



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

October 2022
Volume 11, Issue 10

ESM OUTREACH UPDATE

Mardy Zimmermann, Outreach Coordinator

Requests for outreach have been slow to non-existent recently and are not expected to change until after the first of the year.

Help Wanted

By Harvey Jong and Shirley Coté

The ESM is planning to participate at the 50th Annual Flagg Gem and Mineral Show at Mesa Community College. The show will be held on January 6-8, 2023, from 9am to 5pm each day. So, we are looking for some volunteers interested in helping staff our exhibit, sales tables, and egg carton program.

Like last January, we will have the modified fluorescent mineral display. Are you fascinated with fluorescent minerals? Do you own a UV light and would be interested in helping show visitors discover the hidden beauty of minerals that fluoresce?



Show volunteers are also needed to assist with the ESM's sales tables. Do you like talking with people about rocks, minerals and jewelry? There will be jewelry, rocks, fossils and flats of mineral specimens and lapidary material for sale.

Egg Carton Program

The ESM's Egg Carton Program has been a very popular long-standing activity at the Flagg Show. It provides children the opportunity to build their own personal collections of rocks, minerals, or fossils. For just one dollar, kids can select 12 different labeled specimens.

MAKE YOUR OWN COLLECTION

ONLY \$1 12 DIFFERENT ROCK, MINERAL, OR FOSSIL SPECIMENS ONLY \$1

1. PAY A DOLLAR &
GET AN EGG CARTON



2. SELECT 12 SPECIMENS &
GET A LABEL FOR EACH ONE



3. CHECK OUT &
PERSONALIZE YOUR
NEW COLLECTION



A COMMUNITY OUTREACH SERVICE OF 

ALL PROCEEDS USED TO HELP SUPPORT REOPENING THE PHOENIX MINERAL MUSEUM
& CHILDREN'S SCIENCE EDUCATION

Phantom of the Minerals

By Harvey Jong

The spooky celebrations of Halloween inspired this article which will delve into the phantoms found in minerals. A phantom may be defined as a ghost-like pattern which developed during an early growth stage of a crystal. It preserves the shape of a formative crystal through localized compositional changes and is enclosed by subsequent crystal growth.

How Phantoms Form

Phantoms may occur in a variety of minerals with transparent crystals. Depending on the host mineral, different mechanisms may be involved in the formation of the phantoms.

Inclusions

The inclusion of minerals or rock debris represents a common way of producing phantoms. The phase and concentration of these impurities affects the appearance of the resulting phantoms. They may occur as faint outlines or as translucent “cores”.



Phantom Quartz

James St. John
photo - CC-BY-SA-
2.0, via Wikimedia
Commons

Unspecified site,
Garland County,
Arkansas

We will take a look at a few phantoms involving frequently and not so frequently occurring inclusions. (Note that the

examples appear in alphabetical order based on their inclusions.)



Quartz Crystal with Ajoite Phantom

Photo by Rob Lavinsky, iRocks.com - CC-BY-SA-3.0,
via Wikimedia Commons

Messina Mine, Limpopo Province, South
Africa

Dimensions: 6.9 x 3.4 x 2.5 cm

This sharply-terminated quartz crystal encloses a blue-green ajoite phantom. Ajoite is a potassium sodium copper aluminum silicate that was first discovered at the New Cornelia Mine in Ajo, Arizona and is named after the community of Ajo.

Located in northern South Africa, the Messina Mine (No. 5 shaft) is a well-known source of quartz specimens with interesting habits and colorful secondary mineral inclusions. Crystals containing ajoite were initially found in July 1985, and the finest single crystal specimen was 25 cm long. The mine was closed in 1994 due to flooding and was briefly reopened in 2008. It has been permanently sealed with concrete.



Calcite with Chalcopyrite Phantoms under White Light



Calcite with Chalcopyrite Phantoms under Mid Wave Ultraviolet Light

Chris Clemens photos - CC-BY-SA-3.0, via naturesrainbows.com

Sweetwater Mine, Ellington, Viburnum Trend District, Reynolds County, Missouri

Dimensions: 15.5 x 9.2 x 6.4 cm

This group of light yellow scalenohedral calcite crystals with chalcopyrite phantoms is from a classic Midwestern locality. Under mid wave (302nm) ultraviolet (UV) light, the calcite fluoresces a bright pink color, but is only dimly fluorescent red under short and long wave UV.

The Sweetwater Mine is a lead-zinc mine that opened in 1968 and is still in operation. Twenty three mineral species have been found at the location. Noteworthy specimens include calcite, chalcopyrite, dolomite, galena, marcasite, pyrite, and sphalerite.



