The New Mexico Facetor

Volume 19, No. 3, May/June, 2000

In This Issue

The Prez Sez: TOURMALINE - THE LAST FRONTIER?

In recent years, nearly all of the most sought-after gem materials have been synthesized, usually to the point that gem-quality synthetic material floods the market. Depressed availability and pricing of the corresponding natural material is the usual result, along with a very confused public.

At this point, large scale production of semi-precious and precious gem materials includes: diamond, ruby, sapphire, emerald and aquamarine (and other beryls), amethyst, citrine, ametrine, clear quartz, opal, spinel, alexandrite (chrysoberyl), moissanite, and rutile. Not to be neglected in importance are fluorite, calcite, and a vast array of garnet materials. These last listed synthetic materials are not usually found circulating as gem materials, although they are vital to high technology industries. They can certainly cut some spectacular gems. Synthetic garnets generally have no natural counterpart. Good quality natural gem garnet is apparently plentiful and cheap enough that no one is willing to try to make a living synthesizing it.

According to (1), topaz has been synthesized but not in commercial quantities, although that situation may have changed since publication. The synthesis of tanzanite is no doubt a project being worked on by many research groups. Tanzanite simulants now abound, and synthetics are likely to be seen coming up the back stretch soon.

A notably missing gem material from this list is tourmaline. There is no doubt that gem quality tourmaline commands a high price, for example, Paraiba and some of the recent Nigerian materials. It is becoming increasingly popular, often due to its rich colors and array of hues. Have the synthesizers simply forgotten about tourmaline, or is there something more to the oversight?

Gem quality green tourmaline has reportedly been synthesized under laboratory conditions in the former U.S.S.R. (2). Small, non-gem crystals have also been grown under hydrothermal conditions by the recrystallization of glass melted from natural tourmaline.

That is scary enough. However, consider how long it took for synthetic moissanite to become available. I first heard of a dark green, transparent silicon carbide (moissanite) sample obtained by synthetic means around 1993. It had made its way from a Russian optical materials lab to the NASA Marshall optics facility. Seven years later, faceted synthetic moissanite started to hit the streets in volume. Will tourmaline follow the same path?

I contend that tourmaline is just plain tough to synthesize. It may also be low on the list for synthesis. Tourmaline is a complex hydrated alkali aluminum borosilicate, with numerous metals that substitute in the crystal lattice. Some of these combinations produce the gem materials that facetors know and love. It might be this very character, its complexity, that protects tourmaline from practical large-scale synthesis.

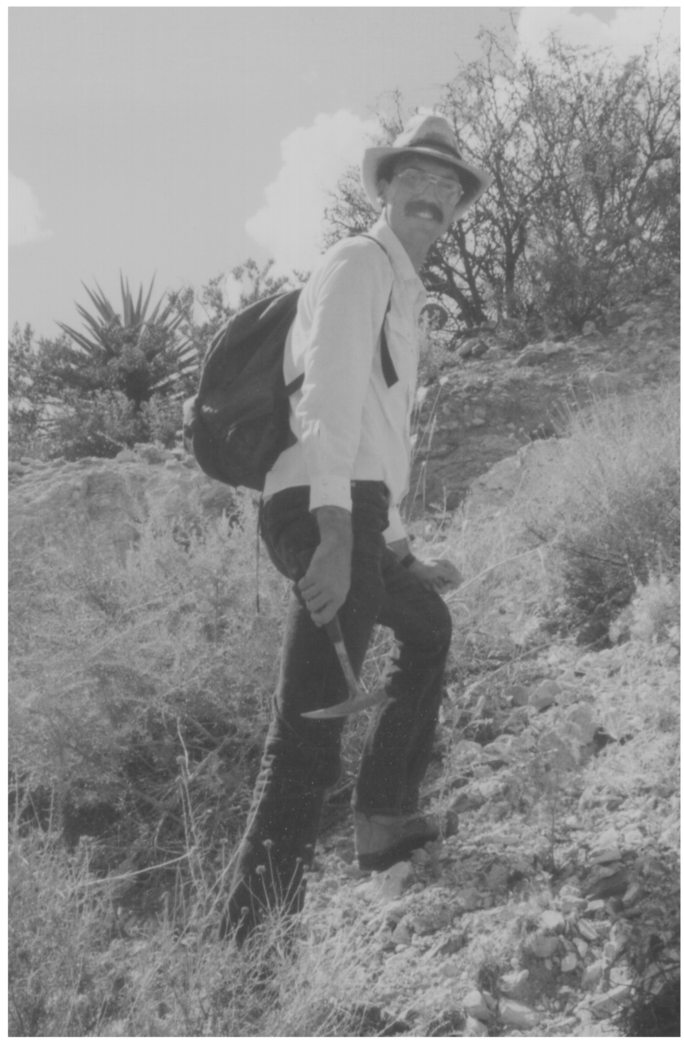
The growth of gem quality crystals requires very tight control on both the physical environment (temperature, pressure, and mechanical stability) and the chemical environment (pH, solute concentration, trace elements, dissolved gases, mineralizer concentration, and flux chemistry) of the growing crystals during their entire growth history. It is difficult enough to control all of these variables for materials with relatively simple chemistry, such as sapphire or beryl. Attempting the same with the complex chemistry of tourmaline is surely enough to drive physical chemists and crystal growers mad as a hatter.

I doubt that there is anyone among us who would not appreciate a large, nearly flawless, brilliant indicolite (blue) tourmaline crystal, complete with mirror smooth crystal faces and full terminations. It would be a vision of beauty and awesome to see such a product of nature's skill at faceting! If such an item were to be synthesized, I think I would feel much the same way, knowing how much work went into its creation.

As many natural materials gradually increase in price and decline in availability (particularly of quality cutting rough), and synthetic materials swamp the market, I will place my bets on the "holdouts", those materials with complex chemistry. Perhaps, tourmaline may outlast them all on the frontier of large-scale synthesis. Maybe, it will show up at the Tucson Show next year. Wagers, anyone?

(1) Cornelius S. Hurlbut, Jr. and Robert C. Kammerling, GEMOLOGY, Wiley Interscience (1991), ISBN 0-471-526667-3, pp 259.

(2) ibid. pp 262-263.



Guild President Scott Wilson

Minutes of NMFG Meeting

May 11, 2000

By Nancy L. Attaway

Old Business

President Scott Wilson called the meeting to order at 7:10 p.m. and greeted all members and guests. He then announced that Susan Wilson had resigned her duties as President of the New Mexico Faceters Guild. Scott Wilson has graciously agreed to serve as Guild President for the remaining term that ends in December, 2000. The New Mexico Faceters Guild will elect a slate of officers at the November meeting to serve a two-year term for the years 2001 and 2002. Nominations for all Guild offices will be entertained during the September meeting.

Scott mentioned that the article by the famous Fred Ward had not appeared in any other gem and mineral publication as yet. The *New Mexico Facetor* was the first to publish Fred Ward's article on dating emeralds using oxygen isotopes. He also complimented Steve and Nancy Attaway on their article about Cad/Cam design for jewelry.

Scott announced that the New Mexico Faceters Guild display that featured peridot from Kilbourne Hole, New Mexico won third place at the Albuquerque Gem and Mineral Club Show in March, 2000. Thank you, Scott.

New Business

Ernie Hawes informed the Guild that he had for sale various gem books from the estate of Harvey Lawler.

