The New Mexico Faceters Guild

March/April 2003

The Official Newsletter of the New Mexico Faceters Guild

NMFG

Show and Tell

The picture on the left shows a four-stone Montana sapphire assortment faceted by Dylan Houtman; a pink-orange and a light blue sapphire both cut in his truncated marquise design, an "egg yolk" sapphire cut into an angular pearshape design, and a deep blue sapphire cut in a pearshape.

The picture on the right shows a barion oval deep orange garnet from Africa faceted by Larry Plunket that exhibited a purple-red color change.

The picture on the left shows the rich color saturation of a Rio Grande de Sol citrine faceted by Ernie Hawes in a hexagonal cushion cut design.

On the Cover: An original cushion cut square design, "Merrill's Inspiration", rendered by Ernie Hawes that he cut in synthetic ruby.

The

New Mexico Faceters Guild

Guild Officers 2002-2003

President: Scott Wilson

Vice President/Programs: Paul Hlava

Secretary/Treasurer: Ina Swantner

Guild Gemologist: Edna Anthony

Guild Mineralogist: Paul Hlava

Workshop Chairman: Ernie Hawes

Newsletter Editors:

Nancy & Steve Attaway

Newsletter Production:

Wild Rice Press

P.O. Box 1355

Cedar Crest, NM 87008

(505) 286-2094

Purpose of the Guild: The purpose of the New Mexico Faceters Guild is to bring together persons who are interested in faceting or faceted stones. We promote the art and science of faceting and provide a means of education and improvement in faceting skills. Finally, we provide a means of communication between those persons involved in or interested in faceting as a hobby.

Guild Membership: Dues are $20.00 per calendar year (January through December) for newsletter issues sent by e-mail. Hard copies of newsletter issues sent by US mail are $30. Please see the membership application / renewal form on the last page of the newsletter.

Meetings are held the second Thursday of oddnumbered months at 7:00 p.m. at the New Mexico Museum of Natural History, 1801 Mountain Road N.W., Albuquerque, NM. Workshops are generally held in even-numbered months. Date, time, and place are given in newsletter. Also, any change in guild meeting times or dates will be listed in the newsletter.

The next meeting of the New Mexico Faceters Guild will be May 8, 2003.

The New Mexico Facetor

Volume 23, No. 2, March/April, 2003

NMFG President Scott Wilson

In This Issue:

The Prez Sez:

by Scott R. Wilson, Ph.D

Are gems set in telecoms slated to make gem rough more scarce?

I recently found several articles in my research that reported a small but rapidly growing demand for custom designed diamond-studded cell phone cases and covers, with a $24,000 price tag. This seems like an odd thing to be appearing in today's economy. It is not occurring in the USA but showing in Japan, with early signs in China and Taiwan.

This has some interesting implications. First, either the general standard of living is rising rapidly in Asia relative to the western world, (which it is, but I would not expect it to do so by such a degree), or there is a much more stratified economic structure coming into place in Asia (there always has been, but this is greatly magnified). If the latter is true, then expect serious political and social turmoil to occur there.

Second, I would expect that the current demand is being driven by those with nearly unlimited financial resources, who desire to demonstrate their wealth to the casual observer. The problem is that once most of the members of that group of people have purchased diamond-studded cell phones, they will all look the same. So, they may try to generate a brand of individuality that is even more unique and turn to incorporating fine colored gemstones into their cell phone case designs next.

Only the highest quality colored gemstones in larger sizes will do. The implication is that high quality stones (and by inference, gem rough) will become much sought after and will soon increase in price.

Third, at some point, "imitators" will arrive on the scene to mass-produce gem-studded cell phone covers for the working public and will likely turn to simulated diamond materials. When they come into focus on colored stones, they will go for the real thing, just in smaller sizes.

Fourth, the "fakes" will then come on the scene with simulated colored stones. This will eventually cause the whole pyramid to fall flat, similar to the diamond "tennis bracelet" craze years ago. The increased demand for simulants will be met and then oversupplied. The remaining unmarked and untraceable simulant material may be dumped on the market in some form of bogus rough for the unsuspecting cutter. Greater gemological skills will be needed to avoid purchasing man-made gem material that has consequently been mixed with natural gem rough.

This scenario is all conjecture, but we have seen such trends before. The behavior of the markets tend to follow a common trajectory. It will be very interesting to see how this one pans out and view its consequences.

Minutes of the NMFG Meeting

March 13, 2003

by Nancy L. Attaway

President Scott Wilson called the meeting to order at 7:05 p.m. and welcomed all members and guests.

Old Business

President Scott Wilson reported that the Guild workshop held at his home on February 20 was a busy one, even though it was sparsely attended. The next Guild workshop will be at Scott's home on April 19.

New Business

Vice-President Paul Hlava announced that the Albuquerque Gem**,** Jewelry, and Mineral Show will be held March 21, 22, and 23 at the Flower and Arts Building at the Fairgrounds in Albuquerque. He invited all to attend. Paul Hlava is this year's show chairman.

President Scott Wilson said that a demonstration table for faceting will be available at the show, and he then asked for volunteers. Handouts about joining the Guild will be given to prospective members.

Ernie Hawes mentioned that he plans to attend the California Faceting Conference in June and asked if anyone else was going. The list of speakers scheduled to talk at the faceting conference is very impressive.

Ernie Hawes mentioned that Merrill O. Murphy wants to sell his vast collection of Lapidary Journals. He also said that Facetron has a very good dial indicator for $300 that can be attached to your machine.

The Guild Library is now at the home of Scott Wilson in Corrales. Ask Scott about checking out any books. The library is also available during workshops.

President Scott Wilson discussed some of the Guild's operating problems. He said that sending the vast majority of the newsletters by e-mail has greatly reduced the costs to the Guild. Several folks have complained about the newsletter being posted on the website with easy access. Scott addressed that issue by saying that our dues pay for all the work that goes into producing such a good newsletter. He mentioned having a password-protected site and establishing a blind link, but those are more trouble than they are worth. Dues for newsletters accessed by e-mail are $20. Hard copies of the newsletters sent by U.S. mail are $30.

Show and Tell

The Show and Tell Case tonight held many faceted stones and jewelry rendered by Guild members. **Moderator, Steve Attaway** used video and television equipment from Paul Hlava and the museum to better show the individual pieces. The color was incorrect on some items, and we will try to correct this problem.

Pat Kirkpatrick displayed a 17mm round brilliant synthetic clear quartz with 16-fold symmetry. He also faceted a small emerald cut almandine garnet and a round brilliant Mexican fire opal. Pat showed a mineral specimen of an alexandrite with six twinned crystals.

