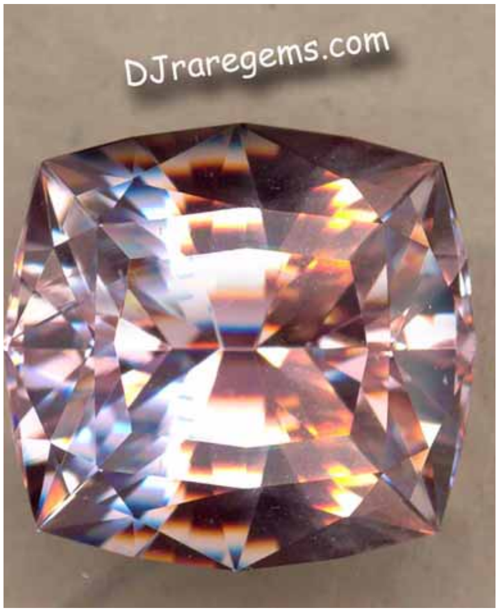
The New Mexico Faceters Guild

November/December 2002

The Official Newsletter of the New Mexico Faceters Guild

NMFG

Show and Tell



John Rhoads faceted this luscious pink 58.33-carat Brazilian morganite. The cushion cut square brilliant morganite won a third place award in the 2002 AGTA Cutting Edge Competition. This morganite is a remarkable and beautiful gemstone.

Will Moats faceted a lovely amethyst in “Merril’s Inspiration”, a special cushion cut square.

Dylan Houtman faceted a stunning danburite in an emerald cut with the long sides flared. He also faceted a very impressive celestite kiteshape, shown with celestite rough.

On the Cover are two gorgeous morganites faceted by Dylan Houtman, shown at the last workshop.

The

New Mexico Faceters Guild

Guild Officers 2002-2003

President: Scott Wilson

Vice President/Programs: Paul Hlava

Secretary/Treasurer: Ina Swantner

Guild Librarian: Russell Spiering

Guild Gemologist: Edna Anthony

Guild Mineralogist: Paul Hlava

Workshop Chairman: Ernie Hawes

Special Events Coordinators:

Rainy Peters & Eileen Smith

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). 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 New Mexico Facetor

Volume 22, No. 6, November/December, 2002

NMFG President Scott Wilson

In This Issue:

The Prez Sez:

by Scott R. Wilson, Ph.D

New Territory

At the New Mexico Faceters Guild meeting held in November, noted facetor, John Rhoads presented a bewildering tale of his travels in the realms of the "Good, the Bad, and the Ugly", in regard to cutting rare and difficult gemstones. At first, it sounded a bit scary, with stories of stones that cleave or break at ever turn. More alarming were the tales involving stones that did not yield a polish, and reports of a few stones that even bent. Fortunately, John provided some hints and good advise from his vast experience on how to deal with these situations and still obtain lovely, rare faceted gemstones.

I found John's words encouraging, and I ordered a pink wax lap and some Linde A. So armed, I began faceting a very pretty blue fluorite (from Mexico, I think) to start my exploration into the world of "delicate" gem cutting. I am happy to say that my first such adventure turned out wonderfully well. I learned a great deal, though. Soft stones may need a very careful pre-polish and a slow polish. I discovered that even fluorite showed a great differential hardness, depending on the orientation of a facet with respect to the crystal axis.

I found that I needed to use all of the "tricks of the trade" to keep the stone on track. I expected the usual and varied glitches that occur with any stone, but these new faceting adventures were now compounded with softness of the gem and a likelihood of fracture. When dealing with gemstones that are difficult to cut, I found that a facetor needed to address many problems during the course of cutting, some even at the same time.

I will be going after other delicate gem materials next, sphalerite and rhodochrosite, for example. I want to try my luck at cutting them and expand my faceting skills. I encourage everyone to attempt something along similar lines, as it is a great reward to cut an unusual gemstone. With the coming gem shows in Tucson, you will have a great opportunity to locate some nice rough of rare or unusual gem varieties.

I wish you all the very best of luck and safe travels in the land of sub-4.5 hardness gemstones. See you at the next meeting and in Tucson.

Minutes of the NMFG Meeting

November 21, 2002

by Nancy L. Attaway

President Scott Wilson called the meeting to order at 7:00 p.m. and welcomed all members and guests.

Old Business

The next Faceters Workshop will be combined with the New Mexico Faceters Guild Christmas Party. The two events are scheduled for December 14 at the home of **Bill** and **Ina Swantner** in Albuquerque. The workshop will begin at 1:00pm, where moderator, Ernie Hawes will discuss faceting emerald cuts. Members will also cut stones that afternoon. The workshop will end at 5:00pm, when the Christmas party will begin. An organized pot-luck dinner is planned, and the rousing gift exchange will begin after dessert. Ernie Hawes will send invitations and a map to Swantner's home.

New Business

President Scott Wilson entertained ideas from the members on the future of the New Mexico Faceters Guild. Scott asked members what they would like to have during meetings and workshops and how often these should be held. Regarding formal meetings and workshops, members asked that meetings remain at six a year. However, members suggested that meetings should include a seminar-type forum or panel discussion on a particular faceting subject. They suggested that three meetings per year feature a formal speaker, while the other three meetings include the panel forum on a certain topic. **The following meeting dates have been scheduled for 2003: January 9, March 13, May 8, July 10, September 11, and November 13.** Two meeting dates, March and May, will have us meeting in the Annex across the street from the main entrance to the museum, due to scheduling conflicts for the main meeting room. Six workshops will be held in 2003.

Members suggested subjects to be discussed during faceting workshops. Some of these topics may be addressed by panel forums at meetings. The topics included dopping techniques, glues, preforming gem rough, orientation of gem rough, how to maximize the yield in carat weight from faceting rough, problems encountered in faceting and how to solve them, gemology for facetors, and how to use GEMCAD. Members also wanted a Show Schedule in the newsletter.

President Scott Wilson agreed with the suggestions from the membership. He will help implement them. Scott also announced that **dues were due** and to pay your dues to the **Guild Treasurer, Ina Swantner.**

The Guild Library will be moved to a new location, the home of Scott Wilson. A complete list of books and publications will soon be made available.

Nancy Attaway announced that out-of-state member, **Brian Cowger** had made a most generous donation to the Guild treasury to help with newsletter costs. Thanks, Brian! We will see you at Tucson 2003!

Nancy Attaway also suggested that folks send **Betty Annis** a sympathy card, regarding the loss of her husband, Russell. She recommended that folks send a card to **Rainy Peters,** regarding her very serious illness. We should call or send a card to Merrill O. Murphy, telling him that we are thinking of him, too. The New Mexico Faceters Guild thanks **Betty Annis, Rainy Peters,** and **Merrill O. Murphy** for their service to the New Mexico Faceters Guild.

Show and Tell

The Show and Tell Case tonight held many faceted stones and jewelry rendered by Guild members. **Moderator, Steve Attaway** asked members who own video equipment to help show the items in the Show and Tell case to the audience using a monitor. We will also ask the museum for a passive projector to use.

Elaine Weisman displayed the small shield cut amethyst that she cut during the last workshop. She also displayed a pair of dangle earrings in sterling silver and mokume gane that held two very thin pieces of agate. The agates were cut and made flat by the late Bill Tordsen using his special secret process.

Dylan Houtman displayed many stones that he cut. He showed four opals and three opal doublets. He showed a square danburite, three pearshape danburites, an emerald cut danburite. Dylan showed an absolutely awesome 15-carat celestite cut in an isosceles triangle and an example of a celestite crystal. He showed three chrysoberyls, three sapphires, and one color-change sapphire in rounds and kiteshapes. He showed three pale yellow/green grossular garnets, a kiteshape, a pearshape, and a triangle. He showed one leaded glass cut in a kiteshape, two purple scapolites cut in triangles, and one obsidian cut in an elongated pearshape.

Will Moats displayed two amethysts and one citrine that he cut in "Merrill's Inspiration". He showed two large emerald cut petalites that he plans to re-cut.

He also had a specimen from Pakistan of peridot and fosterite crystals that exhibited nice crystal structure.

John Rhoads displayed an impressive emerald cut danburite and a lovely triangular Namibian green tourmaline. He also showed the absolutely stunning cushion cut square morganite that earned him a Third Place Award from the 2002 AGTA Cutting Edge Gemstone Competition. He said that his First Place Award sold.

