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

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CALCITE

BY DEAN SAKABE

Calcite is the theme for our September meeting. Calcite, which gets its name from "*chalix*" the Greek word for lime. Calcite is one of the most common minerals on the face of the Earth, comprising about 4% by weight of the Earth's crust. Calcite can form rocks of considerable mass and constitutes a significant part of all three major rock classification types. For example it forms oolitic, fossiliferous and massive limestones in sedimentary environments. Calcite serves as the "cement" for many sandstones and shales. Limestone becomes marble from the heat and pressure of metamorphic events.

Calcite is also a component in the igneous rock called carbonatite, which forms the major portion of many hydrothermal veins. At times some of these rock types are composed of better than 99% calcite. So if Calcite is so common, why would a collector be interested in such a common mineral? Primarily because of its extraordinary diversity, beautiful crystals and very reasonably costs!

There have been more than 300 crystal forms identified in Calcite. Within these forms other crystal types form due to the impurities or other minerals fond with the calcite. Calcite also produces many Twinned varieties, additionally there are also phantoms, included crystals, various colors varieties, pseudomorphsm and other unique associations.

After all that. It would be impossible to describe all of the varieties of calcite, so below it a small sampling of the various forms of Calcite. The most well known of calcite's varieties is also its most common form, the classic scalenohedron or "***Dogtooth Spar***". This variety appears as a double pyramid or dipyramid, but is actually a distinctly different form. The point of the scalenohedron is sharp and resembles the canine tooth of a dog, hence the name. Beautiful clear, colorless or amber-orange examples of this variety (classical and outstanding examples) come from Pugh Quarry, Ohio; Cornwall**,** England and Elmwood, Tennessee.

Another form which Calcite may take is called the "Iceland Spar". This is basically clear cleaved rhombohedron fragments of completely colorless (ice-like) calcite. It was originally discovered and named after Eskifjord, Iceland where the calcite is found in basalt cavities. Today most of the Iceland Spar's come from Mexico. They Iceland Spar Calcite was usied in

Calcite (Elmwood mine, Smith Co. Tennessee)

MEETING
Wednesday
September 23
7:00—9:00 pm
Makiki District Park
Administration Building

NEXT MONTH
Blue Minerals

LAPIDARY

Every Thursday
7pm-9pm
Second-floor Arts and Crafts Bldg
Makiki District Park

MEMBERSHIP COSTS 2009

Single: $10.00
Family: $15.00

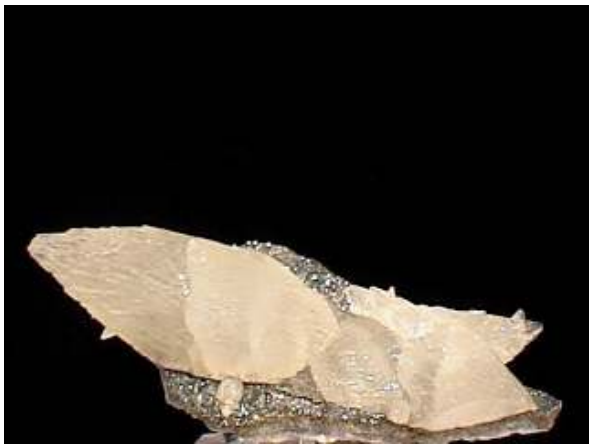
the optical equipment during World War II. Placed in the sighting equipment of bombardiers and gunners. It is iceland spar that best demonstrates the unique property of calcite called double refraction. If you have not guessed it yet rock shops commonly place these calcite specimens next to Ulexite (or TV Rock).

Double Refraction occurs when a ray of light enters the crystal and (due to calcite's unique optical properties) the ray is split into fast and slow beams. As these two beams exit the crystal they are bent into two different angles (the *angles of refraction*) because the angle is affected by the speed of the beams. A person viewing into the crystal will see two images ... of everything. The best way to view the double refraction is by placing the crystal on a straight line or printed word (the result will be two lines or two words). In calcite there is one orientation of the calcite crystal where there is only one image, (i.e. the beams of light are both the same speed) and that is parallel to the C-axis. You find this by rotating the crystal parallel to the C-axis, until the line or word becomes whole again. By contrast, the direction perpendicular to the C-axis will have the greatest separation. The extremely high index of refraction of calcite that causes the easily seen double refraction is also responsible for the interference colors (pastel rainbow colors) that are seen in calcites that have small fractures.