Larry Plunkett displayed a barion oval garnet from Africa in a purple red hue that exhibited a color change. He polished the gem on a tin lap with linde A.

Dylan Houtman displayed an angular pearshape in blue glass, a pearshape Montana sapphire, and a light blue Montana sapphire in a truncated marquise. He cut a pink sapphire in a truncated marquise, an "egg yolk" Montana sapphire in a truncated marquise, and several round brilliant Mexican opals. He also showed two blue topazes that were natural blue, where he cut one in a shield and the other in a pearshape. One of the blue topazes showed distinct areas of white and blue.

Carsten Brandt displayed a square barion yellow apatite that he polished with linde A. He also showed the lovely modified triangular Mexican fire opal that he cut during several Guild workshops.

Herb Traulsen displayed some carved Colombian emeralds he purchased at the Tucson Show that included a set of carved leaves and a wonderful carved horsehead. Herb worked at the Tucson Show for opal dealer, Jimmy Mougris, like he did last year.

Ernie Hawes displayed a lovely Rio Grande de Sol citrine with rich gold color in a hexagonal cushion cut design. He also faceted a round lemon yellow citrine with a 41-degree culet, and he cut a synthetic ruby in his cushion cut square design, "Merrill's Inspiration".

Nancy Attaway displayed two long and slim emerald cut yellow beryls from the Ukraine, two emerald cut rubellite tourmalines from Nigeria, one emerald cut rhodolite garnet, one shield cut rhodolite garnet, and a round flasher cut peridot from Pakistan. She also

faceted a pearshape iolite that was set in a 14Kt. gold pendant and accented with a small diamond. Nancy had modified all the emerald cuts to accommodate the shallow pavilions and still maintain brightness and sparkle.

Steve Attaway displayed two pieces of Namibian chalcedony that he had carved, one with undulating curves and a large piece of Bolivian ametrine that he carved as a bead with curves and grooves. He carved a large piece of gem silica (chrysocolla) and set it into a 14Kt. gold pendant, accented with a round blue zircon.

Steve set in 14Kt. gold his very large Bolivian ametrine that he carved into a stylized orchid. He set the two 8.5x6.5mm pearshape tsavorite garnets that Nancy had faceted into a lovely set of 14Kt. gold earrings accented with twenty-six small full cut diamonds. Steve showed a Namibian chalcedony that he carved and set in a 14Kt. gold pendant accented with a round tanzanite. He showed a pearshape cabochon chrysoprase that he carved and set in a 14Kt. gold pendant and accented at the bottom by a triangular Tribrite cut imperial precious topaz that Nancy cut. He set in a 14Kt. gold pendant the large citrine that Nancy faceted in the "Antique Kite" design and accented it with twelve small diamonds. He also showed the Namibian chalcedony that he had carved into a large shield and set into a 14Kt. gold pendant and accented it with a one carat pearshape morganite cut by Nancy, where the morganite pearshape dangled at the bottom.

Refreshments

Elaine Weisman, Scott Wilson, and **Nancy Attaway** brought refreshments to the March meeting, plus gourmet coffee. Thank you all very much. **Elaine Price** and **Nancy Attaway** volunteered to bring refreshments to the meeting in May.

Future Programs

Vice-President/Programs Paul Hlava plans to talk about "Hot Rocks" - "What's Hot and What's Not in Gems and Minerals". Paul will explain the use of radiation on gemstones and will show slides of both naturally irradiated gemstones and artificially irradiated gems. We need to be aware of how colored gemstones undergo treatments, as well as what particular enhancements have been made to the gems and gem rough we purchase.

This is the same presentation that Paul gave to the audience at the Atomic Museum on April 19. Those who missed his talk then will be able to catch it in full at the May meeting. Don't miss it!

Program Speaker

by Nancy L. Attaway

Scott Wilson, Paul Hlava, Ernie Hawes, and Steve Attaway composed a panel of noted individuals who addressed the faceting issues of orientation of gem rough for faceting, dopping techniques, and preforming gem rough. Each person shared personal knowledge and recommended certain procedures pertaining to the issues and also fielded questions from the audience.

First to talk was Paul Hlava. Though not a facetor, Paul is a recognized expert on crystallography and crystal chemistry. Paul discussed aspects of crystallography as it pertains to orienting gem rough for faceting.

Paul stressed the importance of faceters being familiar with the six crystal systems found in gemstones: cubic or isometric, monoclinic, triclinic, orthorhombic, hexagonal, and tetragonal. The cubic crystal system is the crystal system that shows the highest symmetry with three equal crystallographic axes at right angles. Diamonds, spinel, and garnets fall into this group. The monoclinic crystal system is a crystal system with a low symmetry. Jade, spodumene, and orthoclase feldspar fall into this group. The triclinic crystal system is the least symmetrical crystal system. Turquoise and most feldspars fall into this group. The orthorhombic crystal system is a crystal system of fairly low symmetry and described by showing three crystal axes at right angles but unequal in length. Topaz and peridot fall into this group. The hexagonal crystal system shows three equal axes at 60 degrees and a fourth perpendicular to the other three and unequal in length. Quartz, corundum, beryl, and tourmaline fall in this group. The tetragonal crystal system is a crystal system that exhibits two crystallographic axes equal in length and at right angles with a third at right angles to the first two. Zircon and idocrase fall into this group.

Paul then discussed the optical character of a gem. He advised faceters to determine if a gem is uniaxial, biaxial, or anisotropic. Paul explained that gems of the hexagonal and the tetragonal crystal systems have one direction or optical axis where they fail to polarize light. Doubly refractive or anisotropic gems with one direction of single refraction are said to be uniaxial. He explained that gems of the orthorhombic, monoclinic, or triclinic crystal systems have two directions where no polarization occurs; two singly refractive directions or optical axes. These gems are said to be biaxial.

Paul stated that uniaxial gems are doubly-refractive and have one optical axis. He said that biaxial gems

have two optical axes, two axes of single refraction in a doubly refractive crystal. Paul said that gems in the orthorhombic, monoclinic, and triclinic crystal systems are biaxial. Paul defined birefringence as the strength of double refraction measured by taking the difference between the high and low indices of a doubly refractive stone. He remarked that anisotropic gems have the property of double refraction. A gem is said to be doubly refractive when it separates a single light ray into two rays of light. Double refraction can make a gem's culet area appear fuzzy, as seen in calcite, peridot, benitoite, and synthetic moissanite. Synthetic moissanites show double refraction, while diamonds do not.

