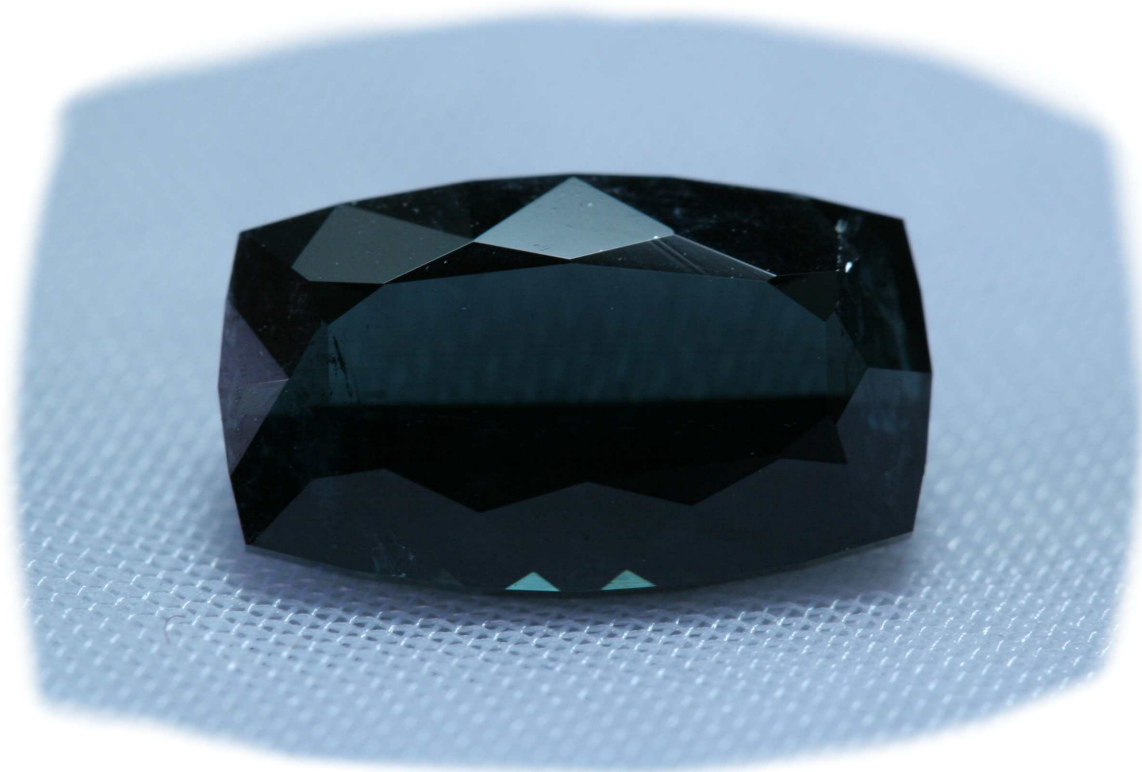


the
New Mexico

faceter

January/February, 2006



The Official Newsletter of the New Mexico Faceters Guild

NMFG *Show and Tell*



Diamonds and opal in 14Kt gold by
Steve Attaway.



Oval Aquamarine, recut by Nancy
Attaway.



Bright yellow labradorite by
Ernie Hawes.



Round Flasher-cut quartz by
Betty Annis.

The **New Mexico Faceters Guild**

Guild Officers 2006-2007

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Vice President/Programs: Ernie Hawes
Secretary/Treasurer: Betty Annis
Guild Gemologist: Edna Anthony
Guild Mineralogist: Paul Hlava
Workshop Chairman: Ernie Hawes

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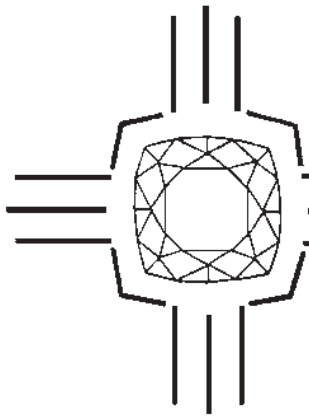
Ernie Hawes

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: The Guild meets now on the second Monday of odd numbered 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.