Photo by Stan Celestian

Quartz with Chlorite Phantom

Stan Celestian photo - Copyright ©2013 all rights reserved, reproduced with permission, via flickr.com

Minas Gerias, Brazil

Dimensions: crystal is 1.8 in. high

The crystal faces have been polished to better show the chlorite inclusion that produced this phantom.

Brazil's state of Minas Geras has produced a variety of phantom quartz crystals with inclusions such as albite, chlorite, clay, hematite, and mica.



Quartz with Clay Phantom

James St. John photo - CC-BY-SA-2.0, via Wikimedia Commons

Iredell County, west-central North Carolina

This specimen is from a deposit that may have formed from ascending hydrothermal solutions, and clay settled down on the growing crystals. The quartz crystals tend to have a stout habit, double terminations, and smoky or amethystine color. Many also contain large cavities filled with water and movable bubbles (Taber, 1950).



Quartz with Hematite Phantoms

Photo by Rob Lavinsky, iRocks.com - CC-BY-SA-3.0, via Wikimedia Commons

Orange River, Namibia?

Dimensions: 5.7 x 5.0 x 3.4 cm



Quartz with Hematite Phantom

Photo by Rob Lavinsky, iRocks.com - CC-BY-SA-3.0, via Wikimedia Commons

Orange River, Namibia?

Dimensions: 2.9 x 1.4 x 1.2 cm

The Orange River area is known for vuggy hydrothermal quartz-carbonate veins with hematite-coated or included quartz crystals. Specimens have been collected

from the Namibian and South African sides of the river, but there are no distinguishing features to identify a specific location.



Quartz (var. Herkimer Diamond) with Hydrocarbon Phantoms

Photo by Rob Lavinsky, iRocks.com - CC-BY-SA-3.0, via Wikimedia Commons

Treasure Mountain Diamond Mine, Little Falls, Herkimer County, New York

Dimensions: 3.9 x 3.7 x 1.7 cm

Hydrocarbons represent one of the most abundant inclusions found in Herkimer diamonds. These inclusions can vary from tiny flakes, small droplets, to dense black phantoms.

In the late 18th century, doubly-terminated quartz crystals were discovered within the dolostone outcrops around Herkimer County, New York. The clarity and natural facets led to the name of “Herkimer diamond”. Similar double terminated crystals have been found at other locations, such as Diamond Point northeast of Payson, but they cannot rightfully be called “Herkimers”.



Quartz with Papagoite Phantom

Photo by Rob Lavinsky, iRocks.com - CC-BY-SA-3.0, via Wikimedia Commons

Messina Mine, Limpopo Province, South Africa

Dimensions: 6.1 x 3.4 x 2.3 cm

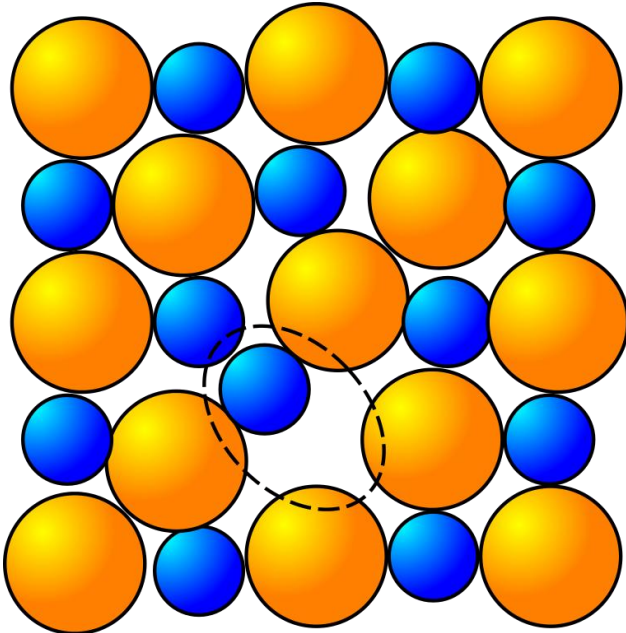
This quartz crystal features a phantom of papagoite which is a calcium copper aluminum silicate. The mineral was first discovered at the New Cornelia Mine in Ajo, Arizona and is named after the old European designation of the people of the Tohono O’odham Nation.

Irradiation

Some minerals may change color when irradiated by a natural radioactive source. This phenomenon is known as a color center.