Scott Wilson displayed a strange natural sphere collected by a friend from a dry river bed in an iron district in the Australian Outback. The black sphere resembled hematite but did not have its heaviness. He do not know the sphere's identity. Scott showed a rare specimen of langbeinite ($K_2Mg(S0_4)$) collected from a potash mining area in Carlsbad, New Mexico. Scott also collected three facet-grade chunks of deep blue and purple fluorite from Bingham, New Mexico.

Nancy Attaway displayed a pearshape Oregon sunstone from the Dust Devil mine that exhibited a lot of schiller. She faceted three Mexican opals in flasher cut (twelve-sided) rounds. One had a whitish body color, and the other two had yellow body colors. Each exhibited an aurora borealis. She cut four rubellite tourmalines, liddicoatites from Nigeria, one large flasher cut round, two smaller flasher cut rounds, and one pearshape. She cut one small square barion Columbian emerald. She cut two peridots from pakistan, a flasher cut round and a half moon tablet. She cut a large tablet of tsavorite garnet, a very remarkable gem. She also faceted an 85-carat Bolivian ametrine in the "Eye of Horus" cut. Steve carved some details of the eye in the bottom, where Nancy had left a flat culet area.

Steve Attaway displayed three of his large Namibian chalcedony carvings. He plans to set them in custom gold pendants in time for the AGATE Show.

Refreshments

Nancy Attaway brought home-baked refreshments to the November meeting, plus gourmet coffee. **Elaine Price** and **Laura Kirkpatrick** volunteered to bring refreshments to the meeting in January, 2003. Thanks.

Future Programs

Vice-President/Programs Paul Hlava scheduled **Ernie Hawes** as the speaker for the meeting in January, 2003. Ernie and his wife, Becky traveled to China and Thailand during September, 2002. They wanted to see the famous Three Gorges area before the dam is installed and the area flooded. Ernie has many stories to relate and slides to show. Don't miss his talk.

Program Speaker

by Nancy Attaway

Award-winning facetor, **John Rhoads** of D & J Rare Gems, Ltd. in Salida, Colorado addressed the New Mexico Faceters Guild on cutting rare and difficult gems. His talk focused on cutting "The Good, the Bad, and the Ugly" in rare gems. John has been a mineral collector since he was three years old and was partial to the glassy crystals that he saw. John earned a B.S. in Geology in 1975 from Kutztown College in Kutztown, Pennsylvania, between Reading and Allentown. He earned a Master's in Geology in 1977 from the New Mexico Institute of Mining and Technology in Socorro. John was involved in uranium exploration and teaching and lived in several African counties. He earned a graduate gemological certification from GIA in 1985. His first faceting machine was a RayTech.

John discussed cutting two types of rare gems, those seen in jewelry and the more exotic ones normally purchased for specialty collections. He divided them into three groups, the "Good", the "Bad", and the "Ugly", and he placed six different gems into each group. Other gems could have been added, but John chose the six that were the most memorable to him. The "Good" included those gems that were rare gems but cuttable. The "Bad" represented those gems that were both rare and a challenge to facet. The "Ugly" marked those gems as rare and extremely difficult to cut.

In the "Good" category, John placed taaffeite, phenakite, axinite, epidote, danburite, and euclase. He discussed each one separately and offered comments.

John said that taaffeite is a beryllium magnesium aluminate with a hardness of 8 to 8.5. John cuts taaffeite on a worn 600-grit lap, pre-polishes it on a newbond lap, and polishes it on a tin lap with linde A. Taaffeite occurs in gray, pink, and purple and can also be colorless. Taaffeite has been compared to the cutting characteristics of spinel.

John said that phenakite is a beryllium silicate with a hardness of 7.5 to 8. Phenakite shows nice terminations and crystal faces. He said phenakite acts like beryl when faceted, except that phenakite has distinct cleavage in two directions. John cuts it like he would beryl and polishes it with either linde A or cerium oxide on a tin lap. Phenakite, which has been confused with quartz, occurs in straw yellow and pink, and it also can be colorless. Phenakite is sensitive to ultraviolet light and will fade when exposed to sunlight over time. Phenakite can be a very brilliant faceted gemstone.

John said that axinite is a calcium aluminum borosilicate with a hardness of 6.5 to 7. Axinite is bladed much like the head of an axe and can show a purplish flash. He remarked that axinite is trichroic and has several color orientations. It also has a distinct cleavage in one direction. John polishes axinite on a tin lap with Linde A. He cautioned faceters to watch the lap speed when polishing axinite and not to go too fast. Axinite can also be polished with cerium oxide on a lucite lap.

John said that epidote is a calcium iron aluminum silicate with a hardness of 6 to 7. Epidote is very dark but easy to polish, providing that the facetor renders a good pre-polish. Epidote has perfect cleavage in two directions and is also trichroic. John polishes epidote on a tin lap with linde A.

John said that danburite is a calcium borosilicate with a hardness of 7. Danburite has a high refractive index and usually is colorless. Danburite can show a slight pink hue and can also be root beer colored or even apricot. John polishes danburite on a tin lap with linde A. Danburite makes a brilliant gemstone because of its clarity. It is usually not a problem to facet.

John said that euclase is a beryllium aluminum silicate with a hardness of 7.5. Euclase cleaves perfectly in one direction, and the cleavage may separate during dopping. Euclase also has twinning planes that will separate from thermal shock. Euclase occurs in pale blue and pale yellow but can also be colorless. John polishes euclase on a tin lap with linde A.

In the "Bad" category, John placed apatite, sphene, diopside (including chrome diopside), fluorite, calcite, and rhodocrosite. He discussed each one separately and provided comments. John said that he uses a worn 600-grit lap to cut many of these very brittle gemstones.

John said that apatite is a variable calcium phosphate with a hardness of 5. John remarked that apatite is a tricky gemstone to facet, and that it can shatter when cut. Apatite is very heat sensitive and can be thermally shocked. John recommended cold dopping for apatite. He polishes apatite on a tin lap with a thin slurry of linde A. Apatite is very susceptible to aggregation, the build up of polishing compound that can cause scratches. It is also susceptible to flow scratches during the polish stage.

John said that sphene is calcium titano-silicate with a hardness of 5 to 5.5. Sphene is a greenish-brown-yellow color with a high refractive index. With its high dispersion, sphene is a very eye catching gemstone. John begins faceting sphene with a 260-grit lap and works through the grits to the polish stage. John said to orient the table parallel to the twinning plane. He polishes sphene on a tin lap with a thin slurry of linde A and recommended slow lap speeds. He said that sphene polishes easy but said to be mindful of aggregation, the build-up of polishing compound on the lap that can scratch or leave a furrow.

John said that diopside is a calcium magnesium silicate with a hardness of 5 to 6. He stated that chrome and chrome diopside were both very brittle gemstones that can give the facetor problems during polish. If scratching or chipping problems occur when polishing chrome or chrome diopside, then the facetor may need to change the direction of the lap. The facetor might even change the direction at where the gem touches the circle of the polishing lap. John polishes chrome on a tin lap with linde A. Slow polish speeds are advised.

John remarked that fluorite is a calcium fluoride with a hardness of 4. Fluorite has perfect cleavage in four directions and is brittle. He said to look for cleavage planes and grind them down. The cleavages in fluorite can be problematic during the dopping stage, the cutting stage, and the polish stage. He recommended orienting the table away from all cleavages. Ten degrees away from the cube face would work fine. John polishes fluorite on a tin lap with linde A. He recommended using a hard wax lap to obtain a polish on those facets that are harder to polish. A wax lap will produce a scratch-free surface but will tend to round the facet edges. A metal lap will give sharp facet meets but can cause scratches. Fluorite can also be polished on a chrome oxide Ultralap. John said to cut fluorite for its lovely color and not so much for brilliance.

John said that calcite is a calcium carbonate with a hardness of 3. Calcite has perfect cleavage in three directions and is very heat sensitive. He recommended placing the table at the junction of two cleavage planes. John polishes calcite on a wax lap with linde A and is very careful with the lap speed and the pressure. He also recommended keeping the facets small when cutting and polishing calcite. Calcite can also be polished on a chrome oxide Ultralap. The cutting and polishing of calcite must be directional with the cleavage.