Paul explained that crystals obey the aspects of their particular structure, which determines hardness, color, and cleavage. He said that these properties are all crystallographically controlled, and that a gem's properties can change with the orientations of the crystal matrix. Gems have an A or B axis (looking along the length of the crystal) and a C axis (looking down the end of the crystal). When the C axis of a gem is facing up, the properties appear different than along the length of the A axis. He said that a gem may even exhibit a different hardness according to which optical axis is being ground on the faceting machine. Likewise, a gem may exhibit a different color depending upon which optical axis the gem is being viewed. A gem is called dichroic when it shows two different colors observed from different optical axes. Paul reminded faceters to be aware of these differences when working with gems.

Paul advised faceters to orient peridot on the C axis for best color and to show the least amount of double refraction or birefringence. Ruby, emerald, sapphire, tourmaline, topaz, iolite, tanzanite will show different color depending upon the different crystal axis viewed. This determines where the table facet will be placed.

Paul cautioned faceters about the cleavage in topaz and calcite. He said that kunzite is brittle and exhibits cleavage. He remarked that apophyllite has a strong cleavage on one axis and a weak one on another axis. Paul said that emeralds are usually cut in "emerald cut" designs or rectangular shapes because they show the best color and allow good yield in carat weight. Parting or twinning features are seen in ruby and sapphire as weak spots on the planer, so pitting may be seen during polish. Paul reminded faceters that hardness varies with crystal direction and to be aware of this directionality, a gem's differential hardness, when cutting gemstones.

Next, Scott Wilson addressed the problem of stones coming off the dop while faceting. Scott said that faceters normally use alcohol that is 70% pure plus 30% water. He advised purchasing alcohol that is over 90% pure with less than 10% water. Scott explained that alcohol with a lot of water can leave a very fine film on the dop and stone that may cause the glue to adhere weakly; the glue bond may eventually fail. He said to use de-natured alcohol to clean your dops and stones.

Scott uses a polariscope to locate optical axis and determine the different axis. Polarizers do the same thing. He remarked that a rainbow color indicates the C axis. Scott stated that a polariscope is a simple but very valuable instrument used in gem identification. Scott defined a polariscope as consisting essentially of two Polaroid plates mounted a certain distance apart to permit gems to be examined between the two plates. He said that the lower Polaroid plate is usually fixed, and that the upper Polaroid plate may be rotated. Scott explained that gems are examined between the crossed Polaroids. He said to turn the upper Polaroid to the position of minimum light passage and place the stone between the plates. If the stone darkens and becomes light at each 90 degree rotation, then the stone is doubly refractive. If it remains dark, then it is singly refractive.

Another very valuable gem identification instrument is the dichroscope. Scott explained very well how to make a dichroscope in the March/April, 2002 issue of the *New Mexico Facetor*. A dichroscope determines the pleochroism in gems.

Next, Steve Attaway addressed the issue of setting stones in jewelry. Steve discussed prong settings and bezels, and he remarked that it required practice to set gems without breaking them. Steve cautioned would-be setters to be careful of the pressure applied to the metal and, thus, the gem when setting it. Steve said that stones with cleavage and brittle gemstones posed a challenge to set in jewelry. He did not recommend soft stones to be set in rings. Steve advised wearers of tanzanite, emerald, and opal gems in rings to exercise caution when wearing the rings and not to wear them while working. He recommended getting many small inexpensive stones and practice setting them in mountings.

Steve then addressed the subject of orientation of gem rough. He said to look for the deep spots in a piece of rough to be the culet area of the pavilion. He said to check the flat spots on a piece of rough and select the one that would work best as the table facet. He wanted faceters to maximum their recovery, while being mindful of the depth required for their selected faceting design. Steve said to look for fissures and inclusions in the rough. Some of these problem areas may be ground away by the coarser grit laps, while a few may need to

be worked in and around the facet design. Steve even recommended hiding them in the pavilion, if possible.

Steve advised using a target dop to center the rough on the dop with putty. Moretight, a clay substitute used to insulate around windows, and mineral tack would also work. Steve recommended using V dops for centering tourmaline and topaz rough. He free-wheels rough on a Facetron machine to preform stones to round shapes. Steve remarked that it was best to grind out cracks, as they may propagate and expand. He preforms rough with grinding wheels and belts. He said that faster speeds do not wear out laps as much, and he always runs his laps and belts wet. Steve advised having the grinding wheels trued. He said to avoid introducing damage layers by not using such coarse grits in the beginning. Damage occurs with each coarse grinding lap, and these damage layers are measurable. In order to obtain a good pre-polish and a final complete polish, the damage layer left from each grinding step must be totally eliminated. Steve cautioned faceters about using coarse laps on smaller pieces of gem rough, as it will greatly reduce your recovery in carat weight.

Last, Ernie Hawes spoke on dopping techniques. Ernie recommended using large cone dops with a clay ball to center rough for dopping. He advised faceters to plan each phase to obtain the best yield and results. He recommended using a trim saw. Ernie also remarked about the usage of wax and shellac. He said that there were three kinds of dopping wax available: green, brown, and black. The colors relate to the temperature at which the wax softens and melts. A 20 to 50 degree difference exists in the melting temperatures of the different waxes. Green wax is normally used for cabbing, but it does not hold up as well for faceting, as do the brown and black waxes. He said to collect stick shellac shavings in a wide mouthed jar to make a paste for dipping stones. Dip, let dry, and then apply the wax. Ernie said that shellac by itself is too brittle, but shellac prepares the surface for dopping. He said not to use wax more than once. Ernie remarked that stones can shift when wax softens and cautioned faceters about the heat build-up generated during faceting. Ernie also mentioned that, for the transfer process, leave room in the dop for a cushion of glue/epoxy to protect the stone.

Thank you all very much, Paul, Scott, Steve, and Ernie, for sharing years of experience and providing such good advise regarding these faceting issues. The New Mexico Faceters Guild is most fortunate to be the beneficiaries of your knowledge and expertise. These tips provide some very good information that faceters may use in their quest for success in faceting.

