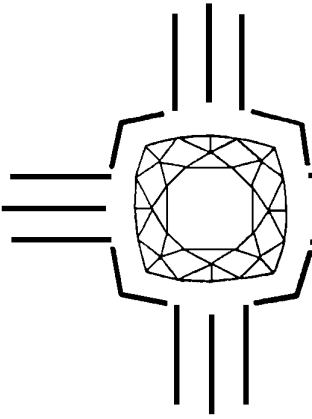


The New Mexico Facetor



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The Prez Sez

by Moss Aubrey, Ph.D.

In the last issue, we reviewed some of the changing fortunes of sapphire in the world gem market. In this issue, I will review the history of American sapphire mining, in essence, Montana sapphire mining. Although a few noteworthy sapphires have been found in North Carolina's Macon County, the most recent discoveries from there showed small sapphires of low to poor quality (Arem, 1987). When American sapphire mining is discussed, it is usually assumed that the source is Montana.

Montana sapphires originate from two distinctly different types of geologic locations. The first type of deposit lies in hard rock dikes, the source of Yogo Gulch stones. The second type of locality is alluvial deposits, where water-worn pebbles of sapphire are sifted from the gravel banks of ancient rivers, now lying adjacent to the prevailing river beds.

Sapphire was first discovered in Montana by gold miners who noticed how certain small pebbles tended to accumulate at the bottom of their sluices where the gold would normally collect. These pebbles were deemed a nuisance, because they cluttered the sluice box. The gold miners usually removed and discarded the pebbles. Although colorful, these river-worn pebbles were first noticed in 1865. However, most of the pebbles showed a low color saturation.

It was in 1895 that gold prospector Jake Hoover decided to collect a few superb blue stones in lower Yogo Creek. He recognized that they might be valuable gemstones and sent a sample to an assay office. The stones were eventually forwarded to George F. Kunz at Tiffany and Co. Kunz, America's first gemologist, positively identified the stones as sapphire. He sent a handsome check to Jake Hoover of \$3,750.00, which amounted to more than Hoover's current gold operations. Kunz requested that more of these sapphires be shipped to him, and Tiffany marketed the stones. Hence, American sapphire mining was born (this brief history courtesy Keith Mychaluk, 1995).

Yogo Gulch rates historically as the best known location for sapphire. The stones from there are clean and uniformly intense in a color termed

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“cornflower blue”. Some describe Yogo sapphires as royal American sapphires. Sapphires from Yogo do not require heat-treatment and generally show good clarity. Yogo stones tend to be small, usually below one carat in the rough. Yogo sapphire rough larger than two carats is very rare.

Yogo sapphire production is low because of the difficulty in extracting the sapphires from the hard rock. Blasting can destroy the sapphire, and weathering of the rough from the hard rock requires time. As a result, Yogo sapphires are relatively expensive when compared to other Montana sapphires. Yogo Gulch is one of very few areas world wide where sapphire is extracted directly from the host rock. Mining at Yogo is an expensive and tedious process, with relatively few sapphires produced. Reports estimate that 2.5 million carats of rough have been recovered in the 100 years of operations at Yogo Gulch (Mychaluk, 1995). The numerous efforts to commercially mine this area have been financially devastating to many entrepreneurs.

Alluvial mining in Montana has centered around a few areas, most notably near Helena and Phillipsburg. Commercial production efforts have waxed and waned over the years, as have the small operations that allowed individual picking through washed gravel for a fee. Gravel with sapphire is still available at gem shows in bags weighing several pounds. These bags of concentrate yield rather bland pebbles, usually under one carat in the rough.

The recent commercial activity has centered around Eldorado Bar, Dry Cottonwood Creek, and Gem Mountain. For years, miners have asserted that there were millions of carats of gem quality sapphire in these deposits, yet little was seen until recently. Some of the mining efforts have been costly and not all that commercially feasible.

The aluminum mining conglomerate, AMAX was active in efforts to commercially mine sapphire during the early 1990's. They eventually stated that their geological studies were not very encouraging, that “Gem mining is too small to warrant taking the management time away from their well-defined coal and copper projects” (Verbin, 1994). They did not renew their lease on their sapphire mining claims in Montana.

Despite the pessimism expressed by AMAX, others have maintained their enthusiasm for the commercial potential of the area. Over the past few years, significant amounts of gem sapphire have been recovered. American Gem Corporation reported recovering 1.8 million carats in 1995, and Gem River reported 1.4 million carats from their operation (Lurie, 1996). (You will note that the combined total for

those two mining operations for 1995 alone is more than the life-time total recovered at Yogo.)

American Gem Corp. has been acquiring claims in the Montana area with the hope to become a major player in the world gem market and to be known for their distribution of Montana sapphire. They now have control of over 110 square miles of potential sapphire deposits. Yields vary from about 44 to 225 carats per cubic meter to over 1,000 carats per cubic meter in selected areas. They estimate over 50 million carats of reserves in their three claims alone (Koivula et al., 1994).

Alluvial deposit sapphire varies in color and quality. Some samples are largely green, pale blue, and steely grey. Others contain a phenomenal range of intense colors. These stones are much larger than Yogo stones. Alluvial deposits yield stones of commercial quality that often are sorted to select parcels of three to ten carat stones. The stones are often less than 6 mm. in diameter, but significant quantities are recovered in the 6 mm. to 12 mm. sizes. Stones larger than 12 mm. remain rare, even from the alluvial deposits (Austin, 1993).

I have seen various material from Montana, both “mine-run” and after heat treatment. One of the problems encountered is that mine-run material is often cloudy. This problem is significantly resolved by proper heat treatment. While some sapphire material is not so impressive, other rough parcels can be absolutely mouth watering from the intense and vibrant colors displayed. The lack of consistent and effective treatment of this material has been one of the stumbling blocks that have proved fatal to the past efforts of commercially mining Montana sapphires.

Recent technological developments seem to have changed all that. Now, a much greater quantity of clean faceted stones are produced when compared to the earlier efforts. An excellent article on this enhancement process was written by John Emmett and Troy Douthit (1993). They describe their experiences in treating over 75,000 stones in their sapphire treating business, Crystal Research (subsequently acquired by American Gem Corp.).