Calcite on Quarts (Minas Gerais, Brazil)

Although not necessarily a variety of calcite. Cave formations are a very unique aspect of calcite's story. Calcite is the primary mineral component in cave formations. Stalactites, stalagmites, columns, cave veils, cave pearls, "soda straws", and many other different cave formations that visitors to underground caverns enjoy are made primarily of Calcite. The overlying limestone are dissolved away by years and years of slightly acidic ground water to percolate into the caverns below. This is in addition to the original dissolving away the limestone which made the caverns. The resulting accumulations of calcite are generally extremely pure and are colored if at all, by very small amounts of iron or other impurities.

Mexican Onyx is a variety of calcite that is primarily used for ornamental purposes. The onyx is soft enough, so that figures can be readily carved in to animals, vases, bookends, plates, obilisks, pyramids, statues, and the ever popular egg. Please note that this is not the same onyx as the quartz variety of onyx which is used in jewelry and is banded white and black. This Mexican onyx is banded with multiple orange, yellow, red, tan, brown and white colors with a marble-like texture.



Calcite with Pyrite (La Sirena Mine, Guanajuato, Mexico)

Another property of Calcite is Florescence, phosphorescence, thermoluminescence and triboluminescence. Although not all specimens demonstrate these properties, some do quite well. The most notable case of fluorescence occurs from the calcites from Franklin, New Jersey, where the massive calcite is enriched in a small amount of manganese and fluoresces a bright red under UV light. Some Mexican iceland spar calcites will fluoresce a nice purple or blue color. Some of the specimens even phosphoresce (continue to glow) after the UV source has been removed. Triboluminescence is supposedly a property that should occur in most specimens, however it is not easily demonstrated To see this the specimens have to be struck or put under pressure in a dark room, the specimen should glow when this happens.

If one cannot determine if a specimen is calcite, the best method, although it is self destructive, is the acid test. Calcite will always bubble (effervesce) when, even cold weak acids are placed on specimens. The reason for this is that Carbon dioxide is given off as bubbles and the calcium dissolves in the residual water. Just about any acid, will produce these results.

Calcite is intricately tied to carbon dioxide in another way. Since many sea organisms such as corals, algae and diatoms make their shells out of calcite, they pull carbon dioxide from the sea water to accomplish this in a near reverse of the reaction above. This is fortuitous for us, as carbon dioxide has been found to be a green house gas and contributes to the so called "green house gas effect". Environmentally, calcite is very important and may have been quite important to the successful development of our planet in the past. By pulling carbon dioxide out of the sea water, this allows more of the carbon dioxide in the air to dissolve in the sea water and thus acts as a carbon dioxide filter for the planet. A significant amount of calcite precipitation in sea water is inorganic, but the exact amount that this contributes is not well known..

Calcite Stalactite (Laie, Oahu)

Calcite is also not the only calcium carbonate mineral. There are no less than three minerals or phases of Calcium Carbonate . Aragonite and Vaterite are polymorphs with calcite, meaning they all have the same chemistry, but different crystal structures and symmetries. Aragonite is orthorhombic**,** Vaterite is hexagonal and Calcite is trigonal**.** Aragonite is a common mineral, but is vastly out distanced by calcite which is the more stable mineral at most temperatures and pressures and in most environments. Vaterite on the other hand is extremely scarce and rarely seen. Aragonite over time will convert to calcite and calcite pseudomorphs after aragonite are not uncommon.

For a starting mineral collector Calcite is one of the best collection type minerals. There are lots of interesting forms and varieties, as well as colorful and beautiful specimens to collect. They are generally easy to identify using its rhomohedral cleavage and double refraction. Its reaction to acids and makes for a great classroom, in addition to the florescence properties. Addiitonally it might be an accessory to other minerals, enhancing their attractiveness. Finally with its many different forms, environments, associations and colors, a collector could *never* have all possible combinations of calcite covered. Which will lead to endless varieties.

Calcite Stalactite and Stagmite
(Ganzhou Prefecture, Jiangxi, China)

Rock and Mineral Society of Hawai'i Inc.

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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 WEBSITE!

http://pohakugalore.net/Hui_pohaku/Hiu_pohaku_1.html

MAHALO TO MARKUS FOR HELPING US GET OUT OF THE ELECTRONIC *STONE AGE*!

2009 ROCK SHOW

OCTOBER 17 & 18

OUTRIGGER WAIKIKI HOTEL

11AM—7PM

CONTACT KEITH KRUEGER FOR BOOTH INFORMATION

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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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