



# 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  
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## ESM at the Flagg Gem & Mineral Show - January 9-11, 2015

By Shirley Cote, Ray Grant and Harvey Jong

The Earth Science Museum participated in the 43<sup>rd</sup> Annual Flagg Gem & Mineral Show sponsored by the Flagg Mineral Foundation and Mesa Community College's Geology Club.

This show is a big fundraiser for the sponsors as well as the local rock and gem clubs like the AZ Leaverite Rock & Gem Society, Maricopa Lapidary Society, Mineralogical Society of Arizona, Apache Junction Rock & Gem Club, the Gila County Gem & Mineral Society and others.

Superstition Mountain Museum volunteers brought a working model Stamp Mill and Cave Creek Museum volunteers showed people how to pan for gold.



Each October, members of the MCC Geology Club, headed by MCC instructor Kelli Wakefield (above center, facing), travel to Searles Lake in California to collect halite (below left) and hanksite (right) specimens to sell at the Flagg Gem & Mineral Show.



Each year the Flagg Mineral Foundation (FMF) sells beautiful mineral specimens and gives away free rock, mineral & fossil samples benefiting teachers and children.



Minerals for sale at FMF booth (left) and free fossil dig for children (right)



Bill Yedowitz (right) of the Flagg Mineral Foundation, donates boxes of mineral specimens to Harvey Jong, ESM President.



Over 1,170 people enjoyed the ESM's Solar-Powered Fluorescent Mineral Display

Fluorescent mineral display featuring A. L. Flagg's "Coals of Fire" and other calcite specimens.



ESM's Teacher Kits Display

Attendee's waiting their turn to spin for a mineral prize at the popular Mineralogical Society of Arizona's booth



Mardy Zimmermann (standing), ESM's VP & Outreach Coordinator, confers with Tom and Joy at the AZ Leaverite Rock & Gem Society's booth.

AZ Leaverite members manage the Egg Carton Program which featured over 300 cups filled with rock, mineral & fossil specimens (with labels) from which to choose.



Tony & Karl (left) chatting with attendees at the Maricopa Lapidary Society's Spinning Wheel



Chuck with the Superstition Mountain Museum's working model stamp mill



Apache Junction Rock & Gem Club booth



Jodi, President, Gila County Gem & Mineral Society, opens their "treasure chest" containing grab bags.



We would like to thank the following individuals and organizations who graciously donated rocks, minerals, fossils and storage boxes to the Earth Science Museum during the Flagg Mineral Show:

- Flagg Mineral Foundation
  - 4 flats mineral specimens
  - Several boxed fossils and rock specimens
- Maricopa Lapidary Society
  - Salton Sea halite
- Shannon Minerals
  - Fold-up storage flats & boxes
- Lynn Mason
  - 2 boxed rock & mineral sets
- Carleton Moore
  - Mineral & fossil specimens
- Dana Slaughter
  - 3 Aragonite sixling twin crystals

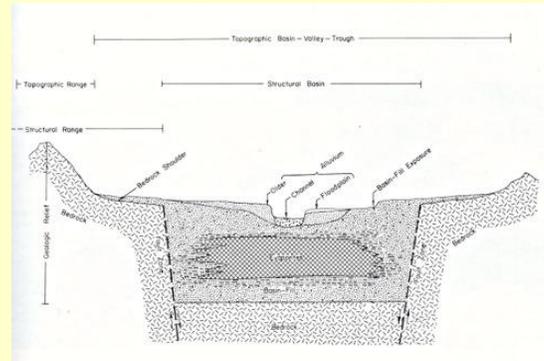


## Arizona Rocks 20

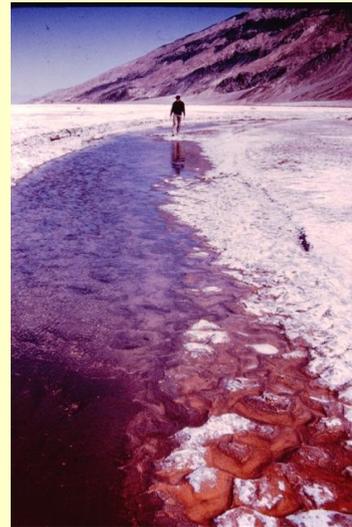
Text and photos by Ray Grant

We are looking at the chemical sedimentary rocks, those rocks that form from elements that go into solution during weathering. The two most abundant elements in solution are calcium (forms limestone) and magnesium (forms dolostone). The other major elements in solution which form rocks are sodium and potassium. These two elements along with calcium form a series of rocks called evaporites that form from the precipitation of salts from solution by evaporation.