Heat-treatment of sapphire has been done in the Orient for many years with primitive methods, such as charcoal ovens. The results have been variable, especially when those techniques were used on Montana material. Pure corundum is colorless and composed of aluminum and oxygen. The coloration of sapphire, especially in the blue colors, stems from the intervalence charge transfer of iron and titanium atoms. The relationship between the iron and the titanium

atoms with the electrons in the corundum molecule is such that the iron is usually distributed throughout the sapphire crystal lattice. The titanium, however, is often bound with rutile needles inside the sapphire crystal.

This composition prevents the intervalence charge transfer, and, subsequently, prevents the desired blue color. If the titanium can be freed from the rutile, the color will change towards blue. This is accomplished by heating the crystals to 1,600 degrees C., sufficient to dissolve the rutile needles but not so high as to melt the corundum (2,052 degrees C.). I have run across heated sapphire with the crystals fused together, apparently from over-zealous heating.

Heat alone is not enough. Attention also must be given to the atmosphere inside the heating oven. A reducing atmosphere rich in hydrogen is needed to facilitate the process. The authors, mentioned above, describe that special atmosphere requirement when working with pale blue stones, pale green stones, and near colorless stones. Approximately two-thirds of the stones slated for treatment can be converted to well-saturated shades of blues and yellows.

The color change is permanent, but such a treatment must be disclosed. I understand that we should assume all sapphires have been heat-treated, unless claimed otherwise. I would be suspicious of such claims, unless a clear possession of the material from the time it had been mined can be established (like a pedigree).

Another good review of the recent developments in heat treatment of sapphire was published in the December 1996 Issue of Lapidary Journal, where an article by Si and Ann Frazier summarized the report by Emmett and Douthit.

It remains to be seen what marketing efforts will ensue, and how they will change the reputation and the acceptance of this lovely gem material. Is the advertising hype backed by the ability to truly follow through, or will the bluff be called on Montana's sapphire reputation?

In the next issue: Poised on the brink?

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Minutes of the NMFG Meeting

March 13, 1997

by Nancy L. Attaway

President Moss Aubrey called the meeting to order at 7:15 p.m. and welcomed all members and visitors.

Treasurer's Report

Treasurer **Bill Andrzejewski** reported:

Heading	Total
Previous Balance	\$1,025.20

<i>Heading</i>	<i>Total</i>
Expenses	\$138.27
Deposits	\$358.88
Balance Forwarded	\$1,245.81

Old Business

Susan Wilson, Guild Librarian, reported that **Nancy Attaway** and she placed all the back issues of the New Mexico Faceter in binders according to month and year. As soon as Susan enters them into the library database, these back issues will be available to Guild members. Nancy plans to have any extra back issues available to all Guild members during the May meeting. The Guild library has a few instructional videos and videos from past faceting symposiums. Susan would add any video tapes of workshop demonstrations to the Guild library.

New Business

Paul Hlava, Chairman for the Albuquerque Gem and Mineral Club's Gem and Jewelry Expo '97 reported on the club's show. Well over one thousand people attended the two day show. This year, the show had expanded to utilize three separate rooms for dealers and demo-dealers. The silent auction was deemed a success. Many fine exhibits filled the hallway, including two from the New Mexico Faceters Guild. One display case housed the Guild faceted stone collection (cut stones donated by Guild members past and present). Another display case presented a scientific explanation of how the critical angle affects a ray of light entering a faceted stone. Thanks to **Scott and Susan Wilson**, who were assisted by **Steve and Nancy Attaway**, for this very interesting educational display.

Nancy Attaway, caretaker of the Guild faceted stone collection, submitted a report to the Guild Treasurer that

listed the details of the cut stones in the Guild collection. **Scott and Susan Wilson** performed an inventory of the collection and submitted their report to the Treasurer. **Al Tlush** recently donated two cut stones he faceted to the Guild collection. Donations from Guild members are always welcome.

Arthur Skuratowicz, a goldsmith, announced that the **New Mexico Jewelers Association** scheduled their annual convention May 3rd and 4th at the Double Tree Hotel in downtown Albuquerque. Several speakers are slated for presentations. For further information, please contact **Mark Guerin** at 881-1013 or **Rick Lopez** at 881-8939.

Betty Annis asked whether the Guild planned to host a faceting symposium this year. **Nancy Attaway** explained that when she organized the faceting symposium two years ago, the attendance was poor. A lot of time and effort went into the last symposium, including a slate of many excellent presentations and a catered lunch. Nancy agreed to assist a committee for hosting one.

Louie Natonek, Vice-President (Workshops) stated that the Texas Faceters Guild holds a well-organized faceting symposium every November, and that anyone attending pays a fee. He thought that the Guild should consider charging a fee.

Louie agreed that a symposium committee should be formed to organize the next faceting symposium. **Betty Annis** said that the next symposium should be scheduled for the spring of 1998, because of the many preparations required. **Moss Aubrey** suggested that we consider hosting a symposium having more of a public forum. We might be able to schedule it in the auditorium of the New Mexico Museum of Natural History, as we hold

our meetings in one of the Museum's meeting rooms.

Bill Andrzejewski, Treasurer, brought up several new items requiring a vote by the Guild. Bill wants to simplify the accounting for the collection of dues. He thinks that the Guild should drop its customary fiscal year (beginning in September) for a fiscal year that matches the regular calendar year (beginning in January). Bill often receives money for dues in January that should have been sent the previous September. He thinks that this change will eliminate any confusion. **Betty Annis** seconded the motion from Bill Andrzejewski.

Bill Andrzejewski also reported that publishing costs and postage for the Guild newsletter has increased, but that dues have remained \$15.00 since 1992. Bill proposes that dues should be \$20.00 yearly. He wants to eliminate the associate membership and the half year membership. Bill said that having a single membership structure would simplify bookkeeping, but it would require printing extra copies of the newsletter to have on hand for new members joining throughout the year. Bill wants dues payments due in January, but anyone paying dues past January will receive issues of the newsletter for that entire year.

Heidi Ruffner asked if the increase in dues could be made to coincide with the four-month extension of the proposed fiscal year.

Nancy Attaway stated that other Guilds charge from \$20.00 to \$30.00 a year for dues, and that our publisher, **Jim Summers** already prints extra copies of the newsletter. **Louie Natonek** said that \$20.00 would still keep us in line with what other Guilds charge for dues. Louie agreed with Bill on his motion, and **Betty Annis** seconded.

Betty Annis mentioned that the election of officers and the terms when officers assume their duties should coincide with the new calendar year proposed by Bill. She also thought that the election of officers should take place in November, with the officers assuming their duties at December's Christmas party.