The color phantoms found in fluorite are due to a color center. This color center, which is also called an F center from the original

German term, *Farbzentrum*, involves a crystal lattice defect known as a Frenkel defect. A Frenkel defect consists of an ion displaced from its normal position in a crystal. Such defects may be created when fluorite is exposed to high-energy radiation, such as X-rays or gamma rays.



Frenkel Defect

Diagram by Cdang - PD, via Wikimedia Commons

The displacement of the ion creates a vacancy in the crystal lattice. The vacancy attracts and traps unpaired electrons, and these electrons tend to selectively absorb light in the visible spectrum. This absorption produces a coloration of the mineral where the intensity is related to the concentration of defects.

Note that either heating the fluorite or exposing samples to a bright light introduces energy which can release the trapped electrons. The color fades, and the crystal may eventually become colorless. The process is, however, reversible where the color may be restored with irradiation.



Fluorite with Purple and Yellow Phantoms

Photo by Rob Lavinsky, iRocks.com - CC-BY-SA-3.0, via Wikimedia Commons

Minerva No. 1 (Mahoning No. 1) Mine, Hardin County, Illinois

Dimensions: 5.5 x 5.1 x 4.0 cm

This is a classic fluorite specimen with a yellow phantom core, followed by a purple phantom, and enclosed by a blue rim.

The Minerva No. 1 (Mahoning No. 1) Mine was a former zinc-fluorite mine located north of Cave-in-Rock, Illinois. The mine's orebody was discovered in 1940, and mining activity continued until 1996. According to mindat.org, 20 valid mineral species are found at the location and includes excellent specimens of alstonite, benstonite, baryte, fluorite, strontianite, and witherite.



Fluorite with Purple Phantom and Green Rim

Photo by Rob Lavinsky, iRocks.com - CC-BY-SA-3.0,
via Wikimedia Commons

Yaogangxian Mine, Hunan Province, China

Dimensions: 5.0 x 3.7 x 3.0 cm



Fluorite with Light Green Phantom

Photo by Rob Lavinsky, iRocks.com - CC-BY-SA-3.0,
via Wikimedia Commons

Yaogangxian Mine, Hunan Province, China

Dimensions: 5.8 x 5.1 x 4.5 cm

A tremendous variety of fluorite phantoms have been collected at the Yaogangxian Mine in Hunan Province, China. The tungsten-tin mine has been active since 1914 and 77 mineral species have been reported from this locality.



Fluorite with Three "Alien" Phantom Faces

Photo by Rob Lavinsky, iRocks.com - CC-BY-SA-3.0,
via Wikimedia Commons

Erongo Mountains, Erongo Region, Namibia

Dimensions: 7.7 x 7.4 x 5.8 cm

This fluorite crystal consists of a nearly opaque cuboctahedral core with translucent faces that transmit light to create the green glow of "alien" eyes. The core is enclosed by a blue-green transparent layer of fluorite.

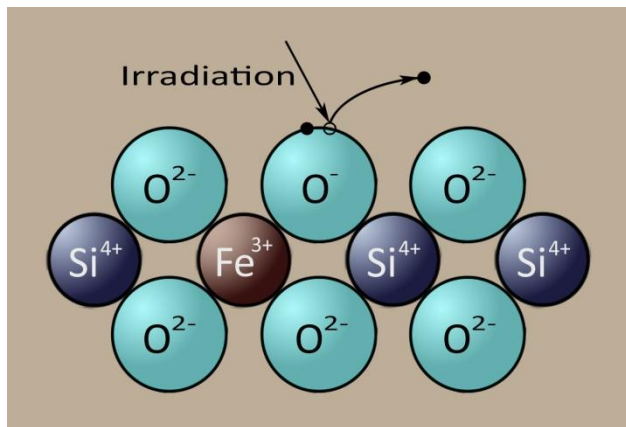
The fluorite is from a 2008 find near the Bergsig Farm in the Erongo Mountains of Namibia. Given the otherworldly appearance of the crystals, the deposit was nicknamed the "alien pocket". The fluorites were sometimes associated with quartz or microcline.

Color Phantoms in Quartz

In addition to inclusions, phantoms in quartz crystals may be produced by color centers. These color centers involve the replacement of silicon (Si^{4+}) ions with either aluminum (Al^{3+}) or iron (Fe^{3+}) impurities. The impurities attract protons to maintain the overall electrical neutrality of the quartz crystal.

Irradiating the crystal with high energy radiation can cause an electron to be ejected from an oxygen (O^{2-}) atom adjacent to an impurity ion. The nearby proton traps this electron, and the resulting O^- ion may selectively absorb light. A purple color is produced if the impurity is Fe^{3+} , while a smoky tint results if Al^{3+} is present.

