The New Mexico Facetor

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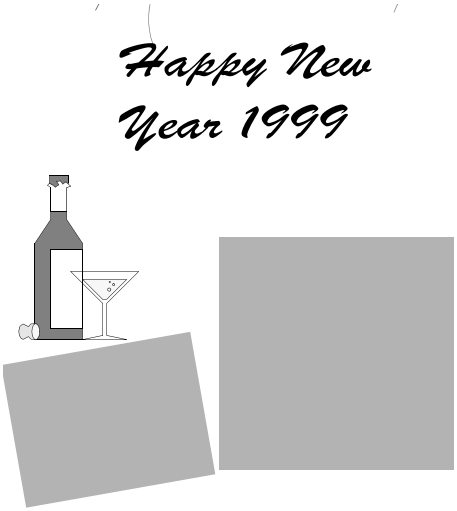


The Prez Sez:

By Moss Aubrey, Ph.D.

I found myself mulling over what to write in this, my last column. One of the reasons I am (for once) at a loss for words is that I am not ending my relationship with the Guild, but merely changing my role. Thus, my thoughts are not about ending a relationship but are what I hope for the Guild over the next several years. That also includes my personal goals regarding the lapidary arts.

First, I hope that the Guild continues to grow. By that, I do not mean just in terms of numbers of members, but I hope we can continue to bring in new faces. New members require that we continually re-visit our basic knowledge, and that sometimes challenges what we thought was true. New members bring new skills, expertise, and curiosity. These are elements needed to keep all of us invigorated and enthusiastic. That enthusiasm then helps foster the other type of growth, the growth of ideas.

Second, I would like to see the Guild newsletter continue to grow. I want to write a few articles from time to time, and I would also like it if other members took up the challenge of contributing on occasion. The Guild newsletter has always been a wonderful product of the knowledge and generosity of our members, and the respect it has garnered world wide is well deserved. I have enjoyed all the diversity of the articles we publish, be they technical, news of the world, or personal opinions and observations. Once again, I invite each of you to write about something of interest and submit it to the editors.

Another of my personal goals is to cut gem materials that I have not yet tried. Some of those are fairly common materials, ones I simply have not gotten around to cutting. Others are specialty materials with reputations that present challenges to faceting. I want to try my hand at cutting these new gems, as they will prompt me to remember the excitement of first learning to facet. Trying a new pattern of a new material that presents a real challenge makes me concentrate more than I usually do when simply cutting yet another stone in familiar and comfortable themes. Repetition

Guild President, Moss Aubrey, Ph.D.

builds craft and technique, whereas novelty fosters growth that expands the artistic boundaries.

Related to the above is my goal to help the Guild offer more advanced workshops. We all have encountered problems in cutting. Sometimes, we are able to resolve the problems, but at other times, we remain perplexed. I would like us to offer classes that address polishing problems, complex patterns, challenging gem materials, and other similar advanced topics. I would also like to see the Guild offer workshops on gem setting techniques. We have some very talented members with advanced stone-setting skills, and I, for one, would like to learn from them. My personal goal here is to provide help to Louie when he conducts workshops, and I invite all the Guild members to help. Those who have mastered a difficult design or have successfully rendered troublesome gem material, please offer to host a session to teach the others. To the rest of the members, please help any way you can, such as coordinating, calling members to inform them, and helping Louie in any way he asks.

I am looking forward to handing over the reins to Susan and to the others who have graciously offered to serve. I find it exciting to step back from the role that I have had for two years and see what develops next. Stay tuned for further Guild developments.

Don't forget: next meeting is on January 14, 1999 at 7:00 pm. Dues of $20 are due.

New Mexico Faceters Guild President-elect, Susan Wilson, Ph.D.

Minutes of the NMFG Meeting

November 12, 1998

By Nancy L. Attaway

President Moss Aubrey called the meeting to order at 7:15 p.m. and welcomed all in attendance. He then asked for everyone to introduce themselves to the group.

Treasurer's Report

Treasurer **Bill Andrzejewski** reported:

Heading	*Total*
Previous Balance	$966.49
Expenses	$88.00
Deposits	$147.00
Balance Forwarded	$1,025.49

Old Business

Vice-President Susan Wilson reported that the Guild picnic, held in September at the home of Paul and Marge Hlava, was a rousing success. Guild members helped themselves to lots of delicious food, and everyone shared in the good conversations that surrounded each table. Susan Wilson showed some of the photographs taken during the picnic, and she said that photographs should play a more important role in Guild events. Another picnic will be scheduled for next September.

Troy and Eileen Smith reminded everyone of the Guild Christmas party scheduled for December 12 at Capo's on Central and Eighth from 5:00 p.m. until 9:00 p.m. Guild members were asked to bring gifts for the gift exchange, always a fun-filled after-dinner event.

Editor Nancy Attaway described the memorial service for Harvey Lawler held in Rio Rancho by his family. The church displayed several of Harvey's wonderful carvings, including one new carving that depicted a man bending over to pet a dog. It was rendered from pink marble that Steve and Nancy Attaway obtained for Harvey from a mine in north Georgia. **Merrill O. Murphy** said he was glad that his article about Harvey's faceting invention was re-printed in the latest issue of the *New Mexico Facetor*.

Nancy Attaway also extended an invitation for all Guild members to attend the fifth annual **AGATE** Gem and Jewelry Show, scheduled November 21 and 22 in the Continuing Education Building in Albuquerque. Several Guild members participate as dealers and will display their work in gems, jewelry, carving, beads, and pearls.

New Business

President Moss Aubrey read the list of the proposed slate of Guild officers to serve in the next two year term. Following a brief discussion, **Ernie Hawes** moved that the nominations be closed, seconded by **Betty Annis.** A unanimous vote by Guild members passed this proposed slate of officers**.** The new slate of Guild officers, who will serve during 1999 and 2000, are**: Susan Wilson** as **President; Bill Swantner** as **First Vice-President/Programs; Louie Natonek** as **Second Vice-President/Workshops; Bill Andrzejewski** as **Secretary/Treasurer; Russell Spiering** as **Guild Librarian; Edna Anthony** as **Guild Gemologist; Paul Hlava** as **Guild Mineralogist; Nancy Attaway** as **Newsletter Editor; Steve Attaway** as **Assistant Editor; and Susan Wilson** and **Nancy Attaway** as **Special Events Coordinators.** Congratulations to all.

Faceting Designer Ernie Hawes explained that the angles used for his "paperweight" design, published in the latest issue of the *New Mexico Facetor,* may be the same for any R.I. gem material. Ernie meant the design to be rendered from lead glass, slag glass, or clear quartz, but he said that it would be wonderful done in rutilated quartz.

Show and Tell

Only the gems and jewelry by **Steve and Nancy Attaway** filled the show and tell case tonight. **Moderator, Steve Attaway** said that he expects to see lots of gems and jewelry from other members for the January meeting.

