the New Mexico Facetor

January/February 2005

The Official Newsletter of the New Mexico Faceters Guild

NMFG
Show and Tell

Peridot collected by the Owen family at Kilbourne hole in southern New Mexico.

Dylan Houtman presented an enormous Russian blue topaz pear and gorgeous tanzanites in a variety of shapes.

Aspen Leaf pendant by **Steve and Nancy Attaway**. Nancy also cut this lovely golden beryl.

The
New Mexico Faceters Guild

Guild Officers 2004-2005

President: Dylan Houtman
Vice President/Programs: Ernie Hawes
Secretary/Treasurer: Bill and Ina Swantner
Guild Gemologist: Edna Anthony
Guild Mineralogist: Paul Hlava
Workshop Chairman: Ernie Hawes

Newsletter Editors:
Carsten Brandt

Newsletter Production:
Wild Rice Press, Inc.
P.O. Box 1355
Cedar Crest, NM 87008
(505) 286-4785

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.

The next meeting of the New Mexico Faceters Guild will be March 14, 2005.

The New Mexico Facetor

Vol u m e 2 5 , N o . 1 , January/February, 2005

NMFG President Dylan Houtman

In This Issue:

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 was able to go to the gem and mineral show in Tucson this year; it was an amazing experience. Tents set up, hotels filled, all across the town. In addition to tools and equipment, carved wood from various sources, and beads beyond description, there was everything from toys for kids to the facet rough – which particularly interested me. And I didn't even get into the biggest of the shows! Seeing people and hearing languages from all of the continents is an experience I will not soon forget.

I obtained some rough that I am unable to get locally and have not seen on the internet: ruby red spinel (way too expensive, but I knew if I didn't get it then I might not see it again), some beautiful blue, blue-green and pale blue kornerupine(aquamarine color), color change diaspore from Turkey, a beautiful color-change garnet(deep pink to golden brown), light blue tourmaline, small mandarin orange spessartite garnets, some good-size and fairly clean orange-brown material the seller claimed as spessartite garnet(probably is!), a nice blue sapphire(2.5 cts. only $5.00), benitoite(cut a 3.7 MM stone), two small emeralds, and a piece of cubic zirconia(tobbaco brown to brilliant green color change).

I cut a piece of the diaspore, AlO(OH), although I had been warned about it's cleavage problems, the piece looked so clean I was overconfident as I began to cut. As I ground a surface to glue my dop to at about five degrees from the main cleavage plane, a veil or crack showed up, so I sawed the piece through it; no problem. I have had excellent results cutting tough materials into triangles, so that was my choice for this one. The cutting went well until I tried to bring the pavilion to a point, where the cleavage plane became evident as material began to flake away. Even with a 1200 grit lap with the rotation approaching from tip of culet to girdle, it was very difficult to

[Continued on page 4]

form a sharp tip. Any but the lightest of pressures resulted in chunks coming off. I used an ultra-lap with 50K diamond to polish with good results. The other piece I am going to make with the table almost perpendicular to the cleavage plane, this seems to work well with Kunzite and I am hoping for better results next time. In my opinion diaspore is a more difficult material than Kunzite; good luck if you choose to give it a go. Rutile, TiO_2, on the other hand is a much easier stone to cut. The pieces I have are a beautiful deep red. The only problem I could see in cutting this material is that damage is very deep when cutting on the "C" axis of the crystal (and the stones will be small). I used lead-tin lap with Linde-A to polish; I am sure your favorite technique will work well.

Keep cutting and bring your stones to show off at the next meeting,

Dylan.

Minutes of the NMFG Meeting

January 5, 2005

by Nancy L. Attaway

President **Dylan Houtman** called the meeting to order at 7:10pm and welcomed everyone to the meeting. He announced that ***dues were due and to be paid to Treasurer*** **Ina Swantner.**

Old Business:

Nancy Attaway related that the Guild Christmas party was a huge success. We all thank **Bill** and **Ina Swantner** for opening their lovely home to us and for hosting the party. Thanks to Ina for cooking the beef brisket. Thanks to **Steve Attaway** for cooking a pork roast in the Dutch oven. Steve also baked Nancy's green chile/garlic scalloped potatoes in the Dutch oven. Nancy made gravy while Steve carved the meat. Thanks to everyone who brought side dishes, bread, desserts, and wine. We all enjoyed a lovely dinner and heartily consumed the delicious food. After dessert, Steve orchestrated the rousing gift exchange. **Ernie Hawes**, who lets his beard grow in December to play Santa for school children, served as our Santa.

The Guild workshop was held in Bill and Ina Swantner's garage from 1:00pm until 4:30pm before the Christmas party. Dylan Houtman and Carsten Brandt worked on cutting their stones. Ernie Hawes helped new members from the Owen family to begin their faceting adventure by having the father and son cut a Flasher Cut round in citrine. Nancy Attaway helped Linda Vayna cut the Apollo Cut triangle.

New Business:

Ernie Hawes announced that Guild member Alston Lundgren from Santa Fe graciously donated several books to the Guild Library. Ernie remarked that Alston is a competition facetor who uses a highly modified Facetron with a complicated electronic readout. Ernie said that Alston also uses a one inch thick granite master lap.

Nancy Attaway announced that the television program that features Scott Sucher, Steve and Nancy Attaway, and Smithsonian Curator Jeff Post has a new air time. The program that chronicles their work on the Hope diamond is scheduled to air on February 10, 2005.