The By-Laws of the New Mexico Faceters Guild states that when a motion is presented during a general meeting, it must be published in the Guild newsletter before the Guild entertains a vote. We can read more about these motions in this issue of the newsletter, and the Guild will cast votes during the May meeting.

Susan Wilson mentioned the New Mexico Science and Engineering Fair scheduled for March 21st. **Scott and Susan Wilson** have been accepted as qualified judges. The Board of the New Mexico Faceters Guild decided to award a prize at the fair for the best project relating to geology and crystallography.

Louie Natonek stated that he planned to hold faceting workshops this spring and summer. **Steve Attaway** wanted to organize a workshop that would include such aspects of faceting as orientating and dopping rough, gemstone setting in jewelry, and gemstone photography. **Arthur Skuratowicz** volunteered to teach the stone setting portion. Perhaps, **Karen Blisard** could travel from Silver City and assist us.

Show And Tell

Susan Wilson faceted a small emerald cut Arizona peridot that contained lily pad inclusions. She also faceted an oval Oregon sunstone rich with the famous copper schiller.

Larry Plunket faceted a barion oval yellow beryl weighing fifteen carats

that housed a separate beryl crystal within. He also faceted a flux grown emerald into a traditional emerald cut and a small labradorite into a square barion.

Moss Aubrey brought two beaded necklaces that his wife, **Lauren**, had strung. One was a strand of freshwater corn pearls that exhibited a lustrous, rosy hue. The other necklace was composed of ruby beads from India.

Steve and Nancy Attaway brought many new stones and pieces of gold jewelry they recently completed. Steve carved and shaped a dozen Australian opals (crystal opals and opals with red pinfire). Steve handmade gold pendants for five of the ametrines that Nancy faceted and where Steve carved the pavilions. Steve showed a large opal that he carved into a triangle with an apex crown. He handmade a gold pendant for it and placed one of Nancy's emerald cut natural emeralds horizontally at the top beneath a triangular handmade bail. The emerald accentuated the greens in the opal.

Steve continues to practice his art of reverse intaglio and showed a quartz pyramid with a remarkable depiction of a horse that he carved in reverse intaglio. He also rendered realistic depictions of frogs carved in reverse intaglio in quartz pyramids.

Nancy faceted a peridot from Pakistan into a square barion that showed the bright green hue indicative of the fine peridot from the Himalayas. She mentioned the article on peridot from Pakistan in the March 1997 Issue of Lapidary Journal. She faceted a piece of Oregon sunstone into a twelve-sided round, also rich in copper schiller. She faceted a pearshape Russian chrome diopside, two large twelve-sided round Tanzanian rhodolite garnets, a triangular rhodolite garnet from Tanzania, and a large emerald cut aquamarine from

Madagascar showing a deep blue hue. The chrome diopside and the rhodolite garnets were all cut at topaz angles.

Moss Aubrey purchased several pieces of an unusual species of orange beryl at the Tucson Show. He traded a piece to Nancy, who dopped it for a pearshape. When Nancy polished the pavilion mains, chipping developed along facet junctions, and conchoidal fractures appeared on some of the facets. The stone behaved much like a glass and seemed not to have the hardness of beryl. Fearing the stone was not beryl, Nancy called Moss Aubrey and Paul Hlava.

Paul Hlava, Guild Mineralogist, brought his refractometer and microscope to the March Guild meeting at Nancy's request. He positively identified the orange gemstone as beryl. Nancy mentioned that the stone contained needles orientated parallel to the mains. Paul remarked that beryl has a weak basal cleavage, and that these needles could directly affect the gem's toughness.

Could the coloring agent of this beryl affect its integrity? This might be similar to the problems found in emerald. Chromium and beryl usually repel each other. However, when the (larger) chromium atoms work their way into the (smaller) fine crystal lattice of beryl, the beryl becomes an emerald. What gives emerald its color is also responsible for its brittleness. When the chromium atoms enter beryl, they can break beryl's crystal lattice. This might be the case with this orange beryl, where the coloring agent may have contributed to the brittleness in the stone that Nancy observed. Sounds like an investigation for our Guild gemologist, **Edna B. Anthony**.

Future Programs

Susan Wilson, Vice-President (Programs) scheduled a presentation

for the May 8th meeting by **Dr. Ralph Dawson**, who grows crystals for Sandia National Laboratories. Ralph Dawson holds a Ph.D. in electrical engineering and also teaches Semiconductor Device Physics in the Electrical Engineering Department at UNM. He grows ultra-pure crystals for semiconductor device use, such as Gallium Arsenide (GaAs) and Indium Phosphide (InP), by using the growth technique of molecular beam epitaxy.

Delicious refreshments were baked by **Heidi Ruffner and Nancy Attaway**. Thank you very much. **Dick Tracey and Eileen Rossen** volunteered to bring refreshments to the Guild meeting in May.

Proposed Increase in Dues and Organizational Changes

Bill Andrzejewski, Guild Treasurer, introduced two amendments to the Articles of Organization that will simplify the record keeping duties of the Treasurer.

Motion 1: To amend the Articles to have the Guild fiscal year match the calendar year, effective September 1, 1997.

Motion 2: To increase the membership dues to \$20. To eliminate the Associate (non-voting) membership and eliminate the half year partial membership, effective January 1, 1998.

In order to make a transition between the current Guild fiscal year, that ends in September, and the regular calendar year, that ends in December, 1997 membership in the Guild would be extended to include the last four months of 1997. A slate of officers will be voted upon during the November meeting, and the new officers will assume their duties during the Christmas Party.

The Articles of Organization will be updated after a vote by the general membership at the meeting scheduled for May 8, 1997.

Program Speaker

Kirk Brock of Rock Solid Jade spoke to the Guild during the March meeting and related his numerous experiences about purchasing jade in the Orient for the last ten years. He sells jade in the Pueblo Inn at the Tucson Show. Kirk lived in California near a deposit of nephrite and has long been enamored with jade.

Kirk stated that most of the jade mined commercially comes from Burma. The mining season for jade spans the months between October and May, and mining ceases when the rainy season begins. Found near rivers and flood plains, jade occurs in the forms of boulders and nodules. A smooth outer rind indicates that a chunk of jade has been water tumbled, hence the name water jade. When a piece of jade has been oxidated by the surrounding soil, the rind is colored brown.