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The New Mexico Facetor

Volume 26, No. 1, January/February, 2006



NMFG President Dylan Houtman

In This Issue:

<i>The Prez Sez</i> by Dylan Houtman.....	3
Minutes of the NMFG Meeting.....	4
Program Speaker.....	6
Facet Designer's Workshop.....	8
Faceting Designs.....	10
In the News.....	9
Email Addresses.....	12
Membership Application.....	12



New Mexico Faceters Guild Official Website

We invite everyone to visit our website at: www.attawaygems.com/NMFG for interesting and informative articles on gemstones and faceting techniques.

The Prez Sez:

by Dylan Houtman

Hello,

I came across some very beautiful fluorite a short time ago, mostly pink with some green stripes. It's not a day-glow pink and green, it is more like a top-gem Morganite color: one piece had a couple of very narrow green bands the other was about half pink and half green. As I have had excellent luck cutting perfect cleavage materials into cushion triangles, I cut the first piece into my cut-corner montringle 2. At 16.3 MM some of the facets were quite large; this concerned me because I am used to cutting small stones. I have had good results on other soft, perfect cleavage stones using a 50K diamond Ultralap and received excellent results on these large facets. The second piece was even larger, and my wish to cut an emerald-cut assured I would have even larger facets than the previous stone. Amazingly I obtained a very nice polish with relatively little effort.

My problems began when I was removing the finished stone from the V-dop. I had used a combination of shellac, black dopping wax, and some orange sealing wax that Ernie Hawes gave to me to try out. I softened the wax with heat, pressed into it the finished pavilion and then applied super-glue to assure that the stone would not come off. After finishing the stone I placed it in acetone to dissolve the waxes and glue, the orange sealing wax dissolved in short order, turning fluid quite rapidly, followed quickly by the shellac and super-glue. The black dopping wax dissolved very slowly, so I picked it off with my fingernail. Big mistake: some small pieces of fluorite came with it; an excellent opportunity for me to try my hand at repair.

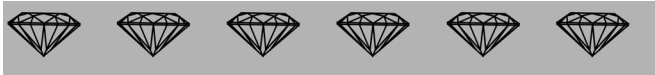
Luckily a large stone on a large dop sits really straight, and lining the stone up to re-cut was fairly easy. So if I don't tell anyone two of the pavilion facets shouldn't be narrower than the rest of them, no one will ever know!

Henceforth, when I cut delicate stones I will use only the orange sealing wax. This wax seems to have a relatively low

melting temperature yet stays pliable a reasonable time and is very rigid when cool. If you are interested in this wax I hope Ernie will be willing to help you obtain some.

In a final note, not all of my purchases on e-bay have been as good as most; I am glad so many of my purchases have resulted in excellent rough. But I have also been taken in - as with some yellow tourmaline rough that turned out to be beryl... So be careful.

Keep On cutting,
Dylan Houtman.



Minutes of the NMFG Meeting

January 9 2006

by Nancy L. Attaway

President **Dylan Houtman** called the meeting to order at 7:15pm and welcomed everyone to the first Guild meeting of 2006.

Old Business:

President **Dylan Houtman** mentioned how much fun the Christmas Party had been. The Guild membership declared the Christmas Party held at the home of **Bill and Ina Swantner** a huge success. Everyone agreed that the Swantners were fabulous hosts, and that the food served was absolutely delicious. Many very nice items were given during the rousing gift exchange held after dessert.

President **Dylan Houtman** reported that a Guild Workshop was held at his home on January 7, this past Saturday. The workshop was held in early January instead of hosting one on the afternoon of the Christmas party. **Ernie Hawes and Nancy Attaway** served as instructors and also led a morning discussion.

New Business:

Nancy Attaway announced that both **Ina Swantner and Herb Traulsen** were in the hospital, and that she brought two get well cards for everyone to sign. We all wished Ina and Herb a speedy recovery.