Nancy Attaway faceted three large aquamarines from a new parcel of dark blue Mozambique material: a square barion, a chevron/shield, and a kiteshape. Steve had the idea for the chevron/shield, and he derived the angles from Gem Cad. The kiteshape, an original pavilion design by Nancy, contained parallel secondary inclusions. These aquamarines were all polished with cerium oxide.

Nancy faceted a small emerald cut imperial precious topaz from Brazil, a square barion Pakistani peridot, and a pearshaped Pakistani peridot tablet. She noted that in the short emerald cuts, triangles, rounds, and squares, imperial precious topaz does not exhibit a rich coloring at the ends, as

shown so well in long emerald cuts. Nancy also faceted four large flasher cut (twelve-sided) round Tanzanian rhodolite garnets, getting two matching pairs for earrings. Taking the polishing advise of a member/guru of the Texas Faceters Guild, Nancy polished the rhodolite garnets and the peridots with a ceramic lap and 60K diamond. However, she found it necessary to polish all the tables with a last lap and 60K diamond.

Steve handmade gold earring jackets for one pair of rhodolites and accented them with small diamonds, and he set the other pair as stud earrings. He also handmade another set of gold earring jackets for two large emerald cut Pakistani peridots that Nancy had previously cut and accented them with small Yogo sapphires.

Steve cast a gold pendant for a large carved South African chalcedony he carved and accented it with one of Nancy's dark Uraguayan amethyst flasher cut rounds. He cast a gold pin for another carved chalcedony and accented it with a small tanzanite round. Steve also cast a small pin, converted from a wax ring pattern, and set Nancy's oval pink tourmaline. He cast six gold rings, but only had time to finish three, all set with Nancy's Montana sapphires. Steve also had carved three gorgeous black opals from Lightning Ridge and set them in gold pendants, but these were not available tonight, nor was the carved white opal flower gold pin. Steve said that all these pieces would be on display at the AGATE Show.

Refreshments

Nancy Attaway brought cakes for tonight's refreshments, and **Roy Waggoner** also contributed. Thank you very much. **Steve Vayna** and **Moss Aubrey** volunteered to bring refreshments to the meeting in January.

Future Programs

Bill Swantner, Vice-President/Programs elect, has scheduled **Dr. Virgil Lueth**, Museum Curator at New Mexico Institute of Mining and Technology in Socorro. Dr. Lueth will speak at the January meeting on two occurrences of turquoise in the Oro Grande district of New Mexico. He also is very knowledgeable on the many garnet deposits in our state. Anyone who has a faceted stone of a crystal from a New Mexico location may donate it to the New Mexico Institute of Mining and Technology Museum. The Museum highlights a very special exhibit that displays faceted gem material found in New Mexico and faceted by faceters from New Mexico. Many Guild members have donated gem material and faceted examples from New Mexico to the Museum, and any donations of faceted stones and minerals are welcome.

Program Speaker

Douglas Irving, a professional geologic engineer, spoke to the New Mexico Faceters Guild on the mining potentials of several countries that he had visited, in particular, Canada and Madagascar. Working for Chapman, Wood, and Griswald of Albuquerque since 1947, Douglas Irving explored the mining potential in parts of western Canada, Australia, Mexico, Ghana, and Madagascar. His firm investigates the mining feasibility for uranium, gold, copper, lead, zinc, and diamonds.

The Guild ladies at the New Mexico Faceters Guild Christmas Party. Top row, left to right: Laura, Moss' date, Rainy Peters, past President Betty Annis, President-elect Susan Wilson, Bonnie Andrzejewski, and Christmas Party Chairman Eileen Rosen Smith. Bottom row, left to right: Kathryn Spiering, Ina Swantner, past President and current Editor Nancy Attaway, Heidi Ruffner, and Maria Traulsen. Becky Hawes left before photo.

Doug addressed the diamond mining in western Canada and showed an example of a piece of kimberlite pipe. He said that the first kimberlite in western Canada with a significant diamond content (very rich; one carat per ton) was discovered in 1991. Doug is well-acquainted with the two geologists, Charles Phipke and Stewart Blusson, who are credited with the famous discovery of diamonds at Ekati Lake after a ten year hunt. The mining area there, run by DiaMet Minerals, occupies a vast section of land just below the Arctic Circle in the Northwest Territories. The Indians there call the area "Lac de Gras", comparing the glaciated, quartz-veined area to "ekati", or caribou fat. This rich deposit is now yielding high quality diamonds.

The open pit mine at Ekati Lake along the McKenzie River operates all year, even under the harsh conditions of an Arctic winter. Doug stated that the mining complex is very specialized for extremely cold weather. He said that supplies are flown in or trucked in on ice roads.

Doug explained how the kimberlite pipes in western Canada lie beneath lakes. These lakes had been gouged out by glaciers, exposing the softer kimberlite rocks. Diamonds are brought up from the earth's depths to the surface in eruptions through cracks and fissures in the rock fragments known as breccias. These breccia form craters that erode away into circular areas known as diatrem.

In searching for diamonds, Doug illustrated how geologists study the geo-chemistry of garnets and chrome diopside, as tracings of garnets and chrome diopside can indicate diamond deposits. The ratio between the chrome content and a high magnesium presence indicates diamond in the kimberlite pipes. Geologists also study the diamond stability field in the keels of a craton, the deep-seated kimberlitic rocks. Doug said that diamonds have been estimated at 50 million to one billion years in age, even up to one to three billion years of age.

Doug mentioned that BHP of Australia has installed a diamond sorting laboratory in Yellowknife, in Canada's Northwest Territories, and is also looking into establishing a diamond cutting operation. Australia remains the world's largest producer of industrial grade diamonds. Australia's Argyle mine also yields diamonds in pinks, powder blue, and shades of brown that are marketed as "champagne, cognac, and coffee" colored diamonds.

Doug said that the kimberlite pipes in Botswana cover an area of 400 to 500 acres and are considered to be the world's best for quality and content. DeBeers reports a yearly profit of 750 million dollars annually from there.

Doug announced that the Kelsey Lake Diamond mine in northern Colorado is for sale. Although several very fine diamonds have been discovered from the Kelsey Lake mine, mining operations have not proved profitable. Doug said that a feasibility study of the Crater of Diamonds State Park in Arkansas, which involved core drilling, revealed that the park would not be an economical commercial venture. Visitors are welcome to collect rough for a fee in the Arkansas mine. However, Doug said that no visitors are permitted at the Colorado mine.

Doug traveled to Madagascar, 250 miles from Mozambique in southeast Africa, in search of commercial mineral deposits. He said that Madagascar was a very poor country

The Guild gentlemen at the New Mexico Faceters Guild Christmas Party. Top row, left to right: Waylon Tracey, retiring Guild President Moss Aubrey, Guild Librarian, Russ Spiering, Gary Peters, Scott Wilson, and Guild Mineralogist Paul Hlava. Bottom row, left to right: Secretary/Treasurer Bill Andrzejewski, Vice-President/Programs Bill Swantner, past Vice-President and current Assistant Editor Steve Attaway, Troy Smith, and Herb Traulsen. Ernie Hawes left before the photo was taken.

with beautiful sandy beaches. His slides revealed a land of rolling hills with hardly any trees. Doug checked the beaches along the coast of Madagascar for ilminite. He showed slides of small-scale family gold digging operations that would allow people a meager existence. He said that most of the gold is not declared and is smuggled out of the country to avoid taxes. Once under Russian rule, Madagascar's educational system closed after the Russians left. It is now open, Doug said, but nearly a generation has been left without any schooling. He fears that this will impact Madagascar's future in a very negative manner.

