HUI PŌHAKU 'O HAWAI'I
Rock & Mineral Society of Hawai'i, Inc.

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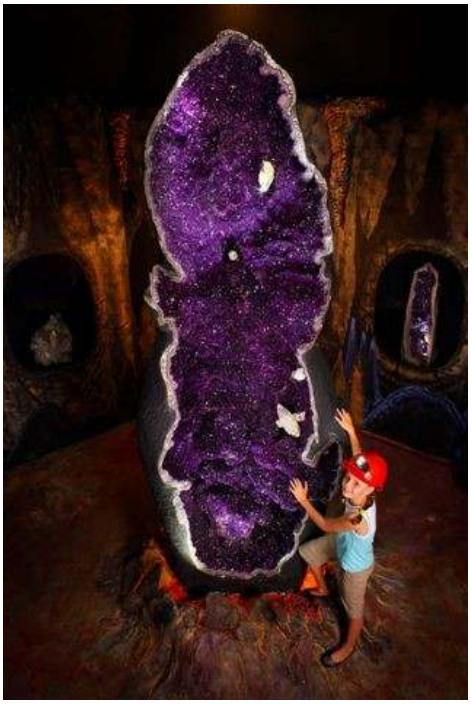
GEODES

BY DEAN SAKABE

April's topic is Geodes, so it begs the question: What is a geode? In simple terms, a geode is a spherical shaped rock with a hollow cavity lined with crystals. Although this is the ideal case it is not always what your find. Most of the geodes that are found are spherical, they can also be oblong, misshaped, or sadly sometimes flattened.

The term geode is derived from the Greek word *Geoides* meaning "earthlike." These mysterious roundish rocks have challenged explanation as to how they were formed. However it does not stop the various theories as to how they were created.

One theory is that bubbles formed in volcanic rock and over time dissolved minerals seeped into a hollow area, which harden into an outer shell creating the outside part of the geode. The mineral solution continued to form on the inside walls of the shell, slowly growing towards the center. The most common dissolved mineral is quartz, however amethyst (1) and other minerals have been found (2, 3). Over thousands of years, layers of silica cool, which could form crystals of different minerals within the cavity. Or the different types of silica cool creating layers of different types of mineral crystals.



(1)Well over eleven feet, and weighing two and a half tons. The World's biggest Amethyst Geode – The Empress of Uruguay. The thousands of perfect, deep purple Amethyst crystals are rated as AA. It is on display at the Crystal Caves, Perth, Australia

MEETING
Wednesday
April 27
6:15-8:00 pm
Makiki District Park Administration Building

NEXT MONTH
Meteorites
May 25

LAPIDARY
Every Thursday
6:30-8:30pm
Second-floor Arts and Crafts Bldg
Makiki District Park

MEMBERSHIP DUE COSTS 2010

Single: $10.00
Family: $15.00

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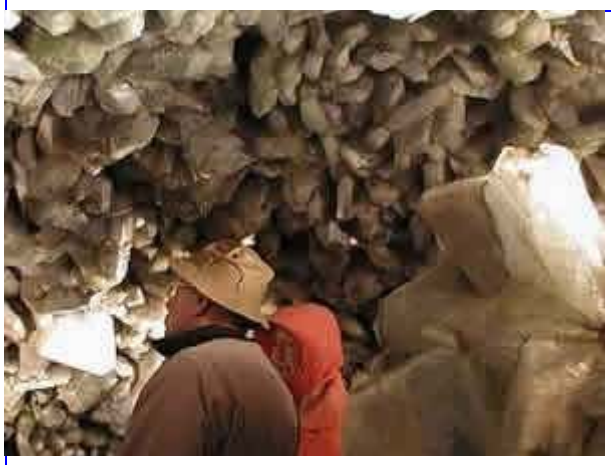

(2) The largest Celesite Geode in the world. Put-In-Bay

Each geode is unique in composition and can only be truly discovered when cracked open or cut open. The size and formation of the crystals and different shades of color of the crystals make each geode special. The rough exterior of the geode gives no indication of what is within its core. The anticipation of what may be found in the geode provides the umph needed for those who collect buckets of geodes.

Geodes that are found in sediment such as dolomite, calcite and limestone are assumed to form from either hollows made by roots, decomposed animals, abandoned animal burros and or concretions. Another suggestion involves cavities that are washed out by ground water later dry out and harden when the water table drops. These hollows then get filled again with mineral rich water if the water table rises. This water then with the constant drying out then redepositing of mineral water forms the crystalline structures over a very long period of time. Another way these crystals form is through a leaching process, as the mineral-rich ground water permeates the hollow, it begins to form the chalcedony shell through silica deposits. The continuing water cycle eventually form hexagons shaped crystals and entirely fill the hollow if allowed to grow. On occasion, some geodes that are completely filled have an inner layer of agate surrounded by the hexagon crystals.