Nancy Attaway mentioned that the February Tucson show begins late January, with several prominent shows opening on February 1. Steve and Nancy will be at the Tucson Show during the first week of February. Nancy and Ernie remarked that Tucson's Old Pueblo Lapidary Club will host a meeting February 4 at their clubhouse in Tucson.

Nancy Attaway also mentioned that the Albuquerque Gem and Mineral Club will be hosting their annual club show, TOTE '06, on March 17, 18, and 19 at the Flower and Arts Building at the Albuquerque State Fairgrounds.

Ernie Hawes announced that **Glenn Klein's** new book "Faceting History" is now available and to contact Glenn for a copy. Both Ernie and Nancy have autographed copies of the new book.

Refreshments:

Jen Baker brought refreshments to the January meeting. Gourmet coffee was also served. Thank you very much. **Linda Vayna and Nancy Attaway** volunteered to bring refreshments to the meeting in March.

Show and Tell:

Betty Annis displayed her most recent stone, an 11mm Flasher Cut round that she rendered in synthetic blue quartz. **Ernie Hawes** remarked that he was surprised at the sparkle and liveliness of the gem for being quartz, and he was inspired to further research the Flasher Cut's faceting angles. He had provided a handout of faceting angles for the Flasher

Cut at the last workshop and discussed his recent findings.

Ernie Hawes displayed a small, bright yellow labradorite, a bytownite from Pueblo Park, New Mexico, that he faceted in the Flasher Cut. He was pleased with the stone's brilliance. Ernie also displayed an absolutely gorgeous 8-carat cushion cut square aquamarine that he faceted in his "Merrill's Inspiration" cut. The stone is owned by Bill Wood and is to be set in a pendant for Bill's wife.

Dylan Houtman displayed 12 stones that he recently cut. He showed a large yellow cushion emerald cut Mexican labradorite and a large rough piece of white danburite. He was working on the faceting diagram for the danburite with GemCad at the last workshop. Dylan showed a pale pink oval California morganite, a cushion oval petalite, a dark blue cushion emerald cut Nigerian tourmaline, a small brown square Brazilian tourmaline, a small pink square Brazilian tourmaline, and a small cushion cut triangular purple spinel. He also showed an orange grossular garnet round, a round and a cushion cut triangular orange spessartite garnet, a small olive green Mali cushion cut triangular garnet, and an unusual natural, unheated yellow sapphire that he cut in a very long and thin marquise shape.

Nancy Attaway displayed four aquamarines that she recently faceted. These were re-cuts that belonged to a jewelry store in Rio Rancho. She had re-cut the pavilions on a long oval light blue aquamarine and a silver blue wide oval aquamarine to improve the sparkle. Nancy had totally re-cut the entire stone on a large dark blue oval aquamarine and a large square greenish blue aquamarine, greatly improving the value of both gems. These stones were obtained from an estate sale, and re-cutting them improved the shape, the sparkle, and the color of both aquamarines. She remarked that these gems, originally cut many years ago, exhibited no brilliance from their very odd and irregular shapes.

Steve Attaway displayed two splendid rings and four lovely pendants that he recently made. Steve

and Nancy had cast twice during the Christmas holidays to make jewelry for clients and for their inventory. One ring was cast in 14Kt. yellow gold and held a beautiful crystalline Australian oval opal, accented by small diamonds. The other ring was cast in 18Kt. white gold and held a 3/4-carat princess cut diamond in the center flanked by two smaller princess cut diamonds. Steve had rendered the design in CAD, and this ring is an engagement ring for a lady famous in the Albuquerque area. He also displayed four beautiful crystalline opals and black opals set in 14Kt. yellow gold cast pendants. Steve remarked how he had milled out the wax patterns for the settings and the bails with his 3-axis milling machine. Steve had also made several other rings and pendants that were already delivered to customers and not available for Show and Tell, and he had cast several pendants and rings for some Namibian chalcedony cabochons that he carved, as well as for some of his opals. These will be shown during the Guild meeting in March.

