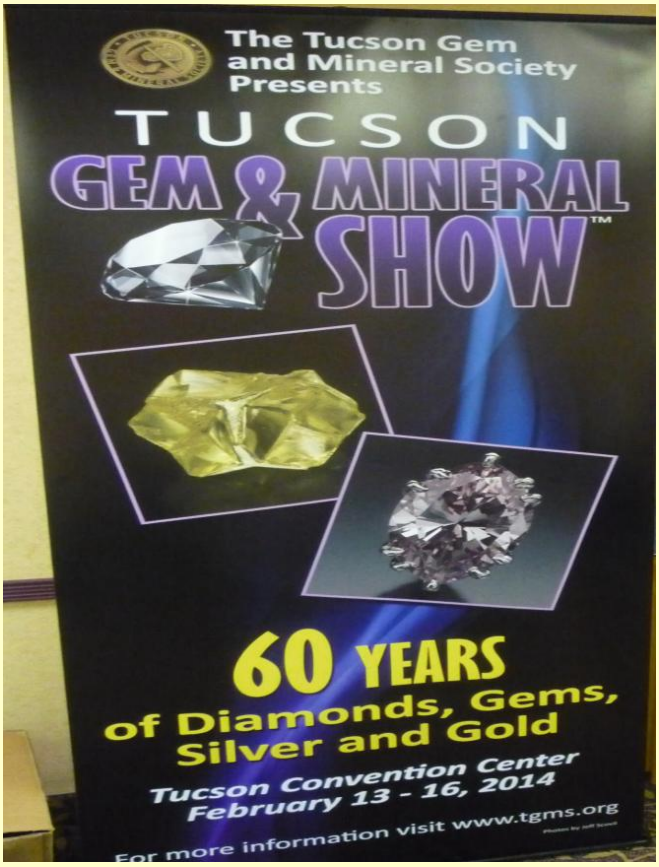
Azurite (blue) & malachite (green) are copper carbonate hydroxide minerals with the chemical formulas of $Cu_3(CO_3)_2(OH)_2$ & $Cu_2CO_3(OH)_2$ respectively.



Azurite/malachite specimens (Photos: Wikimedia Commons)

Rhodochrosite photo Wikipedia

Rhodochrosite is another carbonate mineral with a chemical composition of $MnCO_3$ or manganese carbonate.

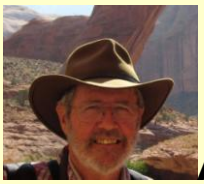


Did you know that some blue diamonds are natural semiconductors, in contrast to most diamonds, which are excellent electrical insulators? The conductivity and blue color originate from boron impurity. Boron substitutes for carbon in the diamond lattice, donating a hole in the valence band.

Silver facts:
Silver possesses the highest electrical conductivity of any element and the highest thermal conductivity of any metal.

Sterling silver is 92.5% silver and 7.5% copper with germanium, zinc or platinum used to replace the copper in some formulas.

Gold facts:
24 karat gold is pure elemental gold. 18 karat gold is 75% pure gold. 14 karat gold is 58.5% pure gold and 10 karat gold is 41.7% pure gold. The remaining portion of the metal is usually silver, but may consist of such other elements, alone or in combination, as platinum, palladium, zinc, nickel, iron or cadmium.

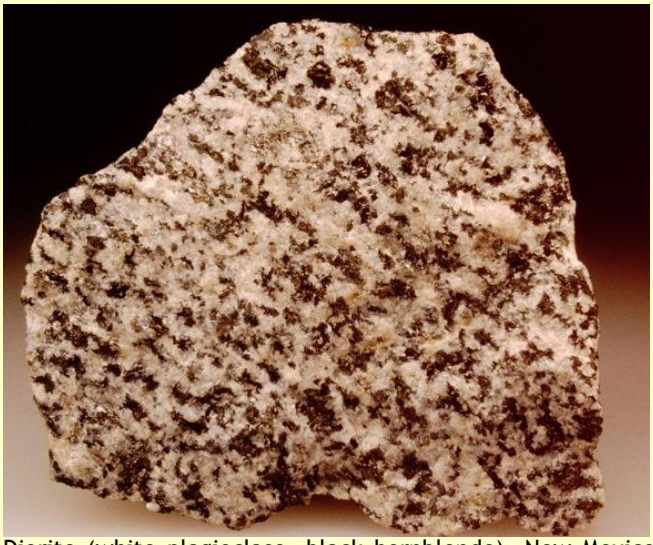


Arizona Rocks 7

Text and photos by Ray Grant

Andesite and diorite are igneous rocks intermediate in silica composition between rhyolite (granite) and basalt (gabbro). Andesite is the fine-grained volcanic rock and diorite is the coarse-grained intrusive rock. The minerals present in these rocks are plagioclase and hornblende with other possible minerals.