Unlike the F centers of fluorite, the color may be very intense with only low impurity concentrations.



Formation of a Quartz Color Center

Harvey Jong diagram, after Nassau (1983) Fig. 9.5
The iron (Fe^{3+}) impurity attracts a proton to maintain charge neutrality of the quartz crystal. High energy radiation causes an outer electron of an adjacent oxygen atom to be ejected, and the proton traps this electron. The oxygen (O^-) ion that is the missing electron may selectively absorb light leading to a purple color.



Quartz with Amethyst Phantom

Photo by Rob Lavinsky,
iRocks.com - CC-BY-SA-3.0, via
Wikimedia Commons

Goboboseb Mountains, Brandberg area,
Erongo Region, Namibia

Dimensions: 5.9 x 3.0 x 2.1 cm

This rich purple amethyst phantom is from the Brandberg area which is a well-known source of amethyst, clear, and smoky quartz crystals. Many of these crystals occur in scepter form.



Quartz with Smoky Phantom

Photo by Rob Lavinsky,
iRocks.com - CC-BY-SA-3.0, via
Wikimedia Commons

Smokey Bear Quartz claims, Lincoln

County, New Mexico

Dimensions: 10 x 6 x 4.5 cm

This quartz crystal has a sharp, distinct smoky phantom which is unusual for the prospect. The site (Sierra Blanca) is located within the boundary of the Lincoln National Forest, and collecting is forbidden by the forest service.



Quartz with Smoky Phantoms

Stan Celestian photo - Copyright ©2022 all rights reserved, reproduced with permission, via flickr.com Adélie Land, Eastern Antarctica, Antarctica Multiple smoky phantoms appear in this quartz crystal from Adélie Land, a claimed territory in Antarctica that has been administered by France since 1955.

Geochemical Zoning

Metamorphic minerals, such as those of the garnet supergroup, exhibit geochemical zoning which provides important data on the, pressure, temperature, and reaction history of surrounding host rocks. This zoning reflects the dissolution and re-precipitation of mineral components during

the growth of garnet crystals. The composition varies from the core to rim of the crystals, and in some instances these differences may lead to phantoms. The phantoms, however, may be subtle, while transparency of outer layers may limit their visibility.

<https://www.mindat.org/photo-945757.html>

Andradite

Photo copyright ©Rob Lavinsky & MineralAuctions.com, ex Kay Robertson Collection, via mindat.org

Stanley Butte, Santa Teresa Mountains, Graham County, Arizona

Dimensions: 2.8 x 2.1 x 1.7 cm

This cluster of lustrous dodecahedra andradite crystals shows light-colored phantoms surrounded by a darker color exterior.

The Stanley Butte area includes intense contact metamorphosed limestone, and abundant garnet (andradite) has been reported in this metamorphic rock (Ross, 1925).



Grossular (var. Hessonite) with Green Phantoms

Photo by Rob Lavinsky, iRocks.com - CC-BY-SA-3.0, via Wikimedia Commons

Jeffrey Mine, Asbestos, Québec, Canada

Dimensions: 2.0 x 1.4 x 1.0 cm

This gemmy group of grossular crystals has green phantom cores which are attributed to the presence of chromium.

The Jeffrey Mine was a former open-pit chrysotile asbestos mine. Mining started in 1879 and continued until 2001. According to mindat.org, the list of minerals found at the site includes 112 valid species.

Phantom Finale

We will close with some phantoms appearing with one last featured mineral, celestine. Celestine, previously known as celestite, is a strontium sulfate that was first discovered near Belvidere, Pennsylvania in 1791. Its name is derived from the Latin word *caelestis* which means celestial and refers to the mineral's occasional delicate sky blue color.

<https://www.mindat.org/photo-299308.html>

Celestine with White Phantom

Tim Jokula, Jr photo and specimen - copyrighted image, via mindat.org

North quarry, West Flamborough Township, Hamilton, Ontario, Canada

Dimensions: 5 cm tall

A ghostly white phantom appears at the center of this three color tabular crystal of celestine which includes tiny specks of marcasite.

Celestine specimens from the North quarry range from white, blue, or purple and may be associated with calcite, fluorite, and sphalerite.



Celestine with Blue and Chevron-shaped Phantoms

James St. John photo - CC-BY-SA-2.0, via Wikimedia Commons

Portage quarry, Portage, Wood County, Ohio

The Stoneco Portage quarry started in 1962 and is an active quarry for building stone. The quarry is well known for celestine specimens. Crystals often occur in large cavities, and some crystals have measured up to 38 cm.