NMFG Workshop

A Guild Workshop was held on January 7 at the home of Dylan Houtman in south Albuquerque. Nine Guild members attended the workshop. Ernie Hawes and Nancy Attaway served as instructors. Upon entering Dylan's home, members were greeted by the wonderful aroma of Dylan's green chile lamb stew. Nancy Attaway prepared gourmet coffee and baked a chocolate/cherry cake, and Jen Baker brought fudge brownies.

Ernie Hawes began the morning session by describing the brilliance and sparkle of the Flasher Cut round over the standard round brilliant. Ernie then handed out copies of several sheets that compared the angles for the standard round brilliant with the Flasher Cut round. He said to pay particular attention to the ISO brightness. Ernie then presented a brief history of the Flasher Cut round and how it had evolved. He stated that he intended to further research the Flasher Cut round by using the various

CAD programs for brightness and tilt to explain what faceting angles yield the best sparkle.

Ernie said that the only aspect of the Flasher Cut round that he did not like was that the design called for a large table facet, which he thought was too large. Nancy Attaway and Dylan Houtman agreed and said that they both had cut on some gems another tier of star facets at a shallower angle using the ceramic lap to make the Flasher Cut round's table facet somewhat smaller. Nancy remarked that a faceter could change the angles for the Flasher Cut round to better suit gem materials more saturated in color. The brightness and sparkle for rhodolite garnets and Nigerian liddicoatites benefit from shallower cutting angles. The cutting angles of the Flasher Cut round can be adapted with shallower pavilion and crown angles to achieve this. She said that some of the volume lost from cutting at shallow angles can be captured by leaving a thicker girdle.

Nancy brought extra copies of the two issues of Lapidary Journal that had published Steve Attaway's article on Grit Size Paradox and the article on the Mystery of Polish. She announced that Steve was addressing those subjects during the Guild meeting scheduled for January 9. She then mentioned that folks interested in reading some of the material beforehand were welcome to the copies. Nancy remarked that Steve's talk would be the same one that he presented during the Texas Faceters Symposium held last October in Austin. Nancy said that Steve had added some new material that Lapidary Journal did not have when they published his polish article.

Folks faceted most of the day at Dylan's place, occasionally stopping to enjoy the delicious food served. Linda Vayna completed the polish of the pavilion of her round yellow Mexican labradorite. Carsten carefully photographed the stones that Dylan and Nancy had brought and enjoyed not being so rushed to do so. Carsten also photographed the lovely round stone that Betty Annis faceted. Dylan worked on a new design for a long cushion emerald cut that he wanted to render from a large rough piece of white

danburite and a large yellow Mexican labradorite. Dylan incorporated a facet arrangement Nancy and he collaborated on, that fanned a series of sliver facets on the short ends of the cushion emerald cut.

Next Guild Workshop

The next Guild Workshop will be held at the home of Steve and Nancy Attaway in late April, providing it does not snow in the East Mountains. There has been a flurry of interest in Robert Strickland's GemCad recently, and Ernie Hawes has been asked to teach several folks how to use this wonderful computer program designed for faceting. Therefore, Ernie Hawes has decided to dedicate an entire Guild Workshop to the usage of GemCad. Members are asked to bring only their laptops for this particular workshop. An e-mail announcement of the April date for this workshop will be sent by Ernie.



Program Speaker

by Nancy Attaway

Guild member Steve Attaway talked about his article, "The Mystery of Gemstone Polish" that was published in the November, 2005 issue of Lapidary Journal. Steve reviewed his previous information on polish and presented his new data that was included in the article.

Steve stated that polish falls into three categories: the finer scratch theory, the flow theory, and the chemical theory. The finer scratch theory renders polish by making finer and finer scratches until the scratches cannot be seen, much as when diamonds are polished. The flow theory polishes by having the surface deform and flow to fill in and level the surface, much like a plastic deformation. The chemical theory achieves polish as the surface is removed atom by atom through chemical reactions, as when a cerium oxide lap or an aluminum oxide lap is used for polish. Steve said that a good polish theory should explain why it is difficult to polish

quartz with diamond, yet easy to polish quartz with cerium oxide. He said that a good polish theory should also explain why sometimes the lap makes all the difference, and at other times, the lap seems not to make any difference at all. He remarked that some polishing laps are soft, like the corian lap, the

lucite lap, and the wax lap, while other polishing laps are hard, like the ceramic lap and the meehanite iron lap. Some of these laps use water for polishing, while others use oil with diamond. Steve said that while most faceters use the same cutting laps for faceting gems, those same faceters have a collection of different polishing laps, as the various types of gem material seem to require specific polish laps. Steve said that current polish theories seem to conflict with each other in their explanations as to what makes a good polish. It is no wonder then that some faceters are left confused.