Nephrite and jadeite are the two types of jade. Nephrite and jadeite are rocks composed mostly of one mineral: tremolite or actinolite in nephrite and jadeite in the other. Nephrite is a calcium magnesium silicate, and jadeite jade is a sodium aluminum silicate. An arrangement of intergrown microscopic fibrous crystals give nephrite its toughness. Jadeite jade forms in a larger interlocking crystal network. Jade is extremely tough and has been used for anvils, tools, and weapons.

Because of their compactness, both jades accept a fine polish. Kirk recommends a 600 r.p.m. speed for polishing nephrite and higher speeds for rendering a polish on jadeite. Kirk said that Thailand is known as the center for

carving jade, but that more and more jade carving factories now operate in China.

The most prized color for jade is the very rare emerald green. The Japanese value the green and white jade, referring to it as moss on snow. True lavender jade is also highly valued.

Mandalay in Burma is recognized as the trading center for jade. The government there levies a heavy tax on jade. Tons and tons of jade is mined and worked every year. A broker is needed for negotiations when purchasing jade. At the government auctions, buyers bid on cubic meters of jade, however, much of it is high-graded beforehand.

Kirk explained how business is conducted on local terms. A prospective buyer of jade is surrounded by many local dealers, who are very persistent to settle upon a price. The first asking price usually is twenty times greater than the final price. A serious buyer must see the bargaining process to its conclusion, and he is obligated to pay the price decided upon. The jade dealers become angry if they discover that you are not a serious buyer. The unwary buyer who enters into a bargaining session for jade without the proper preparation, usually ends up paying way too much. The dealers consider such an experience as a lesson they taught.

Prices of jade can depend upon what is seen through the "window" of a jade boulder or a jade nodule. Often, workers grind and polish a spot on the rough jade to see into it and to help determine its value. A smooth texture that shows no graininess is desired for jade. Dealers also look for a good color saturation.

Kirk warned that synthetic jade abounds. Much of the jade for sale is

color enhanced by many methods that include bleaches, dyes, and epoxy color resins. These color-enhanced jades are known as "B" grade jade. Kirk stated that much of the jade he saw for sale at the Tucson Show was "B" jade. He explained how to spot some color enhanced jade. Since fractures are present in jade, dyes fill in those fractures. Laboratories detect color enhancements in jade using X-ray diffraction and infrared light. Kirk said that it pays to journey to the source for jade to be certain of the goods you purchase. Kirk has every piece of jade recut that he buys in Asia. He thought that the best prices listed for jade were seen at the Tucson Show.

Kirk mentioned that the Asians hold a very special reverence for jade and for colored gemstones in general. He does not see the same appreciation for stones in Americans that the Asians have. The Asians value jade, as well as the workmanship that goes into rendering a jade carving. Such a value system has been passed down through forty generations or more. The Asians have a long history with jade and with colored gemstones, and they know how to work them.

NMFG Sponsors 1997 Science and Engineering Fair Award

Dr. Stephen Attaway and Dr. Susan Wilson served as special award judges on behalf of the New Mexico Faceters Guild during the 38th Annual Northwestern New Mexico Regional Science and Engineering Fair held at the University of New Mexico. This marked the first year that the New Mexico Faceters Guild sponsored an award of a \$100 Savings Bond, plus a one year membership in the Guild. The judges reached a mutual decision to grant a first place award, and no second place award, due to the level of the student projects presented.

The first place award went to seventh grader, **Jason Dawson**. His project was entitled "Refracting Light" and explored the differences in the angle at which white light is refracted through various liquids, such as Karo syrup, alcohol, and water. Jason impressed the judges with his ability to answer questions about his project, which reflected the extend of his scientific concept to other experimental methods.

We have invited Jason Dawson to attend the next Guild meeting and have him describe his winning science project to us. Congratulations to Jason Dawson for his fine work



A Letter from Overseas

From Ross Whipple

Ross Whipple, one of our associate members living in Finland, wrote to praise the new format of the Guild newsletter. He said that following Merrill O. Murphy's editorship would feel a little bit daunting. I find following in the footsteps of two New Mexico legends somewhat daunting, but it has its rewards. Both Merrill O. Murphy and Ernie Hawes established the excellent quality of the Guild newsletter. The *New Mexico Faceter* will continue to feature articles by Merrill O. Murphy. Ernie Hawes will maintain the "Designers' Workshop" column.

Ross Whipple continued in his letter with praise for Susan Wilson's article on calculating faceting angles. Ross complemented Susan on the approach taken for her article. He thought it was well explained.

Ross stated that he also enjoyed the design column. He liked the large and

clear illustrations and the testimonials to its workability.

Ross hoped that human interest stories (trip reports) would become regular features in the newsletter. He thought that it provided a nice balance with the technological articles.

Ross also found reading the *In The News* columns interesting and informative. Steve and I will continue to highlight any articles relating to gems and gem locales from the various journals that we receive.

Our Guild is most fortunate to be composed of a very dynamic group of individuals who appreciate gemstones. We value each and every member of the Guild. Many Guild members actively participate in the rendering of original gemstone jewelry and gem design, visit local and exotic gem locations, demonstrate faceting techniques, and teach faceting to others. Some have written articles on the aspects of facet grinding and polishing, providing insights into their particular methods while explaining the background science.

We share our gathered knowledge and promote the educational aspects of the New Mexico Faceters Guild through the written word. We encourage all of our members to expand upon their creativity. One of the many joys of the Guild is to see our members blossom.

As Editor, I encourage Guild members to write articles describing gem locations and gem shows visited. I would publish personal accounts of any problems encountered, including the solutions discovered, when working with specific gem materials. Many members have excellent writing skills, and some have writing abilities heretofore untapped. We all learn from each other's experiences.



In Memory of Ed Cavanoz

By Susan Wilson and Nancy Attaway

The March 15, 1997 edition of the Albuquerque Journal announced that former Guild member, Yervant Edward (Ed) Cavanoz died on March 9, 1997. It came as a great surprise, because he had just visited Guild members at the Albuquerque Gem and Mineral Club Show on March 1st and 2nd. Ed lived in Rio Rancho.

In 1994, Ed first appeared at one of our Guild meetings and regaled us with stories about cutting diamonds and designing jewelry. He cut the renowned Taylor-Burton pearshape diamond and designed jewelry for Elizabeth Taylor's starring role in the film "Cleopatra". Ed also assisted in the development of the invisible setting for gems. He was a founder and past Secretary-Treasurer of the Precision Machining and Tooling Association of New Mexico.