Betty Annis scheduled a "Ladies of the Guild luncheon" for June 9 at 11:30 a.m. at Paisano's Italian Restaurant on 1935 Eubank Blvd. NE in Albuquerque.

Show and Tell

The show and tell case tonight held lovely new gems.

Merrill O. Murphy displayed four unusual peridots. Forty years ago, he collected the rough along the New Mexico/Arizona state line on the Navajo Indian Reservation just west of Buell Park. (The land is now off-limits to anyone not of the tribe.) Merrill remarked that the stones may be more rare than unusual, in that they appear smoky on one crystal face. When viewed through a light source, the smoky color disappears to reveal a darker green color. Merrill used the smoky side as the table to have it face up yellow with flashes of red-brown when finished. The rough with one or more smoky surfaces may contain a higher than normal iron content. Merrill explained that olivines rise upward with the kimberlite, and, at some depth, pass from a liquid form to a crystalline structure. At molten temperatures, the olivine may be capable of including considerably more iron than can be incorporated into the crystal structure. As the olivine changes to crystalline form, the excess iron forms tiny bits within the crystal structure but is not a part of the crystal itself, much like dust within an icicle. The iron content in the smoky pieces of peridot evidently results in the color differences.

Some of the stones collected may not be peridot at all but may possibly be kornerupine, which is quite similar to peridot. Both peridot and kornerupine are of the orthorhombic crystal system, occur in shades of yellow-green and brown, and have similar hardnesses. However, they can be separated by checking the birefringence. Merrill faceted the red-brown peridots into a split facet octagon, a square, a round, and a marquis. He was able to render a polish using cerium oxide on lucite, because the stones were rather small. The split facet octagon had a pavilion comprised of one row of facets that all met at the culet.

Paul Hlava mentioned that Buell Park was prospected in the 1880's, and he said that 100 tons were sent to South Africa to check the potential for diamonds. Paul thought that the samples became contaminated from the crusher table in South Africa. Geologist Bill Mansker found New Mexico Buell Park garnets with some of the crystal faces covered with sets of trigons, the decorative and telltale marks that form from a diamond pyramid. Evidently, the garnets had formed near a large diamond that was oxidized on the way upward from the kimberlite pipe.

Nancy Attaway displayed nine stones. She faceted two large flasher cut round liddicoatite tourmalines from Nigeria, one a dark pink and the other an orangey pink. She displayed a very large emerald cut, deep red Nigerian rubellite liddicoatite that weighed just under 20 carats. She developed the pavilion of the emerald cut with several experimental facets that seemed to work well. Nancy did not think that a barion-style of pavilion would be suitable for the liddicoatite, considering the shallow critical angle of the liddicoatite and the a deep color saturation. She thought that she could use fewer facets at much shallower angles than normal for the pavilion mains and not use so many "sliver" facets, which are indicative to the barion emerald cut. She arranged a group of facets to "fan out" at the culet on the long sides of the stone. She also incorporated four "pennant-shaped" facets that began at the edge of the fan and spanned across the stone's keel to touch the corners. The effect provided the sparkle that she was hoping to obtain. Her emerald cut design will be published in a future issue of the *New Mexico Facetor*. She polished all of the tourmalines using a Last Lap with 50K diamond, an alumina oxide dyna lap, and a ceramic lap with 50K diamond.

Nancy displayed two imperial precious topazes that she cut from the same crystal. She purchased the crystal at the Tucson Show a long time ago and recently felt ready to tackle faceting it. Unfortunately, the crystal contained so many inclusions that considerably diminished the carat weight yield. Strangely enough, the flasher cut round showed a much paler shade of apricot than the elongated pearshape, which exhibited a rich saturation of apricot. She polished the topazes using a corian lap with 50K diamond.

Nancy displayed a large pair of matching flasher cut rhodolite garnets from Tanzania that showed a rich pink-purple-red. She faceted a very large Arkansas clear quartz in a flasher cut round. She also completed faceting an enormous Bolivian ametrine shield cut tablet of 55 carats. Nancy polished the clear quartz and the ametrine using a cerium oxide dyna lap, and she polished the rhodolite garnets using a Last Lap with 50K diamond and a ceramic lap with 50K diamond.

Refreshments

Elaine Weisman and **Nancy Attaway** brought home-baked refreshments to the May meeting. **Nancy** also provided gourmet coffee. Thank you very much. **Betty Annis** and **Eva Tordsen** volunteered to bring refreshments to the meeting in July.

Future Programs

Suzanne Cowan, who serves as Museum Curator for the New Mexico Museum of Natural History, will make a presentation at the July meeting. She will discuss the museum's mineral, crystal, and gem collection. She will explain how these items are procured, as well as their historic significance. Suzanne will also relate some of her buying experiences at the various gem and mineral shows.

Master gemologist appraiser, Larry Phillips, ISA, CGA, ASA, will address the Guild at the November meeting. Larry will discuss the changes he recently saw during his trip to China, and he will also provide information on appraisals, gem inclusions, and gem treatments.

Steve and Nancy Attaway's 14Kt. pendant with a 7.57-carat 13x13x13 mm triangular Nigerian rubellite tourmaline (liddicoatite) cut in Nancy's "Third Tri" faceting diagram. The design for the pendant was developed by CAD/CAM software. A row of five 0.05-point diamonds and a pinkish-lilac cultured pearl accent the piece.

Program Speaker

by Nancy L. Attaway

Master facetor, Scott Sucher took the Guild on a trip through the marvelous world of diamonds. He explained how diamonds are formed in volcanic pipes that reach one hundred miles into the Earth's core. At those depths, temperatures rise to 2500 degrees F., and the pressure becomes a million pounds per square inch. Tremendous heat and pressure create the birthplace of diamonds, a crystalline, transparent form of carbon and the hardest substance known. Scott discussed where diamonds were found, how they were mined, and the history and mystique relating to many of the famous diamonds known in the world.

Scott listed the areas on Earth where diamonds have been found. He said that Borneo was the first place recognized to yield diamonds. There, a small number of diamonds were sifted from alluvial deposits, but the kimberlite pipe was never found. Diamonds were soon discovered in India. India remained the world's sole source of diamonds until about 1730, when diamonds were discovered in Brazil. India is considered to be the cradle of the diamond industry. Diamonds are mentioned in Indian manuscripts dating back 2000 years ago. Some of the world's legendary diamonds, including the Koh-i-Noor, the Great Mogul, the Hope, and the Nizam, were all mined in India.

Scott related that gold prospectors in Brazil found diamonds in alluvial deposits as they sifted the gravel for gold. In 1850 and 1851, production rose as high as 300,000 carats annually from the diamond-rich deposits in Bahia. The first diamonds were discovered in Africa in 1866 in the alluvial deposits of the Orange and Vaal Rivers. Rumors were spread about the inferiority of African diamonds to maintain the viable market for Brazilian diamonds.

Scott explained how diamond mining in Africa ranged from sifting through alluvial deposits with a few tools to enormous open-pit and deep underground mining operations, where the hard rock kimberlite formations were blasted to extract diamonds. The ore is sorted through a crusher and spread out on a grease table. The diamonds stick to the grease, and the remaining rubble is flushed. One hundred tons of ore is mined for every carat of diamond. The yellow weathered kimberlite, called yellow ground, is shallow and extends one hundred feet down. The blue and pristine kimberlite, known as blue ground, was found beneath the yellow ground and went to one thousand feet. The Premier mine, the Finsch mine, and the Venetia mine, all famous mines, were major kimberlite pipes.