Steve stated that one of the obstacles to understanding polish is that it is very difficult to design experiments that will reveal what is really happening on a surface that is being polished. Since polish occurs on a very, very small scale, the surface is inaccessible during the polish process. A sensor has yet to be invented that can make measurements during the polishing process. Therefore, what is known about polish is often inferred from indirect experiments and observations.

Steve said that several experiments involving glass indicated a change in material behavior can occur at very small loading scales. One such experiment measured the amount of glass eroded by a spray of silicon carbide particles. This experiment determined the angle of impact that maximized the amount of the material removed by a high-speed jet of particles. For coarser abrasives, the fastest material removal rate occurred when the spray was aimed almost perpendicular down upon the glass. The maximum removal rate was at about 10 degrees off axis from vertical for the 120-grit and the 500-grit abrasive, with the removal rate for the 120-grit being greater than the 500-grit. Surprisingly enough, for the finer 1000-mesh abrasive rate, the maximum removal rate was at an impact angle of approximately

30 degrees, over twice the removal rate of the 120-mesh. Steve explained that there was a size effect on the strength of the glass shown in these experiments. One could deduce then that a change of abrasion mechanism can be based upon the grit size. He said that the damage layer generated by certain grit sizes can be measured. Steve recommended that faceters keep this grit size paradox in mind when using the various grinding laps on gemstones. The damage generated by these grinding laps must be eliminated with the finer grit laps to obtain a good polish.

Steve said that, in addition to sandblasting experiments, other research observed changing glass behavior for very small sizes. Opticians have observed scratches in glass, where the behavior of the material seems to be dependent upon the depth of the scratch. For very shallow scratches, the glass seems to behave like ploughed ground, where the material is pushed out of the way as the grit moved over the surface. For deeper scratches, fractures begin to radiate out from the initial point of the scratch. Other scientific scratching experiments showed evidence of material flow, lateral cracking, chipping on the groove, and crushing beneath and ahead of the damage tool. For very shallow depths of one micron, only material flow was seen. As the damage depth increased, both cracks and material flow were observed in the grooved surface. Lateral cracks developed radially from the groove at larger depths of ten microns.

Steve reported that many scientific experiments showed a relation between the depth of the scratch and the glass behavior. Besides glass, similar experiments were done on concrete, sea ice, steel and other engineering materials. He said that in addition to load, this transition also depends upon machine stiffness, tool radius, rake angle, crystallographic orientation, and cutting direction. Conclusions showed that many materials can undergo a transition between ductile and brittle behavior based on a characteristic length that is a property of the material.

Steve next discussed the experiments on thin glass plates done by Twyman in the early 1900's. Twyman observed that the grinding process introduced a thin compressive layer in the surface of the glass. He found compressive stress was induced in grinding and caused the plate to assume a convex form. We now know that this was the result of permanent deformation of the ground material. The amount of deformation resulting from this thin layer of damaged and strained material on the grinding surface can be measured with an interferometer, which measures the curvature of the glass before and after grinding. Steve thought that some of our gem material can be affected in a similar fashion and that might be a cause of a problem encountered during polish. He mentioned how cracks in tourmaline have appeared later in clean crystal material after it was ground.

Steve said that, regarding a flow theory, Beilby was almost correct but for the wrong reasons. Beilby observed what he thought was glass flowing during polish, and he thought that frictional heating produced a viscous liquid that flowed over the surface. Steve said that closer examination of the mechanics of fracture and plasticity shows that material behaves plastically rather than melts. Subsequent research shows polish to be a chemomechanical process that involves a chemical bonding of glass with polishing compounds. The polishing compounds are embedded in a soft tool, and the chemically weakened glass bonds are then pulled apart mechanically on an atomic level.

