



# 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](http://www.earthsciencemuseum.org), [scote@earthsciencemuseum.org](mailto:scote@earthsciencemuseum.org), 602-973-4291

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## ESM RECENT EVENT

By Shirley Coté, Ray Grant and Harvey Jong

Several ESM outreach volunteers, Mardy Zimmermann, Tom Parish and Lynne & Terry Dyer, visited third- and fourth-grade students at Desert Mountain Elementary school in Queen Creek. They presented an interactive, hand-on program to introduce students to rocks and minerals.



Lynne Dyer displayed her personal collection of rocks, minerals and fossils. She included some products used in everyday life and explained how these items are made from various rocks and minerals. Children as well as adults are always amazed to discover the mineral ingredients in common household products and learn that "If it can't be grown, it must be mined".

*Cronkite News* was also on hand to film Mardy and company presenting the ESM's very popular and free outreach program. Reporter Harmony Huskinson produced a story about the closure of the Arizona Mining and Mineral Museum and how the ESM is continuing the mission of earth science education. The news article and video can be viewed at:

<http://cronkitenewsonline.com/2014/02/rock-on-nonprofit-group-continues-legacy-of-closed-state-mineral-museum/>.

## UPCOMING EVENT

22<sup>nd</sup> Annual **Minerals of Arizona Symposium**

Sponsored by the Flagg Mineral Foundation  
Friday through Sunday, **April 4 - 6, 2014**  
Clarion Hotel - 5121 E. La Puente Ave.,  
Phoenix, AZ (NW corner of Elliot Rd. & I-10)

The Friday program features a micro mineral symposium from 2 - 5 p.m. Join in the fun of exploring minerals under a microscope and enjoy a presentation "Micro Mineral Collecting; When Bigger Isn't Better" by Ron Gibbs at 4 p.m. There will be mineral sales in several rooms by the pool from 5 to 10 p.m.

Saturday program: Continental breakfast at 8:00 a.m., talks from 9:00 until 4:30 followed by a dinner at 6 with featured speaker, Dr. Erik Melchiorre, Professor of Geology, California State - San Bernardino, and an auction of donated items. Mineral sales from 4:30 p.m. to 6 p.m. and after dinner.

Sunday program: 9 a.m. to 12 noon, demonstrations, trade session, and sales.

A special feature at this year's event will be a collection of fluorescent minerals and will include Arthur L. Flagg's long lost "Coals of Fire" specimen now owned by the Flagg Mineral Foundation.

A drawing will be held for this celestine geode donated to the ESM by Stan & Sue Celestian.



For more information and registration, please go to: [www.flaggmineralfoundation.org](http://www.flaggmineralfoundation.org).



## Arizona Rocks 9

Text and photos by Ray Grant

We are almost finished with igneous rocks, but in Arizona there is a rare ultramafic igneous rock, kimberlite. Kimberlites of course are famous because they contain diamonds many places in the world. Kimberlite is a type of peridotite found as dikes or pipe like intrusions. It is composed of serpentine, olivine, garnet, biotite, pyroxene and a number of accessory minerals. It can also contain angular fragments of a number of other ultramafic rocks and of the rocks surrounding the pipe. This suggests explosive volcanic activity associated with the formation of the pipes.

The Arizona kimberlites are all found on the Navajo Reservation in northeastern Arizona. There are five pipes in Arizona, four at Garnet Ridge and one at Buell Park. There is one just over the border in New Mexico and a couple in southern Utah. The Arizona kimberlites have been known for some time because of the garnets found at them. These deep red pyrope garnets called anthill garnets because they are found where ants bring them to the surface or Arizona rubies because of the color have been collected for many years.

The Buell Park kimberlite pipe may be the largest in the world. It is about 2.7 miles across. Unfortunately, no diamonds have been found in Arizona and chemical studies of the Arizona kimberlites suggest they are not likely to have diamonds. In northern Colorado and southern Wyoming, there are kimberlites which contain diamonds.

Pyrope garnets (Anthill garnets or Arizona rubies) from Garnet Ridge, Arizona

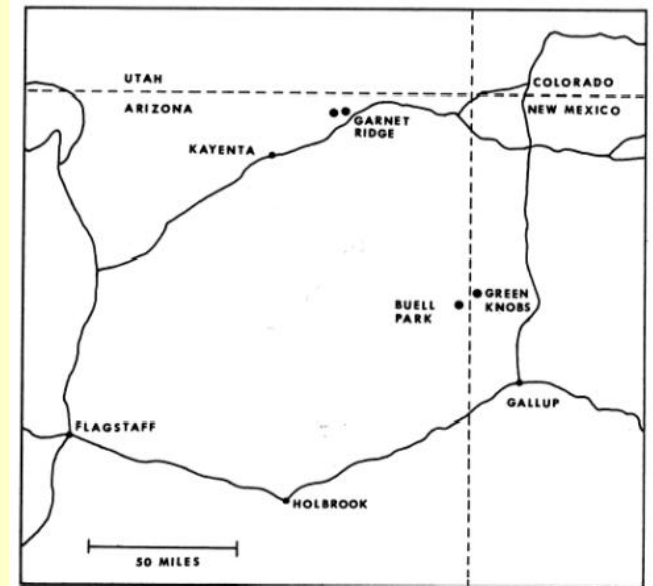
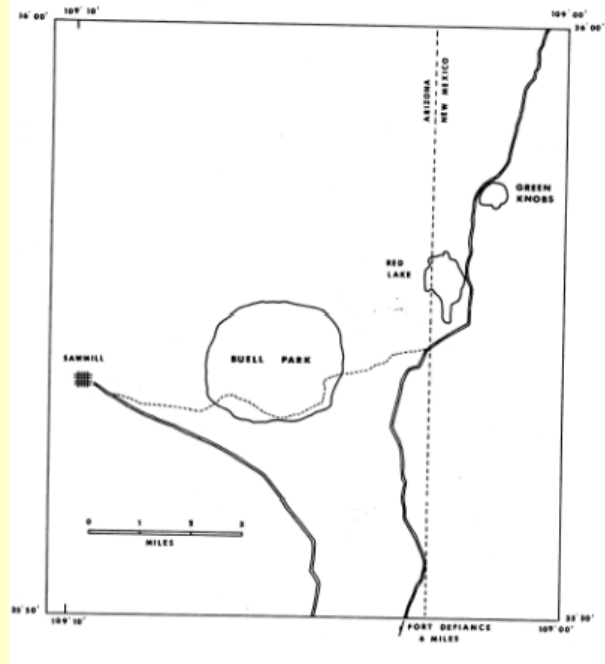