Faceters Guild Workshop

by Nancy L. Attaway

The New Mexico Faceters Guild held a faceters workshop on April 19 at the home of **Scott Wilson** in Corrales. The workshop began at 9:00am and continued until 3:30pm, with a hour's break for lunch. **Moderator Ernie Hawes** was assisted by **Scott Wilson**, **Steve Attaway,** and **Nancy Attaway.**

Steve Attaway and **Ernie Hawes** showed a DVD video of stone setting during the morning classroom session. The video, "*Bezel and Flush Setting"* by **Blaine Lewis,** described the methods of bezel setting oval colored gemstones and fancy shaped diamonds into a ring. The video showed how to flush set round, triangular, and marquise shaped diamonds and colored gemstones. The video included extreme magnification and 3D animation to explain the setting methods and illustrate the various tools used in the process. The author of the video provided some interesting tips on measuring the setting burs that best correspond to the diameter of the stone to be set, as well as how to place the stone table down on the mount and scribe around it. There was even a section on making your own setting tools, but time did not allow the showing of this part.

The video provided advise to faceters about the parameters that are taken into account when setting certain stone shapes. The girdle thickness and the pavilion angles of a stone determine the depth and angle of the seat for the stone in the mounting. When you compare the pavilion of a round diamond to the pavilion of a colored gemstone, the angle of the seat (where the stone will rest in the mounting) cut for a round diamond will be different than a seat cut for a colored gemstone. Also, the sharp corners seen on triangles, marquises, and the squares that are not cut cornered all require special attention when being flush set into a ring mounting. These corners are the vulnerable parts of a stone and need extra room to keep the stone from chipping or breaking while the metal is being pushed over during flush setting process. This excellent video was purchased from Rio Grande of Albuquerque.

Ernie Hawes demonstrated next a Presidium Duo Gem Tester. The device can separate various gem materials and determine diamonds from other materials.

Pizza was bought for lunch. **Marcus Price** brought a spinach/artichoke dip and crackers, **Scott Wilson** had chips and salsa, **Jennifer Galbadon** brought cookies,

and **Nancy Attaway** baked a lemon cake. Tea and coffee were also served. Thank you all for the goodies.

Faceters cut gemstones during the afternoon session. **Elaine Weisman** worked on a large round clear quartz. **Carsten Brandt** worked on a small emerald cut iolite. **Linda Vayna** worked on a large emerald cut green glass, with help from her husband, Steve and Nancy Attaway. **Marcus Price** showed his friend, Jeff Brooks from Australia, how to facet a stone. New member, **Jennifer Galbadon** cut her first stone, a small octagonal citrine, with help from Ernie Hawes and Nancy Attaway. **Kathy Luecki** cut the crown of a large octagonal citrine and progressed to the polish stage, with the help of Scott Wilson and Nancy Attaway. Steve Attaway brought one of his carving machines and showed members how he carves the deep blue Namibian chalcedony and the bright green Australian chrysoprase. He made flat spots on gem rough for dopping and preformed some gem rough for folks.

Thanks to all who participated in the Guild workshop. Thanks to Scott Wilson for hosting the event.

Linda Vayna faceting her emerald cut stone at the Guild workshop in April at Scott's home.

Elaine Weisman faceting her second stone, a round clear quartz at the Guild workshop in April at Scott's home.

New member Jennifer Galbadon faceting her first stone, an octagonal citrine, at the Guild workshop in April at Scott's home.

Tourmaline Sensitivity and Directional Hardness

Text by Doug Turet (Introduction by Nancy Attaway)

Many faceters addressed the subject of sensitive gemstones on Faceters Digest during mid-April. Several faceters related stories about tourmalines that broke suddenly when they were being faceted. I mentioned the times when apatites, chrome diopsides, and emeralds chipped and even broke while being faceted. I also shared my experience with two long emerald cut tourmalines that developed stress cracks after I pre-polished the pavilions and polished the girdles. I noticed the cracks when I went to polish the pavilion facets. These tourmalines had been absolutely water clear. The stress cracks developed from the crown area and grew toward the pavilion. My husband, Steve sawed them into two separate pieces for me to facet later. Texas Faceting Guru, Charles Covill mentioned on Faceters Digest that epoxy changes the volume during curing. He said that epoxy shrinks as it cools. Emerald cuts or long tourmalines will crack, due to the stress involved. Too much pressure on tourmaline will cause it to crack.

Facetor Doug Turet of Maine supplied a long and informative discourse on this subject. With his permission, his post to Faceters Digest is re-printed here.

You are absolutely right, Charles, that epoxies shrink and cool, but were you aware that they generate a considerable amount of heat before they cool and shrink? I do not know enough about the thermal dynamics of cyanoacrylates to comment about them, but I do know that they create equally-tremendous shrinkage stresses upon curing, too. This is why I have always preferred wax's elasticity to either of them, except on cold days, when the waxes can shatter without much warning. Another trio of often overlooked stressors are temperature, hand-pressure, and orientation, relative to the impact of the grit. What follows refers primarily to long emerald cuts and baguette cuts, or other such extended length to width ratio designs, although the principles are certainly applicable to other shapes used with this material, as well.

Far too often, (from what I have heard), faceters will begin cutting a newly (wax-) dopped stone, only to have it shatter on them, or, in the case of bicolors, split at the color boundary. What is going on when this happens is two-fold. First, it is important to remember that tourmaline is both heat sensitive and strongly piezoelectric. Therefore, any sudden temperature change, (like the one that takes place when a warm, just-dopped stone comes in contact with a cold steel lap and a cold water drip), or any change in pressure against the crystal is every bit as shocking to its internal structure as a whack at the tail end with tweezers. Second, because these crystals have both a differential hardness between the sides and ends with a marked tendency to develop lateral fissures, these physical properties must be taken into consideration before grinding the crystal.

What that all should mean to a facetor is this. If a facetor plans cutting a long, thin tourmaline "pencil", then the facetor should, at the very least, give serious thought to orienting that crystal at the hardest, toughest direction (down the crystallographic or "C" axis) and face that direction into the cutting grain of the oncoming lap. A facetor should also seriously consider whether any size of the grit particles that he or she intends to hurl towards their prize crystal will be large enough to open a small chip in it. A facetor needs to be especially wary of a grit particle whose accompanying subsurface fracturing could possibly lead to one of those nasty, crystal-length-abbreviating lateral fissures. For me, there are only two options to consider when cutting bicolors. Use evenly-worn electroplated laps of 600-grit or finer mesh or use relatively new resin-bonded ones 360-grit or finer.

When confronted with a bicolor, especially one still in its primary crystal state (i.e. that has not been modified by alluvial erosion or cobbed into a rounded nodule), it pays to remember that what makes it unique also poses a challenge to facet it. The chemicals that act as coloring agents in bicolors have, by their very presence, imparted different durabilities with thermoelectric and piezoelectric sensitivities to each end of the crystal. The single area of that bicolor rough that cutters and jewelers alike want most to show to their customers just happens to be the single weakest part of the crystal structure. That weakest part is the junction where these dissimilar elements meet, at the color line.