Scott's slides showed where, along the western coast of Africa, miners sifted through sandy beaches of alluvial deposits and dredged the nearby sands beneath the ocean for diamonds. In Namibia, one yard of beach has yielded 2700 carats of diamonds, and over 90% of them were high quality, gem grade. The industrial grade diamonds are weaker from cracks and inclusions, and they are broken and eroded away from tumbling downstream in rivers from the volcanic host rock before they reach the ocean. Zaire, Angola, and Botswana also have produced diamonds. The Jwaneng open pit mine in Botswana ranks as one of the most valuable diamond mines in the world.

Scott said that, in recent years, important diamond deposits were found in Russia, Australia, and Canada. Diamond mining began in 1957 in Russia, and there are about 1,000 known kimberlite pipes in the extensive Siberian Platform. At 12.5 million carats annually, Russia stands as the fourth largest producer of diamonds.

Diamonds were discovered in streambeds in the Kimberly region of Australia in 1971 and were traced back to the weathered remains of a large, hard rock, lamproite volcano. The lamproite pipe was developed into the Argyle mine, a vast open pit operation that at one point produced 40% of the world's diamonds. Fancy pinks and champagne diamonds have been mined at the Argyle mine.

Most of Canada is underlain by cratons, a likely source for diamonds. More than 450 kimberlite pipes have been located in Canada alone, and more than 100 of them reside in the Northwest Territories. Major diamond production by Dia Met unearthed millions of carats of diamonds in the Northwest Territories. The potential for more diamond discoveries in Canada remains great.

Glaciers from Canada carried diamonds in the ice as they spread downward into the midwestern part of the United States. Diamonds were found in the lamproites near Murfreesboro, Arkansas in 1906. The locality has been designated the Crater of Diamonds State Park. Diamonds were also located in the kimberlite clusters along the Colorado/Wyoming state line. The mine at Kelsey Lake, Colorado opened in 1996 and produced up to 100,000 carats annually, but closed a few years later.

Scott stated that the earliest evidence of diamond cutting came from Venice in 1330. At that time, Venice was the trading capital for goods entering Europe from the Far East. The earliest documentation of diamond trading in Antwerp was from 1447. Fashioned diamonds began to appear in Europe after 1380. The European techniques for cutting diamonds soon became standardized and have changed little. One diamond is used to brute or shape another diamond. The techniques of cleaving and polishing diamonds has been a secret closely held within the diamond guilds. Jam-peg machines were used, where the cutter set the cutting angles on the top and bottom of a cone and "eye balled" the angles. Iron laps were used that measured thirty-six inches across. The oldest diamonds cut were irregular shapes, as the stones were cut to match the original shape of the rough. A thread with diamond grit was used to saw a diamond, and it took eight years to make one cut. Modern diamond cutting methods now use lasers and diamond-coated saws and bits. The development of the standard round brilliant cut evolved from cutting the point off a hexoctahedral pyramid-shaped diamond.

Among the important events and increasing contacts between Europe and the Middle East and South Asia were the travels of the famous procurer of gems, Jean-Baptiste Tavernier. Tavernier, who lived between 1605 and 1689, documented his many travels in *Les six voyages de J.-B. Tavernier en Turquie, en Perse et aux Indes* in 1676. He visited several major diamond mines and described many large diamonds, including the Great Mogul, the Great Table, and the Shah. As a merchant, he returned with many diamonds, including a blue one (later to become the Hope). Tavernier's drawings and notes of these diamonds have been studied by historians and gemcutters alike. Scott studied one of the very few copies of this historical manuscript in preparation of his faceting the replicas of the world's famous diamonds.

The list of the world's great diamonds of history comprise an amazing collection. These famous diamonds are large in size and have an additional claim to fame, such as their history, cut, or color. Included in the list of great diamonds are the Hope, the Regent, the Sancy, the Tiffany, the Koh-i-Noor, the Orlov, the nine Cullinans, the Dresden Green, the Kasikci or the Spoon Maker's Diamond, and the Centenary. The Great Mogul was re-cut into the Orlov and set in the Russian crown. The Great Table was re-cut into two stones and set into the Iranian crown. The Florentine disappeared around World War I.

The 45.52-carat Hope diamond evolved from the French Blue, also known as the Tavernier Blue, that was brought back from India by Jean-Baptiste Tavernier in 1668. It originally weighed about 110 carats and was re-cut from an irregular form into a heart shape of 67 carats. It was slated to be set into the French crown jewels as part of the Order of the Golden Fleece, but it was stolen during the French Revolution, was spirited away to London, reappeared as a slightly smaller stone, and was subsequently acquired by the Hope family. It was believed by some that a curse resided within the diamond, that terrible misfortunes would befall its owners. It was later sold to Cartier, who sold it to Mrs. Evalyn Walsh McLean. Upon her death, it was acquired by Harry Winston, who bestowed it to the Smithsonian Institution, where it currently resides. The Hope diamond, naturally colored by boron, phosphoresces orange under ultraviolet light.

The 140.5-carat Regent is a cushion-cut, water-clear diamond with a faint blue tint. The original stone weighed 410 carats, was found in India in 1701, and was brought to England for re-cutting. The stone was originally known as the Pitt, but it was sold to the regent of France in 1717 and set in the crown. It was stolen during the French Revolution, but it remained in France and was used as collateral to finance ensuing wars. It is now displayed in the Louve.

The 55.23-carat Sancy is a pale yellow pear shape diamond whose origin in India has been lost. It can be traced to a French diplomat, Nicolas H. de Sancy, who lived in the sixteenth century. The diamond changed hands via loans for wars and eventually became part of the French crown jewels but was stolen during the French Revolution. The diamond changed hands from one royal to another in Europe, was purchased by a Bombay merchant and sold again, and finally ended up in the hands of William Waldorf Astor in 1892. It was eventually sold to the Banque of Paris and now resides beside the Regent in the Louve.

The 128.54-carat Tiffany originally was a 287.42-carat bright yellow octahedron that was discovered in the early days of mining diamonds in Kimberly, South Africa about 1877. The rough diamond was shipped to Paris, where famed American gemologist, George F. Kunz, working for Tiffany at the time, supervised the cutting. The result was a 128.54-carat canary-yellow cushion cut with ninety facets. Nitrogen imparts the natural yellow color. Tiffany purchased the stone and brought it to New York.

The most famous of all the diamonds is considered to be the Koh-i-Noor, meaning Mountain of Light. It has the longest history. Indian legend claims that the diamond was once the forehead ornament of a statue of the son of Surya, the sun god in Vedic mythology, that it was mounted on the statue of Shiva as his third eye. Documented history began in 1304, when the diamond was said to have weighed over 600 carats. It passed through many royal hands of India and became part of a story about a royal who hid the diamond in his turban, revealed later by a member of the court. The British acquired the Koh-i-Noor in 1849, by which time the stone weighed 186 carats. It was presented to Queen Victoria, who had it re-fashioned into an oval brilliant of 108.93 carats. The Koh-i-Noor is currently mounted in the queen mother's crown and is on display in the Tower of London.