Born aboard a ship in the Turkish Sea, Ed grew up near Paris and planned to become a neurosurgeon. Ed spoke eight languages fluently. He had completed two years of pre-medical studies in college when family finances forced him to change careers from his chosen field in medicine to the jewelry business.

In 1928, Ed arrived in the United States to work for several major jewelry companies in New York that included Cartier and Tiffany. He labored intensively on cutting the Taylor-Burton diamond for three months. His efforts yielded a pearshape diamond weighing 69 carats.

In 1962, Ed left the jewelry industry to work for Angel Records of New York. His responsibilities included

quality control of classical recordings. Ed worked for two other recording companies and moved to New Mexico in the 1970's.

While in New Mexico, Ed served as a consultant for Sandia National Laboratories, for Los Alamos National Laboratories, and also for Texas Instruments. He assisted the Archaeological Society of New Mexico on special digging sites, where he employed his jeweler's skills in removing rock from dinosaur bones.

Our Guild extends its deepest sympathy to Ed's family and friends. We will miss his storehouse of knowledge and miss hearing about the history of the jewelry industry.



Field Trips: A Possible Field Trip For Spring

By Merrill O. Murphy

I'll bet you never heard of a mineral called sepiolite. How about meerschaum? They are one and the same. Sepiolite is the mineralogical name, and meerschaum is the common name. Still wondering? Is meerschaum sounding vaguely familiar? Remember those old tobacco pipes our fathers and grandfathers used to cherish, the ones that featured an ornately carved bowl? The bowls were usually carved in the form of a bearded face. When new, the carved bowls were an opaque, creamy-white material with a polished surface. After extended use, the bowls (or parts of them) changed to a rich mahogany color from the effects of heat and the oils from the tobacco.

Almost all those meerschaum pipes were carved in the Middle East or in the Far East. Many were carved in Turkey, if

memory serves me correctly. The meerschaum, itself, came from deposits in the Orient. The first North American discovery of sepiolite-meerschaum occurred in 1875. Where? In southwestern New Mexico, of all places. Even more strangely, New Mexico remains the only sepiolite source of any significance in North America. Mining commenced almost immediately, shipping thousands of tons of good meerschaum overseas for carving. However, after 1910, demand for meerschaum pipes waned. Major shipments ceased by 1915, although records indicate a shipment of 1,000 pounds in 1943 for use in "pipe liners" and insulators in electronic equipment. (I do not know what was meant by "pipe liners". Sepiolite, being somewhat porous and likely to absorb water, would not seem to be a very good insulator.) Since that time, the old claims and mines remained idle. In all probability, ownership reverted back to National Forest, BLM land, or private ranch property.

What is so attractive about sepiolite-meerschaum? It certainly is a fine carving material, especially for those of us who possess few tools for carving in stone. Also, it would appear to be a suitable inlay material for use in Indian-style jewelry.

Let's take a look at the chemical and physical characteristics of sepiolite-meerschaum. It is a hydrated magnesium silicate. Hydrated means that a certain percentage of water is a chemical part of the crystalline makeup. In form, it varies from compact balls, nodules, and seams in rock outcrops to earthy and clay-like deposits. Under the microscope, pieces of solid ore appear to be a mixture of fibrous material and fine particles. These pieces have no cleavage. The hardness varies from 2 to 2 1/2, not much different from fingernail hardness, yet quite tough. It polishes easily and does not lose that polish readily. The color is creamy-white, grayish, or may have a yellowish or reddish

hue. Carving proceeds quickly using steel tools, files, and sandpaper. I am uncertain as to the polishing techniques used, but I think that hand rubbing with a damp cloth charged with a bit of cerium oxide or Linde A should do the trick.

Now comes the hard part. Where is it, and how do I get some? Several locations may be found a few miles north, northeast, and northwest of Silver City, in Grant County. The original discovery showed a site on Sapillo Creek, a short distance north of Lake Roberts and northeast of the intersection of State Roads 15 and 35. That puts it about 12 to 15 miles northeast of Silver City in the Meerscham mining district. Other locations are found on nearby Salt Creek and the canyon of Bear Creek to the west.

Quite a few homes and ranches are located in those areas, making direct access to the sites a problem. The mines have probably reverted to National Forest, BLM, or may have become private property. The National Forest in the Sapillo Creek area is a Primitive portion of the Gila National Forest where no collecting is allowed. Salt Creek appears to be a similar situation. The Bear Creek area is a combination of BLM and private property. The private property consists of narrow strips along the stream. If we are to collect there, then we must gain permission from the landowners or venture outside the canyon.

Fortunately, we do have contacts in the Silver City area. I will pursue the possibility of a field trip down there when spring arrives. Keep your fingers crossed.



In The News

Montana Sapphires and Black Hills Gold

From National Jeweler March 16, 1997

Gem River Corporation and Landstrom's signed a business agreement that will allow television home shoppers to purchase Montana sapphires set into Black Hills gold jewelry. Gem River Corporation pledges to supply one to three million dollars of finished sapphires from Montana over the next twelve months. Landstrom's agrees to manufacture a special line of jewelry featuring Black Hills tri-colored gold with Montana sapphires.

Gem River Corporation, responsible for marketing, plans its first negotiations with the QVC Home Shopping Channel in the United Kingdom. The special line of jewelry will not be sold in the United States for the first six months.

A similar agreement existed between Landstrom's and American Gem Corporation for a supply of cut Montana sapphires. Lately, Michael Anthony Jewelers contracted American Gem Corporation to furnish cut Montana sapphires for the "American Sapphire Collection", with plans to mass-market its exclusive line of Montana sapphire jewelry for American television home shoppers.

New Papers on the Hope Diamond.

From National Jeweler March 16, 1997

For the third time, new certification papers were submitted for the Hope Diamond. The Smithsonian

requested an updated certification from the Gemological Institute of America's Gem Trade Laboratory in accordance with the new GIA color grading terminology. The report for the forty-five carat diamond, examined unmounted, re-classified the famous stone as "fancy deep greyish blue", with a clarity rating of VS1.

A report from 1960 stated that the Hope Diamond was semi-conductive, a known characteristic of natural color Type 11B diamonds. It also noted a red phosphorescence from a test where the diamond was exposed to shortwave ultraviolet radiation. In 1988, a team of GIA graders examined the Hope Diamond while it was again unmounted. The Summer Issue of *Gems and Gemology* published their results.