As such, whenever I am asked to cut bicolors, my first step is to gently warm the stone. Then, I dop it, using a wax (preferable a soft one, like green or black). Next, I soak my cutting laps in fairly warm water to get them as close (by touch) to the temperature of the stone. I replace the water in my drip tank with warm water, as well. The next step in this process is every bit as crucial as the ones before and after it. I allow a puddle of the warm water to form on the lap. With the lap still motionless, I let the stone sit in the puddle for 30 seconds or so to acclimate it to its new temperature.

When I do finally touch the stone to the lap, I do so with the cutting grain as closely parallel to the direction of crystal growth as possible. I do this so that there is not even the slightest chance of a lateral crack getting started from a coarse scratch across the crystal. In other words, the stone rides on only at right angles to the outer edge of the lap, often on the outermost one half of the lap's surface. It is as if I were cutting the crystal's girdle facets but at a steeper angle.

I was first told of these techniques and their underlying rationale in the mid-1980's. Back then, I was lucky enough to meet one of the great master lapidaries of the last century at a show in New York City. Ever since learning and putting the above lessons into practice, I have never lost so much as a single tourmaline crystal to splitting, not even a bicolor or a tricolor. Before I overheard him talking about those "rules", however, I had only one really good use for most tourmalines. They were inspirational in teaching me how to improve my pitching and cursing techniques!

I hoped that I have helped others, just as Mr. Miller helped me. All the best,

Douglas Turet, GJ

Lapidary Artist, Designer, and Goldsmith

Turet Design

P.O. Box 162

Arlington, Maine 02476

phone: 617-325-5328

fax: 928-222-0815

e-mail: anotherbrightidea@hotmail.com

{Editor's comment: The New Mexico Faceters Guild thanks Doug Turet for graciously presenting this important information regarding some of the issues of heat sensitivities and hardness directionality found in tourmaline. This information may well apply to other colored gemstones. Faceters are well advised to research their gem rough slated for cutting because of the peculiar characteristics found in many types of gem material. Armed with this information, our rates of success in faceting should greatly improve.}

Facetor and silversmith, Waylon Tracy at the meeting in March.

Pictured from left to right: Elaine Price, Al Weisman, Richard Griffith, Paul Hlava, Carsten Brandt, and Dylan Houtman at the Guild meeting in March.

In the News

More Demantoid Garnets Now Available

Source: Colored Stone March/April, 2003

Buyers at the Tucson Show saw a new supply of demantoid garnets for sale. Pala International reported that about twenty kilos were unearthed from a new vein at the old Kladovka mine last summer. More demantoid garnets may possibly be discovered there this summer. Also, Black Pearls and Gems Pty. from Australia is developing a large demantoid garnet mine in South America that promises even more of a supply of the gems. The mine's location remains a secret, but the company reports a lot of gems being produced. The color of the demantoid garnets from South America is not as bright a the Russian material but is more like the Namibian material. The South America demantoid garnets are reputed to show a high dispersion that results from some unusual inclusions, yet to be analyzed. Most of the South American material comes in one carat sizes, more or less, but some larger stones were found. Prices range from $180 per carat up to $6,000 per carat.

Alexandrite from India

Source: Colored Stone March/April, 2003

A new deposit of alexandrites was discovered in India. The stones from this location exhibit a nice blue-green in most types of light. The color change is not as impressive as alexandrites from other locales, as most of the Indian material changes to a very light violet under incandescent light. Quantities are sporadic, and most of the stones found were under a carat in size.

The Possibility of a New Class of Beryl

Source: Professional Jeweler April, 2003

A new cesium-rich beryl was discovered last year in Madagascar. The gem exhibits hues that range from red to orange to deep raspberry. Some dealers labeled the gem as a red morganite, but it could very well be a new species of beryl, in a class of its own. The location of the mine in Madagascar remains a secret.

"Merrill's Inspiration" in Lapidary Journal

Source: Lapidary Journal May, 2003

Check pages 74 and 75 for Ernie Hawes' design.

New Canadian Diamond Distribution

Source: JCK on the Web 3/10/03

Diamond industry firms, Beny Sofer & Sons, Rosy Blue, and Backes & Straus forged a global partnership called Tri-Star Worldwide, LLC to distribute Canada brand arctic-mined diamonds throughout the world. The merger established Tri-Star Worldwide as the global leader in certified Canadian-mined diamonds.

All of the diamonds for the Canadian brand will be supplied by Arsianian Cutting Works NWT, a Rosy Blue affiliate in Yellowknife, North West Territories, Canada, the largest cutting factory there. Following the 1998 discovery of rich diamond resources, the NWT's Gross Domestic Product grew from $2 million to $30 million. The area is expected to be producing 10% of the world diamond output by 2004.

First Analysis on Madagascar's Pink Beryl

Gems and Gemology Spring, 2003

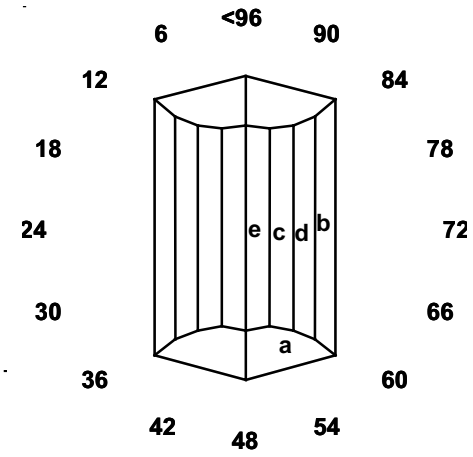
The discovery of a new purple/pink beryl from Madagascar in November, 2002 generated much interest at Tucson. The new beryl material is rich in cesium and exhibits a higher refractive index than previously known. The new beryl was mined from a pegmatite located a few kilometers south of the village of Mandrosonoro, 140 kilometers by a dirt road west of Ambatofinandrahana in central Madagascar. The mine lies in one of the most dangerous areas of Madagascar. The nearly vertical pegmatite measures 4 to 6 meters thick and runs over 200 meters long. Local people unearthed the beryl from a single large pocket.

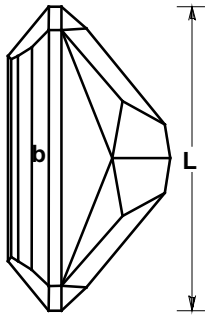
The new beryl occurs in three different morphologies: 1) as large irregularly-shaped flattened masses, 2) as well-formed tabular hexagonal crystals, and 3) as euhedral, tabular-to-elongate crystals on the faces of large tourmaline crystals. The color and optical spectrum of the new beryl differed from those of the red beryl from Utah, but both are colored by Mn3+.