The 189.6-carat Orlov is a faintly bluish-green diamond associated with the Great Mogul diamond. The connection is their similar appearance and shape, like half a pigeon's egg, and that the history of the Great Mogul ends about the time that the history begins for the Orlov. The Great Mogul was discovered in India in the mid-seventeenth century and weighed over 787 carats. Legend claims that the diamond was once in the eye of a statue of Vishnu in a Hindu temple. The story continues with a French soldier who stole the diamond, sold the stone, and it finally ended up in Russia as part of the Russian imperial scepter. Count Orlov, a lover of Catherine the Great, acquired the stone for her, and she endowed the diamond with its name. The Orlov and the Imperial Regalia are housed in the Diamond Fund collection of the Kremlin State Museums.

Thomas Cullinan opened a kimberlite mine that produced a quarter of the diamonds greater than 400 carats. It was named the Premier mine. The original Cullinan rough appeared in 1905 only nine meters down the pit, and it weighed an astounding 3,106 carats. It was sent to London as a gift to King Edward. The task of cutting the Cullinan was given to the Ascher firm in Amsterdam. A special two-handled cleaving blade was built for the job. It yielded nine stones: Cullinan I is a 550.20-carat pearshape; Cullinan II is a 317.40-carat cushion cut; Cullinan III is a 94.40-carat pearshape; Cullinan IV is a 63.60-carat cushion cut; Cullinan V is a 18.80-carat cushion cut; Cullinan VI is a 11.50-carat marquis; Cullinan VII is a 8.80-carat marquis; Cullinan VIII is a 6.80-carat oblong brilliant; and Cullinan IX is a 4.80-carat pearshape. The Cullinan I, known as the Great Star of Africa, was mounted into the redesigned British royal scepter. The Cullinan II, known as the Lesser Star of Africa, was mounted into the British imperial state crown.

The 41-carat rounded pearshape Dresden Green diamond is the only large naturally colored green diamond in the world, colored by natural radiation. The earliest documentation of it came from a letter of sale dated 1726. The Dresden Green was mounted in an Order of the Golden Fleece in 1742 but was remounted in a hat ornament in 1768. The Dresden Green was taken to Moscow after World War II and was returned to Dresden in 1958. It is currently on display in the Albertinum Museum.

The Kasikci or Spoon Maker's diamond is a double-rose pearshape that weighs 86 carats. The story that surrounds this diamond relates that the stone was discovered in a garbage dump by a fisherman, who sold it to a silversmith, a spoon maker. The stone became the focal point of a vast dispute that involved several merchants and was commandeered by the sultan to end the dispute. It currently resides in the treasury of the Topkapi Palace Museum.

The Centenary diamond, discovered at the Premier mine in 1986, weighed 599 carats in the rough. It was described as an irregular crystal of the finest water. Its name acknowledges the one hundred year celebration of DeBeers. Famous diamond cutter and designer, Gabi Tolkowsky fashioned the stone. The special cutting design with 247 facets gives the 273.85-carat Centenary diamond its wonderful brilliance and fire. The Centenary diamond ranks as the largest modern-cut, top-color, flawless diamond in the world.

The Shah Jahan Table Cut diamond measures 44.6 mm by 33 mm by 3.6 mm and weighs 56.71 carats. It is one of several diamonds that are credited to match the Great Table diamond viewed by Tavernier. However, two other similar diamonds in the Iranian crown jewels are better matches for the Great Table diamond. The Shah Jahan Table Cut diamond has two drill holes on one side that allow the stone to be sewn on a garment or a turban, a feature common in gems that were shaped for use and worn by Moguls.

The Florentine was a 137.27-carat yellow pearshape thought to have been owned by Charles the Bold in the fifteenth century after the Battle of Nancy. Tavernier reported seeing it during his travels to India. The Florentine diamond was also known as the Grand Duke of Tuscany's diamond and the Austrian Yellow. It was last owned by the Hapsburg Dynasty. Its present whereabouts remain a mystery.

Scott Sucher's admiration and enthusiasm of the world's famous diamonds definitely shown through his presentation. His explanations of geology, mining, and cutting as they relate to diamonds was easy to understand. The stories he told that surrounded the famous diamonds included real people and historical events, as well as courtly intrigue and legends that wrapped the stones in mystery. The unique allure these diamonds have had is truly remarkable, proof in that, with wars, revolutions, and the changing fortunes of man, the desire to own them became an obsession. These diamonds captivated the hearts and minds of many people for centuries of time. To describe the magic, Fred Ward said that, "Diamonds are stars we can hold in our hands." It was no wonder that Scott Sucher worked so hard to render his selected group of replicas that represented the world's famous diamonds.

Gem Myth of the Month

By John Rhoads, D & J Rare Gems, Ltd.
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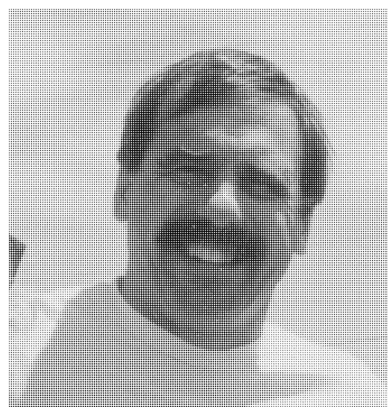

Gem Myth: "Imperial topaz refers to the sherry red topaz."

The term, "imperial topaz", is used to refer to the topaz found in the vicinity of Ouro Preto, Brazil. The gem has received this title as a result of impurities of chromium and vanadium, which impart a stable color that ranges from a light straw yellow to a deep sherry red.

Most of the world's supply of colored topaz is very unstable and fades when exposed to sunlight, unlike the imperial topaz of Brazil. We have heard champagne-colored topaz from Asia referred to as "imperial", but the material fades very quickly when exposed to light. We recommend to our customers who have stones that fade in sunlight to wear the gems at night.

In the News

New Treatment for Diamonds

Source: Modern Jeweler May, 2000, Professional Jeweler July, 2000, and JCK July, 2000

A chemical engineer at the Oved Diamond Company of New York developed an exclusive process that allows its diamonds to withstand the bench jeweler's torch. The "XL-21" enables Oved's diamonds to be re-tipped in the mounting or a shank re-sized without damage to the stone. Its ability to permeate surface-reaching features depends mostly upon the nature of the imperfection. XL-21 has a refractive index similar to diamond. The company submitted its treatment to GIA, who will publish a full report.

New Moissanite Distribution

Source: National Jeweler May 1, 2000 & Colored Stone May/June

Charles & Colvard, formerly C3, no longer distributes its faceted synthetic moissanite to independent jewelers. The company has chosen Rio Grande of Albuquerque, New Mexico and Stuller Settings of Lafayette, Louisiana as its new distributors.

New I.D. for GE POL Diamonds

Source: JCK May, 2000

Lazare Kaplan International and its Pegasus Overseas Limited subsidiary promote their heat-and pressure-treated "Bellataire" diamonds being better than unenhanced diamonds. Viewed under crossed Polaroid plates, the diamonds exhibit tatami graining, allowing identification where the girdle laser-inscription was removed.

Chinese Pearl Mystery

Source: March JCK, April Modern Jeweler and April Lapidary Journal

China, the world's leader in cultured pearl production, produces over 1,000 metric tons of freshwater pearls annually. Chinese freshwater pearls: show a variety of colors, a thick layer of nacre, large sizes, round shapes. Several pearl experts have debated how Chinese freshwater pearls are cultivated. Square mantle tissue may be used, but no one can explain how square mantle tissue produces a round pearl. X-rays show a wispy black void in the pearl's center, left when the mantle tissue dissolves. The pearls could be nucleated with tissue-nucleated, all-nacre nuclei from freshwater cultured pearls tumbled and polished.