References

Nassau, K. (1983) *The physics and chemistry of color*. John Wiley & Sons, New York: 454 p.

Ross, C.P. (1925) *Geology and ore deposits of the Aravaipa and Stanley mining districts Graham County, Arizona*. *U.S. Geological Survey Bulletin 763*: 120 p.

Taber, S. (1950) Quartz crystals with clay and fluid inclusions. *The Journal of Geology* 58(1): 37-48.

◇ ◇ ◇



AZ Mining, Mineral & Natural Resources Education Museum Update October 2022

<https://ammnre.arizona.edu/>

Catie Carter Sandoval

cscarter@email.arizona.edu

703.577.6449

Help support the museum at:

<http://tinyurl.com/SupportMM-NREmuseum>

Arizona FY2023 Budget Details Involving the AMMNRE Museum

By Harvey Jong

In last month's newsletter, we learned about Representative Gail Griffin's latest legislative effort in support of the Arizona Mining, Mineral, and Natural Resources Education (AMMNRE) Museum. She sponsored House Bill 2653 which simply states:

Be it enacted by the Legislature of the State of Arizona:

Section 1. Appropriation; university of Arizona; mining, mineral and natural resources educational museum

The sum of \$12,000,000 is appropriated from the state general fund in fiscal year 2022-2023 to the university of Arizona for the mining, mineral and natural resources educational museum.

The appropriation was integrated into the FY2023 Arizona state budget that was passed in June.

So, I was interested in how the appropriation actually appears in the various budget bills. It is specifically described in House Bill 2858 on Capital Outlay and Appropriations as follows:

Sec.7. Appropriations; Arizona board of regents; capital project; exemption

A. The sum of \$12,000,000 is appropriated from the state general fund in fiscal year 2022-2023 to

the Arizona board of regents to distribute to the university of Arizona for capital improvements to the mining, mineral and natural resources educational museum.

B. Notwithstanding section 35-190, Arizona Revised Statutes, the appropriation made in this section that is unexpended on June 30, 2024 reverts to the fund from which the monies were appropriated.

Note that the one-time appropriation is in addition to the normal amount of \$428,800 that the museum receives as part of the state's general appropriations (See House Bill 2862).

One other noteworthy observation involves House Bill 2864 on Higher Education. Section 5 of this bill specifies a permanent transfer of the museum building. The prior conveyance was due to expire in June 2022.

Sec.5. Department of administration; conveyance of real property housing the mining, mineral and natural resources educational museum to university of Arizona; continued operation, management and maintenance.

Notwithstanding section 37-803, subsection B, paragraph 1, Arizona Revised Statutes, the department of administration shall convey title and fee ownership of the real property and improvements on the real property currently housing the mining, mineral and natural resources educational museum to the university of Arizona for nominal consideration not more than thirty days after the effective date of this section. The University of Arizona shall operate, manage and maintain the mining, mineral and natural resources educational museum at the location consistent with title 27, chapter 1, article 1, Arizona Revised Statutes.

It appears that after 11 years since the closure of the Arizona Mining and Mineral Museum the stage is finally set to reopen the museum. Many thanks to Representative Griffin for her continued championing of the museum.



Arizona Rocks 113

Text and photos by Ray Grant

I recently wrote diamonds on a piece of paper as a possible subject for the next Arizona Rocks. Diamonds have only been found in Arizona in the Canyon Diablo meteorite from Meteor Crater. They were first found in the meteorite in 1891.

When I was in graduate school, Clifford Frondel, my thesis advisor, and Ursula Marvin, who I shared an office with; they dissolved eleven pounds of Canyon Diablo meteorite to look for diamonds. They found diamonds and they found a hexagonal form of carbon they named lonsdaleite, so this mineral was first found from Arizona, making Meteor Crater the type locality.

The lonsdaleite was very small and the work on it was always questioned. I looked it up to see if it was still considered a valid mineral and it is. Then to my surprise I was listening to the radio, and they started talking about lonsdaleite. What a coincidence! Turns out they found much larger crystals in a meteorite from Africa and determined it was harder than diamond, possibly over 50% harder, but difficult to measure. If there was a way to make large enough crystals of lonsdaleite it would be a great industrial cutting material.

Canyon Diablo is an iron meteorite and has nodules containing a number of different minerals including graphite. That makes three forms of carbon in the meteorite, graphite, diamond, and lonsdaleite.