The Flow of Tanzanite

From Modern Jeweler March 1997

Tanzanite originates from only one gem location in the hilly region of Merelani in northern Tanzania. The apparent rarity of tanzanite should drive gem prices up, however, the gemstone market stands currently flooded with low-end to medium-grade tanzanite. The government seems helpless to regulate the flow of tanzanite.

Low tanzanite costs enabled marketers to sell tanzanite jewelry at affordable prices. The popularity of tanzanite soared when television home shoppers participated in a shopping frenzy and bought gold jewelry set with medium-grade tanzanites. Prices for fine-grade tanzanite in the two to ten carat size remain relatively expensive, although the glut of low-end goods brought prices down a bit for the high quality gems.

As tanzanite prices fall because of the surplus of low-end to medium-grade goods, the tanzanite miners

decided to allow time for the glut to pass. Rather than mine tanzanite at a loss, the miners ceased work to wait for a rise in prices.

Russian Diamond Politics

From Modern Jeweler March 1997

The politics in Russia have become so fractionalized as to have erupted war among many government agencies who claim ownership of any diamonds mined in Russia.

The Russian parliament in 1995 gave Komdragmet, the Committee for Precious Stones and Metals, the right to export diamonds on its own. However, most of the Russian diamonds originate from mines in the Republic of Yakutia. Regarding itself as a separate region and subject only to its own laws, the Republic of Yakutia believes that it rightly holds the last word in any negotiations involving Russian diamonds. If DeBeers wants a Russian diamond contract, they need to negotiate with all parties who claim a stake in the diamonds to sign an agreement.

Diamond Politics In Zaire

From The Economist March 15, 1997

Workers have mined rough industrial-grade diamonds valued at hundreds of millions of dollars from deposits near Mbuji-Mayi, Zaire's diamond city. A civil war over control of the region has disrupted all mining. The townspeople welcome the rebels, who they see as a change for the better after years of harsh rule. They fear that government soldiers may loot, rather than defend, their city. The outcome remains uncertain as to who will win, but the losers will include the mine workers and the diamond traders.

Diamond Mines in Decline

The Economist March 22, 1997

The once profitable diamond mines in south-central Zaire show evidence of having been pillaged. Owned by the state, the mines of Shaba have suffered from theft and graft. Some of the once lucrative mines closed down because they lacked investors. Similar circumstances rule the Miba diamond mine, once the world's largest. Reports state that smugglers now run off with more than half of the diamonds mined in Zaire.

Auction Houses Declare Gemstone Treatments

From Modern Jeweler March 1997

To both protect themselves and to properly present themselves to the public, Christie's and Sotheby's now provide a catalog declaring full disclosure of gemstone treatment. The new disclaimer states that emeralds can be oiled to fill cracks and that sapphires can be heated to improve color and clarity. This action challenges the gem and jewelry industry to admit all treatments in use. However, the disclaimer fails to mention the fracture-filling of emeralds and the glass-filling of rubies.

Christie's believes that enhancements directly affect market values. In order to distinguish treated stones from untreated stones, they plan to prepare estimates in reports that disclose any information on enhancements. If no report exists, then customers must assume enhancements of gemstones were performed. Christie's thinks that fine, untreated rubies, sapphires, and emeralds deserve a higher dollar value than treated ones.

Gold Merger

From The Economist March 15, 1997

Newmont Mining out-bid Homestake Mining by offering \$2.5 million for an ownership of Santa Fe Pacific Gold. This merger now ranks the combining companies as the largest gold company in North America.

Lab-Grown Pearls

From Colored Stone March/April 1997

Researchers working for Kinki University in Japan uncovered the organic protein responsible for the luster on a pearl, calling it nacrein. This revelation may enable scientists to produce pearls in a laboratory instead of relying solely on nature.

Most mollusk shells contain calcium carbonate. However, the existence of certain organic compounds transforms the calcium carbonate into a lustrous pearl. The researchers cloned and mapped the genetic structure of nacrein, yielding the replication of nacre as made by oysters. The researchers published their findings in the *Proceedings of the National Academy of Sciences*, Volume 93, Number 18.

China Declares Jewelry Standards

From Colored Stone March/April 1997

The government of China last October enacted national standards for the nomenclature and identification of diamonds and colored stones. These standards were set to establish a basis for law enforcement and for any judgment regarding jewelry.

The standards demand that all treated gemstones be labeled as such, and that they show a description of their treatments on labels, certificates,

or test reports. The standards include definitions of synthetics, composite gemstones, imitations, and reconstructed gemstones.

Judging from the increase in jewelry sales, the Chinese people are becoming more affluent and can now buy more jewelry. The new set of standards hopes to protect Chinese consumers against fraud.

New Tanzanite Simulant

From Colored Stone March/April 1997

M.P. Gem joined with U & M Science Co. to market a special simulated tanzanite. Composed of laboratory-synthesized polysilicate, the simulant more closely resembles the gemological properties of tanzanite than the more commonly used corundum. The simulant exhibits the color of fine grade tanzanite. It will not be sold in Tanzania. It will be marketed as simulated tanzanite with no trade name. The current price for the new simulated tanzanite runs five dollars per carat cut.

More Oyster Deaths Reported

From Colored Stone March/April 1997

Due to severe water pollution in Japanese bays, reports state that more oysters have died in record numbers than previously estimated. Experts predict the pearl harvest this year to only equal half of the pearl harvest from last year. Some think that the full range of the crisis will not be known until the end of 1997.

The life of a Japanese Akoya oyster spans a three-year growth cycle for Akoya pearls that begins with nucleation and ends at harvest. Because of this cycle and the recognized hardness of Akoya oysters, pearl farmers hope for the Akoya pearl situation to improve within the next four years. That may depend upon the water con-

ditions in the bays and how crowded the oysters are packed. Prices now rise and fall, because supplies are so unreliable.

China Sells Oysters to Japan

From National Jeweler April 4, 1997

Because of the magnitude of the oyster deaths, Japanese Akoya pearl companies purchased between 30 million to 40 million oysters from China. It is uncertain if the Chinese oysters will thrive in Japan's waters.

The Origins of Emerald

From Lapidary Journal April 1997

Fred Ward continues his research on emeralds in an article titled "Empires and Emeralds". Fred states that the emerald mines in Egypt are among the oldest and the longest worked of all gem sites in the world. Until the 1500's, all the emeralds in use throughout Africa, in Europe, and the Middle East originated from the mines in Egypt, which came to be known as Cleopatra's Mines. The fine emeralds found in India were obtained in trade from Spain, who shipped the emeralds from their mines in Columbia.