He also traveled to Ghana on the west African coast, also known as the Gold Coast. He explained that DeBeers ran an off-shore diamond mining operation in Namibia, where the beaches were dredged and sifted much like a placer gold mining operation. The beach deposit runs 85 kilometers long. Doug also showed slides of the remote gold camps. He mentioned that the famous deep green dioptase from Tsumeb, Namibia, has all been mined.

Paul Hlava accompanied Doug Irving on an assessment trip into Mexico for wollastonite a few years ago. The Mexican geologists and workers wanted to give Paul and Doug names that corresponded to their equivalent in Spanish. They called Paul "El Bigote" in honor of his handle-bar moustache. However, the only appropriate name in Spanish that they could find for Douglas was "Sin Perro", meaning "without a dog" or "dog-less".

Canadian Geologist Gives Money to Alma Mater

Source: National Jeweler December 1, 1998

Stewart Blusson, one of the two geologists credited with the discovery of diamonds in western Canada and who shares ten percent ownership in the Ekati mine, donated $32 million to his alma mater, the University of British Columbia in Vancouver. The donation is earmarked specifically for scientific research. The provincial government of British Columbia and the Canadian Foundation of Innovation must match each dollar donated.

{Douglas Irving mentioned this large donation. He remarked that it was a way for Stewart Blusson to get his revenge and some personal satisfaction for compelling the matching funds from the University of British Columbia and the Canadian government just for research only.}

Better Times Lie Ahead for Mozambique

Source: The Economist December 5, 1998

Mozambique was once the second poorest country in the world. War, foreign occupation, and several civil conflicts battered the country. Since peace has returned and state farms have been privatized, Mozambique recently showed an economic growth of near eight percent. A new aluminum smelter is under construction, new beachfront resorts show profits, and farms have increased yields.

Most people in Mozambique live in the countryside, where there are few roads. Landmines still litter the land, and occasionally a farmer will step on one. Sixty percent of the schools were destroyed or closed during wartime, but nearly all of them have since been rebuilt. Over half of the adult population is illiterate as a result of the schools being closed for such a long time. Around eighty percent of the people live in deep poverty.

{Douglas Irving discussed these conditions found in Mozambique. His slides showed a poor country with people living in destitution. He foresaw economic potential for Mozambique if the country were given loans and expertise on development from investors outside the country.}

Cutting Operations Begin In Yellowknife

Source: JCK December 1998

Sirius Diamonds of the Northwest Territories is establishing a facility to cut and polish diamonds from Ekati's production. Sirius plans to market Canadian mined diamonds, cut by Canadians, and sold throughout Canada.

{Douglas Irving mentioned this new development. He remarked that this could provide another choice for Canadians and Americans to purchase diamonds from markets closer to home.}

In the News

Lab Grown Pearls

Source: New Scientists November 7, 1998

In nature, calcium carbonate forms clear calcite crystals, enabling living creatures to make complex solids, such as bones, teeth, pearls, and sea shells, by arranging carbonates on proteins. German chemists at the University of Mainz duplicated this process by crystallizing calcium carbonate on layers of sulphanyl phenol surrounding gold particles a mere 5 nanometers wide. Instead of forming calcite crystals, the molecules aligned themselves in the radiating pattern found on pearls. The scientists eventually hope to use similar techniques to make artificial bones and teeth.

Treated Rubies

Source: Modern Jeweler November 1998

Dealers in fine ruby find that they need gemological papers to accompany the stone to sell it. What the papers say regarding the origin of the ruby and any enhancements done to the stone, such as glass-filling, determines the gem's value. Beauty and rarity are not enough. However, the opinion of gem labs vary, and dealers have also discovered that they need papers from more than one gem lab to sell a ruby.

The controversy surrounding glass-filling of rubies continues to effect the price of rubies. Glass-filling is used as the treatment to fill and hide surface pits, but it can also be used as the chemical agent in the accepted practice of heat-treatment needed to enhance color and clarity.

New Way to Estimate Weight

Source: JCK November 1998 and Gems and Gemology Fall 1998

For years, appraisers measured the height, width, and depth of a stone set in jewelry and correlated those measurements into a standard formula to acertain carat weight. GIA derived this method twenty years ago. Charles Carmona, G.G. and President of Guild Laboratories gives new info in his book, *The Complete Handbook for Gemstone Weight Estimation*. He includes over 400 pages of formulas and tables to cover every shape and variety of gemstone.

New Finds in Old Mines

Source: JCK November 1998

Global Mining of New York is using electromagnetic wave-scanning to locate potential gemstone-producing pockets, called vugs, in the tunnels of old mines. They estimate that past mining ventures may have missed nearly as much gem material as was originally recovered.

Sunstone Mine Deal

Source: National Jeweler November 1, 1998

Janus International recently purchased the Ponderosa Mine from mine owner and CEO, Larry Gray. Janus International plans to mine the Oregon sunstone more "aggressively" and market the gems to large retailers, including the Home Shopping Network and QVC. They hope to increase demand by increasing the supply. Oregon sunstone, especially the ones with schiller from copper platelets, is expected to become popular with designers and consumers. India produces sunstone, but it contains hematite rather than copper.

Four Peaks Amethyst Mine

Source: Gems and Gemology Fall 1998

The historic Four Peaks Mine is again in production of high quality amethyst. The deposit, originally discovered at the turn of the century, lies in the rugged Mazatzal Mountains in Maricopa County at an elevation of 7,200 feet. The mine re-opened by a joint venture between Commercial Mineral Company and Four Peaks Mining Company. A limited quantity of amethyst is sold due to the rough being zoned and included. The yield of high quality faceted stones from cobbed material is only around one percent.

Rossmanite Tourmaline

Source: Gems and Gemology Fall 1998 and The Loupe from GIA

A new type of tourmaline has been discovered in a granite pegmatite near Rozna in the Czech Republic. Julie Selway of the University of Manitoba in Winnipeg, Canada, researched tourmalines in pegmatites for her doctorate. During an analysis of chemical compositions, she found one not identified in books. What was at first thought an analytical error became the evidence that proved the existence of a new type of tourmaline. She named the new mineral, Rossmanite, after Dr. George R. Rossman, Professor of Mineralogy and Planetary Sciences at the California Institute of Technology.

Dr. Rossman is credited for his research on the causes of color in gemstones, especially tourmalines. Rossmanite is the third member in a family of lithium-aluminum tourmalines that include elbaite and liddicoatite, after Richard T. Liddicoat, Chief Editor of Gems & Gemology.