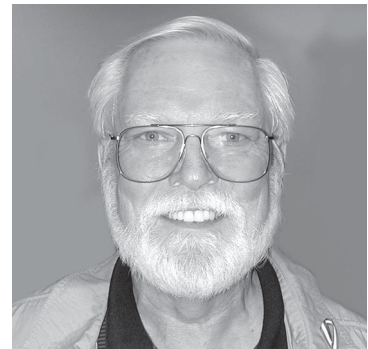
Steve said that, although gemstones do not always behave like glass, the discoveries made from the careful observation of the Twyman effect provide strong evidence that three different types of phenomena may be occurring when we polish gemstones. He said that some parallels exist between glass behavior and the behavior seen in gemstones. Research has suggested that all three mechanisms, finer scratch, ductile flow, and chemical polishing, may be at work. As faceters, when we grind our gem crystals into the desired shapes, we may be introducing stresses into the material and generating

cracks. Steve said that we have only scratched the surface when it comes to understanding the physics and chemistry involved in polishing.

For those interested in reading more about Steve's polish article, please check the November 2005 issue of *Lapidary Journal*. Steve explains the experiments conducted and the terms used, and he provides photos and many references in the article.



Facet Designer's Workshop



By Ernie Hawes

While attending the Tucson gem shows, I had the privilege of meeting Danny Hargreaves, a faceter from Edinburgh, Scotland. Danny had never been to the Tucson shows before, and obviously was as excited about it as the proverbial kid in a candy store. I met Danny while visiting the Alpha Supply booth where Johnny Tew, the sales manager for Fac-ETTE, was demonstrating their machine. Danny was there as Johnny's guest. Danny and I spent part of a day and evening together looking for faceting rough and generally talking about faceting. Danny showed me a pentagram shaped design he had created which he said had been inspired by the Harry Potter books. Danny named the pattern, *WitchGem*. Since I'm always looking for new designs for our newsletter, I asked Danny if he would allow me to publish it. Danny graciously agreed. The average cutter should have little difficulty cutting this pattern, and the result should be intriguing, especially for anyone interested in the Harry Potter books or the occult.

Since Danny is not a member of our guild, I thought it would be appropriate for him to tell us a

bit about himself. Below are his remarks about how he became a faceter.

“I got into faceting by chance. I was retired early due to a stress related illness. In 1999 I went to a rock and gem fair in Edinburgh just as a way of passing some time. The first person I saw there was Steve Smith from Newcastle-on-Tyne, who got me addicted to faceting. My first machine was a Graves MK4 which got me started. A few years later, once I knew what I needed and the money became available, I purchased a Fac-Ette, which gave me the consistency and accuracy I look for in equipment. I cut mostly for the pleasure of producing a good looking stone. Perhaps in the future I will look to cutting competition stones.”

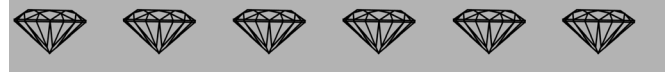
Danny hopes to be able to return to the Tucson shows next year, and hopefully, I'll have the opportunity to spend more time with him. And perhaps he'll have another design or two that he'll share with us!

Our second design is not really new, just the continuing work I've been doing on the Flasher design that Nancy Attaway has gotten me somewhat addicted to. I mentioned at our last meeting that I thought the table on this design was a bit large, and that another row of facets on the table might improve the overall appearance of this design. In the modification presented here, I've added a row of step-cut facets. Nancy said in the meeting that she sometimes added another row of stars. Either one should work to give more scintillation.

A second thing you'll note that I've done is change the index gear to a 72. GemCad divides the 72 index into 12 major steps with markings every three steps. Any twelve main design would be easier to index if the gear on the machine were marked this way. The Polymetric 72 on my XS3 is divided this way, but the Facetron and Fac-Ette gears are not. On some other machines they may be.