John stated that rhodochrosite is a manganese carbonate with a hardness of 3.5 to 4.5. Even though rhodochrosite has perfect cleavage in three directions, it is a bit more robust than calcite. John polishes rhodochrosite on a wax lap with linde A. He remarked that rhodochrosite was mechanically sensitive and to be mindful of the pressure and speed when cutting and polishing rhodochrosite. Rhodochrosite can also be polished on a chrome oxide Ultralap. Inclusions within the gemstone does not necessarily detract from rhodochrosite's beautiful color.

John also mentioned sphalerite, a zinc sulfide with a hardness of 3.5 to 4. Sphalerite has perfect cleavage in six directions and is a very challenging gemstone to facet. The very high refractive index of sphalerite makes it a glittering gemstone. John said that the hardest aspect to faceting sphalerite was orienting the table NOT parallel to a cleavage direction. He uses either a tin lap or a wax lap with linde A to polish it.

In the "Ugly" category, John placed thaumasite, cuprite, cinnabar, crocoite, wulfenite, and cerrusite. He discussed each one separately and made observations.

John said that thaumasite was more brittle than most gemstones. He thought that thaumasite rough resembled small yellow beryl crystals. He remarked that faceting thaumasite was like faceting a potato chip. John uses a worn 1200-grit lap to cut thaumasite and a wax lap with either diamond or linde A for polish. He said that thaumasite was very heat sensitive and to go easy and slow. He has faceted two thaumasites so far.

John said that cuprite is a copper oxide with a hardness of 3.5 to 4, but that some references have the hardness of cuprite at 2. He said that cuprite is also photo sensitive and has one direction of cleavage. John polishes cuprite on a very soft wax lap and goes easy and slow. He remarked that laps used for cutting and polishing cuprite should only be used exclusively for cuprite, as cuprite pastes and coats the laps with a glaze. Since cuprite is very delicate and scratches easily, John gently places a faceted cuprite in cotton inside a gemstone paper. Simply wiping a faceted cuprite with a cloth can generate scratches. Cuprite is best cut as a tablet, due to its very deep, intense red color.

John said that cinnabar is a mercuric sulfide with a hardness of 2 to 2.5. Cinnabar has one direction of cleavage and is very heat sensitive. Since cinnabar is also very brittle, John uses very slow lap speeds to cut and polish the gem. He uses a wax lap to polish cinnabar. He said to clean a faceted cinnabar gently with alcohol on cotton and not to use a cloth to wipe it.

John said that crocoite is a lead sulfate with a hardness of 2.5 to 3. Crocoite has one direction of cleavage, is very heat sensitive, and is extremely brittle. John polishes crocoite on a soft wax lap with linde A.

John said that wulfenite is a lead molybdate with a hardness of 2.5 to 3. He said that wulfenite is a very fragile gem that is extremely pressure sensitive. It also has one direction of cleavage. When working with wulfenite, John dops the entire piece of rough and backs the entire stone with wax because it can bend. He polishes wulfenite on a wax lap with linde A.

John said that cerrusite is a lead carbonate with a hardness of 3.5. Cerrusite has a high dispersion but is extremely heat sensitive. It also has two distinct directions of cleavage. John cold dops cerrusite rough for faceting. He remarked that cerrusite has cleavage and that, remarkably enough, it can heal itself. When John noticed a cleavage plane that had developed on a piece of cerrusite he was faceting, he stopped and waited until the fracture healed. He then returned to facet the stone. John said that barite behaves the same way as cerrusite. John also mentioned the gem, anglesite.

John said that anglesite is a lead sulfate with a hardness of 2.5 to 3. It has two perfect directions of cleavage. Anglesite is extremely brittle and very heat sensitive. John said to polish anglesite on a wax lap with linde A. A chrome oxide Ultralap also works.

John listed several other gemstones that he thought were nightmares to facet. These nearly-impossible-to-facet gemstones included selenite, lepidolite, vivianite, halite, realgar, and sulphur. Selenite is gypsum, a calcium sulfate with a hardness of 2 and three directions of cleavage. Lepidolite is a potassium lithium aluminum silicate with a hardness of 2.5 to 3 and one perfect cleavage. Vivianite is an iron phosphate with a hardness of 1.5 to 2 and one direction of cleavage. Orient vivianite the table parallel to the cleavage plane and cut and polish with the cleavage, not against it. Halite is sodium chloride (salt) with a hardness of 2 and two perfect directions of cleavage. Since halite dissolves in water, polish is rendered with pure grain alcohol. Realgar is arsenic silicate with a hardness of 1.5 to 2. Realgar is very heat sensitive and may be the most brittle of all gemstones. Realgar is also light sensitive and will decompose. Sulphur is pure sulphur with a hardness of 1.5 to 2.5. Sulphur is extremely brittle and dissolves.

John remarked that Art Grant and Mike Gray of Coast to Coast Rare gems also have a significant amount of experience faceting rare gemstones, as well as the gemstones that are very difficult to facet. John mentioned that Mike Gray was researching the hardness direction of gemstones and wanted to quantify and measure the actual directional hardness. That study would be interesting and very challenging to undertake.

John Rhoads presented an excellent discourse on cutting rare and difficult gemstones. His explanations on how to cut some of the very difficult gemstones found in nature were insightful. The New Mexico Faceters Guild thanks John Rhoads for a great talk.

Faceters Guild Workshop and Faceters Guild Christmas Party

by Nancy L. Attaway

The New Mexico Faceters Guild held a faceters workshop December 14 at the home of **Bill** and **Ina Swantner** in Albuquerque. The workshop began at 1:00pm and continued until 5:00pm, when the Guild Christmas Party began.

Ernie Hawes planned for members to try faceting an emerald cut design that incorporated three step cuts both pavilion and crown. He said that the step cuts could be as much as ten degrees apart or as close as two or three degrees, depending upon the type of stone used and the depth of the rough. He gave members a diagram for a meetpoint emerald cut that used a CAM preform. Ernie explained that the CAM or Centerpoint Angle Method was developed by Robert Long. He said that this preforming method outlines the shape of the design by first cutting a preliminary pavilion to a common centerpoint and then cutting the girdle outline to a level line around the stone.

The CAM preform establishes the girdle outline to very close tolerances but does require additional gem material. The temporary preform facets meet first at a common center point, and then some of that gem material will be sacrificed to form the keel of the pavilion. CAM, as originally developed, wasted a lot of gem material, because the angles used were higher than the final pavilion girdle facets and pavilion main angles. The older faceting designs that used CAM are best rendered in inexpensive gem material. CAM was later modified to use angles much closer to the final pavilion angles and be less wasteful in gem material.

Carsten Brandt worked on his emerald cut preform with a nice piece of iolite. **Linda Vayna** worked on her emerald cut preform with a green synthetic gem. **Dylan Houtman** worked on his emerald cut preform with an interesting piece of quartz that exhibited a phantom, a pattern that was comprised of a series of yellow/brown chevrons. **Laura Kirkpatrick** worked on her emerald cut preform in a large piece of amber. Members soon understood the CAM preform and how it was to appear on their stones.

Kathy Luecki, Scott's girlfriend from Santa Fe, finished polishing the pavilion of her octagonal citrine. With the help of **Nancy Attaway,** Kathy rendered good meetpoints, even at the culet. A good polish was obtained using a cerium oxide dyna lap.

Dylan Houtman brought to the workshop three lovely morganites that he cut, a large oval, a small sparkly round, and a very striking half moon. We hope to get the diagram for the interesting half moon design in a future issue of the *New Mexico Facetor.* We hope that Dylan brings the stones to the meeting in January.

More Guild members arrived for the Christmas Party around 4:30pm, and the rest arrived after 5:00pm. Mouth-watering smells could be sniffed from **Ina Swantner's** kitchen. Ina had beautifully decorated her lovely home for the holidays. Although members contributed side dishes and desserts, Ina cooked much of the Christmas dinner for the Guild party. Those members who attended the Christmas Party enjoyed a variety of delicious food, yummy desserts, and good conversation. **Steve Attaway** began the rousing gift exchange after dessert and distributed presents to all.