Ernie Hawes arranged for a Guild Workshop to be held March 5, 2005 at the Home of Steve and Nancy Attaway in the East Mountains. Nancy said that she hopes to have a DVD of the Hope diamond research to show during the morning session of the workshop.

Refreshments:

Linda Vayna and **Carsten Brandt** baked yummy desserts for tonight's refreshments. Gourmet coffee was also served. Thank you very much. New member **Deb Owen** and **Nancy Attaway** volunteered to bring refreshments to the meeting in March.

Show and Tell:

New member **Deb Owen** brought several of the mineral specimens that were collected during the Owen family outing to Kilbourne Hole in southern New Mexico last weekend. Deb showed a piece of facet grade peridot with good color that will yield a very nice gem. The piece was considered large for Kilbourne Hole specimens. Also shown were peridot bombs in matrix with ortho-pyroxene and enstantite.

Dylan Houtman displayed nine stones that he recently faceted. He showed a very large Russian blue topaz pearshape and a mid-sized Russian blue topaz triangle cut in his Montringle design. Dylan cut these two light blue gems from one piece of rough. Dylan showed five very interesting sphenes, a large round, a large parallelogram, a small triangle, and two small rounds. He remarked that he polished the sphenes on a tin/lead lap with linde A, and he said that the gems polished quite easily. Sphene is a soft gem with a very high dispersion. Dylan also showed six lovely tanzanites that he cut, a large triangle, a mid-sized oval, a small square, a small marquise, a small triangle, and a small oval.

Nancy Attaway displayed three stones that she recently faceted. She showed two large emerald cut yellow beryls or helidors from the Ukraine that exhibited a rich golden hue. She also showed a 12mm Flasher Cut round Mexican opal that displayed a nice contraluz rainbow of colors. Nancy remarked that Steve rendered a gorgeous pendant for the Aspen Leaf oro verde citrine. She said that Steve will send Editor Carsten Brandt a picture of the finished piece for the next issue of the New Mexico Facetor. She will also send Carsten a picture of the large cushion cut oval aquamarine that she faceted, which was not shown; the gem was in Santa Fe at the time of the meeting.

Program Speaker

by Nancy Attaway and Carsten Brandt

Paul Hlava presented an updated version of his very interesting talk on **"Synthetic Gemstones".** Paul began by defining terms and then discussed the history of gem synthesis. He explained the many techniques used over the years for making synthetic gems. Paul included a new section on synthetic diamonds and discussed synthetic yellow diamonds from Apollo and Gemesis.

The following pages give a summary of Paul's talk with additional information taken from references on this subject. Books and websites used in addition to Paul's presentation are listed at the end of the article.

A selection synthetic sapphire boules, grown with the Verneuil method.

Gemstone Synthesis

A gemstone is by definition “beautiful, rare and durable enough for adornment”. These features make such an item desirable and valuable. Not everyone can afford the gemstones they would like to have. Since ancient times, humans have figured out ways to imitate natural gemstones with the use of more readily available materials. The early Egyptians and Greeks produced simulants (see definitions below). The technologies for creating manmade synthetics did not emerge until the Age of Enlightenment.

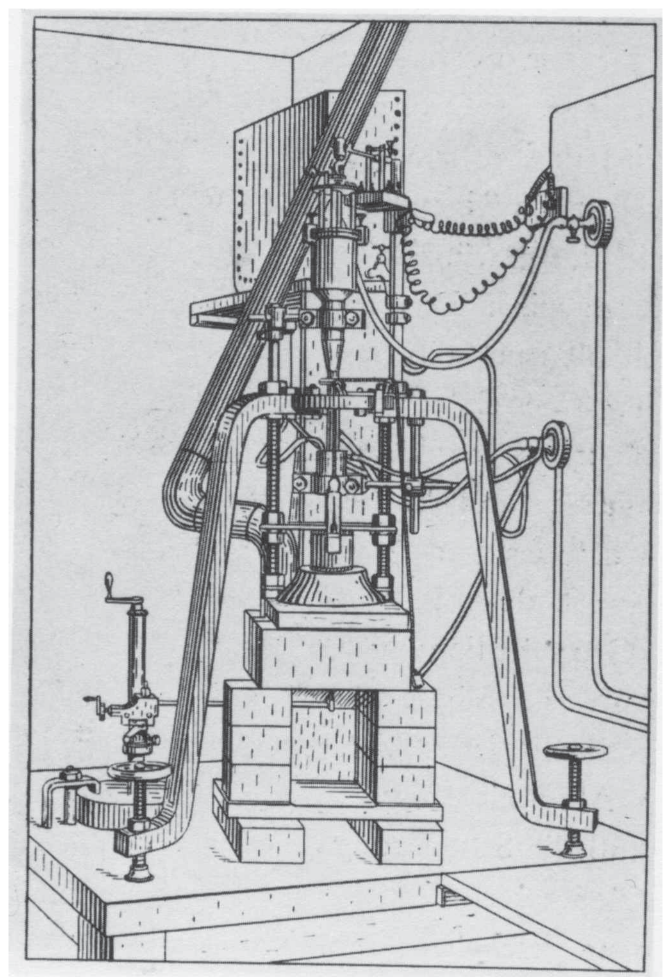
Gemstone Terminology:
Naturals - material mined from the earth (ruby).
Synthetics - identical to naturals but made in the lab (synthetic, created, or lab-grown “ruby”).
Invented - no natural equivalent (CZ, Cr-YAG, langasites).
Simulants - any material with the wrong chemistry and physical properties masquerading as a gemstone (plastic, glass, other minerals).