I had already modified the angles of the original pattern to give an overall better brilliance and

scintillation. This time, I also changed the angles some so the design would work well with peridot, one of my wife's favorite stones. If you haven't cut this pattern yet, I really encourage you to do so. You're bound to be pleased with the result.



In the News

Christie's sets new record for ruby

Source: AGTA Gemological Testing Center '06

At Christie's February 15, 2006 auction in St. Moritz, the per-carat world record for ruby increased from \$275,000 per carat to \$425,000. The 8.62-carat gemstone yielded a final price of \$3.6 million. This continues the upward price trend of the past few years for fine quality untreated colored gemstones.

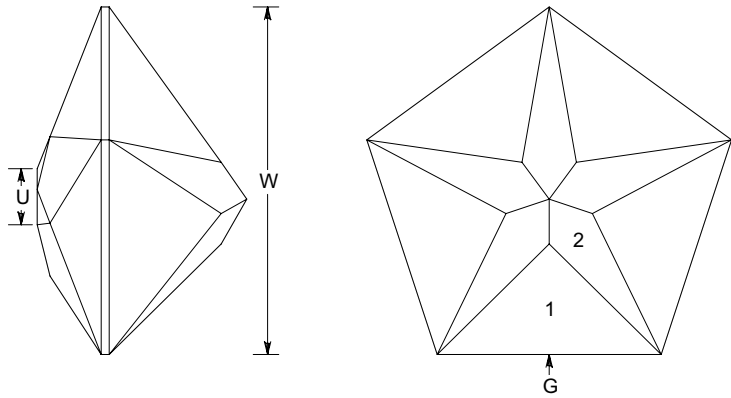
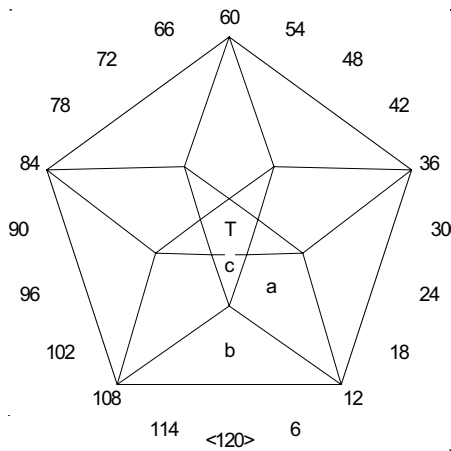
Record-breaking 16,839-carat rough tanzanite found

Source: AGTA Gemological Testing Center '06

A massive tanzanite crystal was recently found 270 meters underground in the "Bravo Shaft" of TanzaniteOne Ltd's Merelani Mine in northern Tanzania, a huge crystal weighing 16,839 carat (over 3 Kg) was found at a depth of 270 meters. The stone measures 22 x 8 x 7 centimeters.

TanzaniteOne dubbed the record-breaking tanzanite crystal "The Mawenzi" after Mount Kilimanjaro's second highest peak. Ian Harebottle, TanzaniteOne's president and COO, said, "We were reluctant to name it Uhuru, after Kilimanjaro's highest peak, on the off chance that a larger piece is ever found."

A value has not yet been placed on the crystal, and it will most likely be put on public display before deciding whether and how to cut it into polished gemstones. If this magnificent stone is cut into gemstones, the largest one will probably be named after Tanzanian President Benjamin Mkapa; others of the cut stones will likely be put on display at Tanzania's National Museum.



