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

Meeting Times

MEETING
Wednesday
February 28, 2017

6:15-8:00 pm
Makiki District Park
Admin Building

NEXT MONTH
Lead Based Minerals

LAPIDARY
Every Thursday
6:00-8:00pm
Makiki District Park
2nd floor Arts and Crafts Bldg

MEMBERSHIP
DUE COSTS 2017
Single: $10.00
Family: $15.00

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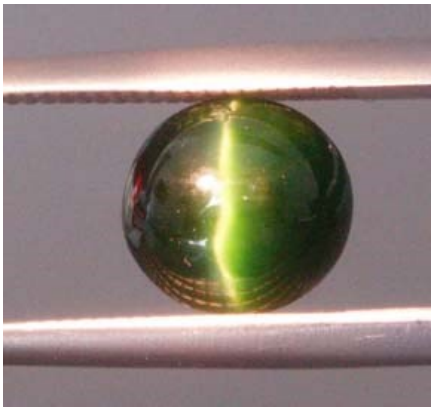
Phenomena and Synthetic Gems

By Dean Sakabe

When one 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.



Chrome Diopside (cat's eye)

Special optical characteristics… what do we mean by special optical characteristics? Well if one sees a star sapphire, the star effect, which is refered to as asterism, this is an optical characteristic or phenomena.

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. Rare minerals would be Star Emeralds.

Kornerupine (cat's Eye), Sri Lanka

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. Again to fully appreciate chatoyancy, the materials should be cut en cabochon. The word chatoyant is derived from a French phrase that translates as "eye of a cat." Cats have a common trait -- a characteristic slit that runs through the center of the eye; hence the more

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Color Change Tourmaline

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.

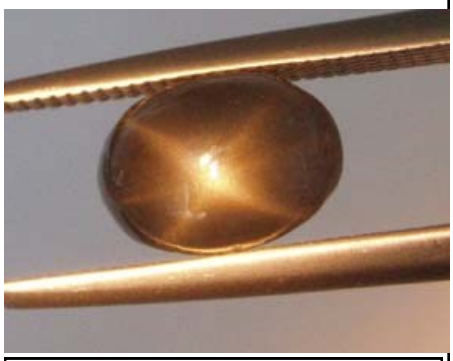
In case of simple chatoyance, for instance Tiger's eye, most pieces are a yellow to light brown color, but enhancements can create reds or other colors, and a naturally occuring variant called "hawk'seye" has a grey-blue to greenish color. Less familiar to many, but greatly admired for their displays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

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. 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 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

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.



Scapolite (Sri Lanka)

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 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

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Star Spinel (Sir Lanka)

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.

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. However, certain types 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 Obsidian, Rainbow Obsidian, Silver Sheen Obsidian, or Gold Sheen Obsidian.

Moonstone (India)

Labradorescence is 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 is another phenomena from which occurs when a gem displays a billowy floating

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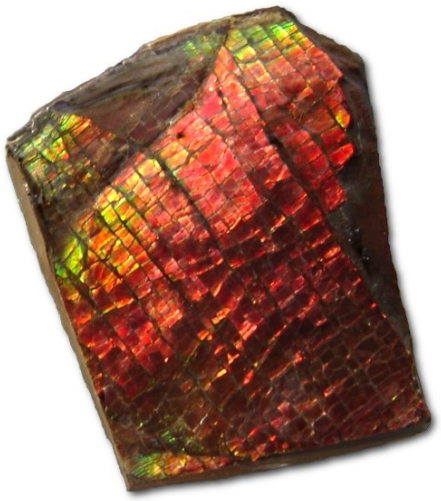
valuable specimens, preferentially in the blue or the blue and orange. As in so many cases of optical phenomena the size or distance from layer to layer influences the colors we see.

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, the is a phenomena which owe their 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. 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 Victorian times.



Ammolite (Canada)

Synthetic Gems

"Synthetic Gems ", as the name implies it is man-made or more commonly called laboratory grown. A process to replace or simulate naturally occurring gemstones. The idea of synthetic gems first occurred about 315 B.C. by Theophrastus's writings "on Stones." He believed that stones, including the precious kinds, are produced by solidification from fluids; some through the action of heat, others through cold, and probably some by both means. He reported that amber is the solidified urine of the Lynx, with male Lynx's producing reddish amber and female Lynx's producing a paler color. Furthermore wild animals produced a better quality of amber than tamer Lynx's.

In 1902, Auguste Victor Louis Verneuil produced the first man made gemstone, a synthetic Ruby. It duplicated Ruby's chemical composition, crystal structure, the correct color, and clarity. More importantly the ruby crystals were large enough to be used in jewelry. Verneuil's flame-fusion technique which is still used today, has been largely unchanged for the growth gemstones.

Charolite

Controlled introduction of impurities, caused colors in the corundum boules. A short sample of the impurities and the associated colors are:

No impurities	White Sapphire (Colorless)
CR	Ruby
NI + CR + FE	Orange Sapphire (Padparadscha)
NI	Yellow Sapphire

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Newsletter Editor

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, 6:15-8 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.

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.

Synthetic and Simulant are terminology used for laboratory grown gemstones, some other names are Lab Grown or Lab Created. Laboratory grown "synthetic" gemstones have essentially the same appearance, optical, physical, and chemical properties as the natural material that they represent. Laboratory grown "Simulant" gemstones have an appearance similar to that of a natural gemstone, however they have different optical, physical, and chemical properties. Additionally, certain colors of "synthetic" sapphire and spinel, used to represent other gemstones, would be classed as "Simulants." Colored and colorless varieties of cubic zirconia are the major "Simulants" produced. Examples of these are :

Seraphinite, Russia

FTC Guidelines require that any gem material grown in a lab, or not mined from the ground, must be called a name that includes the fact that it is not a natural gemstone. For example : Chatham Created Emerald, or Gilson Created Opal. These are names that are now acceptable because they denote the fact that the stones are lab created and not natural.

"Chatham Emeralds", are not just synthetic emeralds they are nice quality synthetic emeralds that have a fancy name. They differentiate themselves from others through creative marketing. They have established an aura around their product that it is something more than just a synthetic emerald.

The laboratory opal producing process, first invented by Pierre Gilson of France in 1974. This process produces a kaleidoscope of colors. From the rare and precious black opal, to crystal and white opaque opal.

The Gilson formula is considered the truest gemological process in the world today. Considered by many gemologists to by the world's finest laboratory grown Opal. This process takes from 14 to 18 months, and the colors are natural with no treatment or enhancements.

Unlike its natural counterpart, this created opal is much tougher and not prone to breaking. It gets it's hardness because it contains no water. Unlike natural opal which does contain water. The lack of water in Gilson opal has currently brought about debates and differences of opinion.

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