Diorite is not a very common rock. It occurs in Arizona associated with the major intrusive bodies particularly those associated with the large copper deposits such as at Ajo.

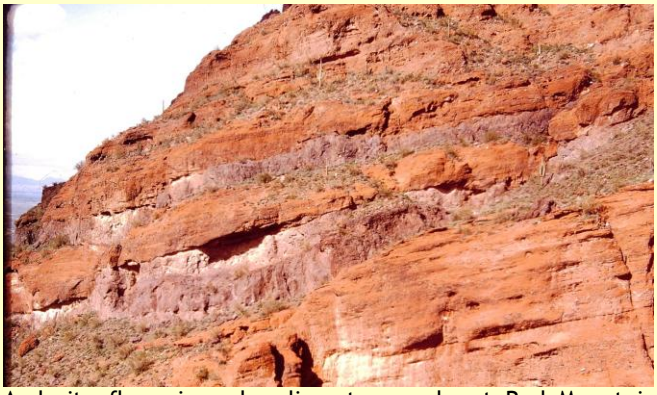


Diorite (white plagioclase, black hornblende), New Mexico (Jeff Scovil photo)

Andesite (the name derived from the Andes mountain range in South America) is found as part of the major volcanic fields in Arizona. One problem is that andesite looks like basalt, it is just a lighter color (gray instead of black), and when the andesite weathers it will look just like basalt. Andesite is not nearly as common as basalt, but we do have some locally in the Phoenix area. It occurs on the top of Tempe Butte (A Mountain), at Red Mountain (Mount McDowell) on the Beeline Highway, at Blue Point on the Salt River, around Apache Lake, and as dikes at South Mountain. The dikes at South Mountain have also been called microdiorite. They are fine-grained (andesite), but since they are intrusive and not volcanic the name microdiorite was used. All of the andesite and microdiorite in this area is about 20 million years old.

Microdiorite dike at South Mountain (Ray Grant photo)

Andesite on top of A Mountain (Tempe Butte) (D. Duffy photo)



Andesite flows in red sedimentary rocks at Red Mountain (Ray Grant photo)

EXPLORE YOUR WORLD!

Sunset Crater Volcano National Monument

Text & photo from NPS.gov and Wikipedia

The Colorado Plateau's most recent volcanic eruption (900-1,000 years ago) resulted in Sunset Crater volcano which is located in the San Francisco Volcanic field. The volcanic field encompasses 1800-square-miles in northern Arizona and contains over 600 volcanoes including the San Francisco peaks with the highest peak, Humphrey's, at an elevation of 12,633 feet.

Sunset Crater is a picturesque cinder cone with red, yellow, pink and white mineral deposits on its rim of cinders that suggested the colors of a perpetual sunset, to explorer and geologist John Wesley Powell, and inspired its name.

Sunset Crater has a characteristic bowl-shaped crater at its summit which is 400 feet deep and 2,250 feet from rim to rim. The cone is almost a mile wide at its base and stands 1,000 feet high.

Sunset Crater photo by S. Cote

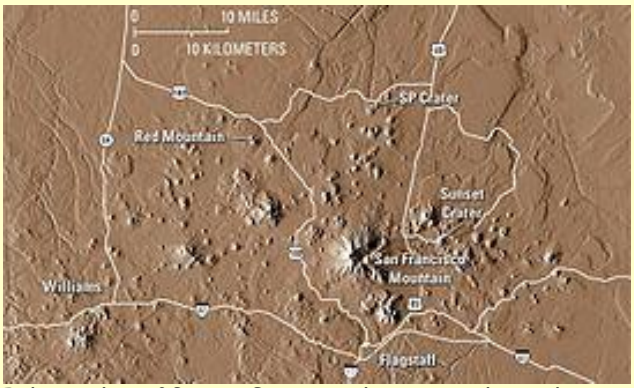
The rock fragments making up Sunset Crater, called cinders or scoria, are glassy and contain numerous gas bubbles "frozen" into place as magma exploded into the air then cooled quickly.

Some geologic features associated with Sunset Crater include lava flows, lava tubes, spatter cones and an ice cave. Many of these features look as fresh and rugged as the day they were formed.