Canadian Sapphires

Source: National Jeweler December 1, 1998

A new sapphire deposit was discovered on the Slocan Valley claim owned by Anglo Swiss Resources. The new area, named Sapphire Hill, measures more than 400 meters in length and 50 meters in elevation. Early production yielded more than 6,000 sapphire crystals that ranged in colors of bronze to gray/blue, with a few rare sky blue crystals.Estimates expect the yield to more than triple the company's sapphire resource.

More on Polar Jade

Source: Lapidary Journal November 1998

Fred Ward reported on the beautiful, bright green nephrite jade from the Cassiar Mountains in British Columbia. Working at an elevation of 6,000 feet, jade miners extract enormous jade boulders from mountain outcrops. Polar jade is the most translucent, greenest, and hardest nephrite jade yet discovered. The jade was formed in remelted serpentine boulders when the mountains were underwater. After the mountains were lifted, glaciers and weathering eroded the peaks to reveal the jade. The calcium content in the jade is very unusual and is due to its undersea origin. The mine is worked only in summer and is now the world's largest producer of jade.

Quartz Illustrated

Source: Lapidary Journal November 1998

Questions and answers regarding the many varieties of quartz are explained by Si and Ann Frazier. Accompanying photos are great.

Cairngorm Illustrated

Source: Lapidary Journal December 1998

Cairngorm, brownish hued quartz, is known as smoky quartz. Si and Ann Frazier said that the name Cairngorm originated from the Cairngorm area in Scotland and applied to the smoky quartz from there. Hues range from dark brown to light smoky citrine, shown by great accompanying photos. Color and heat-treatment are explained.

Arizona Andradite Garnet

Source: JCK December 1998

Charles Vargas, CEO of Apache Gems on the San Carlos Apache Indian Reservation in Arizona, discovered many andradite garnets while mining peridot last year. The bright and colorful andradites occur in golden yellow, greenish-yellow, and reddish-brown. The mines have also yielded a limited supply of fine quality demantoid garnets.

Montreal's Diamond Bourse

Source: JCK December 1998

First Canadian Diamond Cutting Works wants to start a revolution and create a diamond industry in Montreal, Canada in hopes that diamond buyers in New York will come to Montreal instead of Antwerp or Israel. President, Mayer Gniwisch spent three years learning the diamond trade in South Africa from his father-in-law, a DeBeers sightholder. He has already established a diamond-importing company and is involved in marketing diamonds in New York with his father-in-law. He became a diamond consultant for the government of the Northwest Territories. He owns and operates a diamond cutting factory in Montreal.

Record Faceted Pollucite

Source: Lapidary Journal January 1999

What may well be the world's largest faceted yellow pollucite was cut by Mark Krivanek of D & J Rare Gems, Ltd. in Salida, Colorado. The gem rough was found in Buckfield, Maine and yielded a parallelogram cut gem that weighed 4.45 carats.

Noted Gemcutters Featured

Source: Lapidary Journal January, 1999

Lapidary Journal featured several faceters known for custom cutting gem fine material, rare gems, and very large examples of soft gems. The article highlighted the work of Art Grant, Mike Gray, and John Bradshaw. Art Grant, who runs Coast to Coast Rare Stones, was praised for his excellent cutting of soft and rare gems in large sizes. Mike Gray, son of Buzz Gray, specializes in benitoite. John Bradshaw is the Associate Curator of Gems at the Harvard Mineralogical Museum.

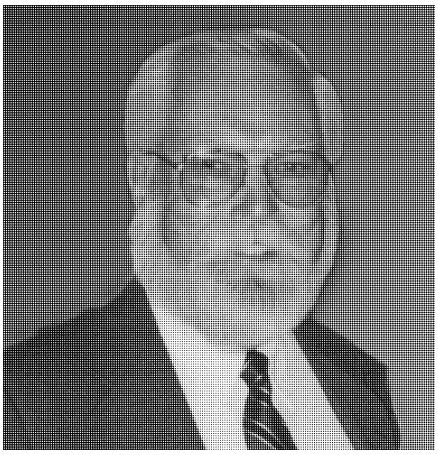
New Nigerian Tourmaline

Source: http://www.preciousgemstones.com: The Gem Forecaster Vol. 16, No. 4

The Ibadan mine, a placer deposit in Ogbomofo, Nigeria has yielded a new find of tourmalines. Large, clean crystals in reds, greens, and bi-colors were extracted. About 1/3 of this deposit went to Germany, 1/3 to Bangkok, and 1/3 to the United States. The new material is not normally irradiated, but some was heat-treated. Heat-treatment does not improve the color but does lighten the tone. The longer the heating process, the lighter the tone. Supply will run for about 18 months.

Facet Designer's Workshop

By Ernie Hawes



According to DataVue2, there are at least fifty-four different heart designs available to cut. There are even more that are not in DataVue2. Yet, in nearly eighteen years of "Show-and-Tell", I do not think that I have seen more than one or two heart-shaped designs displayed by any of our members. Why is that? Every February, lots of us should be cutting hearts for valentines. Perhaps, folks think that hearts are very hard to cut. Maybe, they think that there should be a real notch in the girdle to get the heart shape, somewhat of a problem to achieve on a faceting machine. Surprisingly, the only true "heart-shaped" gems I have seen were commercially-cut stones. Whatever the reason, I think that it is time some of us cut a heart-shaped design. To make sure that you have a pattern available, I have selected two for you try.

Robert Long has designed several heart-shaped cuts over the years, and both of the designs I have chosen for this column were his creations. The first is called "Heart in a Heart" and is currently being used by some faceters to cut their version of "La Coeur de la Mer", the now famous "The Heart of the Ocean". Having studied pictures of "The Heart of the Ocean" sapphire and the necklace created for the movie "Titanic", I would agree that this could be the design used for one or both of these magnificent gems. Whether or not it is that design, it certainly is an excellent pattern suitable for medium to light-colored rough. "Heart in a Heart" was originally published in the Seattle Facetor Design in May of 1978.

The second design is called "PC Heart". Robert Long used the same crown for this design as he did for "Heart in a Heart," so it, too, could be used as a version of "La Coeur de la Mer".

The overall effect is different and optically a little better, (ISO brightness is 68.3, while the "Heart in a Heart" is only 61.3.) The brightness appears to be more evenly distributed in the "PC Heart". This design would cut well in both light and darker materials.

Both designs use a little optical sleight-of-hand to make the finished stone appear to have a notch in the top of the heart. On both the crown and the pavilion, the facets where the notch would be located are cut at a higher than normal angle. This results in a dark "vee-shaped" area. Thus, the appearance of the expected notch. Cut them, and you will see what I mean. If you just have to have a real "vee" notch, it is possible to accomplish that on a fine grit carborundum wheel after the stone is completely finished, but still on your faceting dop. Polish the notch with a hard felt or leather wheel using 14,000-grit diamond compound. I recommend this idea only to folks who are experienced cabochon cutters. You could ruin an otherwise beautiful gem if you are not very careful with this procedure.