The rocks that form are rock salt composed of halite (NaCl) and sylvite (KCl), gypsum or gypstone ( $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ ) and anhydrite ( $\text{CaSO}_4$ ). Halite, gypsum, and anhydrite are very common in Arizona, but rarely seen. That is because they formed during the early period of the Basin and Range formation from 15 to 3 million years ago. At that time many of the basins in Arizona looked like Death Valley does today. The basins were down faulted and the water collected in them and evaporated. More recently, as rivers connected the basins together the evaporites were covered with deposits of sand, gravel, and mud. Almost every basin has some evaporites present when there is drilling deep enough to find them. The Luke Basin by Luke Air Force Base has over 3,000 feet of halite that was found starting at 1,000 feet down. The halite is being mined there by dissolving it in hot water and pumping the solution to the surface. In the Pichacho Basin by Eloy anhydrite over a mile thick was found about 2,000 feet down. One place to see evaporites is at the Verde Salt mine outside of Camp Verde. The halite and other minerals formed when a lake was present in the Verde Valley.



Idealized cross-section showing the evaporites in the basins of southern Arizona



Salt forming from evaporation in Death Valley, California at the present time. Many basins in southern Arizona looked like this in the past.

Halite crystals from Searles Lake, California



Collecting halite at the Verde Salt Mine

## Arizona Rocks Trivia Quiz

Questions taken from past Arizona Rocks Articles

Choose your answers from the list on the right.

1. One of the most common rocks found in Arizona is \_\_\_\_\_.
2. The next most common volcanic rock in Arizona is \_\_\_\_\_ and is a fine-grained light colored volcanic rock.
3. An intrusive igneous rock with very large crystals (usually over one inch in size and up to many feet in size) related to granite is \_\_\_\_\_.
4. When the basalt magma does not reach the surface to form a volcanic rock, it is intrusive and cools slowly forming larger crystals. This coarser grained intrusive rock is \_\_\_\_\_ or \_\_\_\_\_.
5. \_\_\_\_\_ forms when silica rich magma cools very fast, so fast crystals can't form.
6. \_\_\_\_\_ and \_\_\_\_\_ are igneous rocks intermediate in silica composition between rhyolite (granite) and basalt (gabbro). \_\_\_\_\_ is the fine-grained volcanic rock and \_\_\_\_\_ is the coarse-grained intrusive rock.
7. Ultramafic (high in iron and magnesium) igneous rocks originate in the Earth's mantle and are pushed up to the surface in mountain building events or they are carried to the Earth's surface as nodules (xenoliths or inclusions) with basalt magma. \_\_\_\_\_ contains mainly olivine and pyroxene with small amounts of other minerals such as garnet and spinel.
8. \_\_\_\_\_ is a rare ultramafic igneous rock found as dikes or pipe like intrusions and is a type of \_\_\_\_\_.
9. Igneous rocks are named based on two features. First the \_\_\_\_\_ whether it is fine-grained, coarse-grained or glassy, etcetera, and, second the \_\_\_\_\_ or minerals it contains.

10. Another common term used with igneous rocks is \_\_\_\_\_, which means the rock has two sizes of crystals. These are volcanic rocks where the magma started to cool underground and large crystals were forming and then it erupted out on the surface and the remaining magma cooled quickly forming small crystals.

### Answer List

Some of these terms may be used more than once.

Granite  
Peridotite  
Gabbro  
Chemistry  
Diorite  
Porphyry  
Basalt  
Obsidian  
Pegmatite  
Diabase  
Kimberlite  
Andesite  
Textures  
Felsite

**Visit the Tucson Gem and Mineral Society's  
2015 Tucson Gem and Mineral Show®  
"Minerals of Western Europe"  
FEBRUARY 12-15, 2015  
Tucson Convention Center**

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**Minerals of Arizona  
Twenty-third Annual Symposium  
Friday March 27, Saturday March 28, and  
Sunday March 29, 2015**

**Friday Program: Micromineral Symposium**

- 2:00 Welcome by Ron Gibbs  
Trade / give-away session - Microscopes available or bring your own. Please bring minerals to share, trade, and/or brag about.
- 4:00 Presentation: to be announced
- 5:00 Dealers selling in rooms

**Saturday Program: Continental Breakfast 8 AM, talks from 9 AM to 4:40 PM followed by a Dinner at 6 PM with a speaker and an auction of donated items**

