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

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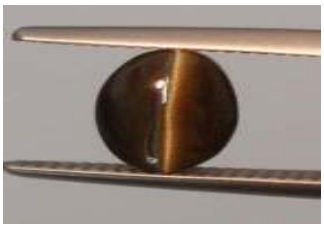
PHENOMENAL GEMS

When you hears the phrase "phenomenal gems", what do you think the meaning is? The dictionary definition of phenomenal gives the impression that these are really great stones, by gem standards very exceptional. In some respect that is correct. However, in gemological circles, the term "phenomenal" holds a very special meaning. It is minerals or gemstones classified in a way which it exhibits special optical characteristics -- or phenomena.

Special optical characteristics… what do we mean by special optical characteristics? Well if you see a star sapphire, the star effect, which is refered to as *asterism*, is an optical characteristic or phenomenon

Asterism

A star may have four, six, or 12 legs (rays) radiating outward from a central point. They will also follow the light source as it travels over the surface of the stone. To fully exhibit this effect, gemstones or minerals need to be cut *en cabochon*, a style that has a dome-like appearance on top. While many minerals and gemstones exhibit stars, some are extremely rare and highly prized by collectors and jewelry designers. Stars can be found in Quartz, Garnet, Sapphire, Ruby, Scapolite, Spinel, and Diopside.



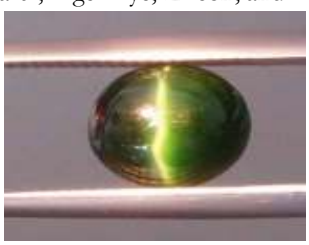
Kornerupika ne (cat's Eye), Sri Lanka

Chatoyancy

Another types of phenomena, is where some gemstones exhibit the optical effect called *chatoyancy*. A chatoyant gemstone, if properly fashioned, will display a line of varying thickness that will glide over the surface of the host material as it follows the light source. To fully appreciate fashioned, will display a line of varying thickness that will glide over the surface of the host material as it follows the light source. To fully appreciate chatoyancy, materials need to be fashioned in the same way that stars are -- en cabochon.

The word chatoyant is derived from a French phrase that translates as "eye of a cat." Large or small, feral or domesticated, all cats have one trait in common--a characteristic slit that runs through the center of the eye; hence the more well known term "cat's eye".

It should be noted that the term cat's eye always refers to the mineral Chrysoberyl. However there are other minerals which exhibit this effect. Such as Tourmaline, Quartz, Tiger Eye, Zircon, and Moonstone



Chrome Diopside (cat's eye)

MEETING

Wednesday
March 19, 2008
7:00—9:00 pm
Makiki District Park
"Optical Minerals"

NEXT MONTH

Wednesday
April 23, 2008
"Diamonds"

LAPIDARY

Classes on Thursday Evenings
7:00—9:00 pm

MEMBERSHIP COSTS 2008

Single: $10.00
Family: $15.00

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So how do stars and cat's eyes occur? They are due to a special arrangement of inclusions in the mineral. As incoming light strikes the surface of the host material, it comes into contact with and reflects off of a series of fine fibers or needles. If the needles are arranged parallel to one another, this creates a Cat's Eye effect. If the layers of parallel needles or fibers are arranged at definite angles throughout the material, stars are produced.

In case of simple chatoyance, for instance Tiger's eye, most pieces are a yellow to light brown color, but enhancements can create reds or other colors, and a naturally occuring variant called "hawk's eye" has a grey-blue to greenish color. Less familiar to many, but greatly admired for their displays of chatoyance are the Charoite, Pietersite, and Serefinites.

Seraphinite

The gem variety of Clinochlore, is a lovely dark-green stone that changes sparkle and light as you view it from different positions. It comes from mine Korshunovskaia which is situated not far from Baikal Lake in Eastern Siberia, Russia. This mineral got its name from the Greek words for inclined and green since its structure is monoclinic and its common color is green.

Charolite

From Russia, discovered in 1978 in the Murun Mountains in Yakutia. Named after the nearby Charo river. It is opaque bright purple, with wild swirls of fiberous material and is one of the strangest looking natural gemstone.

Pietersite

Pietersite crystallizes in the form of masses, the structure a result of inclusions in jasper where the inclusions are pseudomorphs after asbestos. The color is blue/black/red/yellow with a strong chatoyant quality. It was discovered by Sid Pieters, on his farm in Namibia

Color Change

Another very important phenomenon is color change. You may occasionally hear the more technical term *photochroism* (photo : light and chroism : color) used to describe the effect. The most famous color-change gemstone is Alexandrite, a member of the chrysoberyl species. When exposed to daylight and then incandescent light, it will change colors. The most highly prized material changes from a bluish green to a reddish color. The more intense the change, the more valuable the material becomes.

Color change, while highly prized by collectors, is not present in many mineral species. In some cases, such as Tourmaline, the phenomenon is extremely rare. While Alexandrite is the most well known and expensive color-change mineral, there are less expensive alternatives, such as color-change Garnet or Sapphire.