If you would like something a little simpler, try Nancy Attaway's "Glittering Heart", published in the May/June 1998 issue. Or, if you have the desire to cut a heart in corundum and do not want to convert the angles on the two designs presented here, you could go back to the February, 1994 issue where I reworked Robert Long's "Highlight Heart 72" for corundum. Personally, I prefer this design over most of the heart shapes available. The original design with quartz angles was published in Seattle Facetor Design in June of 1980. If you subscribe to the Faceter's Digest on the Internet, you will find instructions for other heart designs there in some recent issues. My point, though, is cut a heart for someone. You will make that person happy. Successfully rendering a heart shape can certainly be a gratifying faceting experience.

Correction: The refractive index listed for "Paperweight One" in the September/October 1998 issue is incorrect. It should read "any RI", as obviously, this design was not created for a specific refractive index.

Gem Myth of the Month

By John Rhoads, D & J Rare Gems, Ltd.
raregems@amigo.net

Gem Myth: "Emeralds are soft gems." We hear this myth spoken often by customers in our store in Salida, Colorado. I have heard it voiced elsewhere at shows, and I am certain that many of you have also heard this myth expressed at one time or another. I am not sure where it originated, nor what the logic behind it is trying to express. However, I do believe that it must be properly addressed as a gem myth.

When speaking of softness or hardness, we refer to the ability of a gem to be scratched. This is quite different from durability, where a gem, such as topaz or euclase, is very hard (hardness of 8 on the Mohs scale, where diamonds are 10), but not very durable, due to the tendency in the structure of their crystal lattice to cleave.

Emeralds, being a member of the beryl family, are hard gems with a hardness of 7.5 to 8 on the Mohs scale. However, emeralds can be fragile due to the inclusions often contained. Inclusions, such as other individual crystals and fluids, can create areas of weakness in an emerald and may contribute to breaking an emerald.

The chromium content of an emerald can also be a factor in the durability of an emerald. Curiously enough, what makes an emerald green can also make it brittle. The chromium atoms that give an emerald its lovely green hue are bigger than the small openings found in the tight crystal lattice structure of beryl. Hence, chromium atoms can generate areas of stress within an emerald crystal that can manifest as cracks. Cracks and fractures can also be a result of blasting during the mining process of emeralds.

When setting an emerald in jewelry, the effect of any inclusions present in the gem must be considered in order to avoid breaking the stone from undue stress. A jeweler must be extremely careful with the amount of pressure used when setting an emerald.

Those of you who have faceted emeralds know how tedious they can be. I recall years ago cutting an emerald as a special request for a friend who wanted a marquise cut emerald for her engagement ring. The pavilion cutting had gone well, and the crown cutting went without incident. Upon removing the gem from the dopping wax, however, I found that the gem had split along the girdle. This certainly was not due to hardness or softness, but was the result of a fracture that I had not properly identified. I had not adjusted my cutting of the gem accordingly. I was much more careful with future emeralds and have not had any similar results since then.

Gem Myth: "Spinels are man-made, created gems." This gem myth came to us from a dealer at a recent gem and jewelry show. Although we know that most of our customers are aware otherwise, it just goes to show you how an uninformed public can react.

Our dealer friend told us of a customer who admired a spinel in his display case. When told of the stone's identity, the customer informed the dealer that all spinels are synthetic. No matter which reference book the dealer showed the customer to prove that natural spinels exist, the customer held firm her opinion on spinels as synthetic gems and eventually stormed away. She threatened to report the dealer to the authorities.

This is a most unfortunate incident in that many people only know spinels through their appearance as synthetics in old jewelry. Synthetic spinels have been made for many years. They have been used extensively due to the ability of man to create them in nearly every color imaginable. We have seen many stones that have been passed as the gems they imitated, which only adds to the problems regarding natural gems versus synthetic.

Spinels are very durable and attractive natural gems, often overlooked by gem enthusiasts. I recommend that my customers acquaint themselves with the beauty of natural spinels. Natural spinels are hard and durable gems. They occur in red, blue, green, purple, and orange. Both the famous Black Prince's Ruby and the Timur Ruby in the Crown Jewels of England were later proved to be a large natural red spinels, not rubies. Red spinels were also known as Balas rubies in ancient times.

Best Friends, Planetary Diamonds

By Merrill O. Murphy

There is an old saying that diamonds are a girl's best friend. That is probably true enough, but how come an old dog is man's best friend? Perhaps, we men just do not deserve better. Or, could it be that true friendship is indeed an equal or better gift regardless of who offers it?

I have written about diamonds in New Mexico before, but I would like to add a thing or two and finish off with a well-calculated source of diamonds in a size and quantity far beyond any gem-hunter's dreams.

First, let me make an observation. Most amateur gem cutters and gem and mineral hunters believe that diamonds are formed in a volcanic rock called kimberlite. Find a kimberlite dike, and you are sure of finding diamonds. There is little truth in either idea. Many kimberlites contain no diamonds for any of several reasons. Diamonds seem to form in dome-like areas far down in the earth. These domes must be relatively stable areas where pressure and temperature are within a narrow range suitable to the crystallization of carbon as diamond. They form in a molten mass with a chemical composition somewhat similar to peridotite with a dash of carbon. If everything were to have remained perfectly stable, then we would, of course, have no diamonds on the earth's surface. However, in the long ago, elevators, in the form of molten kimberlite, would break free and rush to the earth's surface. Many such occurrences would pass through no diamond formation domes and would, therefore, contain no diamonds. Other kimberlite express elevators might not rise fast enough or might pause during the flight to the surface. In either case, the diamonds would oxidize to carbon dioxide before reaching the surface.

Diamonds are undoubtedly still forming and growing ever larger in those domes where temperature and pressure are just right. However, the express elevators stopped running ages ago. The kimberlites no longer rush to the surface as they did a very long time ago. Perhaps, the earth has lost a few degrees of temperature as the ages spun away. If so, the mantle of solid rock may have grown thicker and, thus, became more difficult to break through. Perhaps, the extreme pressure that ran the elevators is now lower. There are, no doubt, other possibilities. At any rate, the diamonds waiting in the domes will be getting no free rides to the surface. But remember, DIAMONDS DO NOT GROW IN KIMBERLITE. They were only caught up in the rising semi-liquid kimberlites in eruptions to the surface.

Here, then, by county, are the areas in New Mexico where one or more diamonds have been found, or, at least, have been reported as found.

McKinley County - The Buell Park areas straddling the New Mexico/Arizona state line is the best known of the New Mexico "possible sources" of diamonds. Buell Park is located about 25 miles north of Window Rock. The park itself is an open eroded region just west of the state line in Arizona, but the kimberlite-like tuff found there extends eastward well into New Mexico. All the indicators of a "diamond pipe" are present there. There is the rock type (if it is not kimberlite, it is very similar), several garnet varieties, peridot, and chrome diopside. These are all good diamond indicators, but despite diligent search, including one shallow core drilling, no diamonds have been reported from that site. It should be emphasized, however, that no extensive earth removal or core drilling has been done.