Until early chemical analytical skills were developed, most gemstones were categorized by their color. For example: emerald, green sapphire, peridot, tourmaline, etc. were all named smaragd/smaragdus; sapphire was originally the name for lapis lazuli. By the end of the 18th century many chemical analytical techniques allowed gemstones to be identified by their elemental composition (diamond, 1797; emerald, 1798; ruby, by 1800).

There are some key requirements for gemstone synthesis: **Heat** is needed to be able to melt or fuse raw materials. Ruby and sapphire synthesis often requires temperatures around 2200^{o}C. **Pressure** is required for most methods, and many diamond synthesis processes require very high pressures (in the range of 60,000 atm). The **raw materials** must be very pure, tiny amounts of impurities give the gemstone its color. Too many impurities may make the gemstone dark and cause cloudiness or inclusions. Geological processes are re-created in laboratory settings in order to produce synthetics.

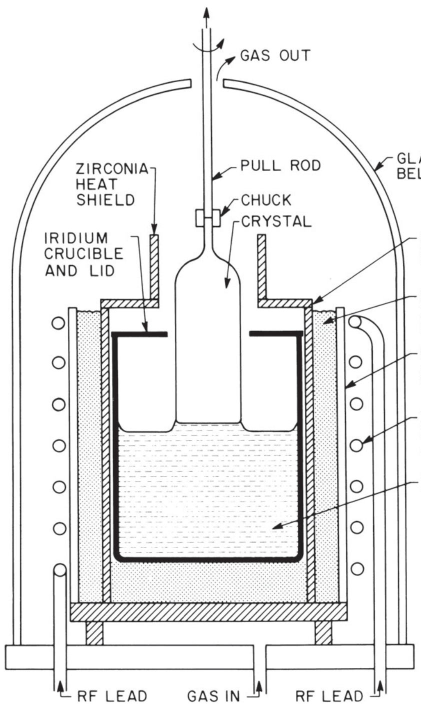
The Frenchman Gaudin in 1837 created **rubies** using a torch, alum, and Cr-salt, but didn’t realize it. He thought they were a glass because the crystals were cloudy and had a low specific gravity. In 1877, Frémy used large crucibles with Pb-oxide flux to obtain small but commercial quality rubies, but these where too expensive to compete with naturals.

Verneuil, a student of Frémy, perfected a special furnace to make ruby, and later sapphire between 1888 and 1891. Commercial mass production began in 1902. The technique is called **Flame Fusion,** or the **Verneuil Process**. The Verneuil process produces single crystals of **corundum** and **spinel** in almost any color desired. Worldwide, thousands of furnaces produce millions of carats of synthetic gemstones every year at low cost (pennies/carat).



Drawing of Verneuil’s Flame Fusion furnace [Nassau].

A variation of the Verneuil process is the **Czochralski Crystal Pulling** method, which produces large high-quality boules: A small seed crystal on a rotating rod is dipped into a pool of molten ruby. The rod is then slowly pulled up as the crystal grows. The resulting crystals are expensive, huge single crystals, reflecting the difficulty of the technique and the cost of special iridium crucibles required.

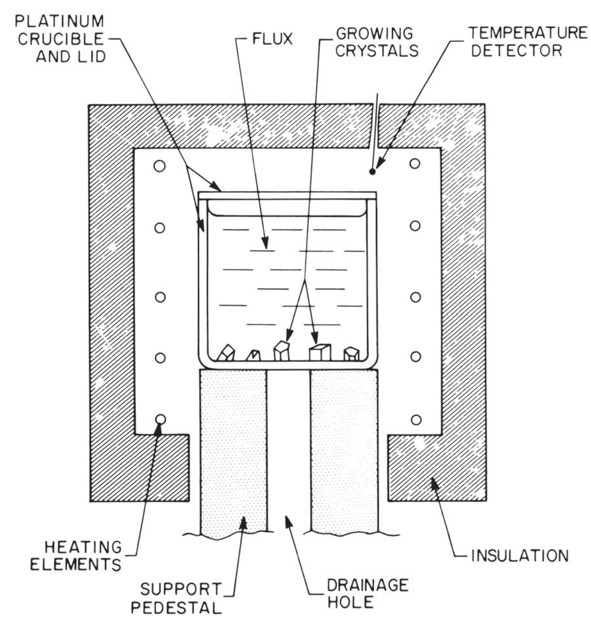


Schematic of the Czochralski Crystal Pulling setup [Nassau].

Emeralds cannot be made by Verneuil or Czochralski methods, because emeralds melt and crystallize incongruently (i.e. they decompose into other compounds before they melt or form these upon cooling from a melt). They have to be crystallized from solution or flux (**Flux Growth method**). J. J. Ebelman in 1848 used boric acid flux and powdered emerald to grow tiny crystals upon cooling of the flux. A number of researchers found that the best fluxes were lithium molybdenum oxide with extra molybdenum oxide and/or vanadium oxide.

The German company IG Farben was one of the first to create synthetic emerald in 1934 under the trade name Igmerald, but the flux growth method did not become viable until Carroll Chatham refined it with homogeneous nucleation. In 1935 (at age 21) he reported growth of his first crystals, in1938 he refined is protocol, and in the following year tried to sell his emeralds to jewelers, but had trouble convincing them that he had made the gems.