The New Mexico Faceters Guild gives a hearty "Three Cheers!" and a very big "Thank You!" to **Bill** and **Ina Swantner** for being the "Hosts with the Most". Bill and Ina graciously opened their home to us. We wonder with envy if Bill always gets to eat like that.

John Rhoads, the guest speaker from the November, 2002 meeting. John Rhoads is a facetor of note, who has won several faceting awards from the AGTA Cutting Edge Competition. John and his wife, Donna operate D & J Rare Gems, Ltd. in Salida, Colorado.

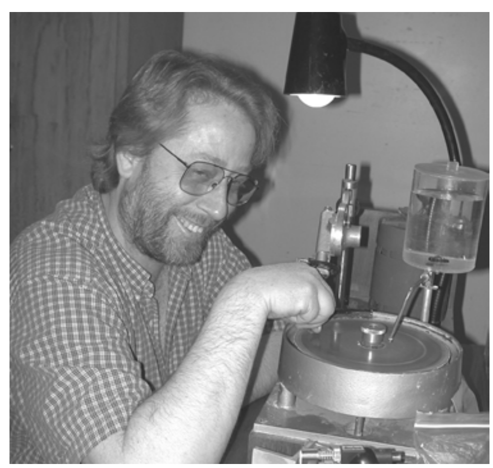
Workshop and Meeting Photos

Paul Hlava, Guild Vice-President/Programs and Mineralogist, with Donna Rhoads and Liz Sorroche.

Laura Kirkpatrick at the workshop, holding a dopped stone.

Scott Wilson dopping a fluorite marble to cut.

Nancy Attaway, louping a pavilion facet on the citrine that Kathy Luecki was faceting at the workshop.



Dylan Houtman at the workshop. Dylan uses his ear to listen to the stone while cutting.

Guild Chrismas Party Photos

Ina Swantner, Christmas Party Hostess

Elaine Weisman

Maria Traulsen

Becky Hawes

AGATE Show Pictures

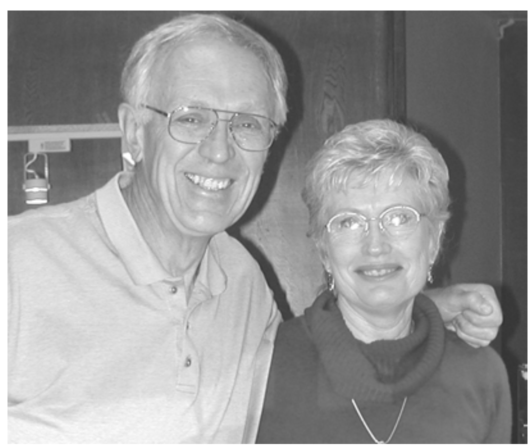
Guild past Prez, Moss Aubrey & Emily LaLumia

Edna Anthony, Henry Anthony, & daughter Carol.

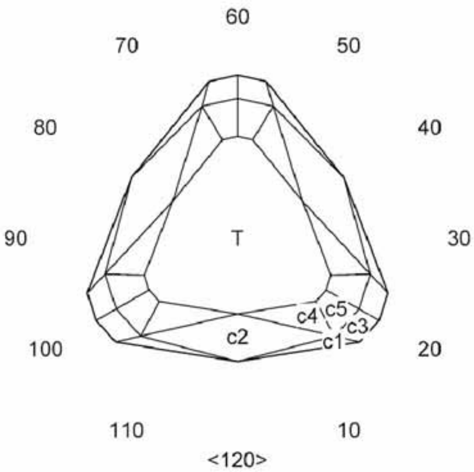
Guild past President, Betty Annis with her daughters, Jennifer Marquardt and Alison Almquist, granddaughter Elaine Almquist, and author, Florence LaBruzza (*Minerals of New Mexico*, third edition).

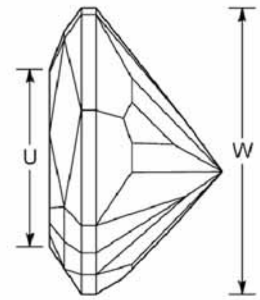
Heidi Ruffner and husband, Dave Teter

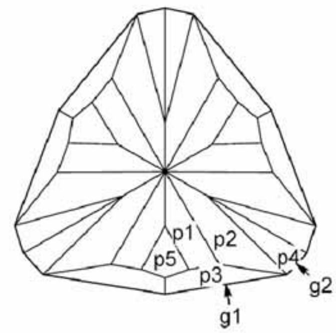
Dean Crane and David Moroleon Brown



Tom and Loretta Massis

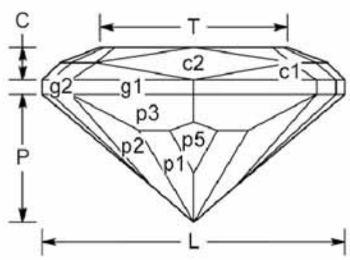






Brilliantry

By Dillon Houtman



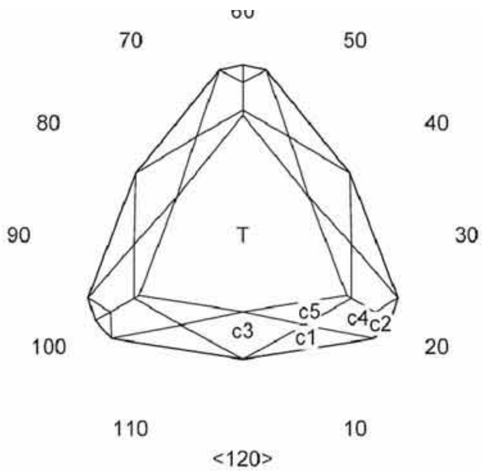
Angles for R.I. = 1.75
55 facets + 12 facets on girdle = 67
3-fold, mirror-image symmetry
120 index
L/W = 1.052 T/W = 0.653 T/L = 0.620
P/W = 0.441 C/W = 0.112
H/W = (P+C)/W+0.02 = 0.574
P/H = 0.769 C/H = 0.196
Vol./W^3 = 0.214
Brightness: COS = 69.1 %   ISO = 81.0 %

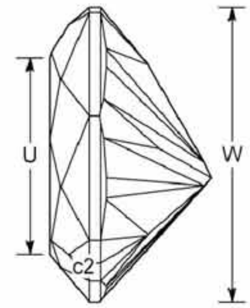
PAVILION

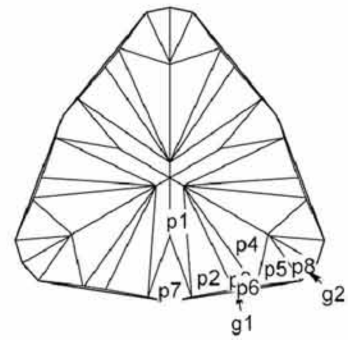
g1	90.00	003-037-043-077-083-117
p1	42.00	003-037-043-077-083-117
p2	40.00	010-030-050-070-090-110
p3	60.00	003-037-043-077-083-117
p4	39.00	016-024-056-064-096-104
g2	90.00	016-024-056-064-096-104
p5	44.00	120-040-080

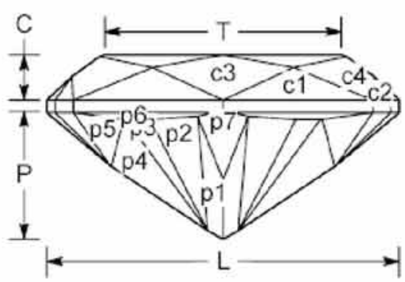
CROWN

c1	60.00	003-037-043-077-083-117
c2	34.00	120-040-080
c3	37.00	016-024-056-064-096-104
c4	22.00	003-037-043-077-083-117
c5	22.00	016-024-056-064-096-104
T	00.00	Table









Pink Fizz

By Dillon Houtman

Angles for R.I. = 1.58
73 facets + 12 facets on girdle = 85
3-fold, mirror-image symmetry
120 index
L/W = 1.053 T/W = 0.706 T/L = 0.670
P/W = 0.382 C/W = 0.135
H/W = (P+C)/W+0.02 = 0.538
P/H = 0.711 C/H = 0.252
Vol./W^3 = 0.189
Brightness: COS = 35.9 % ISO = 52.1 %

PAVILION

g1	90.00	003-037-043-077-083-117
p1	42.00	001-039-041-079-081-119
p2	42.00	002-038-042-078-082-118
p3	41.50	003-037-043-077-083-117
p4	40.80	004-036-044-076-084-116
p5	41.50	005-035-045-075-085-115
p6	70.00	003-037-043-077-083-117
p7	42.50	120-040-080
p8	40.50	016-024-056-064-096-104
g2	90.00	016-024-056-064-096-104

CROWN

c1	50.00	003-037-043-077-083-117
c2	51.00	016-024-056-064-096-104
c3	40.00	120-040-080
c4	40.00	006-034-046-074-086-114
c5	26.00	003-037-043-077-083-117
T	00.00	Table

In the News

Canadian Diamonds Featured

Source: Gems and Gemology Fall 2002

Canada is currently the seventh most important diamond producer by weight and fifth in value in the world diamond market. This issue by GIA chronicles the history of the exploration for diamonds and the discovery of the primary diamond deposits throughout Canada. Particular attention is given to the important kimberlite pipes in the Northwest Territories. To date, 538 kimberlites have been reported. Typically, these pipes are small but contain high grade diamonds. Sales of diamond rough and the newly established cutting and polishing industry in Canada are described in the report, along with branding and marketing strategies.