Meteor Crater, Arizona, type locality of lonsdaleite



Sign about diamonds in the Meteor Crater Visitors Center



Polished slice of Canyon Diablo meteorite showing nodules, sample about 3 inches across, Carleton Moore collection and photograph



Pinal Museum and Society News

351 N. Arizona Blvd., Coolidge, AZ

Pinal Geology and Mineral Society meeting

November 16, 2022

www.pinalgeologymuseum.org

Ray Grant raycyn@cox.net.

**The Museum is open from 11 to 4,
Wednesday through Saturday**

Masks are now optional at the Museum. Please bring your own mask if you wish to wear one. We will have some masks on hand at the Museum, but cannot guarantee to provide them.

November 12 - Full STEAM Ahead! A celebration of Science, Technology, Engineering, and Math

November 16 - Meeting, Presentation by Mesa Community College Speaker TBA

November 24 - Thanksgiving, Museum Closed

December 10 - International Mountain Day Celebration - special activities and crafts about mountains and volcanoes

December 21 - Meeting, Presentation by Robert McCord, Curator of Paleontology, AZ Museum of Natural History

December 25 - Christmas, Museum closed

December 31 - New Years Eve, Museum closed

January 1 - New Years Day, Museum closed





The 2nd
**PHOENIX HERITAGE
GEM & MINERAL SHOW**



**GET READY TO
ROCK PHOENIX!**



**NOV
5 and 6
2022**

RADISSON HOTEL PHOENIX AIRPORT

427 NORTH 44TH STREET | PHOENIX, AZ 85008

Saturday 9am – 5pm | Sunday 9am – 4pm

WULFENITE, "Official AZ Campaign Wulfenite"
Red Cloud Mine, La Paz County, Arizona, USA
3.9cm - Evan Jones Collection - Jeff Scovill Photo

Admission: \$1 CASH

ATM Available

FREE 12 years and younger

Larger Show Featuring: Minerals,
Kids Activities, Exhibits, Saturday Night
Dinner with Program and Auctions

msaaz.org

FEATURED DEALERS & ACTIVITIES

CANYON BALLROOM

- #1 MEXICAN MINERALS
- #2 EL CUCUY MINERALS
- #3 SHANNON FAMILY MINERALS
- #4 OCEANSTONE COLLECTIONS
- #5A BLUE SKY MINERALS
- #5B IC MINERALS
- #6 UNCOVER THE EARTH
- #7 HEADFRAME MINERALS
- #8 SAPPHIRE SUNSHINE CRYSTALS
- #9 SUN GEMSTONES
- #10 MINERALS OF MORIA
- #11 DIWOLF FINE MINERAL EMPORIUM
- #12 BARKING GECKO ENTERPRISES
- * SPECIAL EXHIBIT

SUNSET BALLROOM

- #13 UNIQUE MINERALS
- #14 ASE MINERALS
- #15 THE MINERAL SHOWCASE
- #16 THE DUSTY GEM
- #17 CWS FINE MINERALS
- #18 RAY'S ROCKS
- #19 LOOMIS MINERALS
- #20 BORIS DIMOV MINERALS
- #21 BACK IN TIME MINERALS
- #22 MINPORTS
- * SPECIAL EXHIBIT

CANYON FOYER

- #B VISATA HANDCRAFTED JEWELRY
- #C JOHN'S CUT STONES
- #F DE NATURA—GEODE CRACKING
- * MSA SPINNING WHEEL
- * SPECIAL EXHIBIT

CACTUS BALLROOM

- #23 TREASURES OF DARKNESS
- #24 ARIZONA ROCKS
- #25 ED DAVIS MINERALS
- #26 TUCSON STORE FIXTURES
- #27 POLMAN MINERALS
- #28-29 LUCKY MUCKERS
- * SPECIAL EXHIBIT

DEMONSTRATIONS FOYER

- SATURDAY: CARVING NATHAN SCHOLTEN
- SUNDAY: WIRE & GEM ART JODI BREWSTER

GET READY TO ROCK PHOENIX!



The 2nd
**PHOENIX HERITAGE
GEM & MINERAL SHOW**

RADISSON HOTEL PHOENIX AIRPORT
November 5-6, 2022
Saturday 9am – 5pm
Sunday 9am – 4pm





FEATURED SPEAKER

DANIEL ULIBARRI

**“Wulfenite at
La Morita Mine”**

**SATURDAY NIGHT
PROGRAM, DINNER
& AUCTIONS**

November 5, 2022

6:00 PM PST

Program & Dinner \$43.00.

Deadline to Pay 10/31/2022

LINK to REGISTER & PAY:

[Saturday Night Dinner with Program and Auctions](#)

GET READY TO ROCK PHOENIX!