By 1964, Gilson developed this method further and created emeralds grown by heterogeneous nucleation, using seed crystals. The flux growth method is more complicated, as it requires long times (about one year, give or take a few months) at carefully controlled temperatures. The long time at elevated temperature and platinum crucibles make this an expensive process, but the product is of excellent quality.

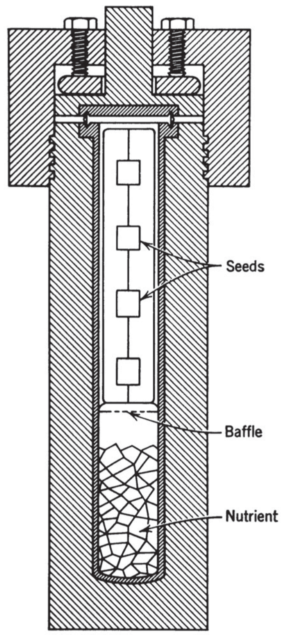


Flux growth appartus schematic [Nassau].

Humphrey Davy experimented with **quartz synthesis** in 1822, but his first crystals had many inclusions. By 1851, Sénarmont created microscopic crystals; between 1898 and 1908 Gergio Spezia refined his **hydrothermal** technique to grow macroscopic quartz crystals. He published many papers about his research and his reactor design is still used today: His process involves placing natural quartz seed crystals and a sodium silicate solution in a silver-lined vessel under a temperature gradient (320-350°C at the top, 165-180°C bottom).

Today's reaction vessels reversed the temperature gradient (hottest at the bottom). Around WW2, Richard Nacken further developed the mass production of quartz crystals by using an isothermal growth process to take advantage of a supersaturated solution with a vitreous silica supply. During WW2 the US and Britain investigated this process as well, but it was not commercialized until after WW2, taking advantage of German developments.

The **hydrothermal growth** method requires an alkaline (NaOH), aqueous solution, kept at relatively low temperatures (just a bit over 300°C) and pressures (1700 bars), a modest temperature gradient (~40°C) across the reaction vessel and pure feed material. Crystal growth takes about one month. The world production is in the millions of pounds per year range; most quartz is used in the electronic and optical industries. A fraction of the synthesized material is smoky quartz, citrine, and amethyst for the jewelry industry.



Schematic of a hydrothermal growth chamber [Nassau].

Cubic Zirconia is another important man-made gemstone. It has been used to imitate diamond, but is now desired just for what it is – a beautiful stone, not a low cost imitation of one of the most precious stones. Creating CZ requires a different technique, as CZ's melting point is too high for platinum or other containment vessels used in the above-mentioned methods. CZ is created by heating the raw materials (Zirconium oxide and a stabilizer – usually Yttrium or Calcium) using a microwave oven. The material in the center melts first, leaving a crust of zirconium oxide around the melt, containing the liquid. Upon cooling, the CZ crystal remains within a "skull" of zirconium oxide, thus giving this method its name: **skull melting**.

The synthesis of **diamond** followed a difficult road from creating tiny crystals that are only of industrial interest (for abrasives) to making stones of large enough size and quality for use as gemstones.

The first successful synthesis was done in 1950 by a Swedish research team of the Allmanna Svenska Elektriska Aktiebolaget Laboratory in Stockholm. This team did not advertise the results until GE published its success in Nature in 1951. Many techniques have been developed to create diamonds since the 1950s: A variety of compaction methods including special presses, explosives and modern pressure chambers have been used.

Today two companies have come into the spotlight for high volume production of high quality diamonds: Apollo and Gemesis. Both create diamonds of a quality that is very difficult to differentiate from natural diamond.

Gemesis uses high pressure, high temperature process chambers roughly the size of a washing machine to create large yellow diamond crystals. Processing conditions are around 58,000 atm and 2,300^{o}F to convert pure graphite into diamond over a period of about three days.

Apollo uses a CVD method, decomposing methane through a microwave plasma into its hydrogen and carbon constituents. The processing conditions couldn't be more different from Gemesis' technique: the process chamber is evacuated to 1/10th atm and the temperature in the chamber is rather cool, but within the plasma itself, temperatures around 1,800^{o}F are reached. Once the gas has been broken down, the carbon deposits on a wafer seed layer. The growth rate is only about half a millimeter per day, but the resulting diamond is ultra pure and crystal clear (by adding dopants colored diamond can also be made).

While not a technique for the synthesis of diamonds, Diamond Anvil Cells (DACs) are nonetheless very interesting: they have been developed to study geological processes and behavior of materials under extreme pressure and temperature conditions. DACs use two brilliant cut diamonds with flattened culets facing each other, between which the material of interest is placed. Pressure applied to the tables of the brilliants is magnified onto the sample due to the much smaller surface area of the culets (pressure=force/area).DACs can achieve pressures as high as 3.5 million atmospheres at 6273K – similar to conditions at the center of the earth. Because the diamonds are transparent, the sample can be observed easily while being exposed to extreme pressure and temperature.

References:

"Gemstones Synthesis" presentation by Paul F. Hlava, 2004.

"Gem Identification Made Easy," Matlins and Bonanno, 1997.

"Gems Made by Man," Nassau, 1980.

a variety of websites – please see below.

Websites about Gemstone synthesis

Please note that many webpages disappear over time, move to new location, or change from being free to a fee. At present these sites are freely available. Keep a hardcopy of useful info for future reference.