WitchGem

created by Danny Hargreaves

Angles for R.I. = 1.760

26 + 5 girdles = 31 facets

5-fold, mirror-image symmetry

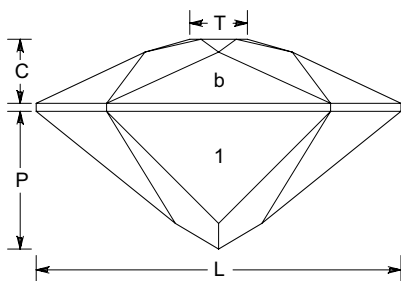
120 index

L/W = 1.051 T/W = 0.170 U/W = 0.161

P/W = 0.399 C/W = 0.185

Vol./W³ = 0.184

Average Brightness: COS = 65.2 % ISO = 81.9 %



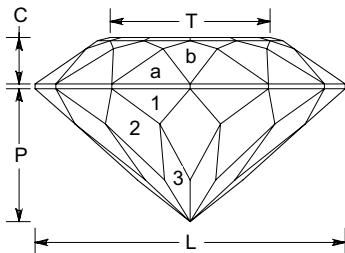
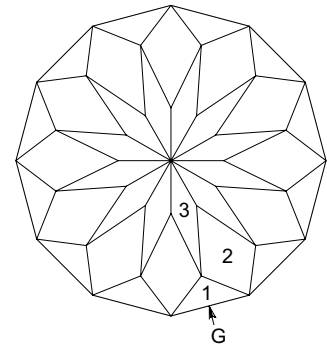
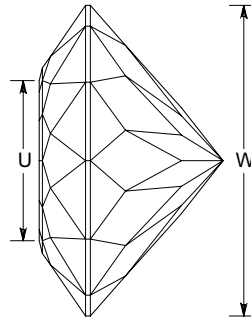
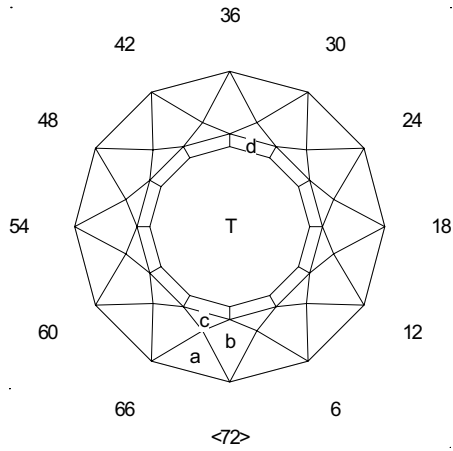
PAVILION

G	90.00°	120-024-048-072-096
1	45.50°	120-024-048-072-096
2	35.80°	012-036-060-084-108

CROWN

a	21.80°	012-036-060-084-108
b	33.60°	120-024-048-072-096
c	13.60°	120-024-048-072-096
T	0.00°	Table

Permission granted to members of the New Mexico Faceters Guild for non-commercial use.
Original angles rounded to tenths of a degree with Danny Hargreaves' permission.



Modified Flasher revised by Ernie Hawes

Flasher design is angle variant of 45.011 Spectrabril

Angles for R.I. = 1.650

85 + 12 girdles = 97 facets

12-fold radial symmetry

72 index

$L/W = 1.000$ $T/W = 0.514$ $U/W = 0.514$

$P/W = 0.425$ $C/W = 0.153$

$Vol./W^3 = 0.199$

Average Brightness: COS = 80.1 % ISO = 86.4 %

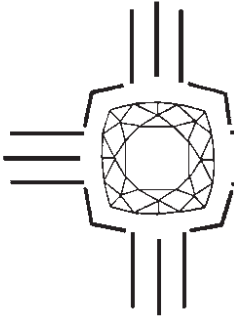


PAVILION

G	90.00°	03-09-15-21-27-33- 39-45-51-57-63-69
1	49.00°	03-09-15-21-27-33- 39-45-51-57-63-69
2	41.50°	72-06-12-18-24-30- 36-42-48-54-60-66
3	39.00°	03-09-15-21-27-33- 39-45-51-57-63-69

CROWN

a	40.30°	03-09-15-21-27-33- 39-45-51-57-63-69
b	35.00°	72-06-12-18-24-30- 36-42-48-54-60-66
c	24.00°	03-09-15-21-27-33- 39-45-51-57-63-69
d	15.00°	03-09-15-21-27-33- 39-45-51-57-63-69
T	0.00°	Table



The New Mexico Facetors Guild

Membership application or renewal form

Dues:

- 1 year membership, includes electronic copy of NMFG newsletter:.....\$20.00
- 1 year membership and mailed paper copy of newsletter.....\$30.00

Please print this page and send it along with a check (made out to NMFG or New Mexico Facetors Guild) for dues to:

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