**The 2nd
PHOENIX HERITAGE
GEM & MINERAL SHOW**

**RADISSON HOTEL PHOENIX AIRPORT
November 5-6, 2022**

Saturday 9am – 5pm

Sunday 9am – 4pm



**Wickenburg
Gem & Mineral Show**

**Thanksgiving
Weekend**

Nov 26 & 27 2022

9am-5pm Sat
10am-4pm Sun

Wrangler Event Center

251 S Tegner Street
Wickenburg AZ 85390

Sale & Show

Over 40 Vendors
Rocks, Gems, Minerals,
Beads, Jewelry, Fossils,
Kids Room, Door Prizes,
Food and More...
Raffle Drawing:
Sponsoring Scholarship
Tickets are \$2.00 each
or 3 for \$5.00

Vendor/Show Information:

Richard Barnett
717-304-9283
rbarnett12@comcast.net



Gem & Mineral Show
Nov. 26 & 27
Free Admission
Wickenburg Gem & Mineral
Society

2023 FGMS SHOW INFORMATION

50th FLAGG GEM AND MINERAL SHOW
THE PHOENIX AREA'S LARGEST GEM AND MINERAL SHOW
(JEWELRY, GEMS, BEADS, FOSSILS, MINERALS, AND LAPIDARY SUPPLIES)
FRIDAY, SATURDAY, SUNDAY JANUARY 6, 7, and 8, 2023
9AM TO 5PM EACH DAY
FREE ADMISSION / FREE PARKING
AT MESA COMMUNITY COLLEGE
THE WEST PARKING LOT ON DOBSON ROAD JUST NORTH OF THE
SUPERSTITION FREEWAY (ROUTE 60), MESA, ARIZONA



2023
65th ANNUAL
GILA COUNTY
GEM & MINERAL SHOW

JANUARY 13th, 14th & 15th 2023
FRI & SAT. 9 AM - 5 PM & SUN 10 AM - 4 PM

DEALERS * DISPLAYS
DEMONSTRATORS * ACTIVITIES

LOTS OF CHILDREN'S ACTIVITIES ** DEMONSTRATORS AND VENDORS
 LAPIDARY EQUIPMENT/TOOLS **40+ SPECIMEN DISPLAYS
 HOURLY DOOR PRIZES ** AND MUCH, MUCH MORE!!

OPENING CEREMONY PRESENTATION OF COLORS PROVIDED BY THE GLOBE JROTC

SNACK BAR PROVIDED BY THE GLOBE/MIAMI ELKS LODGE # 489

WITH HANDS ON LEARNING

PRESENTATION FOR ALL AGES
 JOHN O'BRIEN - WHAT IS A FOSSIL @ 1PM FRIDAY, SATURDAY & SUNDAY

DEMONSTRATION FOR ALL AGES
 GILA COUNTY COLLEGE - LAPIDARY - ALL DAY FRI, SAT & SUN
 WIRE WRAPPING JEWELRY WITH POLYMER CLAY - CINDY KOONTZ - ALL DAY FRI, SAT & SUN
 WIRE WRAPPING ART - HALEY WILLIAMS - ALL DAY FRI, SAT & SUN
 NATHAN SCHOLTEND - STONE CARVING WITH JADE - ALL DAY SATURDAY

JOIN US @ GILA COUNTY FAIRGROUNDS
 GLOBE, ARIZONA
 3 MILES NORTHEAST OF JUNCTION U.S. 60-70

VISIT US ON THE WEB WWW.GILAGEM.ORG



DONATIONS
 \$3 SINGLE
 OR
 \$5 COUPLE
 STUDENTS AND KIDS FREE

CONTACT
 JODI BREWSTER
 President
 (623) 810-9780
 JERRY KASTNER
 Vendor Chair
 (520) 401-8715

50TH ANNUAL **FLAGG GEM & MINERAL SHOW**



GOLD - QUARTZSITE, LA PAZ COUNTY, ARIZONA
U OF A MINERAL MUSEUM COLLECTION
PHOTO CREDIT: JEFF SOOVL
2.2CM HIGH

JAN 6 to 8
2023

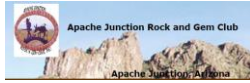


MESA COMMUNITY COLLEGE
NE CORNER OF US 60 AND
DOBSON ROAD | 9AM - 5PM



The Tailgate Show
Tradition Continues!

FREE Parking
FREE Admission
FREE Samples for Kids
www.Flaggshow.info



Apache Junction Rock & Gem Club

Meetings are on the 2nd Thursday
 Next Meeting: November 10, 2022, 6:30 pm
www.ajrockclub.com
 @ Club Lapidary Shop
 2151 W. Superstition Blvd., Apache Jct.