Compilation of Verneuil, Czochralski and a few other methods. Includes additional theory on melting/solidification of materials:
http://www.cmat.uni-halle.de/~hsl/PoM-files/Physics%20of%20materials%205%20Phase%20transitions.pdf

Verneuil Fusion method – schematic and picture furnace:
http://www.hawkantiques.com/hawkantiques205.htm

Henri Hureau de Sénarmont:
http://micro.magnet.fsu.edu/optics/timeline/people/senarmont.html

1911 encyclopedia on artificial gemstones
http://89.1911encyclopedia.org/G/GE/GEM_ARTIFICIAL.htm

Hydrothermal Growth of Quartz Technical Brief:
http://www.sawyerresearch.com/Hyd_Growth_qtz_Tech_Brief.htm

Skull melting technique (basic):
http://www.ilpi.com/inorganic/glassware/skull.html

Skull melting (in-depth theory, 2 parts):
http://www.crystalresearch.com/crt/ab34/319_a.pdf
http://www.crystalresearch.com/crt/ab34/329_a.pdf

Gemstone inclusion library (emerald):
http://www.cigem.ca/inclusion/em01.html

Tairus created gems:
http://www.tairus.com/index.html

Ramaura cultured ruby (includes their recipe):
http://www.ramaura.com/

Chatham created gems:
http://www.chatham.com/

Wikipedia on skull melting and CZ:
http://en.wikipedia.org/wiki/Cubic_zirconia

"Your Gemologist":
http://www.yourgemologist.com

Berkeley Geology lecture:
http://socrates.berkeley.edu/~eps2/wisc/Lect3.html#hydrothermal

Emporia State University - Gems and Gemology Class material:
http://www.emporia.edu/earthsci/amber/go340/syllabus.htm

Diamonds:

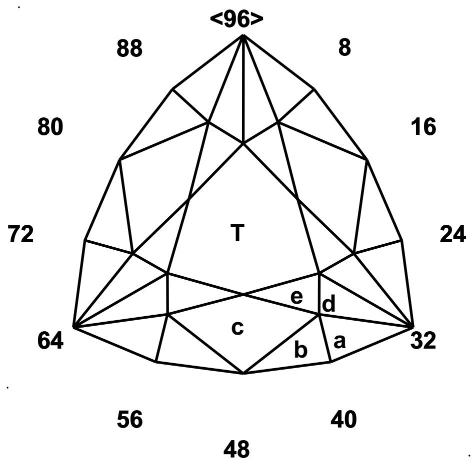
American Chemical Society – History and background on Diamond Synthesis:
http://pubs.acs.org/cen/coverstory/8205/8205diamonds.html

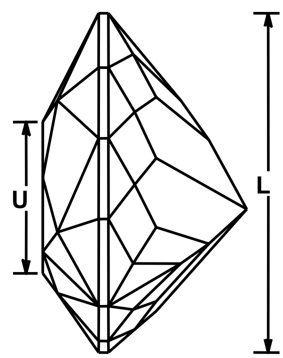
Wired article on Diamond Synthesis:
http://www.wired.com/wired/archive/11.09/diamond.html?pg=1&topic=&topic_set=

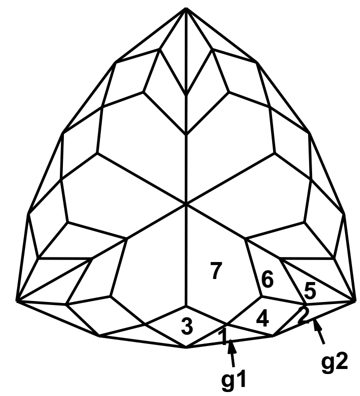
Diamond Anvil Cell:
http://www.llnl.gov/str/pdfs/03_96.2.pdf
http://unicorn.mcmaster.ca/beamlines/CHESS_newsletter_2000.pdf
http://researchmag.asu.edu/stories/tactics.html

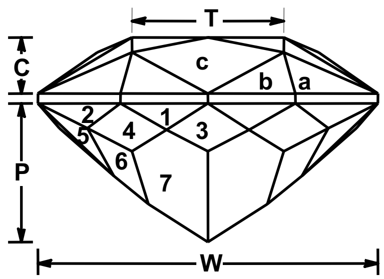
American Museum of Natural History – The Nature of Diamond:
http://www.amnh.org/exhibitions/diamonds/index.html

[Continued on page 12]





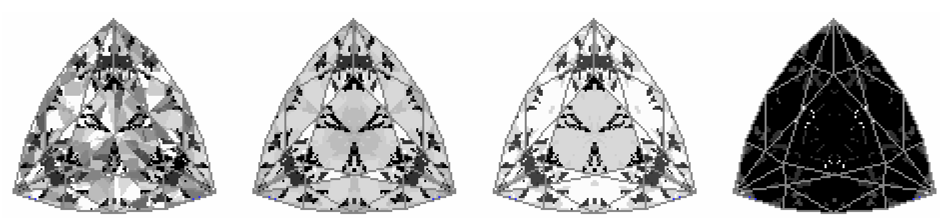




Montringle 96

By Dylan Houtman

Angles for R.I. = 1.760
67 + 12 girdles = 79 facets
3-fold, mirror-image symmetry
96 index
L/W = 1.000 T/W = 0.444 U/W = 0.444
P/W = 0.409 C/W = 0.169
Vol./W³ = 0.195