Colorado Diamond Mine Sold

Source: JCK July, 2000

The diamond mine at Kelsey Lake was sold to McKenzie Bay International of Toronto. The mine filed for Chapter 11 in January.

More on GE POL Diamonds

Source: Professional Jeweler May, 2000 and July, 2000

Exposure of diamonds to high-pressure and high-temperature conditions creates an optical center that produces yellowish-green diamonds. GE POL diamonds displayed a strong green luminescent body color and greenish-yellow fluorescence. These features alone are not enough proof that a colored diamond has been subjected to HPHT processes. Spectroscopy testing is also needed. New research from a lab in France revealed that all the untreated Type IIa brownish diamonds examined showed the presence of nitrogen vacancy centers.

Blue Jade & White Turquoise

Source: JCK May, 2000

A fibrous, sometimes chatoyant, sometimes botryoidal blue nephrite jade was found near Petaluma, California in 1949. It was called Vonsen blue jade after the discoverer. Anders Karlsson rediscovered the mine three years ago and has re-opened it. Mining for blue jade is all done by hand.

White turquoise comes from the Dry Creek mine north of Austin, Nevada. It was also found at the White Buffalo mine in the Gilbert Mountains between Tonopah and Mina, Arizona. Tests revealed that the white turquoise contains major amounts of quartz, calcite, and alunite (aluminum potassium sulfide) with turquoise. Hardness ranges from 5.5 to 6.0, and it takes a good polish.

New Laser Drilling Method

Source: JCK May & July, 2000

A new method of laser-drilling diamonds enables the drill hole to mimic inclusions. The drill hole will show a "fan-like pattern" instead of a single hole, but the holes are wider.

GIA I.D.'s New Laser-Drilling

Source: The Loupe Spring 2000

GIA has identified the diamond laser-drilling method made to appear as natural diamond inclusions. The new laser-drilling method is used on diamonds with shallow, dark-appearing inclusions and a type of associated tension fracture or cleavage. Pulsed lasers are used to focus upon a near-surface inclusion to heat and expand it, creating enough stress to extend the cleavage to the surface. This provides a channel to the dark inclusion for the boiling acid treatment to whiten it.

Watermelon Garnets

Source: Professional Jeweler April, 2000

An variety of hydro-grossular garnet mixed with idocrase has reappeared on the gem market. It is translucent and exhibits variations of pink, red, and green. Some show fern-like and tree-like inclusions. The watermelon garnets were found in the 1940's in South Africa's Transvaal region and called "Transvaal jade".

Branded Garnets

Source: Professional Jeweler June, 2000

Columbia Gem House, Inc. of Vancouver, Washington gave purple garnets the brand name of Grape Garnets^tm for only the best specimens. They also trademarked Sea Foam Tourmaline^tm and Spice Pearls^tm.

New Tanzanite Operation

Source: JCK June & July, 2000 and Professional Jeweler July, 2000

Afgem of Johannesburg, South Africa was conveyed a long-term lease on mining rights to the tanzanite-rich Block C area, considered to be the future of tanzanite. The terms of the lease has allowed mechanized mining, previously restricted. Afgem has improved the mine's infrastructure and installed drainage systems. Oxygen is pumped into the mine, and miners use better equipment. The property is fenced with a new security system. Tanzanians own 25% of the mine. Afgem plans to establish a buying office and cutting factories, and it will trademark the highest quality tanzanite as True Blue with laser-inscribed serial numbers. A web site is also planned. Afgem wants to control tanzanite prices and supply.

New Platinum Solder

Source: Professional Jeweler April, 2000

Precious Metals West of Los Angeles has developed a plumb (90% to 95%) platinum solder with the same platinum content as most platinum jewelry. The plumb platinum alloy can vary the platinum content to achieve a range of colors and three flow temperatures. It will not leave dark, discolored solder seam lines, and colors will match jewelry better.

New Silver Alloy

Source: Professional Jeweler July, 2000

Vaasa, Ltd. patented a new silver alloy that will eliminate firescale and allow silversmiths to create jewelry that resists tarnish. The alloy contains 1.2% germanium, a semiconductor.

Another Diamond Treatment

Source: JCK June, 2000

First Diamond Group Ltd. of Israel announced a new color and clarity enhancement for diamonds based on "natural" treatments. The method combines high temperature and pressure with natural irradiation to create fancy colored diamonds. The process uses rubidium 87, thorium 232, radon 220, and lead 208. The level of radiation exposure depends upon location and altitude, created in the lab. The company has succeeded in "removing white and black piques without the rainbow". The fancy color enhanced diamonds come in intense yellow, canary yellow, green, blue, gold, cognac, black, and pink.

Check the July, 2000 issue of *Computer Graphic World Magazine* for an article on CAD/CAM jewelry.

Bar Codes for Diamonds

Source: JCK June, 2000

3Beams Technology of Hillsboro, Oregon and Gem Trace of Brighton, Massachusetts both now use focused ion beams and laser technologies to bar code diamonds and jewelry with certification info, inventory numbers, logos, special dates, and photographs. Gem Trace is promoting its LMS 2000 excimer laser that uses "drag and drop" software, which allows the user to view a simulation of the inscription superimposed on the diamond before it is engraved. E-mail sites: info@norsam.com gemtrace@gemtrace.com

Divorce Settlement at Ekati

Source: JCK June, 2000

The largest divorce settlement in Canadian history involved Chuck Fipke, the geologist who discovered diamonds in Canada's Northwest Territories, and his ex-wife, Marlene Fipke, who managed the geology lab for her ex-husband. They were married thirty years. Chuck Fipke agreed to transfer his $85 million stake in Dia Met, one of the mine owners of the Ekati mine, to Marlene Fipke. Chuck will also step down as Dia Met's chairman, but he retains his 10% direct stake in the Ekati mine.

GIA to Teach CAD/CAM

Source: The Loupe Spring 2000

GIA is developing a new computer-aided design and computer-aided manufacturing (CAD/CAM) Extension course for later this year. It will feature true parametric 3D solid-modeling technology to create jewelry designs and will produce fully three-dimensional models.

Gem Smuggling in Myanmar

Source: Colored Stone May/June, 2000 and GemKey Mar/Apr., 2000

Smuggling gems out of Myanmar is not a new development, but it has been dramatically increased. The best rubies from Mong Hsu and Mogok are taken out via commercial airlines. Dealers, who have paid the right people to look away, stow rubies in bags and checked luggage. Even high-level government officials are involved in gem smuggling. Cheaper and bulkier gems are carried out over land routes, controlled by independent couriers and ethnic rebel groups.

New Tsavorite Mine

Source: Colored Stone May/June, 2000

A new tsavorite deposit was discovered in the state of Lindi, Tanzania. It was found beside a river in the Namungo Hills by a gold miner in 1999. The deposit shows great potential, but the location is in the most backward district in Lindi. In the absence of government control, smuggling is a popular method of carrying tsavorites out of the country without divulging the extent of the mining operation and without paying taxes.

No Benitoite Mine for AZCO

Source: Colored Stone May/June, 2000

AZCO Mining, Inc. had the option to purchase the Benitoite Gem Mine in California but chose to let it go. It has decided to totally move out of the gemstone business. Mike Gray, whose family owns the benitoite mine, is not worried. He already has a stockpile of cut benitoites for sale.