The New Green Gems in the Yukon

Source: Professional Jeweler December, 2002

Canada's first emerald mine lies in Yukon's wild Pelly Mountains. The Regal Ridge emerald mine, located near Finlayson Lake, northeast of Whitehorse, was first spotted from a helicopter. The pilot and field engineer noticed a green rock outcrop they thought might be malachite. Expatriot Resources conducted soil grids and trenching, and the company determined the emerald outcrop to be 700 meters by 400 meters, about 70 acres. Sold to True North, enough money has been invested to permit core sampling and plotted mechanical stripping with a massive backhoe. About six tons of ore has been processed after two years. Mining occurs only during the three months of summer. Of the emeralds found so far, 5% are gem quality, 10% are near gem, and 85% are non gem. To date, the emeralds unearthed are surface material from frost shatter and oxidation zones. Beneath the permafrost, Cretaceous granite, and basalts may lie a rich deposit of emeralds.

Black Pearls from Mexico

Source: JCK January, 2003

Perlas del Mar de Cortez, the first modern commercial saltwater pearl farm in North America, recently harvested its fourth crop of black pearls in green, blue, copper, and purple hues. The cultured Mexican black pearls, trademarked Sea of Cortez Cultured Pearls, are grown mostly in rainbow-lipped oysters and in a few indigenous Panamic black-lipped oysters (the Pinctada mazatlanica, similar to the Pinctada margaritifera). The pearls are grown in Bacochibampo Bay, near the city of Guaymas in the state of Sonora.

Pearls were found along the Central American coast by the pre-Columbian Aztecs, Zapotecs, Yaquis, and Seris Indians. The Spanish conquistadors made the new world pearls famous in Europe. Commercial pearl farming began in Mexico about 1903 in La Paz. The Mexican Revolutionary Army in 1914 left La Paz and its pearl farms in ruin. Around 1936, salinity soon killed the pearl oysters in the Sea of Cortez, as the Hoover Dam prevented fresh water from the Colorado River from reaching the Sea of Cortez. Pearl Farming began again in the 1990's. (see: www.perlas.com.mx)

Faceters Symposium 2003

Presented by the Faceters Guild of Southern California and held at the Seaside GEMboree AFMS/ CFMS Convention and Show in Ventura, California on June 6, 7, and 8, 2003 (Friday, Saturday, and Sunday).

You are invited to participate in the Faceters Symposium 2003, scheduled for June 6, 7, and 8 at the Seaside Park (Ventura Fairgrounds) at Ventura, California, held during the AFMS/CFMS Convention and Show.

The CFMS GEMboree falls on those dates, as well as on Thursday, June 5. All events are happening at the same location, just a hundred yards from the beach.

The Faceters Symposium 2003 will feature ten speakers, who will have presentations covering various parts of gemstone faceting interests. The Faceters Symposium 2003 also includes a Hospitality Hour on Friday evening and a Saturday Awards Luncheon.

There will be competitions at the Novice, Advanced, and Master Levels. Get started on your competition entry soon.

The CFMS GEMboree itself will have buildings that have exhibits on display, dealers with their wares to offer, demonstrators to show how it is done, and speakers with presentations covering other lapidary fields of interest.

For information and costs regarding the Faceters Symposium 2003, including competition information, please contact Glenn Klein, Symposium Chairman at 24001 Muirlands Blvd., Space #79, Lake Forest, California 92630 or e-mail him at: glennklein@yahoo.com

Flexible Crystals

By Smoky MacClaren

I had the pleasure of hearing about a curious observation from my friend of many years, Merrill O. Murphy, and his friend, Scott Wilson. Merrill related to me a story surrounding one of Americas top gemcutters, John Rhoads. This fellow discovered that a gem crystal had literally drooped into a bent form under the force of gravity while at rest in a box during cutting! Such an occurrence would truly be a disturbing thing to encounter, given our everyday experiences with those solid substances that we call gem crystals.

I would like to offer an explanation to this conundrum. I claim that this behavior can occur for certain gem materials when the crystal form is exactly right for a phenomenon called "glide". This "glide" occurrence is related to the common property that we gemcutters know as cleavage, but it is much less frequently seen.

An example of "glide" can be seen in calcite and crystals that exhibit the same atomic arrangement as calcite. It is possible to press a sharp edge (a knife blade) into one of the edges of a calcite crystal near one end of the crystal. As pressure is applied, the part of the crystal between the blade and the end of the crystal will "shift over" or "glide". With practice, the shifted portion will still be relatively clear and exhibit relatively flat faces.

By continuing to "glide" portions of a crystal, one can come up with some strange forms. Some crystals, particularly the long, thin, needle-like crystals of ammonium nitrate, can be glided so easily that they can be bent into a circle, twisted into a spiral, or even tied into a knot.

Cleavage generally occurs along crystal planes where there is charge neutrality for crystals that exhibit ionic bonding. For other types of crystals, cleavage is most pronounced on planes that have the least bond density. Glide is a completely different behavior. Glide occurs on crystal planes, where the atoms can slide relatively easily and move only a short distance before they encounter positions that have a similar physical arrangement to their original position. Then, they just decide to remain in their new place. This new arrangement is a twin plane to the original crystal plane, and the glided and unglided portions of the crystal are actually twins. These are "man-made", as opposed to having grown that way in the first place.

It is clearly necessary that the crystal be a soft material (low hardness), which tends to make glide be observable only in materials that are not often faceted. This requirement stems from the need to physically shove over sets of atoms to their new positions. That would be a difficult task in a hard material.

There is more, though. The crystal must also contain a high density of dislocations in the crystal structure to make it possible to move the atoms by a simple application of force with a sharp blade.

A dislocation is a defect in the atomic arrangement of a crystal that causes stress (induced by pressing the blade into the crystal) to be localized to a small, usually microscopic portion of the crystal. In the case of glide, it then becomes easier to "shove over" a set of atoms bounded by closely spaced dislocations. It would much more difficult to shove over an entire plane of atoms that spans the width of an entire crystallographically perfect specimen.

As the atoms in the vicinity of one dislocation glide, the stress field moves to the adjacent dislocation, which eventually glides. The process repeats until the glided portion of the crystal is too large to maintain the needed level of stress in the crystal. At that point, increasing the force on the blade would likely just break the crystal.

The end result is that a soft crystal with certain atomic arrangements (calcite and related minerals, for example) with a high dislocation density can be glided somewhat easily. Ice is another material that will glide nicely, although it is somewhat difficult to work with, as you might imagine. Ice crystals will glide under their own weight due to the force of gravity. Single crystals of metal (with sufficient dislocations) can be glided nicely, as well.

It is entirely possible, then, that a long thin crystal of gem material might also bend and deform under its own weight due to the glide phenomenon. Perhaps, this is what was observed with the crystal that bent under its own weight while resting on the cutting bench.

For those who are interested in discovering more about this unusual behavior, you might consider reading *Crystals and Crystal Growing*, by Alan Holden and Phyllis Morrison, MIT Press (1982), pages 207-212. ISBN 0-262-58050-0. Thank you, Merrill and Scott for bringing this interesting and remarkable phenomenon to my attention. I wish a happy holiday season to you all and wish you all good faceting in the year 2003.