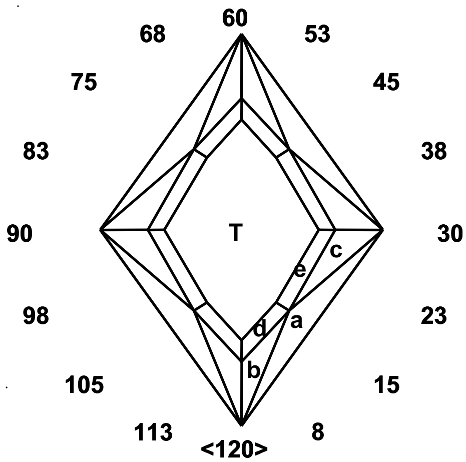
Random COS = 66.1 % ISO = 75.7 % Hints = 45.1 %
Scintillation = 54.9 %

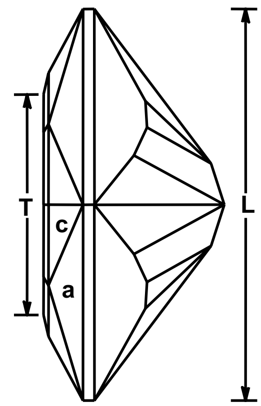
PAVILION

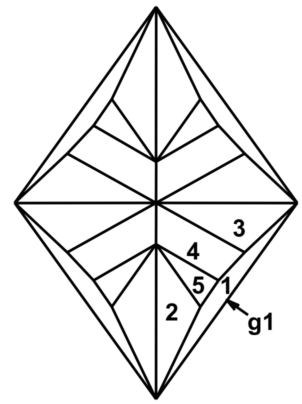
g1	90.00°	14-18-46-50-78-82
g2	90.00°	10-22-42-54-74-86
1	57.00°	14-18-46-50-78-82
2	57.00°	10-22-42-54-74-86
3	49.00°	16-48-80
4	49.00°	12-20-44-52-76-84
5	42.00°	06-26-38-58-70-90
6	42.00°	10-22-42-54-74-86
7	42.00°	14-18-46-50-78-82

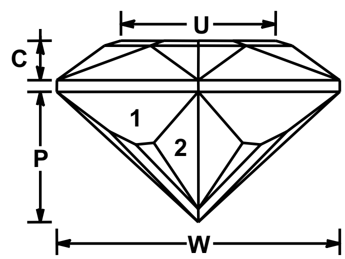
CROWN

a	41.41°	10-22-42-54-74-86
b	41.23°	14-18-46-50-78-82
c	35.81°	16-48-80
d	28.31°	03-29-35-61-67-93
e	20.52°	12-20-44-52-76-84
T	0.00°	Table





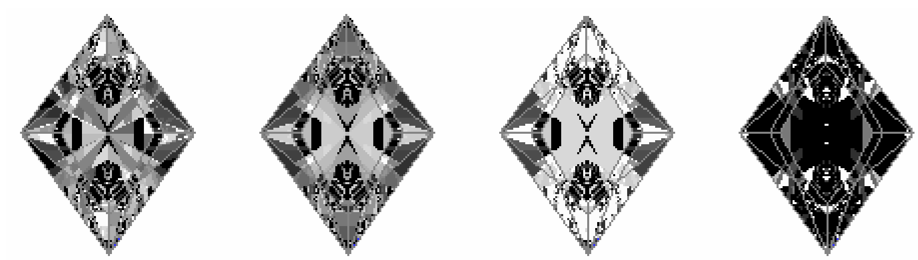




Bleu Lozenge

By Dylan Houtman

Angles for R.I. = 1.620
41 + 4 girdles = 45 facets
2-fold, mirror-image symmetry
120 index
L/W = 1.376 T/W = 0.781 U/W = 0.540
P/W = 0.456 C/W = 0.143
Vol./W³ = 0.234



Random   COS = 42.8 %   ISO = 61.6 %   Hints = 45.1 %
Scintillation = 54.9 %

PAVILION

g1	90.00°	018-042-078-102
1	70.00°	018-042-078-102
2	41.00°	010-050-070-110
3	43.00°	026-034-086-094
4	42.00°	023-037-083-097
5	42.00°	017-043-077-103

CROWN

a	50.00°	018-042-078-102
b	40.00°	016-044-076-104
c	40.00°	020-040-080-100
d	20.00°	016-044-076-104
e	20.00°	020-040-080-100
T	00.00°	Table

Gemesis Cultured Diamonds (Company featured in Wired and ACS article):
http://www.gemesis.com/home.htm
Apollo Diamonds (Company featured in Wired and ACS article):
http://www.apollodiamond.com/
Lifegems (A new take on cremation):
http://www.lifegems.com/
De Beers (for reference):
http://www.debeersgroup.com

Tsunami

by Paul Hlava

In light of the great tsunami that occurred December 26, 2004 and devastated several coastlines in the Indian Ocean, Paul Hlava presented information about tsunamis. Webster's dictionary defines a tsunami as a huge ocean wave caused by an underwater earthquake or a volcanic eruption. Paul said that a tsunami is Japanese for harbor wave, and that tsunamis are not to be confused with tidal waves. He described a tsunami as a wave train or a series of waves generated in a body of water by a sudden disturbance that vertically displaces the water column.

Earthquakes, underwater land slides (like the one in Alaska's Lituya Bay in 1958), volcanic eruptions (Krakatoa in 1883), a sudden uplifting of the ocean floor, explosions, and even the impact of bodies from outer space, such as meteorites and asteroids, have generated tsunamis in the past. Tsunamis have been known to savagely attack coastlines, causing devastating property damage and great loss of life, as was dramatically seen from the one that recently hit several coastlines in the Indian Ocean. Calling a tsunami a seismic sea wave may also be an appropriate description. Paul said that one of the remarkable aspects of the recent great tsunami in the Indian Ocean was that 95% of the tsunamis occur in the Pacific Ocean; the other 5% occur in the Indian Ocean.