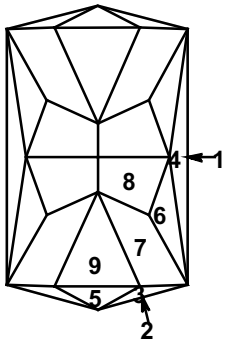
New Deposit of Fire Opal Found in Oregon

Source: Gems and Gemology Spring, 2003

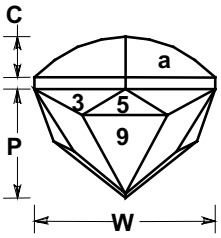
Ken Newnham of Klamath Falls, Oregon is a claim owner of the Juniper Ridge, Oregon fire opal. The diggings lie between Klamath and Lake Counties, south of Quartz Mountain, at an elevation of 6,000 feet. The opal forms in seams and nodules within volcanic rock. Fist-sized pieces of fire opal are commonly found.





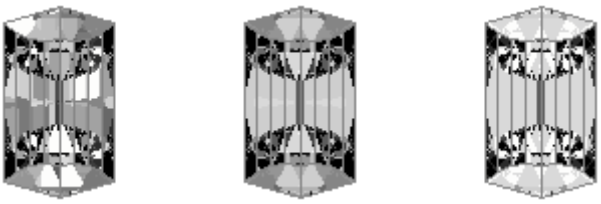


Tippler



By Dylan Houtman

Angles for R.I. = 1.620
34 + 6 girdles = 40 facets
2-fold, mirror-image symmetry
96 index
L/W = 1.688
P/W = 0.605 C/W = 0.230
Vol./W³ = 0.736
Brightness: COS = 55.1 % ISO = 70.9 %

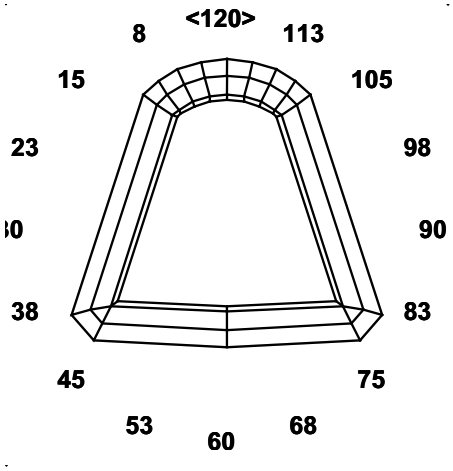


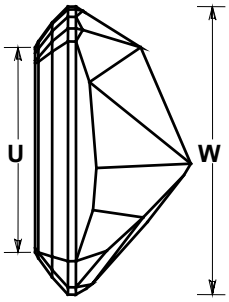
PAVILION

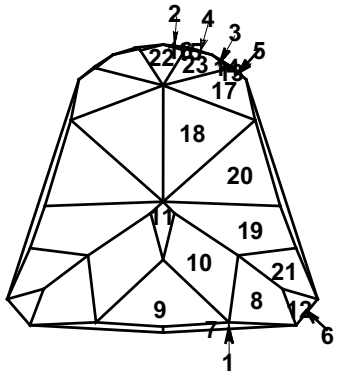
1	90.00°	24-72
2	90.00°	04-44-52-92
3	70.00°	04-44-52-92
4	70.00°	24-72
5	50.00°	96-48
6	50.00°	21-27-69-75
7	39.00°	12-36-60-84
8	39.00°	22-26-70-74
9	39.61°	96-48

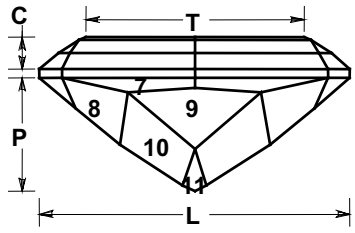
CROWN

a	41.00°	04-44-52-92
b	42.00°	24-72
c	18.00°	24-72
d	30.00°	24-72
e	6.00°	24-72









Note: The crown is not numbered due to the many small facets which would be obscured by labeling. Also, on the pavilion, 16 obscures 15.

Cinder Stack

By Dylan Houtman

Angles for R.I. = 1.69
74 facets + 14 facets on girdle = 88
1-fold, mirror-image symmetry
120 index
L/W = 1.081 T/W = 0.761 T/L = 0.704
P/W = 0.400 C/W = 0.110
H/W = (P+C)/W+0.02 = 0.530
P/H = 0.755 C/H = 0.207
Vol./W^3 = 0.214
Brightness: COS = 40.1 % ISO = 60.2 %

PAVILION

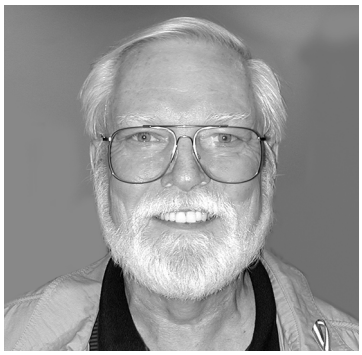
1	90.00	024-059-061-096
2	90.00	002-118
3	90.00	010-110
4	90.00	006-114
5	90.00	014-106
6	90.00	044-076
7	70.00	024-059-061-096
8	39.00	055-065
9	42.00	060
10	38.00	057-063
11	36.50	060
12	42.00	044-076
13	70.00	014-106
14	70.00	010-110
15	70.00	006-114
16	70.00	002-118
17	42.00	019-101
18	40.00	020-100
19	40.19	025-095
20	41.25	023-097
21	40.03	029-091
22	58.65	120
23	54.48	008-112

CROWN

a	43.00	059-061
b	43.00	044-076
c	43.00	024-096
d	43.00	014-106
e	43.00	010-110
f	43.00	006-114
g	37.00	044-076
h	43.00	002-118
i	37.00	059-061
j	37.00	024-096
k	37.00	014-106
l	37.00	010-110
m	37.00	006-114
n	37.00	002-118
o	27.00	024-059-061-096
p	27.00	014-106
q	27.00	010-110
r	27.00	006-114
s	27.00	002-118
T	00.00	Table

Facet Designer's Workshop

By Ernie Hawes



More Interesting Shapes

As a beginning designer who is relatively new to faceting, Dylan Houtman is unencumbered with traditional ideas as to what a gem should look like. Quite a lot of the designs that he has created recently follow few conventions and, as often as not, depict shapes that are seldom seen in faceting designs. The designs in this issue are no exception. One is an elongated barrel shape with pointed ends, and the other is a rounded keystone. The rounded keystone is named **Cinder Stack,** and the doubly pointed barrel is called **Tippler**.