Daisy Mountain Rock & Mineral Club

Meetings are on the 1st Tuesday
 (unless a Holiday then 2nd Tuesday)
 Next Meeting: November 1, 2022, 6:30 p.m.
Please go to their website for more info
www.dmrnc.com
 @ Anthem Civic Building
 3701 W. Anthem Way, Anthem, AZ



Maricopa Lapidary Society, Inc

Meetings are on the 1st Monday
 (unless a Holiday then 2nd Monday)
 Next Meeting: November 7, 2022, 7:00 pm
www.maricopalapidarysociety.com
 @ North Mountain Visitor Center
 12950 N. 7th St., Phoenix



Mineralogical Society of Arizona

Meetings are on the 3rd Thursday
 Next Meeting: November 17, 2022, 7:30 pm
Please go to their website for more information
www.msaz.org
 @ Franciscan Renewal Center
 Room: Padre Serra
 5802 E. Lincoln Dr., Scottsdale



Pinal Geology & Mineral Society

Meetings are on the 3rd Wednesday
 Next Meeting: November 16, 2022, 7:00 pm
In person meeting
www.pinalgeologymuseum.org
 @ Artisan Village
 351 N. Arizona Blvd., Coolidge



West Valley Rock & Mineral Club

Meetings are on the 2nd Tuesday
 Next Meeting: November 8, 2022, 6:30 pm
www.westvalleyrockandmineralclub.com
 @ Buckeye Community Veterans Service Center
 402 E. Narramore Avenue, Buckeye, AZ



Gila County Gem & Mineral Society

Meetings are on the 1st Thursday
 (unless a Holiday then the next Thursday)
 Next Meeting: November 3, 2022, 6:30 pm
www.gilagem.org
 Club Building
 413 Live Oak St, Miami, AZ



Wickenburg Gem & Mineral Society

Meetings are on the 2nd Friday
 (February & December on the 1st Friday)
 Next Meeting: November 11, 2022, 7:00 pm
www.wickenburggms.org
 @ Coffinger Park Banquet Room
 175 E. Swilling St., Wickenburg

ESM's Meeting Notice

ESM's next meeting will be at North Mountain Visitor Center, 12950 N. 7th St., Phoenix, on Tuesday, TBA 2022, at 6:30 p.m.

BECOME A MEMBER!
Join the Earth Science Museum's



IS IT TIME TO RENEW YOUR MEMBERSHIP?
Please renew today! 😊😊😊

----- cut here -----
**ESM Earth Science Investigation
 Team Membership Form**
 _____ **New Member** _____ **Renewal**

Membership levels:

_____ **ESI Family \$20**

_____ **ESI Individual \$10**

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
- Flagg Mineral Foundation
www.flaggmineralfoundation.org
- Friends of the AZ Mining & Mineral Museum
- Maricopa Lapidary Society
<http://maricopalapidarysociety.com/>
- Mineralogical Society of AZ
www.msaz.org
- Payson Rimstones Rock Club
- Sossaman Middle School
- White Mountain Gem & Mineral Club
www.whitemountain-azrockclub.org
- Wickenburg Gem & Mineral Society
<http://www.wickenburggms.org>
www.facebook.com/pages/Wickenburg-Gem-and-Mineral-Society/111216602326438
- West Valley Rock and Mineral Club
<http://www.westvalleyrockandmineralclub.com/>
- Staples Foundation
www.staplesfoundation.org
- Anita Aiston
- Peter & Judy Ambelang
- Stan & Susan Celestian
- Russ Hart
- Will & Carol McDonald
- Debbie Michalowski
- Janet Stoeppelmann
- 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:

Card ID # _____ Expires: _____

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

Phone:
 602-973-4291

Editor E-Mail:
 scote@earthsciencemuseum.org

Mission
 Our Mission is to excite and inspire all generations about earth sciences through educational outreach.

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.

We're on the Web!

Visit us at:

www.earthsciencemuseum.org

NOTICE:
 ESM's next meeting will be at North Mountain Visitor Center, 12950 N 7th St, Phoenix, on Tuesday, TBA 2022, at 6:30 p.m.

THANK YOU FOR YOUR CONTINUING INTEREST & SUPPORT!!!

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

Harvey Jong	President
Mardy Zimmermann	VP Outreach
Shirley Coté	Secretary/ Treasurer

Cindy Buckner, Doug Duffy, Ray Grant,
 Bob Holmes, Chris Whitney-Smith

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