Two lava flows, occurred from gas-depleted magma, orginated at the base of the cinder cone. The Kana-A Flow broke through the eastern base of the volcano and flowed over six miles to the northeast, filling a narrow valley. The Bonito Lava Flow oozed out from beneath the northwest base of the cone and pooled over a 2-square-mile area. It is believed to be as much as 100 feet thick that accumulated during at least three separate flows. Both lava flows have a layer of cinders on top of them signifying the continued development of the cinder cone.

Lava tubes are a type of lava cave that forms when a very liquid lava flow developes a continuous and hard crust, which thickens and forms walls and a roof around the still-flowing lava stream. When the supply of lava stops at the end of an eruption, or is diverted elsewhere, lava in the tube systems drains downslope and leaves partially empty cave-like conduits beneath the ground. Lava tubes can become ice caves when they contain a significant amount of perennial (year-round) ice.

A spatter cone forms from molten lava that is ejected from a vent that has the consistency of taffy. Still partly liquid rock splashes down over the sides of a developing mound as irregular deposits that weld together as they cool.



Relationship of Sunset Crater to the surrounding volcanic field. Wikipedia photo.

ESM's Upcoming Meeting

The Earth Science Museum's next scheduled meeting is January 8th at the Burton Barr Library, located near Central Ave. and McDowel in Phoenix at 6:30 p.m. in Rm. B. Everyone is welcome to attend.

Rock & Gem Shows

January 2014 – February 2014

Jan. 3-5-MESA, ARIZONA
Phoenix Area's Largest Gem and Mineral Show the **42nd FLAGG GEM AND MINERAL SHOW at MESA COMMUNITY COLLEGE.**
Friday, Saturday, Sunday, January 3, 4, and 5, 2014, 9 a.m. to 5 p.m. each day
Free Admission and Parking
Go to **www.flaggshow.info** for more information and directions

Jan.1 - Feb. 28-QUARTZSITE, AZ
http://xpopress.com/QZ-show-schedule.html

Feb. 1-15-TUCSON, AZ
www.tucsongemshows.net/coming.html

Feb. 13-16-TUCSON, AZ
Tucson Gem and Mineral Show, Tucson Convention Center; 260 S. Church Ave.; Thurs.-Sat. 10-6, Sun. 10-5; www.tgms.org.

_ _ _ _ _ _ _ _ cut here _ _ _ _ _ _ _ _ _ _

ESM Earth Science Investigation Team Membership Form

_____ New Member _____ Renewal

Membership levels:

_____ **ESI Family $20**

_____ **ESI Individual $10**

_____ **ESI Student** (16 & under) **$5**

Membership benefits:

- Monthly e-newsletter *Earthquake*
- Official team membership card
- Knowledge that your contribution is making a difference in earth science education

MANY THANKS TO OUR MAJOR DONORS!

AZ Leaverite Rock & Gem Society
www.azleaverite.org

Flagg Mineral Foundation
www.flaggmineralfoundation.org

Friends of the AZ Mining & Mineral Museum

Maricopa Lapidary Society

Mineralogical Society of AZ
www.mineralogicalsocietyarizona.org

White Mountain Gem & Mineral Club
www.whitemountain-azrockclub.org

Wickenburg Gem & Mineral Society
www.facebook.com/pages/Wickenburg-Gem-and-Mineral-Society/111216602326438

Staples Foundation
www.staplesfoundation.org

Stan & Susan Celestian
Russ Hart
Debbie Michalowski
Dennis & Georgia Zeutenhorst

_ _ _ _ _ _ _ _ cut here _ _ _ _ _ _ _ _ _ _

Name: _____

Address: _____

City, State, Zip: _____

Email: _____

Phone Number: _____

Mail form & payment to: Earth Science Museum 3215 W. Bethany Home Rd., Phoenix, AZ 85017

For Office Use Only

Card given/mailed: _____
Database updated: _____
Distribution Lists updated: _____
Expires: _____ Card ID # _____

Earth Science Museum
3215 W. Bethany Home Rd.
Phoenix, AZ 85017

Phone:
602-973-4291

Editor E-Mail:
scote@earthsciencemuseum.org

We're on the Web!

Visit us on *and at:*

www.earthsciencemuseum.org

Mission
Establish an innovative, world-class destination museum in the Phoenix area dedicated to inspiring all generations about earth sciences.

Vision
We envision a community where students and the general public have curiosity about, passion for, and understanding of the underlying principles of earth sciences.

For more information about the ESM, how to become a member or how to arrange for a school visit or Community function, go to: www.earthsciencemuseum.org.

Please join us at the next ESM board meeting Wednesday, January 8, 2013, at the Burton Barr Library in Phoenix at 6:30 p.m. Rm. B.

Earth Science Museum
3215 W. Bethany Home Rd.
Phoenix, AZ 85017