Quay County - A diamond that cut into four one and one half carat gems was found about 1909 and reported in the local newspaper. Reportedly, a 13-year old girl found it on family property. The stone was said to have been in dirt being excavated for a well or cistern. This find is not well substantiated, and there are no known kimberlites in the area.

Santa Fe County - In 1904, F.A. Jones, one the best known of the early New Mexico geologists, reported that small sapphires and even diamonds have been occasionally found in Santa Fe County. Again, I know of no substantiation for this claim. As in Quay County, there are no known kimberlite pipes in Santa Fe County.

These three "finds" are all that geologists and University of New Mexico professor Stuart A. Northrop felt warranted reporting in his book, *Minerals of New Mexico.* However, other investigators claim that several diamonds have been found along the New Mexico/Arizona line north of Buell Park. In New Mexico, these locations would be in San Juan County. There are also vague reports of poorly exposed kimberlites in

this area. As a possible minor substantiation, nearly forty years ago, my family and I collected "diamond indicator" pyrope garnets a few feet off Highway 160 on Indian Reservation near the village of Tec Nos Pas, Arizona. Do not hike up there by yourself. In these later years, the Indian people do not welcome collectors on the reservations.

One might be inclined to say that there are no diamond sources in our state. However, I am an optimist in regard to such subjects. I would rather say we have found no good sources - yet! I know of one possible source that I shall not divulge until I walk around there with my eyes surveying the ground. To compensate, I shall tell you of two possible sources in Colorado and a third "way out" but very probable source. Boy oh boy, is it way out!

First, let us list those two Colorado possibilities. One is on or near a rampaging mountain stream called Grizzly Creek. Grizzly Creek empties into the Colorado River a few miles east by a little north of Glenwood Springs and close beside U S Highway 70. Grizzly Creek carries the indicator pyrope garnets and, toward its lower end, picks up a load of black and near black tourmaline. That creek sports some of the most difficult walking I have ever tried to do. The valley is choked with house-size boulders that one must clamber over, as they are part of the trail. In winter, snow covers everything. In the springtime, the creek becomes a river that makes the trail impassable. Mid to late summer is all that is left to explore Grizzly Creek and its environs. If you have a very good mountain vehicle, then the easiest approach might be via a road of sorts that intersects the north or source end of Grizzly Creek. If you feel you must go there, then come to me first. I will show you the road as it appears on the maps. Another factor is that I do not know whether there are kimberlites on or near Grizzly Creek. Indicator minerals often lie. However, legend has it that there are tin minerals on Grizzly Creek. That is all I am going to say about that.

The second Colorado diamond possibility is a rather large and wild area north of Steamboat Springs and in the general vicinity of Hahns Peak. Pyrope garnets and volcanic rocks appear in this area also, but I cannot tell you there are kimberlite pipes there. However, Hahns Peak is not any great distance from the recent diamond finds along the Colorado/Wyoming state line. Winters in that area are very cold and very snowy. Summer is the only chance one might have in exploring that area. However, in the summer, the mosquitoes eat you alive.

Now, I suppose you want to know about that "way out" possibility...er probability. Tons of huge diamonds...mountains of them! Unless scientists get some very improbable breakthroughs, mankind is not going to disturb these babies.

In the early 1980's, scientists at Lawrence Livermore National Laboratory were working out the chemistry of the planets, Uranus and Neptune. Various earlier studies had indicated that these planets consisted of a rocky inner core, a fluid middle layer called the "ice layer," and an outer hydrogen-helium layer of solar composition. The ice layer was thought to contain methane, water, ammonia, and various other compounds of hydrogen. They knew that these compounds act one way in earth-normal conditions and quite another way under different levels of pressure and temperature. Methane gas, a highly flammable compound of carbon and hydrogen, quickly caught their attention. In the ice layer, the temperature and gravitational pressure associated with these two planets would cause the carbon and hydrogen components of the methane to separate into molecules of carbon and molecules of hydrogen. Under these same pressure/temperature conditions, the carbon would crystallize into diamond. Over unending ages, the tiny crystals would attach themselves to earlier crystallizations of diamond. We call the process, "crystal growing." Mountains of diamond would then be grown.

The scientists ran laboratory experiments which verified their conclusions. If the ice layer of Uranus and Neptune is as previously determined, then these planets are huge diamond farms in the sky. However, there is currently no way to harvest the fields. The gravitational attraction of either planet would crush any current space vehicle. If we, somehow, beat that problem, then we could not send enough fuel for takeoff and return. Maybe, in a few centuries, it will happen. Let's dream on it, anyway.

This way out idea came from "The Ice Layer in Uranus and Neptune---Diamonds in the Sky?" by Marvin Ross, Lawrence Livermore National Laboratory. Any of the Albuquerque Public Libraries can get you a copy for a small nuisance fee.

What constitutes a beginner, an intermediate, or an advanced design?

By Stephen W. Attaway, Ph.D.

My father told me that one thing he learned from being a master carpenter was: "Get good, then get fast."

When I first began faceting, I searched for designs containing the fewest facets to use as a learning exercise. Now, I realize that I was picking some of the harder designs. These "simple" stones had big facets and were somewhat complex. The more time I logged I cutting, the more I realized that some stones took much longer to cut and were much harder to cut than others. I then wondered if there was some way to measure how easy or hard a given stone design was to execute.

In order to "measure" the ease and the difficulty of cutting a given design, I decided to study the time and motion required for gemstone cutting as a tool for learning project management software. Several years ago, I had to attend a project management course for work. As part of the class, I employed Microsoft Project to estimate the total relative time required to cut different designs. I outlined the cutting of each facet as a series of tasks, such as move the mast, set the index angle, cut a facet, and so on. In project management jargon, finishing a row of facets represented a milestone. I assigned a duration for each task. For example, I assumed that fixing the mast angle and height took 2.0 units, setting the index took 0.5 units, cutting a facet to two units, etc. I also had to make some rough estimates for these time costs. For example, I assumed that once the mast was set, it took less time to cut the same facets at that particular angle. Many faceters know that changing the mast angle requires lots of cutting and looking to get the proper needle match. Once the needle matches, the rest of the facets go fairly quickly.

Project management tools illustrate that there is often more than one way to cut a stone. As most faceters know, learning the right cutting path can save a lot of time. More importantly, some designs require very little work to define the geometry, while others require cutting multiple facets to determine the overall shape. For example, a round or square design takes very few steps to define the length, width, and depth. Other designs, such a pear shape, require a lot more effort to define the corresponding geometry.

Another concept that can be borrowed from project management is the critical path. If the location of a facet depends upon meet points 11, 2, and 8, then the facets that make up these meetpoints will have to be cut before the facet can be cut. Project management software can help define which facets will depend upon the existence of other facets. This software has tools that will search and sort out each of these dependencies and show the longest path of dependencies. The longest path will be known as the critical path.