Fred writes a compelling and well-told story about the world's emerald locations. He explains how history determines the destiny of gems, as he describes the historical events that affected world gem trade.

News from Gem River Corporation

From Colored Stone March/April 1997

Having served as the former United States Deputy Attorney General and the former Acting Director of the FBI, William Ruckelshaus now sits on the advisory board for Gem River Cor-

poration. Because William Ruckelshaus served as the former Administrator of the Environmental Protection Agency, Gem River asked William Ruckelshaus to improve Gem River's corporate image to one more environmentally responsible. William Ruckelshaus plans to help Gem River follow government guidelines and regulations.

Gem River announced a certification of "no child labor" for all of their products. Gem River employs no one under the age of eighteen.

The Flooding of Fracture-Filled Rubies

From National Jeweler April 1, 1997

Reports estimate that 50% to 60% of the rubies now on the market are fracture-filled. Fracture-filling affects nearly all of the rubies from Mong Hsu. C. R. "Cap" Beesley of American Gemological Laboratories in New York believes that fracture-filling of rubies currently runs rampant and remains essentially undisclosed. He crusades for the full disclosure of fracture-filled rubies and Opticon-treated emeralds.

American Gemological Laboratories recently examined the many eight to twelve carat rubies in a Harry Winston necklace sold during an auction at Sotheby's. The tests revealed that every ruby had been subjected to very high temperatures. The results uncovered evidence of fracture-filling in 70% of the rubies.

AGTA plans to research the prevalence of fracture-filled rubies. If their inquiry results show that the vast majority of rubies are fracture-filled, then AGTA can require its members to disclose all rubies for sale as fracture-filled.

The permanence of fracture-filling rubies is currently unknown, but the

color enhancement is permanent. The intense heat changes the integrity of the crystal lattice, leaving the ruby more brittle. If it is permanent, then no disclosure is required under the new FTC guidelines. No study has yet been done to determine the permanence of fracture filling.

Tests for Synthetic Amethyst

From Colored Stone March/April 1997

The Asian Institute of Gemological Sciences now utilizes a new test to determine synthetic amethyst from natural amethyst. The laboratory will not yet disclose the exact methods used in their testing.

Because of the heavy saturation of synthetic amethyst now found in parcels of natural amethyst, many dealers and members of the jewelry industry requested that such a test be made available. It remains to be seen whether costs for testing will be deemed economical on lots containing small-sized amethysts.

The AGTA sent some sample lots of amethysts to the laboratory for testing, and the tests returns were near to 100% accurate. Many ethical dealers expressed concern regarding the flooding of undisclosed synthetic amethyst. It remains to be seen whether the manufacturers and the dealers of synthetic amethyst will endorse the testing ability that determines synthetic amethyst from natural amethyst.

Huge Ruby Crystal Found

From National Jeweler April 1, 1997

Cutting a marble boulder from Myanmar revealed a gem quality single ruby crystal that measured 21 by 18.5 by 7 centimeters. Two gem laboratories in Hong Kong examined the 6.5 kilo-

gram ruby crystal and declared it to be natural.

A New Gold Solvent

From New Scientist March 29, 1997

Japanese chemists revealed the discovery of a new gold solvent reported to be cheaper and safer. Yukimichi Nakao of the National Institute of Materials and Chemicals Research outside Tokyo led this research. After working with halogens and halogen compounds for years, he derived a new workable combination of iodine, tetraethylammonium iodide, and acetonitrile. The traditional solvent used for gold has been aqua regia, composed of nitric acid and hydrochloric acid.

The new solvent becomes saturated with gold when it reaches the boiling point of 82 degrees C. Gold then precipitates from the solvent as the temperature is gradually lowered to approximately 20 degrees C.

The objectives for using the new solvent include smelting gold and extracting gold from chemical waste. Research continues on the solvent to make it recyclable.



Let's Talk Gemstones:

By Edna B Anthony, Gemologist

Sillimanite

This article marks the third and last in my series on the polymorphic aluminum silicate group. This group is comprised of andalusite, kyanite, and sillimanite. Sillimanite was named in honor of the American mineralogist Benjamin Silliman (1779-1864), who was a chemistry professor at Yale.

Sillimanite is seldom transparent. However, a deposit in Mogok, Myanmar (formerly Burma) yielded lovely and rare violet-blue facet-grade crystals. The pale blue to colorless material from Kenya matches the Burmese material in quality, but the crystals from Burma tend to be smaller in size. The gem gravels of Sri Lanka yield rare greyish-green, transparent, and fibrous chatoyant stones. Collectors search for these transparent varieties of sillimanite because the material is so rare.

Sillimanite occurs in deposits found world-wide. The many sources for sillimanite include Tanzania, South Africa, Korea, India, Madagascar, Brazil, France, Germany, Italy, Ireland, Scotland, Canada, and the United States. The producers of sillimanite in the eastern United States include North Carolina, South Carolina, Delaware, Pennsylvania, Connecticut, and New York. Sillimanite is also found in Oklahoma and South Dakota. The Clearwater River Valley in Idaho has sillimanite cobbles that are carved into figurines and sold as souvenirs of Idaho.

Text written by Dr. J. Kourimsky, found in the Illustrated Encyclopedia of Minerals and Rocks, states that sillimanite is "commonly finely fibrous to

acicular and is colored white; when mixed with quartz, it is called fibrolite.”

One of our prized reference books that Tony and I acquired for my gem and mineral library is an old textbook entitled “Manual of Mineralogy”, 19th edition, by Dr. Cornelius S. Hurlbut, Jr. and Dr. Cornelis Klein, after J.D. Dana. I found the information and explanations from this book to be very explicit, comprehensible, and thorough. The following sentences quoted from this book will explain why research can be such fun for me. “Sillimanite occurs as a constituent of high-temperature metamorphosed argillaceous rocks. In contact-metamorphosed rocks, it may occur in sillimanite-cordierite gneisses or quartz-muscovite-biotite hornfels. In regionally metamorphosed rocks, it is found, for example, in quartz-muscovite-biotite-oligoclase-almandite-sillimanite schists. In silica-poor rocks, it may be associated with corundum.” What a thoroughly descriptive mouthful that was!