Synthetics in the Inventory

Source: JCK June, 2000

GIA's John Koivula is an expert on the visual identification of gemstones. He listed the top ten man-made gems that we need to be aware of and look for when buying gems.

Hydrothermal synthetic amethyst and citrine contain growth spikes, known as nail-head spicules, that are produced by growth blockage. Because a quartz crystal caused the spike and since the host material is also quartz, polarized light is used to reveal the inclusion in the crystal. Manufacturers are also growing synthetic ametrine hydrothermally.

Negative crystals in synthetic moissanite reveal the material's hexagonal structure. Their angular form may cause the host to be mistaken for a natural gem. Synthetic moissanite is doubly refractive, and diamond is not. Groups of long, thin and wavy needle-like inclusions are common in synthetic moissanite, not in diamond.

Partially-healed fractures are usually seen in flux-grown synthetic emeralds. Because of their appearance, these types of inclusions are known as flux fingerprints. Platinum platelets from crucibles, graining and growth patterns, nail-head spicules, and gold crystals from gold-lined crucibles may be found in the synthetics.

Curved striae are very characteristic of synthetic rubies grown from flame fusion. Deposits of successive flow layers create the patterns. Primary and secondary flux inclusions may be contained. Natural rubies show similar types of internal patterns that confuse the issue. Platinum inclusions from crucibles can be present. Hydrothermally-grown rubies also show a roiled growth internal pattern.

Most synthetic sapphire is colorless. Platinum platelets from the crucible may be found. Look for curved colored growth rings or banding, as these successive growth layers are the result of variable amounts of coloring chemicals. Look also for tiny white clusters of pinpoints, which are gas bubbles in synthetic sapphire grown from flame fusion. Synthetic flux sapphires contain drippy flux fingerprints. Natural sapphire may show similar fluid inclusions.

Synthetic alexandrite chrysoberyl contains large primary flux inclusions with small bubbles that develop in the flux before it solidifies. Tiny triangular and hexagonal platinum platelets from the crucible are scattered about in flux-grown synthetic alexandrite.

Hydrothermally-grown synthetic aquamarine shows wavy growth lines, seen best using darkfield binocular illumination. Look for a roiled, angular growth zoning in hydrothermals.

Synthetic spinels are produced by flame fusion and flux. Flame-fusion spinel shows characteristic gas bubbles and curved growth markings. Flux-grown spinels show angular growth and have few inclusions. Natural spinels contain tiny octahedral crystals that are like double pyramids.

Black and white opals are created in the lab. Telltale inclusions are columns of color and snakeskin or chicken-wire honeycomb-like patterns. The slow settling process, a form of sedimentary event, is used to produce synthetic opal and results in the telltale formation of a columnar structure.

Obituary

The May/June, 2000 issue of *Colored Stone* said that AGTA award winning gem carver, **Kreg Scully** died March 13, 2000 of cancer.

Will's Short, But Fun, Tucson Show 2000

by Will Moats

In some ways, this year was no different than the others. Tucson Show time had arrived, and there was not enough money or annual leave to spare. However, I rationalized that money and time were not important enough reasons to skip Tucson, so off the family and I went in search of wonderful crystals to add to the ever growing collection.

Over the last several years, I have spent much of my time satisfying my business needs at the wholesale jewelry shows. This year, I decided it would be different in that I would spend more time at the mineral shows. Other than wanting to find some synthetic gem crystals to add to my personal collection, I had no set plans as to what I might purchase.

The first stop was the G&LW Show at the Holiday Inn/ Holidome. We needed to purchase a few items for the business, and I wanted to get this "work" activity completed as soon as possible. Most of this effort was limited to obtaining more Chinese freshwater pearls, seen again in abundance at the show. In general, I thought that prices for high quality pearls were somewhat higher than last year, but the increase for once did not seem as bad as in earlier years. Within an hour, we had all the pearls we could use for the rest of the year.

Our visit at the Holidome yielded an opportunity to check out the Tairus dealer for synthetic gem crystals. They specialize in synthetic gems both rough and cut. Among their excellent selection of gem rough for sale were synthetic diamonds that showed a strong yellow color. Their displays featured flux-grown spinel and large crystals of hydrothermal emerald and red beryl. They also carry large amounts of synthetic quartz, cubic zirconia in a staggering array of colors, and colorful split boules of synthetic spinel.

I have always wanted to buy some complete crystals of the various types of synthetic beryl, but the budget so far has not permitted it. A small complete crystal of hydrothermal emerald or red beryl can easily cost $400 or more at even the relatively low price of $5-6 per carat. A large crystal can easily cost 10 times as much. Note that small complete synthetic beryl crystals are uncommon, as they are considered to be an undesirable product of the growth process. If you were to purchase a small synthetic beryl crystal, then you would likely end up with a considerable percentage of the crystal being inferior in quality near the terminations. It is important to keep in mind that, when buying synthetic crystals, you are paying premium prices for gem rough. Quality is important, even if you do not intend to cut the rough. You want value for your money.

Although I have seen excellent crystal specimens of flux-grown spinel at other times, Tairus had only heavily damaged pieces left by the time I got to the show. It was still excellent cutting material, just not nice crystals. Most of the crystals were probably in the 1-3 carat range, but some appeared to be much bigger, perhaps 25 carats each.

Of even more interest was the variety of Russian flux-grown garnets selling at $5 per carat that contained various rare earth elements. I purchased nice lustrous examples of each type: tsavorite-green europian gallium garnet (EGG), citrine-yellow samanium gallium garnet (SGG), ruby-red gadolinium gallium garnet (GGG-Mn), and cobalt-blue gadolinium gallium garnet (GGG-Co). The red garnet (GGG-Mn) is colored by manganese. The unusual blue garnet (GGG-Co) is colored by cobalt. Although well crystallized, the examples of these flux-grown garnets tended to have only about 1/2 to 2/3 of their crystal faces preserved. This is because the garnet crystals must be chipped off the sides of the containers wherein they are grown.

Last, but not least, Tairus also carried a new lot of Chinese-grown hydrothermal ruby. I had not heard of hydrothermal ruby before I saw these. The crystals are bright red down the c-axis, exhibit an unusual tabular habit, and are perfectly formed. Each crystal had small pieces of wire embedded in the top and bottom faces, leftover from the manufacturing process. These were so neat, that I just had to buy a 21.71-carat example for myself at $5 per carat.

Our remaining time in Tucson was spent mostly at the "main" shows downtown. We also visited the Executive Inn in search of minerals. Several Russian dealers at the Executive Inn carried small (2-inch), beautifully formed crystals of synthetic colorless quartz. Many of the same dealers also had slabs of synthetic ametrine at very low prices (my piece cost $15 for an estimated 100 ct +). I did not see any complete crystals of ametrine.

The "new finds" of natural gem crystals were pretty much limited to topaz. Among this latter group, I saw (and purchased) a 2-inch tall topaz crystal from Chopsin, Mogok, Mandalay Division, Myanmar (Burma). The crystal, off matrix, shows a light sherry-color and is nicely etched. I displayed this neat crystal at the Albuquerque Gem and Mineral Club Show this past March. The dealer who sold me the piece said that it was unique among his inventory. There may not be much of this material around, but I hope that I am wrong. These are neat gem crystals.