Facet Designer's Workshop

By Ernie Hawes

Dylan Houtman has been experimenting recently with the new GemCad for Windows. He has had some interesting results that I think everyone will find attractive. I was struck right off with the fact that Dillon used the 120 gear index for some of his creations. While the 120 index is one of the standard index gears available for most faceting machines, there are not very many designs that have been created using this index. Out of over 3,800 designs in the DataVue2 database through 1999 (latest update), only 125 of them were originally done using a 120 index. I suspect that a lot of faceters do not even have a 120 index for their machine. Even though there have been relatively few 120 index designs published, I recommend that every faceter have a 120 index. Some of those designs rendered with the 120 index are very interesting, and the 120 index is a great tool to have if you ever do any freeform cutting.

The two designs included in this issue are both triangles. Like Nancy Attaway, Dylan tends to cut as he designs and translates the data later into a finished pattern. The first design, called ***Brilliantry***, was cut in garnet, and Dillon used angles suitable for garnet as he created this design. The second pattern Dylan named ***Pink Fizz***. He cut this originally in morganite and obviously felt that name fit the finished stone. Having seen the stone, I would have to agree with his choice.

If you compare the angles that Dylan has used with the recommended angles given by various authorities, it becomes apparent that Dylan has deviated somewhat from their recommendations. A lot of my designs deviate from the "authorities" too. There can be various reasons for this. First of all, when a faceter is cutting as he/she designs, sometimes the available material determines what angles are necessary in order to obtain a reasonably sized final product. If the material being cut is deeply colored, then lower than recommended angles may be required to have any color appear in the finished stone and avoid the color extinction.

Frankly, I think it is good to see some deviation from the prescribed limits, so long as the result is still an attractive gem. Designers who are not stifled by limiting parameters often think of the more interesting designs. Of course, I would avoid windowing a stone whenever possible. However, I am sure that most would agree that if I were cutting a really valuable stone, such as a nice ruby or sapphire, I would not hesitate for a moment to think of a design that better fits that valuable piece of rough, even if it meant cutting a big window. More on that subject in the next newsletter, when I talk about some other designs that Dillon has created. Meanwhile, get out your 120 index or buy one if you do not own one and give these designs a try.

The Next Faceters Workshop

The next faceters workshop will be held **February 22, 2003** at the home of Scott Wilson in Corrales. The workshop will begin at 9:00am and end at 4:00pm. Ernie will re-check the CAM preforms and have members continue cutting their emerald cut designs. He will also further explain the recommended placements of the step cuts in both pavilion and crown.

Ernie plans a classroom presentation for the morning session on cutting accuracy. He will discuss cleanliness in the faceting area, as it can affect the cutting accuracy. He will also talk about using microscopes for cutting. Members will facet their stones after lunch.

Members attending workshops are asked to bring their own faceting machines, but Ernie Hawes and Scott Wilson each have a faceting machine that may be used during the workshop. Please be certain to request this option if you need it. Coffee will be served in the morning, and pizza and iced tea will be served for lunch. Members attending workshops are asked to contribute $5. Baked goods or snacks brought to the workshops are always appreciated. Thanks.

We will also have a "Tucson Show and Tell" sometime during the workshop. Those members who will have attended the February Tucson Show are asked to bring their purchases to the workshop. Any related stories or observations from the show may be shared.

LET'S TALK GEMSTONES

Edna B. Anthony, Gemologist

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

The Tourmaline Group

[A CYCLOSILICATE]

BUERGERITE

CHROMDRAVITE

DRAVITE

ELBAITE

FERRIDRAVITE

LIDDICOATITE

TSILAISITE

SCHORL

UVITE

Our trip to Tucson this year provided the opportunity to see a number of the species of gemstones in quantities that permitted comparison not usually available at other sites. The range of quality, color, and price was extensive. Knowledge of the properties of a gemstone and care in selection are imperative in order to choose an appropriate gem. The popular tourmaline group presents wide variations in color and quality from which to select outstanding gems at very reasonable prices.

Tourmalines are classified as silicates. Silicates are minerals composed of SiO_4 tetrahedra arranged in various structural configurations that incorporate other chemical elements in the structure. In tourmaline, the tetrahedra form rings, where several different elements in various proportions can be accommodated. Such a ring structure is known as a cyclosilicate. The tourmalines are a group of extremely complex aluminum borosilicates (boron is the one constant element in combination with the SiO_4 tetrahedra) that crystallize in the hexagonal (trigonal) crystal system. Numerous differences in physical and optical properties exist in the various species. Elbaite and liddicoatite form a continuous solution series, as do uvite and dravite. The nine species most likely to be encountered by those involved in the jewelry industry are the subject of this article. Elbaite and liddicoatite are the species most used as gem material.

Some of the transparent color varieties of tourmaline are identified by commonly used descriptive names. *Achroite*, meaning "without color," denotes the colorless variety. Pink and red stones are often called *rubellite*. An exceptionally intense electric pink material is found in California. The strong pleochroism of the unique deep greenish-blue *Indicolite* (*indigolite*) may cause the gem to appear green or seem to lose transparency. A deposit near Newry, Maine is the source of some of the finest blue-green and red tourmalines. All shades of green tourmalines are sometimes called *verdelite.* Traces of chrome impart an especially vivid color to the chrome-green tourmaline. The violet-red colors (prevalent from a deposit in Siberia) are known as *siberites*. Bi-color and parti-color crystals show a variation of color along the length of the crystal.

Crystals found on the island of Elba in the Mediterranean Sea often exhibit striking bands of color. Simon and Schuster's *Guide to Gems and Precious Stones* refers to "*moor's head*" crystals from this source. In *A Guide in Color to Precious and Semiprecious Stones*, Jaroslav Bauer and Vladimir Bouska state "One end of the crystal may be green, then the colour may change into a yellow or even a colourless zone, and the other end may be black." The *Illustrated Encyclopedia of Minerals and Rocks* by Dr. Jiri Kourimsky describes them as "a common occurrence" having "black ends, but a green and pink core." A similar crystal exhibiting a red termination is called a "*turkhead.*" On page 180 of the Simon and Schuster volume, a photograph of a four-carat Brazilian cabochon gem shows an extremely sharp division of its reddish- brown and greenish-blue colors. *Watermelon tourmaline*, usually from Brazil, is an apt name when the variation of colors occurs in concentric bands with a reddish-pink center surrounded by a white zone and enclosed in a green "rind." South Africa produces material where the color sequence is reversed. Concentrations of fibrous or acicular inclusions, commonly in green and pink materials, cause the "cat's-eye" effect in some stones cut *en cabochon.* Even the change of color phenomenon is found in tourmaline. The alexandrite-like gems change from yellowish-green in balanced white light to reddish-orange in incandescent light.

Tourmaline possesses strong pyroelectric and piezoelectric properties. [The following is quoted from the American Geological Institute's *Glossary of Geology:* "piezoelectric effect; In certain crystals, the development of an electric potential in certain crystallographic directions when mechanical strain is applied", also pyroelectricity; The simultaneous development, in any crystal lacking a center of symmetry, of opposite electric charges at opposite ends of a crystal axis, due to certain changes in temperature.] The piezoelectric property makes tourmaline useful in the manufacture of gauges to measure transient blast pressures. Its pyroelectric nature was discovered as early as the seventeenth century, when long prisms of "Brazilian emeralds" were brought to Europe by Dutch traders. George Kuntz, in *The Magic of Jewels and Charms*, tells of children using such "aschentreckers" warmed by the sun to attract and repel straw and ashes.

The electrical properties of the stone also intrigued Benjamin Franklin. When "some ingenious gentlemen from abroad" denied its negative polarity, he concluded the examined specimens were improperly cut. He wrote the following in a letter, dated 7 June 1795, thanking Dr. William Haberden for two stones, "the positive and negative planes having perhaps been obliquely placed. To obviate this, I suggest that the positive and negative sides should be accurately determined before the operation of cutting begins."