FIGURE 1.—Location of the three kimberlite pipes studied.



Maps: from Switzer, G. S. 1977, *Composition of Garnet Xenocrysts from Three Kimberlite Pipes in Arizona and New Mexico*, Smithsonian Contributions to the Earth Science, Number 10, p 1 - 21.



# EXPLORE YOUR WORLD!

## LOWELL OBSERVATORY

Text & photos from Wikipedia and Lowell's website

Lowell Observatory, located atop Mars hill in Flagstaff, Arizona, was established in 1894 by Percival Lowell and is one of the oldest observatories in the United States. In 1965, the observatory was designated a National Historic Landmark.

The 24-inch Clark Refracting Telescope, was built in 1896 for \$20,000, assembled in Boston, Massachusetts by Alvin Clark and then shipped by train to Flagstaff.

Even though the Clark Telescope is currently undergoing renovations and will not be open until the middle of 2015, there is plenty to see and do at the observatory. The Steele Visitor Center is open and features a gift shop and many educational exhibits.



Steele Visitor Center opened in 1994 in celebration of their centennial.



Clark Telescope



The Pluto Walk is a 350 foot model of the solar system ending at the Pluto Discovery Telescope.



The 13-inch Pluto Discovery Telescope was used by Clyde Tombaugh in 1930 to discover the dwarf planet Pluto.

If you happen to be at the observatory between noon and 12:45 p.m., you can view the sun through a specially equipped solar telescope.

In the evenings at 5:10, 6:10, 7:10 or 8:10, be sure to see *Scanning the Skies: The Discovery Channel Telescope*. This 42-minute Discovery Channel special documents the construction of Lowell's cutting-edge, world-class telescope from conception to "first light" in 2012.

For days and times that the observatory is open and more information please go to:  
<http://www.lowell.edu/visit.php>.

## **ESM's Upcoming Meeting**

The Earth Science Museum's next scheduled meeting is March 12<sup>th</sup> 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**

**March 2014 - April 2014**

**Sat. - Sun. March 15 - 16 - Cottonwood, AZ**  
**2014 Cottonwood Gem & Mineral Show**  
 Mingus Union High School, 1801 E. Fir St., Sat. 9-5, Sun 9-4, Admission \$3, Children under 12 Free

**Sat. Sun. April 12 - 13 - Anthem, AZ**  
**2014 Annual Anthem Gem & Mineral Show**  
 Anthem School, 41020 N. Freedom Way, Sat 10-5, Sun. 10-4, Admission \$3, seniors and students \$2, children are free



### **Great Free Mineral & Gem Resource:**

Mindat is the largest mineral database and mineralogy reference website on the internet. This site contains worldwide data on minerals, mineral collecting, mineral localities and other mineralogical data and Gemdat is its gem counterpart.

<http://www.mindat.org/>

<http://www.gemdat.org/>

**THANK YOU!**

We wish to thank Russ Hart for his recent donation of rocks and minerals to the Earth Science Museum. This donation included cement blocks and plywood for shelving which the ESM has put to good use in our storage facility to hold the very heavy Archbold economic geology collection. The collection was donated last year by the Flagg Mineral Foundation.

## **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  
[www.facebook.com/pages/Wickenburg-Gem-and-Mineral-Society/111216602326438](http://www.facebook.com/pages/Wickenburg-Gem-and-Mineral-Society/111216602326438)

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

Anita Aiston  
 Stan & Susan Celestian  
 Russ Hart  
 Will & Carol McDonald  
 Debbie Michalowski  
 Dennis & Georgia Zeutenhorst

**THANK YOU!**

We wish to thank Anita Aiston for her recent monetary donation.

We also wish to thank all those who have joined or renewed their memberships with us.

We would like very much for you to become a member of the Earth Science Museum. Just fill out the membership form at the bottom of the next page and send it along with your check to the address listed on the form.

If you missed getting to Tucson for the Tucson Gem & Mineral Show earlier this month, here are a few photos of some of the wonderful displays. (S. Coté photos)



The Periodic Table of Elements



Smokey quartz "fish" (Brazil)



Gold and silver display courtesy of the U of A Mineral Museum



This lapidary & mineral display was a group effort.

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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.

----- 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 # \_\_\_\_\_

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*We're on the Web!*

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

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**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).

Please join us at the next ESM board meeting  
Wednesday, March 12, 2014, at the Burton  
Barr Library in Phoenix at 6:30 p.m. Rm. B.

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