I noticed that a German dealer at Tucson carried several matrix topaz specimens from a pegmatite locality at Gaoli Gong Shan, Yunnan, China. The sherry-brown topaz crystals looked somewhat similar to those from Pakistan. They were attached to snowy-white bladed crystals of cleavelandite. Several matrix pieces were priced at under $1200, relatively inexpensive by today's standards for how special they are. I am hoping that even better pieces show up next year.

Some rather large crystals of topaz were recently found at the Zapot claim in Mineral County, Nevada. Some examples of this material found its way to the Tucson Show, and the largest and best of these pieces were on display (probably also for sale if one were to ask). Although the crystals were large and interesting pieces from an American locality, many of the crystal specimens are not especially aesthetic. Almost none were associated with matrix. A few large cut stones of Zapot claim topaz were seen at the Tucson Show.

Not normally thought of as gem rough, I will close by mentioning that there was a new find of blue-green smithsonite from the San Antonio mine, Santa Eulalia, Chihuahua, Mexico. The material was said by some dealers to be the "equal" of smithsonite from the infamous, but now defunct, Kelly mine in Socorro County, New Mexico. I believe that is wishful thinking on their part. Although some very fine examples were available at the Tucson Show, none matched the quality found in the best pieces of Kelly mine smithsonite that I have seen. Carvers and cabbers might want to keep their eyes open for some "poor" quality specimens of this Mexican smithsonite that might make excellent cutting material.

Can Tucson in 2001 be even better? I can't wait to find out!

Steve and Nancy Attaway's 14Kt. earrings with two matching solid black opals from Lightning Ridge, Australia that weigh 15.15 carats total weight. Steve carved the black opals. The design for the earrings was developed by CAD/CAM software. A total of six 0.06-point diamonds accent the earrings.

Facet Designer's Workshop

By Ernie Hawes

Scott Wilson

Something Old, Something New

During the May meeting, Merrill Murphy gave me a copy of an article that he had put away for quite some years. The header on the article simply said "**BRILLIANT INNOVATIONS**". There was no author given and no indication of what publication it came from. The top and bottom views displayed several designs. Based on some research, I am guessing that the article was published some time in the late eighties but maybe not. It was out of a professionally done publication, as it included several photographs of the stones cut from two of the drawings. Sadly, there were no cutting instructions.

Merrill's purpose in giving this to me was the fact that he had read the numerous inquiries made last year and this year on the Internet publication **FACETER'S DIGEST** about a square diamond design called the "***Princess***". Pictures of the cut stone have appeared in various jewelry advertisements over the years but never the design itself. However, there it was, third drawing in the first column with a top and bottom view and no instructions. Merrill said that a lot of people would be interested in getting instructions for this design. He wanted to know if I would figure it out. Of course, I said. Sure, I would give it a try.

My first task was to make certain as best I could that the design was not already published, perhaps under a different name. Reviewing designs in GemCad and a few other places revealed some similar patterns but not this ***Princess***. I did find a design by Alexandre Wolkonsky called "***Princess Look Alike***" that was published in ***FACETS*** in June of 1992. However, it did not look a lot like this design. Not finding the pattern anywhere with detailed cutting instructions, my task became what Merrill had originally asked, that I would figure it out for him.

The drawing was obviously intended for a diamond, as there was a tiny culet facet in the center of the pavilion. Since few of us are ever likely to cut a diamond, I decided to work out the design with quartz angles and leave out the culet facet. Since I like Schlagel's angles for quartz, that is what I used.

Working with GemCad, I began to experiment. It took awhile, but I finally came up with a design that matches closely the top and bottom views shown in the article that Merrill gave me.

I must admit that I do not consider this to be my design. It is just my interpretation of a pattern created by some unknown diamond designer. I hope it pleases those folks who have been searching for the ***"Princess"***. The angles can be adjusted in GemCad for higher refractive index gems, and the design should look quite good in light to medium intensity colored stones. A colorless cubic zirconia will, of course, most closely resemble the diamond for which the design was originally created.

Our next design is another of Nancy Attaway's creations. Once again, she has come up with a pattern to fill a need. It answers a frequent problem when cutting the pavilion on a tourmaline. I better let Nancy tell her story.

"I have submitted a new pavilion for an emerald cut designed specifically for a large (liddicoatite) rubellite tourmaline. The finished stone weighed just a bit under twenty carats. The color saturation of this liddicoatite tourmaline showed a deep red hue with a slight pink cast. From trial and error, I have found that cutting these deep reddish liddicoatite tourmalines is best done with a small number of facets cut at very shallow angles. A few, well-placed facets at shallow angles lightens the color tone and encourages a lot of sparkle. With this particular stone, I felt that a barion-style pavilion, one with a lot of long, thin facets, would not work very well. Such a design just might muddle the deep red tone and prohibit the sparkle.

After cutting the pavilion mains fairly shallow, I "fanned" out eight facets at the culet, four each on the two long sides. One set of facets that comprised the fan was cut at 41 degrees, and the other set was cut at 40 degrees. I had another problem on the keel of the pavilion. I needed to eliminate several little chips along the keel near each corner, and I did not want to re-cut the entire stone all over again on the pre-polish. (That would leave a smaller stone than I wanted to have, and I had everything else in the design the way I wanted it to be.) To accomplish this, I developed a facet that ran horizontally along the keel between the edge of the fan and touched the corner facets. These "pennant-shaped" facets erased all the abrasion.

When I finished the crown and removed the stone from the dop, I was delighted to see that the fanning effect allowed a sparkling culet. The pennant-shaped facets winked some sparkle back, too. The design is called ***Emerald Cut with Fanned Culet***, an emerald cut design for liddicoatite."

All I can say is another "well done" to Nancy. I am sure that the Guild members will want to see and admire this beautiful gem at our meeting in July.

Steve and Nancy Attaway's 14Kt. pendant with a 16.5x10 mm emerald cut 9.14-carat aquamarine from Mozambique. The design for the pendant was developed by CAD/CAM software. A row of five 0.05-point diamonds and a 0.15-point trillion diamond accent the piece.

Special Dates for Guild Members

Jerry Murphy will celebrate her birthday June 7. Harriet Natonek will celebrate her birthday June 15. Steve and Nancy will celebrate their 16th wedding anniversary June 23. Bill Swantner will celebrate his birthday June 27. Eileen Smith will celebrate her birthday July 16. Henry (Tony) and Edna Anthony will celebrate their 51st wedding anniversary July 20. Betty Annis will celebrate her birthday July 21. Herb and Maria Traulsen will celebrate their 26th wedding anniversary July 27. Congratulations to all.

Let's Talk Gemstones

By Edna B. Anthony, Gemologist

Scott Wilson

TITANITE [SPHENE]

[A NESOSILICATE]

Sphene has caused excitement in the gem world since a more knowledgeable public has begun to appreciate and seek the lesser known gemstones. Sphene's intense body color, strong dispersion, and adamantine luster make a clean well-cut stone a spectacular gem. Distinct cleavage (sometimes two-directional with an angle of sixty-six and one-half degrees of separation), a low hardness, and a brittle nature make it a fragile one.