Today, tourmaline's distinct pleochroism is a more important factor to the facetor. The weak dichroism of pale colored crystals allows the cutter a wide latitude on the orientation of facets. With dark material, the placement of the table facet parallel to the optic axis of the crystal is often necessary to obtain a lighter more desirable color. Some deep-colored gems, especially the dark reds, blues, and greens, exhibit a unique loss of transparency if the table facet is oriented perpendicular to the prism axis. Deep green and brown crystals exhibit strong pleochroism. In instances when the strength of the absorption of the *o*-ray is sufficient to plane-polarize light, only one edge of absorption may be visible on the refractometer. Such tourmalines may appear isotropic.

Simon and Schuster's *Guide to Gems and Precious Stones* tells of an unusual property that is characteristic of mid-green tourmaline gems. A unique optical effect is exhibited when such stones are given a rectangular cut. The way in which light is reflected from the pavilion facets causes distinctive alternate longitudinal lines of lighter and darker color.

Because tourmaline occurs in such a wide range of colors, it may be confused with many other transparent gemstones. Its strong pleochroism and similar refractive indices to andalusite dictate careful examination of greenish yellow-brown stones to avoid misidentification. Tourmaline can also be confused with amethyst, citrine, apatite, peridot, topaz, danburite, idocrase, synthetic spinel, glass, and other materials. Tourmaline's lack of cleavage is a factor in distinguishing it from hornblende. Simon and Schuster's *Guide to Rocks and Minerals* makes note of the fact that synthetic tourmaline, which is now available, is identifiable only by laboratory tests. However, in their volume *Guide to Gems and Precious Stones,* it is stated that rubellite, indicolite, and green tourmaline "are neither imitated nor produced synthetically." The Singhalese word "turamali", meaning *mixed-colored stones*, is given by Arem in the *Color Encyclopedia of Gemstones* as the source for the name tourmaline. It is interesting to note that Bauer and Bouska spell the word "toramalli" and define it as "carnelian", an alternate spelling of carnelian. Carnelian is translucent reddish chalcedony.

The pegmatites of Minas Gerais, Brazil have replaced Sri Lanka's alluvial deposits as the source of most of the world's tourmaline material. Especially vibrant "cotton candy" colored gems come from deposits in and near Paraiba. These "paraibas" command premium prices. Tourmaline deposits in Nigeria and Namibia yield exceptionally fine crystals that may rival the intense color of the paraibas. Madagascar's crystals of various colors often resemble those from Brazil. Fine red "Siberian rubies" are among the many hues found in the coarse granites of the Urals near Murzinka and Sverdlovsk. The largest gem quality crystals are recovered in Mozambique. A magnificent 42-cm long, rich red specimen from Mozambique's Muiiane area is on display in the museum in Lourenco Marques.

With the exception of schorl, of pegmatitic origin, tourmaline is a late pegmatitic hydrothermal product.

Inclusions of protogenetic minerals, such as apatite, pyrite, colorless quartz, mica crystals and hornblende, are common. Concentrations of mineral fibers, perhaps amphiboles, cause the cat's-eye phenomenon in some tourmalines. Gas may fill small internal fractures in red tourmaline, and very flat films can reflect light.

Two specific types of inclusions, however, developed syngenetically in the hydrothermal environment. Growth tubes, resembling gramophone needles parallel to the crystal axis, are long liquid filled channels extending from tiny crystals. This "mother liquor" may be accompanied by a secondary liquid as well as a gas bubble. These tubes occur mainly in blue, green, red, and pink material, and if densely packed, can cause the cat's-eye effect. Diagnostic "trichites," which are also 2-phase inclusions, differ sharply from growth tubes and are common to all tourmalines. The irregular hair-fine networks formed by partially healed crevice surfaces consist of tiny capillaries and vesicles filled with syngenetic secondary fluid. Tourmalines develop in an especially complex chemically rich environment. So few are completely free of inclusions. Black acicular tourmaline is sometimes found as protogenetic inclusions in transparent "tourmalated quartz."

The lovely colors of rubellite, the green "chrome tourmalines", the vibrant "paraibas", and the exquisite gems from Nigeria and Namibia are most in demand today. The consumer has an extensive palette of hues from which to choose. With hardness comparable to quartz and the lack of a perceptible cleavage, tourmaline is an excellent choice for all types of jewelry, including rings and bracelets.

In the following pages (pages 17, 18, and 19), each species is listed separately, and information specific to each one is presented. Properties common to all species are shown on page 20 (in this newsletter).

Buergerite

$NaFe_3Al_6B_3Si_6O_{30}F$

Sodium aluminum borosilicate

A bronze iridescent schiller lying just below the crystal surface is characteristic of this yellow-brown to black specie of tourmaline. The specific gravity can vary from 3.29 to 3.32. The ordinary ray of the refractive index is 1.735, while the extraordinary ray reading can fall between 1.655 and 1.670. This results in a birefringence range of 0.065 to 0.080. The pleochroic colors of yellow-brown and pale yellow are the norm. Buergerite is found in rhyolite near San Luis Potosi in Mexico. Its name honors the crystallographer and research scientist, Professor Martin J. Buerger.

Dravite

$NaMg_3Al_6B_3Si_6O_{27}(OH)_3(OH,F)$

Magnesium aluminum borosilicate

This yellow-brown to black tourmaline specie forms a series with schorl and with elbaite as well as with uvite [Simon and Schuster's *Guide to Rocks and Minerals*]. Dravite crystals are usually found in contact metamorphic and metasomatic rocks, pegmatites, and crystalline limestones. Deposits in the Carinthian district of Drave, Austria are the source of its name. It occurs in Crevoladossola, Novara, Italy and at Gouverneur, in St. Lawrence County, DeKalb and Pierrepont, New York, [USA]. Kenya produces both red and yellow material. Deposits yielding excellent intense red crystals exhibiting the properties of refractive indices [e = 1.623, o=1.654, density = 3.07] and [e = 1.626, o = 1.657] and a specific gravity of 3.04 are located there. The yellow crystals present slightly lower readings [e=1.619, o = 1.642 with S.G. = 3.04]. Red crystals from near Chipata, Zambia exhibit properties quite similar to the Kenyan red material. Crystals with pyramidal form are found in Australia near Yinnietharra. Numerous pairs of pleochroic colors can be displayed in dravite: colorless/yellow, light yellow/orange-yellow, yellowish to pale brown/medium to deep brown, deep green/yellow-green, and blue-green/yellow-green.

Chromdravite

$NaMg_3Cr_6(BO_3)_3Si_6O_{18}(OH)_4$

Sodium magnesium borosilicate

Aluminum is absent, and chrome is present, which give an intense green color to chromdravite found in the central Karelian region, located near the eastern border of Finland. The refractive indices are among the highest for the tourmalines [o = 1.778 *e* = 1.772]. The pleochroic colors are dark green and yellow-green, respectively. The density of 3.39 – 341 is the greatest of the several tourmaline species. The chemical composition accounts for its name.

Ferridravit

$(Na,K)(Mg,Fe^{+2})_3Fe_6^{+3}(BO_3)_3Si_6O_{18}(O,OH)_4$

Iron Magnesium borosilicate

Aluminum is also absent from this tourmaline specie. Its colors range from brown to dark yellow-green. Pleochroic colors of deep-brown to deep olive-green/pale brown to pale olive-green are the norm. Optical properties include a birefringence of 0.057 with refractive index readings of e = 1.743 and o = 1.80 to 1.82. With a variation of 3.18 to 3.33, the density is a bit less than that of chromdravite.

Elbaite

$Na(Li,Al)_3Al_6B_3Si_6O_{27}(OH)_3(OH,F)$

Sodium lithium aluminum borosilicate

Elbaite is one of the two species of tourmaline most used as gem material. Its name is derived from the Isle of Elba, Italy, the source of some of the finest of these lithium-rich tourmalines. The extensive deposit at Newry, Maine [USA] yields stunning colors of pink, red, blue, blue-green and green crystals. An uncommon pastel pink is found at Pala, California. Nuristan, Afghanistan is known for superb emerald green, blue, and pink material. Minas Gerais in Brazil produces gem quality crystals in large sizes and a wide range of colors, as well as watermelon, bi-color, and tourmaline cats-eye material. The Jonas Lima mine is the source of fine, extremely large cranberry-colored crystals. Excellent dark red crystals are found at Ouro Fina.