I usually have a hard time coming up with a catchy name for my designs, so the names others give their patterns always intrigues me. Consequently, when viewing a design for the first time, I am normally somewhat curious as to how the designer arrived at the name he or she gave it. When Dylan gave me the name **Cinder Stack** for his rounded keystone design, the basis for the design name became obvious to me. However, it is probably not so obvious for those readers unfamiliar with what a cinder stack is, or what it could possibly have to do with the naming of a faceting design. So, a little explanation follows.

While designers arrive at names for their patterns in various ways, many times the design outline, reminiscent of the shape of something else with which the designer is familiar, becomes the basis for the design's name. Dylan Houtman's **Cinder Stack** is certainly one of those. When he displayed the tanzanite that he had cut in this pattern, Paul Hlava immediately said it looked like a cinder stack. For those not familiar with logging and sawmill operations, at least in the West and Southwest, a cinder stack is a very large metal structure built in the shape of a rounded cone where sawmill wastes are burned. The larger diameter is on the ground, and the smaller rounded part of the stack may project a hundred feet or more into the sky. When in operation, smoke is visibly pouring forth during the day, and the orange glow at the top of the stack can be seen for many miles at night. Although common in the past, very few cinder stacks are still in active use today. Dylan had not selected a name for his design when he displayed the cut stone, but he thought that **Cinder Stack** was as appropriate as anything else. So, **Cinder Stack** it became. Although not exceptionally bright, the design has good scintillation and results in a very attractive stone. Because of the complexity of the design and the large number of small facets, it would likely be best cut in a fairly large stone. Mounted in a pendant, a medium to large gem cut in this pattern would be very striking.

Tippler is another unique design that Dylan created for a piece of tourmaline he wanted to cut. Tipping the finished stone from side to side and end to end results in an interesting play of reflections, caused by the unusual combination of pavilion and crown facets. Thus, one can easily see why **Tippler** would seem to Dylan to be a fitting name for this design. Like **Cinder Stack,** this design is helped quite a bit by its degree of scintillation. Both of these designs offer the facetor an opportunity to cut something different, adding variety to his or her collection of gems. Both faceting designs would certainly look very nice mounted in jewelry.

The Next Faceters Workshop

The next faceters workshop will be scheduled for **June 14,** starting at 9:00am until 4:00pm, at the home of Steve and Nancy Attaway in the East Mountains.

We want to have faceters plan on cutting one or all of the following shapes this summer: a flasher cut (twelve-sided) round, an Apollo cut triangle, and a square barion. These shapes will be discussed, and we will help select the gem rough best for each diagram. Faceting diagrams for all these designs will be provided at the June workshop.

How about some barbecue from Ribs in Cedar Crest for lunch instead of pizza?

See you there!

LET'S TALK GEMSTONES

Edna B. Anthony, Gemologist

P.0. BOX # 49371
Colorado Springs Co 80949-9371,
eba@bwn.net

[INOSILICATES]

INTRODUCTION:

In the silicate class, **inosilicates** are the minerals where the SiO_4 tetrahedra share oxygen atoms to form twisted single or double chains. Double chains or bands are created when the single chains lie side by side and alternate tetrahedra share oxygen atoms. These two different but related arrangements form two groups of rock-forming minerals called the **pyroxenes** (single chain structures) and the **amphiboles** (double chain structures). Their physical, chemical, and crystallographic properties are frequently quite similar. Both develop in the monoclinic and orthorhombic crystal structures. It should be noted that a group of single chain minerals with the same chemical composition and Si:O ratio (1:3) of the pyroxenes exhibit a different structure. These **pyroxenoids** develop in the triclinic crystal system.

The difference in the underlying chain structures of the pyroxenes and the amphiboles cause distinctly different cleavages. Their habits also differ. Slender crystals and acicular habits are typical for amphiboles. Stout prisms are the common form of the pyroxenes. In igneous melts or in magnesium and iron-rich metamorphic formations, the species of the pyroxenes generally crystallize earlier at higher temperatures than their analogous amphibole counterparts. Consequently, they lack the (OH) component that characterizes the amphiboles. When water is present, these minerals sometimes react interchangeably under prograde and retrograde metamorphic conditions. The (OH) factor generally causes the amphiboles to exhibit lower specific gravity and refractive indices. The hardness, color, and luster are usually similar for the counterpart species.

According to the *Manual of Mineralogy after J. D. Dana* by Cornelius S. Hurlbut, Jr. and Cornelis Klein, "the pyroxene structure is based on single SiO_3 chains that run parallel to the *C* axis with a repeat of about 5.2 Angstrom units along the direction of the chain." The length of the repeats in the **pyroxenoids** is greater. Only a few members of the pyroxene group provide minerals that are cut as gems. **Enstatite** and the intermediate members **bronzite** and **hypersthene** of the enstatite ($MgSiO_3$)-orthoferrosilite ($FeSiO_3$) solid solution series are three. Although Fe^{2+} can replace up to 90% of Mg in this series, the ratio rarely exceeds 1:1. Pure end member orthoferrosilite seldom occurs in nature for, "in most geologically observed pressure and temperature ranges the compositionally-equivalent assemblage Fe_2SiO_4 +SiO_2 (fayalite) is more stable." **Diopside** ($CaMgSi_2O_6$) and **hedenbergite** ($CaFeSi_2O_6$) of the calcic diopside-hedenbergite series are also faceted. **Jadeite** ($NaAlSi_2O_6$) and **spodumene** ($LiAlSi_2O_6$), where sodium is replaced by lithium in the chemical composition, are members of the sodium pyroxenes and are frequently used as gems.

The **pyroxenoid** group's triclinic crystal structure is the result of variations of the lengths of the repeat distance of the twists in the single chains. In a diagram in the *Manual of Mineralogy*, the repeat distance of **wollastonite** ($CaSiO_3$) is shown as 7.3 angstroms and that of **rhodonite** ($MnSiO_3$) as 12.5 angstroms. The repeat distance for **pectolite** (**larimar**) [$Ca_2NaH(SiO_3)_3$] is not shown. A repeat distance of 17.4 angstroms is shown for **pyroxmangite** [$(Mn,Fe)SiO_3$], but the author has been unable to confirm in any other available reference that this mineral is a pyroxenoid. No further information is given in the *Manual of Mineralogy*. Dr. Joel Arem lists it as a gem mineral in his *Color Encyclopedia of Gemstones*. After considering its triclinic crystal structure, chemical composition, the physical and optical properties, and its

use as a gemstone, the author will treat it as a member of the pyroxenoid group.