((3) The giant gypsum crystals of the Pulpi Geode, Mina Rica near Pilar de Jaravia in Southeastern Spain. The Geode is more that 25 feet long.

A type of Geode is called Thunder eggs. (4-6) The name "thunder egg" comes from a Pacific Northwest Indian legend. Millions of years ago, two mountain peaks, Mt. Hood and Mt. Jefferson, got mad at each other, rocks flew, fire and thunder roared. Afterwards the Indian people found these round rocks on the slopes, and attributing these rocks to the Thunder-beings, called them Thunder Eggs.
They look like roundish rock, the exterior typically made up of limestone, however they have crystal formations of quartz on the inside. Their crystal formations typically come in a wide variety of colors, from deep purple to pink, blue, and even a silvery crystal color. If one is extremely lucky, the exterior is composed of Opal.

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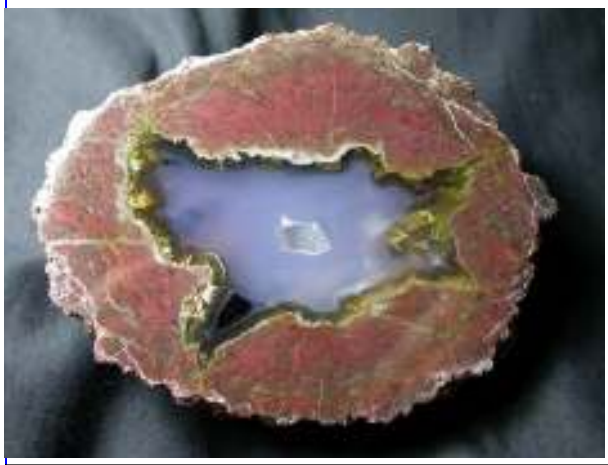
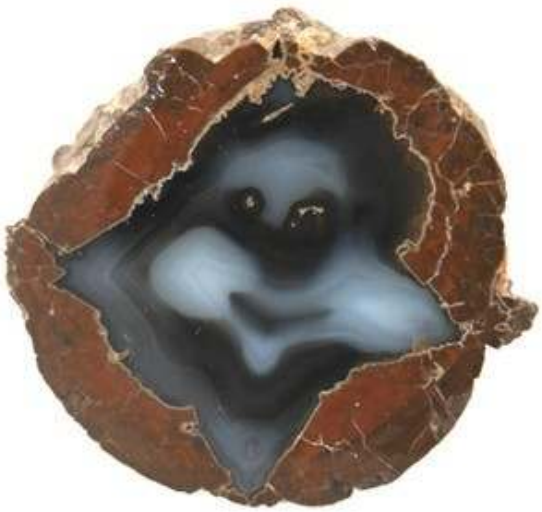
(4) Thunder eggs, Hermasas, New Mexico



((5) Thunder egg, Deming, New Mexico

In Oregon, the Thunder Egg is made of an outside volcanic material called rhyolite, with a solid center of agate. They are a result of bubbles in lava that later filled in with silica and other minerals. In comparison the Colorado thunder eggs tend to have a moss agate or plume agate center. The plume agate center being the most rare, found in less than 1% of thunder eggs mined.



(6) Thunder egg named "Casper" located in the Crater Rock Museum, Central Point, Oregon

Keokuk, Iowa is known as "the geode capital of the world". There are no less than 300 outcrops of the Lower Warsaw Formation that geodes are found in within a 100 mile radius of the city. The main exposures are found in streambeds that are tributaries of the Mississippi River. The geodes found loose in creek beds originated in the Lower Warsaw Formation, but over time weathered out of the rock and fell into the creek, with many being transported downstream away from their source. In some locations where the Lower Warsaw Formation is right along the creek bank or even in the creek itself, it is advantageous to collect geodes right after a heavy rain that may cause a rise in both the creek level and the water current as fresh geodes may be loosened or dislodged from their host rock due to the faster-moving water.

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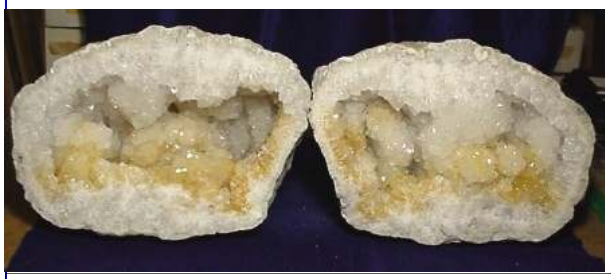
The rind of Keokuk Geodes (7) is basically Quartz. Clear and iron-stained geodes are the most commonly seen type of quartz geode. Many geode samples have also been identified with "rings" of pyrite in the geode rind, indicating successive growth stages of quartz, then pyrite, then quartz again, etc. The iron-staining is caused by the weathering of various sulfide minerals, most notably pyrite but also marcasite, chalcopyrite, etc. The pink or cherry tinted geodes are occasionally caused by a close association with the surrounding host rock where excessive iron amounts have caused more of a reddish tint in the geodes. In other geodes, the faces of several quartz crystals are coated with a very weak pink to vivid red, these are most likely associated with hematite.