The rubellite from Madagascar is prized, and the Somabula Forest region in Zimbabwe produces excellent elbaite. Various pale colors and bi-colors are produced at Alta Lingonha, Mozambique. Violet, blue and red crystals are extracted from the decomposed granites at Nerchinsk and Mursinka in the Urals. Pink elbaite is found with red crystals at Mogok in Myanmar [Burma]. The deposit near Klein Spitzkopje, Otavi, Namibia yields various colors including numerous shades of green. The green elbaite crystals produced in Kashmir, India exhibit a specific gravity of 3.05, refractive indices of 1.622-1.643 and birefringence of 0.021. Deposits at Usakos, Namibia yield excellent green chrome tourmaline. The vivid green crystals from Tanzania contain traces of chrome and vanadium. Zambia is the source of a yellow manganese-bearing elbaite resembling tsilaisite in color and chemical composition. Color-zoned material is found at Haddam, Connecticut [USA] and at Glenbuchat, Aberdeenshire, Scotland.

The density range of elbaite is 2.84-3.10 with the norm of 3.05. Refractive indices [o =1.619-1.655 e =1.603-1.634] result in a birefringence that can vary from 0.013-0.024. Pleochroic colors vary according to the body color of the material.

Gem Color	*o*	*e*
Pink- red	pink	colorless or pale pink
Blue	medium blue	colorless, pink or violet
Blue-green	bluish green	pale green to violet
Green	green	yellowish green to yellow

Liddicoatite

$Ca(Li,Al)_3Al_6B_3Si_6O_{27}(OH)_3(OH,F)$
Calcium lithium aluminum borosilicate

It was only in recent history that this calcium-rich lithium-bearing tourmaline specie was differentiated from elbaite and named to honor the late Richard T. Liddicoat. Madagascar is the source of the sometimes extremely large crystals. Material exhibiting multi-bands of several colors and fine rubellite are extracted from these deposits. Like elbaite, the color-range of the normally medium to lighter hued liddicoatite is extensive. Its physical and optical properties exhibit few variations from the norm. 3.02 is the usual density reading. The ordinary ray of its refractive index varies little from 1.637, while the extraordinary ray is constant at 1.621. Birefringence is 0.016. The pleochroic colors mimic those of elbaite. However, brown crystals occur and exhibit o = brown and e = pale brown hues.

Schorl

$NaFe_3^{2+}Al_6(BO_3)_3Si_6O_{18}(OH)_4$
Sodium iron aluminum borosilicate

The old mining term denoting any of several dark brown, green, blue-black or black rocks and minerals has become the accepted name for this common tourmaline specie that forms a series with dravite. Sites in England are a major source for the material, but distribution in granite pegmatites is worldwide. Its frequently hemimorphic, heavily striated prismatic crystals can attain several feet in length. Acicular crystals housed in transparent quartz gives rise to the term "tourmalated" quartz. Schorl's hardness – 7.25 – is mid-range for tourmaline with a specific gravity of 3.10 – 3.25. Its refractive indices are a bit above normal with readings of 1.62 – 1.69. During the Victorian era, faceted schorl, as well as jet, was used extensively in mourning jewelry. Today, the collectors of unusual gemstones are its principal market.

Tsilaisite

$Na(Mn,Al)_3Al_6(BO_3)_3Si_6O_{18}(O,OH,F)_4$
Sodium manganese aluminum borosilicate

Manganese oxide can make up as much as 9.2 percent of the chemical composition of this very rare bright yellow to red tourmaline material found in Zambia. Its birefringence range of 0.023-0.028 is the function of refractive index readings from 1.622 to 1.648. It exhibits pleochroic colors of yellow-brown for the ordinary ray and a vivid yellow for the extraordinary ray. The average specific gravity is 3.13. Confusion with elbaite is a distinct possibility unless the source and its chemical composition can be established.

Uvite

$CaMg_3(Al_5Mg)B_3Si_6O_{27}(OH)_3(OH,F)$
Calcium magnesium aluminum borosilicate

The extensive mineral deposits at Franklin and Hamburg, New Jersey and near DeKalb and Gouverneur, New York are sources of the dark brown uvite crystals. A number of years elapsed before uvite was identified as the calcium rich end member of the solid solution series formed with dravite. Its density range of 3.01-3.09 is a bit lower than that of dravite. The same is true of the optical properties range. Refractive indices of *o* =1.632-1.660 and *e* =1.612-1.639 produce a birefringence range of 0.017 – 0.021. The pleochroic colors are quite similar to those exhibited by dravite. Collectors of unusual gems may acquire faceted stones, but uvite is practically unknown in the jewelry trade.

COMPOSITION:	See individual specie
CLASS:	Silicates
GROUP:	Tourmaline
SPECIES:	Buergerite; Chromdravite; Dravite; Elbaite; Ferridravite; Liddicoatite; Schorl; Tsi-laisite; Uvite
VARIETY:	By color and by the following designations: Achroite – colorless Dravite – yellowish-brown to dark brown Indicolite (indigolite) – all blue tones Rubellite – pink to red – possible violet tint Siberite – lilac to violet-blue Schorl - black
CRYSTAL SYSTEM:	Hexagonal [Trigonal]
HABIT:	Elongated Prismatic- usually exhibits different termination forms at opposite ends of vertical axis when doubly terminated - vertical striations; Columnar; Acicular; Massive
CLEAVAGE:	Imperceptible
STREAK:	White
FRACTURE:	Conchoidal; uneven, Brittle
FRACTURE LUSTRE:	Frequently resinous
LUSTRE:	Vitreous to resinous
DIAPHANEITY:	Transparent Translucent Opaque
COLORS:	All
PHENOMENA:	Chatoyancy, Change-of color
SPECIFIC GRAVITY:	See specific specie
HARDNESS:	7.0 – 7.5
TOUGHNESS:	Good Brittle
REFRACTIVE INDICES:	Varies by specie o = 1.619 to 1.82e = 1.603 to 1.772
BIREFRINGENCE:	See specific specie
OPTIC CHARACTER:	Uniaxial (-) Arem
DISPERSION:	0.017
PLEOCHROISM:	See specific specie
LUMINESCENCE:	Weak- variable – Blue, Newry, Maine– SW-chalky blue/deep- blue Pink, Brazil – SW- pale blue or light violet Yellow; green; brown –Tanzania – SW – Strong yellow
SPECTRUM:	Usually faint – Not diagnostic
CHELSEA FILTER:	No information
AQUA FILTER:	No information
SOLUBILITY:	Insoluble in acids
THERMAL TRAITS:	**AVOID THERMAL SHOCK** Fusibility – Variable with composition Lithium bearing varieties - infusible Iron-rich varieties – fusible with difficulty Magnesium-rich varieties – fusible at 3 Brief green flame when fused with boron flux
TREATMENTS:	**Heat** to 450^{o}C to achieve paler hues. Difficult to detect. Causes brittleness. **Opticon** for fracture filling. **Irradiation** uncommon.
INCLUSIONS:	See information above

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 and Rainy Peters .... albpet@msn.com
Russ Spiering .... DesignsByRKS@email.msn.com
Jim Summers: .... commish1@worldnet.att.net
Bill Swantner .... swantner@bscoptics.com
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

Alpha Taurus For Sale

As many local faceters know, I have more machines that anyone with good sense needs. I just bought a new Alpha Taurus to use as my primary machine. Although I want to keep some of the other machines to use in the Guild's workshops, I have decided to offer the two older Alpha Taurus machines for sale. Both have been carefully calibrated by me and are in good working condition. Each has a 96 index gear and comes with a basic set of laps and a standard set of dops. New Alpha Taurus machines, without laps, list in Alpha Supply's catalog for $2,250. I will take $1,100 for the older one and $1,200 for the newer one. I will even throw in some gem rough to sweeten the deal. If interested, call me, Ernie Hawes, at (505) 821-3201. My e-mail is: ehawes7@comcast.net

Advertisement

FOR SALE

Graves Mark IV

John Roberts, a former member of the New Mexico Faceters Guild has for sale a Graves Mark IV faceting machine. Ernie Hawes has examined the unit and believe it to be in very good condition. The machine comes with 96, 64, 32, 80, and 120 index gears, 65 dops with a wood holder, two 45 degree dops, a transfer block, and two notebooks full of faceting designs. No laps are included, as John will use them on another machine. John is asking $500 or best offer. For those interested, please call John at (505) 299-8209.