Of the numerous minerals that comprise the **amphiboles**, only the following members are of any significant value as gems. **Hexagonite** [$Ca_2Mg_5Si_8O_{22}(OH)_2$] is a very rare variety of **tremolite**. Mountain leather and mountain cork are names used for a felted aggregate of tremolite fibers. According to Dr. Arem, **smaragdite**, a chrome-rich tremolite, is found at the Merelani mine in Tanzania. No mention is made of its use as a gemstone. It is interesting to note that the Greek appellation *smaragd* has been cited as an origin for the name for emerald. **Actinolite** [$Ca_2(Mg,Fe)_5Si_8O_{22}(OH)_2$] is an intermediate member of the tremolite-ferroactinolite solid solution series. Small fragments of actinolite crystals have been faceted with great difficulty, but it is of no consequence as a faceted gem. **Nephrite** [$Ca_2(Mg,Fe)_5(Si_4O_{11})_2(OH)_2$] is the fibrous variety of actinolite. It established its place as jade in the gem and lapidary world many centuries ago. **Pargasite** is a sodium and aluminum bearing calcic amphibole closely related to hornblende.

These are the mineral groups, species, and varieties of the inosilicates that will be described in later articles.

The picture on the left shows a carved chrysocolla (gem silica) rendered by Steve Attaway set in a 14Kt. gold pendant and accented by a 4mm round blue zircon set in one of Steve's bail designs.

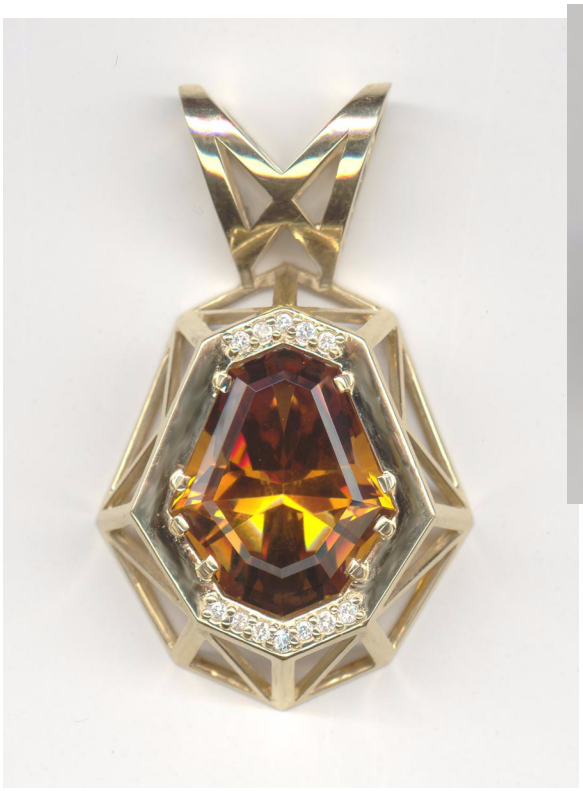
The picture on the right shows a carved Namibian chalcedony rendered by Steve Attaway set in a 14Kt. gold pendant and accented by a 4.5mm round tanzanite set in one of Steve's bail designs.

The picture on the left shows a carved Bolivian ametrine orchid of 91.5 carats rendered by Steve Attaway set in a 14Kt. gold pendant with one of Steve's bail designs.

The picture on the right shows a carved shield cut Australian chrysoprase rendered by Steve Attaway set in a 14Kt. gold pendant with a 7x7x7mm triangular Tribrite cut imperial precious topaz faceted by Nancy Attaway.

The upper left picture shows two emerald cut yellow beryls from the Ukraine. The picture above shows four rhodolite garnets from Tanzania: two pearshapes, an emerald cut, and a shield cut. The left picture shows a pair of pearshape peridots from Pakistan as earrings in 14Kt. gold. The center picture shows a pearshape iolite set in a 14Kt. gold pendant accented by a diamond. All gemstones were faceted by Nancy Attaway.

Nancy Attaway faceted the eight peridots from Pakistan pictured above: a large square barion, a shield cut, a flasher cut (twelve-sided) round, a small square barion, a flasher cut round, two large emerald cuts, and a large pearshape. She also cut the above five tourmalines (liddicoatites) from Nigeria: a large 12mm flasher cut round, three emerald cuts, and a square barion.



The picture above shows a matched pair of 9mm flasher cut (twelve-sided) round tourmalines (liddicoatites) from Nigeria faceted by Nancy Attaway set in 14Kt. gold earrings. Nancy faceted the gems from the same crystal facing down the C axis. It is difficult to get the color to match in a pair of tourmalines.

The picture above shows a 23x19mm citrine that weighs 22.75 carats faceted in the "Antique Kite" design by Nancy Attaway. Steve Attaway set the citrine into a custom 14Kt. gold pendant, accented by 12 diamonds.

The picture below shows a pair of 8.5x6.5mm pear-shape tsavorite garnets faceted by Nancy Attaway that were set by Steve Attaway in custom 14Kt. gold earrings, accented by 26 small, full cut diamonds.

The picture on the right shows a carved shield cut Namibian chalcedony by Steve Attaway set in a custom 14Kt. gold pendant with a pearshape morganite dangle that was faceted by Nancy Attaway.

E-Mail Addresses

Edna Anthony ..... eba@bwn.net
Bill Andrzejewski ..... sierragm@uswest.net
Nancy and Steve Attaway .... attaway@highfiber.com
Moss Aubrey..... drsaubrey@aol.com
Charles Bryant ..... crbryan@swcp.com
Ernie Hawes..... ehawes7@comcast.net
Paul Hlava..... hpf1@qwest.net
Dylan Houtman.....dhoutman9@aol.com
Mariani Luigi ..... ENVMA@IOL.IT
Will Moats ..... gemstone@flash.net
Merrill O. Murphy ..... momurphy2@juno.com
Gary Peters..... albpet@msn.com
Russ Spiering..... DesignsByRKS@email.msn.com
Jim Summers: ..... commish1@worldnet.att.net
Bill Swantner.....WSwantner@Comcast.net
Herb and Maria Traulsen ..... htraulsen@mycidco.com
Stephen and Linda Vayna .... Vayna@transatlantic.com
Elaine and Al Weisman..... almgtcons@aol.com
Scott Wilson..... swilson@copper.net

Advertisement