Iridescence

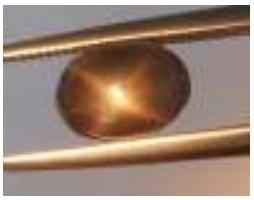
Iridescence is a phenomenon which shows as a multicolored, surface effect, which is caused by diffraction. As white light passes through very small openings such as pores or slits,
or through thin layers of material which differ in refractive index, a prism effect causes it to separate into spectral colors. These may then be seen on the surface, or in some cases in the materials interior. Sometimes when combined with interference, i.e where the slightly out of phase color waves bounce off of different layers overlap as they reflect, a loss of some colors or a reinforcement of others colors can take place giving rise to dramatic color blocks, which may shift with viewing angle.

Iridescence is the most widespread of the optical phenomena, we see its effects in pearls, the display of fire agate, "rainbow calcite", certain obsidians, and iris agate. It also creates the rainbow display of fractures, the beautiful colors of Labradorite, and, the most well known occurrence in the "color play" of precious opal.

Pearls

The *orient* of pearls, is a delicate, shifting, iridescent color layer that is distinct from the basic body color of the pearl or from its luster. Both luster and orient are a function of the thickness and perfection of the layer of nacre on the pearl's surface. Nacre is composed of thin plate-like layers of Aragonite crystals accounting for over 90% of its weight, along with conchiolin protein, and water. Although most pearls have that characteristic "pearly luster", only fine quality pearls have orient. It can also be present in the "mother of pearl" lining of shells, and is especially vivid in the shells of some species of abalone.

Color Change
Tourmalines, Brazil



Scapolite (Sri Lanka)

Spinel (Sir Lanka)

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Fire Agate
The aggregate quartz known as fire agate, gets its iridescence from thin coatings of iron oxide (limonite) layered over its botryoidal chalcedony surface. The best specimens of this material can be very striking.

Ammolite
This gem is the result of the fossilization of extinct, shelled mollusks, called ammonites. Although many ammonite fossils are found, only a certain type from a restricted area in Canada shows the iridescent effect, which has preserved, and enhanced, the thin, tablet-like aragonite crystal layering of the shell. The thickness of the preserved layers controls the colors that will be seen. Thicker layers produce red or orange colors, and thinner ones, the blues and violets. Due to the fragility of the thinnest layers, specimens with blue or violet color are especially rare and costly.

Phenomenal obsidian
Most obsidian is pretty plain looking, in mostly drab shades of brown and black. Certain types, however, display iridescent patterns due to dense congregations of minute suspended inclusions that act like diffraction gratings. This is sometimes given the trade names of "velvet" or "rainbow" obsidian.

Labradorescence
Labradorescence is a type of phenomenon, whereby a form of iridescence caused by repeated, microscopically thin layer (lamellar) twinning in Labradorite feldspar. One of the characteristics is that the twinning is very specifically oriented within the crystal, thus making the iridescent display highly directional. At some angles the light encounters no thin layers and no effect is seen, in other directions of view we see a bright blue, gold, green or multicolored surface.

Adularescence
Adularescence is another phenomena from which occurs when a gem displays a billowy floating light which appears to come from blow the surface. The name comes from the most prominent gem displaying the phenomenon: moonstone, known historically as "adularia". The term "shiller" or "schiller" is sometimes used to describe the light.
In Moonstone, adularescence is due to a layer effect, where thin inner strata of two types of feldspar intermix, (exsolution regions of sodium feldspar in potassium feldspar). These layers scatter light either equally in all spectral regions producing a white shiller, or as in the most valuable specimens, preferentially in the blue or the blue and orange. As in so many cases of optical phenomena the size or distance from layer to layer influences the colors we see.

Moonstone was designated the official state gem of Florida in 1970 to memorialize American astronauts landing on the moon in 1969 (all astronaut-controlled spaceflights had been launched from the Kennedy Space Center in Florida). Incidentally, moonstone is not found naturally in Florida.

Aventurescence
Aventurescence is a phenomenon which owes its beauty and distinctiveness to structural features which diffract or scatter light. Aventurescence is a consequence of reflection. When disk or plate-like inclusions of another mineral are present, and are of a highly reflective nature, they act as tiny mirrors, which causes the gem to sparkles and glitters. This glitter is called aventurescence. The term shiller, is also used to describe this sparkly glow. The most common reflectors are copper, hematite and mica.

The name is derived from the Italian word for "chance" or accident, and has no "d" in it, but the word is mispronouced as "adventurine". The most commonly encountered species showing this effect are certain feldspars and one variety of quartz.

"Goldstone", a man-made aventurescent glass with copper particles deliberately added to it, has been an inexpensive and popular gem imitation since the Victorian period.

Moonstone (India)

Ammolite (Canada)

Pietersite (Namibia)

Seraphinite (Russia)

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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.

NEWSLETTER COMMENTS? SUGGESTIONS?

I am hoping to 'freshen up' the newsletter a bit., and would love your input! If there is anything that you would like to be added, taken away or changed around, please email me at elise.thomasson@gmail.com All comments would be appreciated.

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, a week 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.

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