- 8:00 - 8:45 - Coffee Hour
- 8:45 - 9:00 - Welcoming Remarks and Introductions
- 9:00 - 9:40 - Crystallized Gypsum Deposits of the San Pedro River Basin - Barbara Muntyan
- 9:40 - 10:20 - Red Cloud Mine - the world's greatest wulfenite locality - Les Presmyk
- 10:20 - 10:50 - Break
- 10:50 - 11:30 - Notable Native Silver Specimen Producing Localities in Arizona and New Mexico - Tony Potucek
- 11:30 - 12:10 - The Apex Mine, Utah -- A Colorado Plateau-type Solution-Collapse Breccia Pipe and a Tsumeb, Namibia Analogue - Karen Wenrich
- 12:10 - 1:30 - Lunch
- 1:30 - 2:10 - Mine Reclamation and Mineral Specimen Recovery Operation at the Blanchard Mine, Socorro County, New Mexico - Mike Sanders
- 2:10 - 2:50 - Origins of Azurite and Malachite - Erik Melchiorre
- 2:50 - 3:20 - Break
- 3:20 - 4:00 - History of the Freeport-McMoRan Minerals Mineral Collection - Will Wilkinson
- 4:00 - 4:40 - Emus, 'Roos and Minerals and Mines at Broken Hill, NSW, Australia - Anna Domitrovic

4:40 - 6:00 - Happy hour, visit dealers

6:00 **Dinner and evening speaker** - There will also be an auction of donated items and an evening speaker to be announced. Cost is \$20 per person.

#### Sunday Program

**9:00 to 11:00** - Portable XRF demonstration of analyzing gold and other minerals for their chemistry. Participant can bring one unknown sample to be analyzed.

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**Clarion Hotel at Phoenix Tech Center, 5121 E. La Puente Avenue  
(NW corner of Elliot Rd. and  
I 10) in Phoenix**

The Clarion has a special rate for rooms during the symposium. They are \$99.00 per night plus tax and include breakfast and a light evening meal (salad bar and one hot item). If you want a selling room you need to request a first floor, courtyard (poolside) room, these rooms are also \$99 plus tax this year. We have asked that those rooms be saved for dealers. If you do not want a selling room, just specify that you are with the mineral symposium to get the quoted rate. The Clarion telephone number is 480-893-3900.  
Directions: Take Interstate 10 N or S to Elliot Road exit. Go west on Elliot Road to the first light (a short block), turn north on 51<sup>st</sup> Street to La Puente Ave. Turn right into the Clarion.

Go to [flaggmineralfoundation.org](http://flaggmineralfoundation.org) for the latest information.

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**Minerals of Arizona Symposium Registration Form:**

Please mail this form with the \$45.00 registration fee (Foundation and Mineralogical Society of Arizona members pay \$40.00) before March 23, 2015 so lunch and other food can be ordered. Saturday evening Banquet cost is \$20 per person.

Mail to:

Flagg Mineral Foundation

P.O. Box 41834

Mesa, Arizona 85274

Make checks payable to: Flagg Mineral Foundation

Enclosed is \$ \_\_\_\_\_ for \_\_\_\_\_ registrations and \_\_\_\_\_x \$20 for Saturday Dinner.

Name(s): \_\_\_\_\_

Address: \_\_\_\_\_

E-mail: \_\_\_\_\_

## ESM's Upcoming Meeting

The Earth Science Museum's next scheduled Board meeting on March 11, 2015, 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.

### **BECOME A MEMBER!**

Join the Earth Science Museum's



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**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](http://www.azleaverite.org)

Flagg Mineral Foundation  
[www.flaggmineralfoundation.org](http://www.flaggmineralfoundation.org)

Friends of the AZ Mining & Mineral Museum

Maricopa Lapidary Society

Mineralogical Society of AZ  
[www.mineralogicalsocietyarizona.org](http://www.mineralogicalsocietyarizona.org)

White Mountain Gem & Mineral Club  
[www.whitemountain-azrockclub.org](http://www.whitemountain-azrockclub.org)

Wickenburg Gem & Mineral Society  
<http://www.wickenburggms.org>  
[www.facebook.com/pages/Wickenburg-Gem-and-Mineral-Society/111216602326438](https://www.facebook.com/pages/Wickenburg-Gem-and-Mineral-Society/111216602326438)

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[www.staplesfoundation.org](http://www.staplesfoundation.org)

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**Editor E-Mail:**  
 scote@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](http://www.earthsciencemuseum.org).

*We're on the Web!*

Visit us on  and at:  
[www.earthsciencemuseum.org](http://www.earthsciencemuseum.org)

Please join us at the next ESM Board meeting Wednesday, March 11, 2015, at the Burton Barr Library in Phoenix at 6:30 p.m. Rm. B.

**THANK YOU FOR YOUR CONTINUING INTEREST & SUPPORT!!!**

**EARTH SCIENCE MUSEUM  
 NON-PROFIT BOARD OF DIRECTORS**

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