The length of the critical path is important, because a stone with a longer critical path will be more subject to error stack-up. Suppose that in order to determine the location of a given facet, we have to define seven or eight different meetpoints. Any error that occurs in an earlier facet can propagate to "stack up" in the latter facets. For a simple round, once the pavilion mains are defined, all the other facets quickly fall into shape. Anyone who has ever cut a complex egg shape with the required 10 or 15 rolls of facets knows how a small cutting error can quickly stack up and lead to an uneven row of facets.

To a certain extent, cutting a gemstone is very similar to solving a set of simultaneous equations. Each facet can be written as the equation of a plane, with the location of each meetpoint describing the intersection of these planes. For anyone who has spent time solving simultaneous equations using a hand-held calculator, one quickly learns that the required number of digits of perception used to solve a given set of equations can affect the accuracy of the solution. In some cases, if not enough digits are used, then the equations cannot be solved.

Often, a shortcut can be found that reduces the number of mathematical operations, which can also reduce the round-off error. The same is true for cutting. For gemstone cutting, the accuracy used in defining a given meetpoint is analogous to the precision used in the solution of the equations. For complex designs, where the cutting path includes multiple intersections that all depend upon each other, the chance for errors to propagate through the design is very high. The critical path can then be viewed as a minimum number of interdependent meetpoints (the bandwidth in simultaneous equations). Once these meetpoints have been established, other facets can be cut to these meetpoints without introducing any errors in the later facets.

Outlined below is a table that shows the total units required for cutting, the total units required to set the geometry, and the total units that define the critical path. As expected, setting the geometry for rounds and squares is very inexpensive. The pear shape, on the other hand, was one of the more expensive designs. The pear was expensive both in total time, the time required to set the geometry, and the time needed to set the critical path. For the particular pear shape design we were looking at, the facets defined along the bottom of the pear required moving the mast up and down from 90 degrees to 43 degrees. When we changed the design to have the bottom of the pear as half of a circle, the cutting

time, the time required to set the geometry, and the critical path all decreased.

TABLE 1.

Design	*Total units*	*Set Geometry*	*Critical Path*
Round	54	6	36
Square	52	6	46
Triangle	54	10	36
Oval	70	42	42
Barion Emerald	82	21	40
Pear - Hard	85	55	55
Pear - Easy	75	37	37

If the above analysis is correct, then one has to wonder why pear and oval shapes do not cost more per carat than rounds and squares. Note that if the girdle is not faceted, but is instead left unfinished with a pre-form, the critical path drops from 36 to 6. (We pay a lot to get those level faceted girdles.) You should take these time estimates with a grain of salt, since I did not measure the cost of each task directly.

Should we initiate a cutting competition that considers the time it takes to cut a stone? For such a contest, each contestant could be given a 6mm. square of material, with the goal of cutting a round 5mm. pavilion in a set amount of time. The resulting stone would then be judged to see how well it matched the 5mm. size, the accuracy of the meet-points, and the quality of the polish. If I were designing such a contest, I might require each contestant to start with a 10mm. square to ensure that the different techniques for rapid material removal are used. A fixed cutting time could be allowed, say 30-45 minutes, with the judging occurring at the end.

While I do not like to compete at my hobby, such a competition could result in having enthusiastic faceters gathered to watch "Championship Speed Cutting". Viewers would hope to pick up new techniques that make cutting more economical, while still retaining the expert precision we all value. The competition could be extended to include a "tag team" approach, with each cutter using different grits and hardware to cut multiple stones. Would such competitions allow us to quickly learn who makes the fastest machines, best laps, or which clubs have the best tag teams? Look out WWF.

There are cutters that try to cut a stone with as much perfection as possible, regardless of the cost. I understand the art of perfection that these gifted cutters are trying to achieve. They have perfected the "good" of stone cutting.

I have been told some people can cut such a stone in under 20 minutes. That is a long way from the hours it takes me. Can someone show me how to get fast without giving up being good?

Just how long do you take to cut a 5mm. round?

On the Net: Faceter's Digest

There is now a mail list devoted to faceting. The mail list is the result of the efforts by Norma and Jerry Dewbre. E-mail messages are sent to them, and they compile the messages into a daily edition of the Faceter's Digest and e-mail this to the whole group.

Each new member is requested to send a short biography to the group upon joining. This will help everyone to get to know each other better. This list will be dedicated to the sharing of information about faceting. Questions, answers, tips, hints, and general information are encouraged. Although trading, buying, and selling are encouraged, long lists are not. Please just tell the group that a list is available.

If you would like to subscribe, then you can e-mail Jerry Dewbre at **faceters@ix.netcom.com** and ask to be placed on the Faceter's Digest List.

Lets Talk Gemstones

By Edna B. Anthony, Gemologist

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BERYL: A CYCLOSILICATE

Green, Yellow-Green, and Brownish-Yellow-Green Beryls

Yellow-green beryl has achieved "desired gem" status with consumers just within the last few years. Museums were eager to acquire spectacular specimens, while connoisseurs sought it for their collections. However, fashion trendsetters ignored it. As in aquamarine, the iron incorporated into its chemical structure is responsible for the color. In *Gemstones of the World*, Walter Schumann states that "Green beryl is designated in the trade as aquamarine, as the color can be heat-treated at 752-842 degrees F (400-450 degrees C) and improved into aquamarine." A very interesting report on heat-treatment of green beryls may be found on page 114 of the soft cover volume of Dr. John Sinkankas' *Gemstone and Mineral Data Book*. He first mentions that a specimen of yellow beryl became a pale blue when heated to 400 degrees C. Experiments showed that "olive-brown, greenish-yellow, and yellowish-green" materials lost the yellow tones at 250-280 degrees C and turned a clear green. Upon reheating to 280-300 degrees C, the stones changed to blue. The blue tones begin to appear at 280-300 degrees C, with the rate of change increasing as the temperature rises to the optimum 400-450 degrees C. Dr. Sinkankas believes all green beryl becomes blue when heat-treated. He states that "the depth of blue is directly proportional to the depth of the original green" and that "the finest blues are obtained from dark oil-green or dark olive-green specimens." The color is stable to 1025 degrees C. At higher temperatures, the material may become colorless or greenish. Crystals harboring mineral, liquid, or gaseous inclusions are less apt to undergo heat treatment. Different heat-expansion rates of the inclusions and the host crystal could fracture or shatter the crystal.

The major source of green beryl is the state of Minas Gerais in Brazil. Crystals recovered from the hydrothermally-influenced granitic pegmatites there are noted for their numerous gas-liquid inclusions and also for the striking patterns of inclusions developed on partially healed fracture planes. Excellent pictures depicting the examples of these are found on page 158 of Dr. E. Gubelin's *Internal World of Gemstones*. Deposits in hydrothermal greisen formations (granitic rock composed of quartz, mica, and topaz) in the Transbiakalia region of the former U.S.S.R. yield fine alkali-free crystals with few inclusions. Madagascar, India, and Sri Lanka are the other sources of this variety of beryl.