Paul explained that plate tectonics, how the continents float in the Earth's crust, set the stage for tsunamis. He said that the boundaries where these continental plates meet generate enough tension to form tsunamis. As these continental plates move, they strike-slip, spread, converge, and subduct. Paul stated that it was the sudden subduction of the Indian plate under the Eurasian plate that caused the recent great tsunami in the Indian Ocean, which squeezed water into a long ridge. The subduction zone of this recent tsunami comprised of 15 meters of movement along 620 miles of plate boundary, and its travel time was determined to have been 500 miles per hour.

A tsunami changes as it leaves the deep water of the open ocean and travels into the shallower water neat the coast. Paul said that a tsunami travels at a speed related to the water depth. As the water depth decreases, a tsunami slows, but its energy flow remains nearly constant. The speed of a tsunami diminishes as it travels into shallower water. As a consequence, its height grows. Because of this shoaling effect, a tsunami may grow in height to be several meters or more as it nears the coast. When it finally reaches the coast, a tsunami can appear as a rapidly rising or falling tide or even as a series of breaking waves. That is why a tsunami can, when it first reaches land, appear as water rushing out to sea, before it returns to pound the coast. Paul said that this drawback water and the incoming water generate lots of turbulence. Paul explained that the wave motion or the progression of a wave moves in circles. He stated that water in any wave moves in circles that diminish in size with depth. The energy generated is then transferred forward. Paul said that when a tsunami hits land, it forms a wall of churning water with a tremendous force that is full of sediments and debris. The wave front rises nearly vertical and can be very destructive. Tsunamis have a significant erosion potential and can cause flooding for many miles inland.

Paul said that tsunamis are unlike wind-generated waves, in that tsunamis are characterized as shallow water waves that have long wave lengths. Tsunamis have extremely long wave lengths. Wind-generated waves have small-sized wave lengths. Tsunamis can be over 100 feet tall (a run-up height), can have wave lengths of 10,000 feet near the coast and have 300,000 feet wave lengths in deep ocean, and can travel at speeds up to 850 miles per hour. Paul said that a tsunami can even raise the sea level for a short time. He also remarked that, over time, the effects of tsunamis on the Earth have made our planet turn a bit faster and made our days a bit shorter.

Facet Designer's Workshop

More Designs From Dylan Houtman

By Ernie Hawes

Our President, Dylan Houtman, continues to be both a prolific cutter and designer. Dylan displays a fairly large quantity of gems for our "show 'n tell" at each meeting, and often they are of rare or unusual materials. They are also frequently rather small, which never ceases to amaze me, as many of Dylan's designs are rather complex.

Dylan's Montringle design is certainly one of his best. Originally, Dylan developed this pattern for a 120 index. Actually, many of Dylan's designs are for a 120 index. I think he finds it easier to come up with some of his more complex designs by using this gear. However, as we all know, the 96 index is the most popular one, and almost all faceters have it as their primary gear. Probably more designs are created for this index than any other. Recognizing that almost everyone has a 96, and not everyone has a 120 gear, Dylan has modified his Montringle design to work with a 96 index gear. Thus, our first design for this issue is Montringle 96. It is basically the same as the original with only a slight change in the appearance of the outline curve. Other than that, its appearance is the same outstanding pattern our readers already have. Dylan designed this version for stones in the 1.76 RI range, but it can easily be modified for other materials by anyone with GemCad.

Dylan's second design that we present for you is a lozenge shaped pattern. The lozenge is a shape that is infrequently cut, but one that is quite attractive and works well in almost any type of jewelry. Dylan calls this new design Bleu Lozenge. It is essentially a barion style cut. Angles are for tourmaline and I imagine the design would work well in reducing the dark C axis of many tourmalines.

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Anyone who missed seeing the TV program recently about the research on the Hope Diamond done by Scott Sucher, and Steve and Nancy Attaway, missed a truly interesting program. A DVD of the program was shown at our workshop last Saturday and everyone there thought it was fantastic. If you missed it, and would like to see the show, let me know and I will see what I can do to have a special showing some time in the future

Montringle by Dylan Houtman.

In the News

Four Giant Diamonds Found in Lesotho

Source: www.chinaview.cn on the Web

Local media reported on February 27, 2005 that miners found four huge diamonds, weighing a total of 366 carats, in Lesotho, a tiny kingdom surrounded by South Africa. The four flawless diamonds, valued at over $6 million, were unearthed at Lesotho's Letseng diamond mine in the Maluti Mountains. The diamond weights were: one at 76 carats, one at 112 carats, one at 106 carats, and one at 72 carats.

Petrified Wood Created in Laboratory

Source: www.stevequayle.com on the Web

The Associated Press and the Seattle Times reported on January 25, 2005 that researchers at the Pacific Northwest National Laboratory, a national science laboratory in Richland, Washington, achieved a way to convert wood into mineral. The ability to make petrified wood could ultimately permit scientists to separate industrial chemicals, filter pollutants, and soak up contamination. Wood petrified is both a very hard and very porous material. Petrified wood has a large, hard surface, and its insides are porous. These properties make it an ideal material to soak up or separate substances or act as a catalyst in other processes. Natural petrified wood occurs when trees are buried without oxygen, (i.e. when buried beneath molten lava), then leach their wood components and soak up the minerals within the soil. To create petrified wood, researchers bought pine and poplar boards, gave a half-inch cube of wood an acid bath, and then soaked it in a silica solution. The wood was air-dried, cooked in an argon-filled furnace, and cooled in argon to room temperature. The result was a new silicon carbide that exactly replicates petrified wood.