Sphene is the rather common mineral titanite. The ore is a source of titanium oxide that is used as a paint pigment. Titanite usually implies dark opaque material, while sphene denotes translucent or transparent material suitable for cutting into gems. Titanium derives its name from the mythical first sons of the earth, the Titans; the Greek word *sphenos* describes the often well-formed, wedge-shaped crystals of sphene. Granular, acicular, tabular, flattened prismatic, columnar, lamellar (layered), and compact massive forms develop in the monoclinic crystal system. Crystals are frequently twinned and show zones of color. In its structure, independent SiO_4 tetrahedra share an edge with CaO_7 polyhedra that share four edges and corners with TiO_6 octahedra. Sphene may contain trace amounts of rare earths cerium and yttrium, chrome, zirconium, magnesium, iron, manganese, and aluminum. It occurs in metamorphic crystalline schists and granular limestones and appears as an important accessory mineral in many igneous rocks, such as hornblende granite and diorite. An "envelope" appearance is characteristic of crystals recovered from igneous formations. It alters to brookite, ilmenite, leucoxene, or rutile. Fusion produces intumescence on the edges of a dark colored glass. Complete decomposition occurs in sulfuric and hydrofluoric acids, but it is less affected by hydrochloric acid. Like garnet, sphene is presumed to be untreated. However, in *A Guide in Color to Precious & Semi-Precious Stones*, Jaroslav Bauer and Vladimir Bousks state that "some brown titanites can be annealed to various hues of reddish brown or orange-brown." However, A statement that heat-treatment of some crystals can yield colorless material cannot be confirmed.

The dark colors usually contain a greater amount of iron than the lighter browns, yellows, and greens, and a lower content of titanium results in somewhat lower refractive indices. A grape-yellow variety, castellite, was found by an Italian mineralogist in 1866. Intense green material lacking a yellow tone is extremely rare. Chrome sphene seldom occurs in sizes over three carats. Especially fine green crystals are found in druses in the alpine areas in Europe. The Alps and the Tyrol are also sources of excellent yellow crystals partially covered with chlorite crystals. Some large green crystals have been found in Madagascar, but green material from India has produced most of the large impressive gems. A major source in Baja, Mexico yields chrome-bearing green material, as well as exceptionally large gem quality brown and yellow crystals. Twinned greenish and yellow gemmy material is found in the deposits in Minas Gerais, Brazil. Unlike the crystals from alpine areas and the Baja deposits, a "sleepy" look is characteristic of the yellow material from Brazil. Yellow, greenish-yellow and brown crystals come from Sri Lanka. Burma and Pakistan produce some sphene material. In North America, sphene is found in Quebec, Ontario, Maine, New York, New Jersey, Pennsylvania, Arkansas, Montana, and California.

Any twenty carat sphene gem is considered very large. The largest known is an intense dark green, near flawless 106-carat square emerald-cut gem of Indian origin that resides in a private collection. A magnificent set of sixteen matched golden yellow sphenes from Switzerland was presented to the Smithsonian Institution by Nina Lea several years ago. The collection of the Devonian Group in Calgary, Alberta, Canada contains an extremely rare red sphene gem that weighs 4.95 carats. Until recently, sphene gemstones have been the province of collectors. This has changed since the discovery of the deposits in Baja that yield exceptionally fine large crystals in generous quantity.

Sphene's excellent dispersion is best exhibited by a round brilliant cut. It chips and scratches easily. Its most appropriate use is for earrings and pendants. When set in rings, care must be taken to protect the gemstone in a suitable mount. It should be worn with care and stored to prevent contact with other gems and metals.

TABLE 1. Gemstone Properties

SPECIE	*sphene*
Composition:	[calcium titanium silicate] $CaTiO_5$+Ce,Yt,Cr,Zr,Mg,Fe, Mn,Al
Class:	silicate [nesosilicate]
Group	
Species:	titanite [sphene]
Crystal System:	monoclinic
Variety:	(named by color)
Colors:	yellow, brown, green, gray, red, blue
Phenomena:	none
Streak:	white
Diaphaneity:	transparent to translucent
Habit:	wedge, envelope, tabular, prismatic, granular, compact, or lamellar masses
Cleavage:	distinct
Fracture:	conchoidal
Fracture Lustre:	resinous to adamantine
Lustre:	adamantine to resinous
Specific Gravity	3.45 to 3.55
Hardness	5.0-5.5

TABLE 1. Gemstone Properties

SPECIE	*sphene*
Toughness:	poor
Refractive Index	a=1.843-1.950; b=1.87-2.034; y-1.943-2.110
Birefringence:	varies; 0.100 to 0.192
Optic Character	biaxial positive
Dispersion:	0.051
Pleochroism	moderate to strong: Brown = pale yellow/ brownish-yellow/ orange-brown; Yellow = colorless/ yellow/ reddish; Green = colorless/ green/ yellow; Blue crystals = blue/ colorless (if present)
Luminescence	none
Absorption Spectrum	sharp lines at 5900, 5860, 5820, 5800, 5750, 5340, 5300, 5280 distinct "rare earth" specimen in Sri Lankan material
Aqua Filter	no reaction
Chelsea Filter	no reaction
Solubility	soluble in sulfuric and hydrofluoric acids; less so in hydrochloric acid
Thermal Traits	fuses to dark glass with intumescence on edges
Treatments	none confirmed
Inclusions	rare; none described

Advertisement

Steve Attaway lists for sale an **eighteen-inch vibratory flat lap** made by Contempo Lapidary. The unit comes with two trays, one for grinding and one for polishing. His asking price is $150. Steve may be reached by phone at 505-281-4163 and by e-mail: attaway@highfiber.com

Moss Aubry lists the following items for sale: **Casting equipment.** This is a home-made system for vacuum casting. Included are a pancake vacuum motor, pressure gauge, metal platform, Plexiglas dome, hoses, etc. Also, a burnout oven, crucibles, tongs, gloves, and several pounds of R&R casting media. Note that the oven needs to be re-wired with a new element. $100 for all./ **Sphere Cutter:** This is a home-made device for cutting small spheres. Consists of two electric motors mounted on a board to allow re-positioning. I never used this, so I cannot assist in its operation. $10./ **Lamps:** Four electric swing arm lamps, suitable for workshop or trade show. One of the base clamps needs to be altered, but three are operational. $15 for all./ **Light box.** This is a metal box with a glass lid and light fixture inside. It's a commercial light for recessed ceiling mount, but it makes a good box for examining gem rough. Some electrical cord and plug (120 v.) will be needed. $15./ Moss may be reached by phone at 505-842-6968 or e-mail: DRsAubrey@aol.com.

New Diamond Symphony

The May, 2000 issue of *JCK* and the July, 2000 issue of *Professional Jeweler* reported that Gabi Tolkowsky, the famous Belgian diamond cutter and facet designer, believes that sound waves from a diamond's light waves can be transformed into musical compositions. A diamond emits a unique pattern when illuminated with a laser that exhibits as points of light. Computer software created at Gemprint, a company based in Ontario, Canada, can make a digitized plot of the pattern from a bit map. The sound peculiar to each diamond can be recorded to coincide with its unique "fingerprint". The diamond songs are played by computer-derived bells. Gabi Tolkowsky chose bells, because he wanted it to sound like music from angels. Each diamond has its own unique melody, not mathematical but more abstract. Sometimes the musical suites are accompanied by a piano and a guitar. Gabi Tolkowsky has applied for a patent on diamonds' musical translation.

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NMFG Back Issues

Back issues of the *New Mexico Facetor* are available for all of 1999, all of 1998, and much of 1997. Please contact the Editor for any requests for back issues. Thank you.

Please send the editors photos of your work for the next newletter!

Don't forget: next meeting is July 13, 2000 at 7:00 pm.

Meeting Location: NM Museum of Natural History. Dues are $20.