(7) Keokuk Geode, Iowa

An interesting variety of mainly quartz geode is the "snowball" geode. This geode has a silica concretion in the interior of the geode that was later coated over by quartz and sometimes additional minerals, forming an attached round ball of quartz to the interior of the geode cavity. Other minerals found in Keokuk geodes are Chalcedony. Not just white chalcedony, but blue, grey, orange, black, red, brown and green Chalcedony. Calcite is probably the prettiest mineral which one can find in the geode. Again all colors of calcite will be found, in rhombohedron, scalenohedron, barrel, and tabular structures. Pyrite is also found within these geodes. Excellent clusters and lines of pyrite several inches long were frequently found in the "old mine" at Sheffler's and also at the Canton, Missouri roadcut. Marcasite hs been found in Keokuk geodes presenting itself in an interesting fashion. Marcasite has protrusions from the main crystal, resembling a TV antennae. They also appear as sword-shaped crystals. To a lesser extent Gypsum, Aragonite, Barite, Sphalerite, Kaolinite, Pyrolusite, Gorthite, Hematite, and Smithsonite are found in these geodes.

The two most amazing geodes from Keokuk are the "enhydro" geodes. The first are those geodes with water in them. These tend to be very smooth and well formed geodes which tend to have very old water in them. The other geode contain oil (bitumen). Oil is able to migrate quite readily through certain soils and rock, and reach the surface as the host rock that contains the geodes. From there it seeped into the geode.

Mexican Coconut Geodes (8) from Chihuahua, Mexico, were formed in gaseous bubbles in volcanic lavas. Minerals in solution within the cavity start to crystallize in layers as the surrounding rock cools. The type of crystal that forms inside a geode is determined by the composition of the hydrothermal fluids within the cavity. In the case of the coconut geodes, it's hard to predict what formations will be inside, however most likely the mineral composition will be mostly chalcedony with a chance for calcite crystals. Colors can vary from white to blue, brown to golden, gray to even red.

(8) Coconut Geode, Mesteno Ranch, Chihuahua State

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DOOR PRIZES

Please note that we have instituted door prize drawings at our monthly meetings. Because of Hawaii's gambling laws, these drawings cannot be conducted in the common "raffle" format where tickets are sold. Rather, each *paid* member attending the meeting will receive a drawing ticket upon request. A voluntary donation of $1.00 is requested and encouraged. Drawings will be conducted at the end of the meeting with available prizes awarded in random order. You must be present to win. Please remember: if you win a prize, please bring one to the next meeting. This helps to keep our drawings going. Thank you.

WE HAVE A FACEBOOK PAGE! LET'S GO LIKE IT!

HTTP://WWW.FACEBOOK.COM/PAGES/ROCK-AND-MINERAL-SOCIETY-OF-HAWAII/103902329673700?V=WALL&REF=SGM

MAHALO TO MARKUS FOR ESTABLISHING OUR *ROCK FACE*!

MAKE YOUR OWN GEODE

What You'll Need:

- Water
- borax*
- clean egg shells halves
- egg carton
- waxed paper

Steps:

1. Create a super-saturated solution of borax and water — fill a jar with boiling water then add borax one tablespoon at a time until no more will dissolve. This will be about three tablespoons per cup of boiling water.
2. Place small pieces of waxed paper in the egg carton sections.
3. Set the clean egg shell halves in the carton on top of the waxed paper.
4. Pour a small amount of the super-saturated borax solution into the egg shell halves.
5. In a few days, or less, crystals will form inside the shell.

*You can use other solids to make super-saturated solutions with. Such as : table salt, rock salt, sugar, baking soda, and Epsom salts. Each of these will create a different looking crystal and will require a different ratio of water to solid, and will require a different number of days to form.

PARKING AT MAKIKI PARK

Parking along Keeamoku St. starts at 5:30
After that, good luck because it drops off really fast!

Rock & Mineral Society of Hawai`i, Inc.

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The Rock & Mineral Society meets on the 4th Wednesday of each month (except for adjusted dates in November and December) at the Makiki District Park, 7:00 - 9:00 pm. Enter from Keeaumoku Street. Parking is free but limited.

The Newsletter is published monthly, some days prior to the meetings and is distributed in electronic format by email (Adobe Acrobat PDF file attachment). Printed copies are "snail" mailed to those who do not have email. The electronic format usually contains full-color images; the print version may be limited to B&W due to reproduction costs.

Any newsletter comments are appreciated, and can be sent to elise.thomasson@gmail.com

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