Mysteries of the Smithsonian's Hope Diamond Solved with New Scientific Research

Source: Smithsonian Institute Press Release

Is it possible that the Hope Diamond was cut from another larger blue diamond 200 years ago? Is there another blue diamond out there also cut from this possible "parent stone"? Could the Hope Diamond have a "sister" stone?

New research has provided important insights into the lineage of the Hope Diamond at the Smithsonian's National Museum of Natural History. Conducted over the past year, the research supports the theory that the Hope Diamond was cut from the French Blue Diamond after it was stolen from the French Crown Jewels in 1792. The team of researchers included Jeffrey E. Post, Smithsonian curator of gems and minerals, and Steven Attaway, engineer and gem cutter; as well as Scott Sucher and Nancy Attaway, gem cutting experts.

This extensive research project was captured on film and will be featured on the Discovery Channel. "Unsolved History: Hope Diamond" will premiere on Feb. 10 at 9 p.m. with additional scheduled airings on Feb. 11 at 12 a.m. and Feb. 13 at 2 p.m.

The team used state-of-the-art imaging and computer modeling technology, combined with new measurements of the Hope Diamond and historical records and sketches of the Tavernier Blue Diamond and the French Blue Diamond, to create for the first time ever accurate virtual computer models of the three diamonds. The results of the modeling study clearly show that the Hope Diamond fits exactly within the French Blue Diamond – a clear indication of lineage – and reveal that no sister stone to the Hope Diamond could have been cut from either previous stone. The computer models were used to guide the cutting of accurate replicas of the two precursor stones—in cubic zirconia.

"This new Hope Diamond research would not have been possible ten years ago," said Post. "What is exciting is that we are constantly learning new information about our collections as we apply new high tech research methods. Even the Hope Diamond is grudgingly giving up some of its secrets."

"The geometric evidence was overwhelming, leading us to conclude that not only did the Hope Diamond fit within the French Blue Diamond, but some of the facets on the Hope Diamond may be relics from the French Blue Diamond," said Steven Attaway.

The Smithsonian's National Gem and Mineral Collection is one of the greatest collections of its kind in the world. More than 375,000 individual specimens include such famous pieces as the Hope Diamond and the Star of Asia Sapphire, as well as a research and mineral collection used by scientists around the world.

Background on the Hope Diamond

The Hope Diamond—the world's largest deep blue diamond—is more than one billion years old. The parent stone of the Hope Diamond formed deep within the Earth and was carried by a volcanic eruption to the surface in what is now India. It was discovered prior to 1668 in the Golconda region of southern India. In 1668, French gem merchant Jean Baptiste Tavernier sold the 115-metric-carat diamond to King Louis XIV of France, who commissioned it to be re-cut to the 69-carat French Blue Diamond. The French Blue was stolen during the 1792 French Revolution.

Twenty years and two days later, after the statute of limitations expired, a 45.52-carat blue diamond was quietly put up for sale in London, and eventually Henry Phillip Hope purchased it. After being passed down through the Hope family, the diamond was sold in 1901.

It then changed hands several times and was eventually sold to Pierre Cartier in 1909. Cartier sold the diamond to Evalyn Walsh McLean of Washington, D.C., in 1911. McLean's flamboyant ownership of the stone lasted until her death in 1947. Harry Winston, Inc. of New York City purchased McLean's entire jewelry collection, including the Hope Diamond, from her estate in 1949.

For the next 10 years, the Hope Diamond was shown at many exhibits and charitable events worldwide by Harry Winston, Inc. On Nov. 10, 1958, the company donated the Hope Diamond to the Smithsonian Institution.

The weight of the Hope Diamond for many years was reported to be 44.5 carats but in 1974 it was removed from its setting and found to weigh actually 45.52 carats. It is classified as a type IIb diamond, which are semi-conductive and usually phosphoric. The Hope Diamond phosphoresces a strong red color that lasts for several minutes after exposure to short wave ultra-violet light and the diamond's blue coloration is attributed to trace amounts of boron in the stone. The pendant surrounding the Hope Diamond has 16 white diamonds – both pear-shapes and cushion cuts – and the necklace chain contains 45 white diamonds.

Reminder:
If you have not paid the 2005 dues, please do so now. See page 16 for the membership application/renewal form.

E-mail Addresses:

Edna Anthony .... eba@bwn.net
Nancy and Steve Attaway.... attaway@highfiber.com
Carsten & Margaret Brandt...brandtmeister@comcast.net
Ernie Hawes........................ erniehawes@msn.com
Paul Hlava........................... hpf1@qwest.net
Dylan Houtman....................dhoutman9@aol.com
Mariani Luigi .... ENVMA@IOL.IT
Gary Peters .... albpet@msn.com
Kevin Schwebel.....................kschwebel@zianet.com
Jim Summers: ....commish1@worldnet.att.net
Bill Swantner.........................WSwantner@Comcast.net
Herb and Maria Traulsen ..... htraulsen@mycidco.com
Stephen and Linda Vayna ..... Vayna@transatlantic.com
Elaine and Al Weisman .... almgtcons@aol.com
Scott Wilson......................... swilson@copper.net

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The New Mexico Facetors Guild

Membership application or renewal form

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