Beryl has been recognized as an excellent material for gem carvings for centuries. New designs and techniques for faceting gemstones are proliferating. The growing demand for such carvings and "designer" gems has increased the public's knowledge and acceptance of many previously unappreciated gem materials. This includes the beautiful and durable natural green beryls, a distinctive choice for all types of jewelry appropriate for both ladies and gentlemen.

Correction: In the third paragraph of the previous **Let's Talk Gemstones** article on aquamarine, an error occurred in the transcription of my notes concerning the Marta Rocha crystal. The two sentences should read as follows:

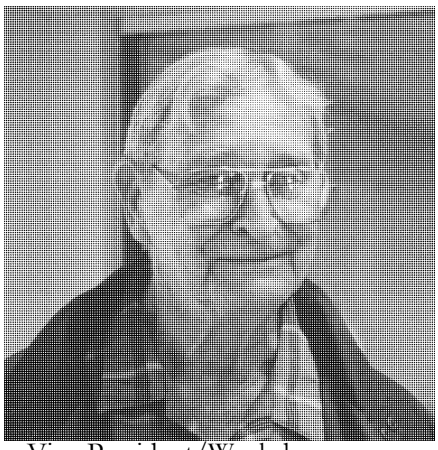
"The standard for comparison of color in aquamarine was set by the deep blue Marta Rocha crystal recovered from the same area. Dr. Joel Arem tells us in his *Color Encyclopedia of Gemstones* that 300,000 carats of superb gems were cut from this 134 pound crystal."

TABLE 2. Gemstone Properties

SPECIE	*aquamarine*
Composition:	beryllium aluminum silicate $Be_3Al_2Si_6O_{18}$ +Fe
Class:	silicate; cyclosilicate
Group	beryl
Species:	green beryl
Crystal System:	hexagonal per Arem; hexagonal (trigonal) per Schumann
Variety:	green, yellow-green, brownish-yellow-green
Colors:	green, yellow-green, brownish-yellow-green
Phenomena:	chatoyancy and asterism uncommon
Streak:	white
Diaphaneity:	transparent, translucent to opaque
Habit:	prismatic; often striated and etched
Cleavage:	imperfect
Fracture:	conchoidal; brittle
Fracture Lustre:	vitreous
Lustre:	vitreous
Specific Gravity	varies from 2.67 to 2.71
Hardness	7.50 to 8.0
Toughness:	good; sometimes brittle

TABLE 2. Gemstone Properties

SPECIE	*aquamarine*
Refractive Index	o=1.567 to 1.583; e= 1.572 to 1.590
Birefringence:	varies from 0.005 to 0.007
Optic Character	uniaxial negative
Dispersion:	0.014
Pleochroism	definite yellow-green/blue-green per Schumann
Ultraviolet Fluorescence	inert; iron quenches fluorescence
Spectra	no definite references found
Color Filter	no information
Aqua Filter	specimen from private collection: definite greenish-blue
Chelsea Filter	specimen from private collection: definite greenish-blue
Solubility	insoluble except in fluoric acid
Thermal Traits	avoid thermal shock; remove stone during jewelry repairs
Treatments	heat treatments
Inclusions	gas-liquid; patterns on partially healed fracture planes



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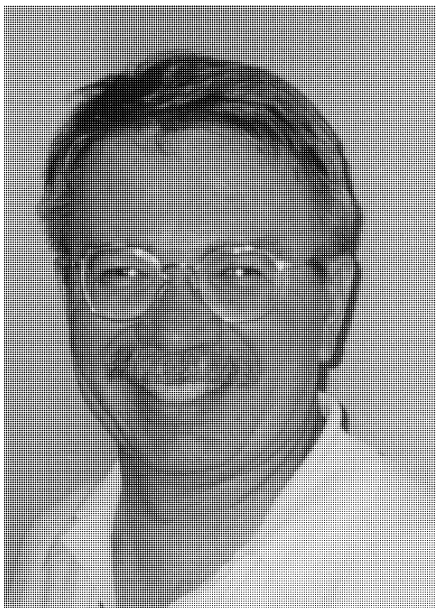

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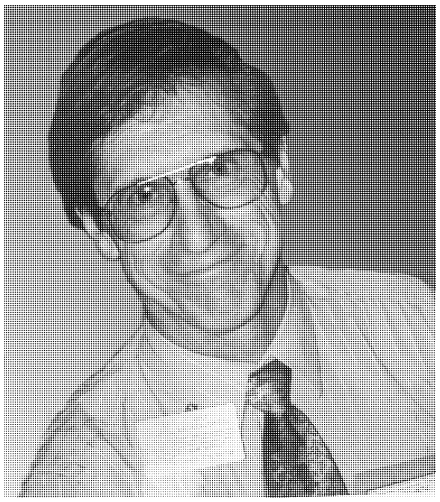

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We exchange newsletters with the following guilds

Anglic Gemcutter, Beaver Creek, Oregon
Facets, Portland, Oregon
Tacoma Faceters Guild, Tacoma, Washington
Stoney Statements, Houston, Texas
The Permain Faceter, Midland, Texas
Angles, Woodland Hills, California
Texas Faceters Guild, Cedar Park, Texas
Albuquerque Gem and Mineral Club, Albuquerque, N.M.
The Roadrunner, Big Springs, Texas
Intermountain Facetors Guild, Port Townsend, Washington
The Midwest Facetor, Birch Run, Michigan
The Transfer Block, Sacramento, California
USFG, Kalispell, Montana
Facet Talk, Ashgrove West, Queensland, Australia
Calgary Faceters Guild, Saskatoon, Saskatchewan, Canada
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TABLE 3. Shows of Special Interest

Name	*Location*	*Date*
Gem and Lapidary Wholesalers, Inc. Show	Tucson, Arizona	Jan. 31 to Feb. 4
Atrium Productions Show	Tucson, Arizona	Feb. 1 to 4
AGTA Show	Tucson, Arizona	Feb. 3 to 8
Arizona Mineral and Fossil Show	Tucson, Arizona	Feb. 3 to 13
Gem and Lapidary Wholesalers, Inc. Show	Tucson, Arizona	Feb. 4 to 12
The Best Bead Show	Tucson, Arizona	Feb. 4 to 9
Atrium Productions Show	Tucson, Arizona	Feb. 5 to 13
Gem and Lapidary Wholesalers, Inc. Show	Tucson, Arizona	Feb. 5 to 13
Tucson Gem and Mineral Society's Show	Tucson, Arizona	Feb. 11 to 14
6th Annual Rock and Gem Show	Deming, New Mexico	Mar. 5 - 7
Deming Gem and Mineral Society American Federation Show	Deming, New Mexico	Mar. 11 - 14
Albuquerque Gem and Mineral Club's Jewelry, Gem, and Mineral EXPO-99	Albuquerque, New Mexico	Mar. 19 - 21