Sillimanite, like kyanite, presents problems when rendering faceted representations. The brittleness and directional cleavage of sillimanite present challenges for faceters. The scarcity of facetable sillimanite and its difficulty in cutting add value to a faceted sillimanite. The sillimanite catseye cut en cabochon make unusual and very attractive stones for rings.

TABLE 1. Gemstone Properties

<i>SPECIE</i>	<i>Sillimanite</i>
Composition:	Al ₂ SiO ₅
Varieties:	transparent by color, translucent to opaque, and chatoyant

TABLE 1. Gemstone Properties

<i>SPECIE</i>	<i>Sillimanite</i>
Colors:	green, yellow, brown, black, grey, blue, white, colorless
Phenomena:	chatoyancy
Streak:	white
Crystal System	orthorhombic
Habit:	usually fibrous massive crystals; long prismatic crystals are rare
Cleavage:	perfect in one direction
Fracture:	uneven and brittle
Fracture Lustre:	vitreous pearly
Lustre:	silky vitreous
Specific Gravity	varies 3.23-3.2; compact mineral 3.14-3.18
Hardness	6.5-7.5
Toughness:	poor
Refractive Index	alpha 1.654-1.661; beta 1.658-1.662; gamma 1.673-1.683
Birefringence:	0.020
Optic Character	biaxial positive

TABLE 1. Gemstone Properties

<i>SPECIE</i>	<i>Sillimanite</i>
Dispersion:	0.015
Pleochroism	pale brown, yellow green-brown, green-brown, blue
Ultraviolet Fluorescence	Sri Lanka: inert; Burmese: blue-weak reddish
Spectra	Sri Lanka: weak line 4100; sharp lines 4410 & 4620
Color Filter	no information
Solubility	no reaction to acids
Thermal Traits	infusible; avoid thermal shock
Treatments	none
Inclusions	fibers



My New Concentric Faceting Machine Design

by W.R. Deazley, Member of The North York Faceting Guild & The Rochester Lapidary Society

Introduction, History And Background.

With the advent of powerful home computers, a new tool is now available to assist in shaping gemstones! Computer programs for generating new gemstone designs have introduced data accuracy into the facet design process.

The new faceting machine I constructed, herein described, uses the facet distance data now available in computer generated descriptions of gemstone shapes.

The most immediate signs from the influence of computers are the availability of gemstone design programs. These include: GEMCAD, developed by Robert Strickland for the IBM flavored PCs, MAKEGEM developed by Piet G. van Zanten in the Netherlands for AMIGA style PCs, and Fred Van Sant's program MacGem for the Mac enthusiasts.

These very powerful CAD programs contain many functional similarities. They all select vertex points and the connecting facet edges. They allow a consistent set of facet angles to be selected or computed. The resulting facets form the correct intersection edges, with their corresponding vertices.

In addition, the program DATA-VUE, developed by Bob Long and Norm Steele, permits an easy selection and displays a mind-boggling number of accumulated computer facet designs for use on your home computer.

Reasons For The New Faceting Machine Design

One common thread that occurs in all of these computer design methods is the need to position each facet by specifying three numerical values: (1) facet angle, (2) index angle, and (3) the distance of the facet from a selected centerpoint inside the stone. Alternate sets of numbers are used in programs, but they result in an imperfect choice of facet distances.

A number of methods to control stone shaping have evolved. The CAM (Center-point Angle Method), and CED (Center-to-Edge Distance), discussed in Robert Long and Norm

Steele's early publications, can be used to determine the girdle shape. Meet-point methods are most effective when one is trying to grind the non-girdle facets. The real difficulty occurs when there are no available meetpoints to help set the distances. Then, only your "calibrated eyeball" is available to know when to stop.

Until the arrival of computer generated designs, information on facet distances was not a part of the "recipe" for making the stone shape. They only became a necessary part of the data for stone design during their development on a computer.

One of the computer's major design tasks is the determination of these elusive distance values. The most amazing thing is that after all this extra work is done by the computer, these distances are not published in the computer generated facet design "recipes". Only facet angles and index settings are.

Certainly, we all know the reason for this omission. NO faceting machines available to the hobbyist and the small production cutter are built to use the distance data, even if it were available. So, distances are usually not mentioned. To my knowledge, only Long & Steele's early discussions on how to shape girdles using mast height micrometer controls (available on some of the more fancy faceting machines), and the CED approach provide a method that directly controls the facet distances to the girdle.

Here, the common thread is: only the girdle facet distances are easy to determine.

The faceter's ability to calculate what distance setting to use on a mast, for all facets, is very difficult, because of the mechanical coupling between facet angle settings and depth settings

at the mast. Computing the correct distance settings for facets having angles less than 90 degrees requires very accurate knowledge of this coupling. This problem certainly must have been addressed very carefully on the Jarvi Facetron CNC automatic faceting machine.

In 1992 I wrote a 'C' language faceting design program to emulate exactly the problems one finds in the actual cutting process. The only way I could obtain a correct design was to "cut" the facets on the computer in exactly the same way that I would do with a real stone, that is, by changing the facet distance and not the vertex points and facet edges. Only facet angles, index angles, and the facet plane's distance were selectable. The computer would then calculate the corresponding facet edges, including all the minor edges that occur when meetpoints are not perfect. The final result was a rotating display showing the perspective 3D wireframe model of the stone shape.

When I examined the Long & Steele ASCII data files in DATAVUE, I quickly recognized that distance information was included in their files as well. This made it quite easy for me to put Long & Steele stone designs into my computer program to duplicate any stone shape published in their files. After happily playing with many facet

{1Robert Long & Norman Steele, Facet Design. Volume 1 Ovals (Mercer Island, WA 98040: Seattle Faceting Books, 1983) D25-27.}

designs, it finally occurred to me, in early 1994, that it would be an interesting problem to develop a faceting machine that could accurately make use of the newly available distance data.

The angle/distance - decoupling approach that I used was to simply

avoid it, as well as all the numerical fussing required for a conventional mast style machine. I decided to design the basic machine to eliminate any coupling between facet angle settings and distance settings.

The basic principle was to fix the facet angle rotational axis to have it always intersecting the stone center point; i.e., the rotational axis must be "concentric" with the stone center. The index angle rotation axis is already intersecting the stone centerpoint (by default), therefore, there is no need to "decouple" index settings from the distance setting mechanism.

The Basic Design Concept and Why I Call It a "CONCENTRIC" Faceter

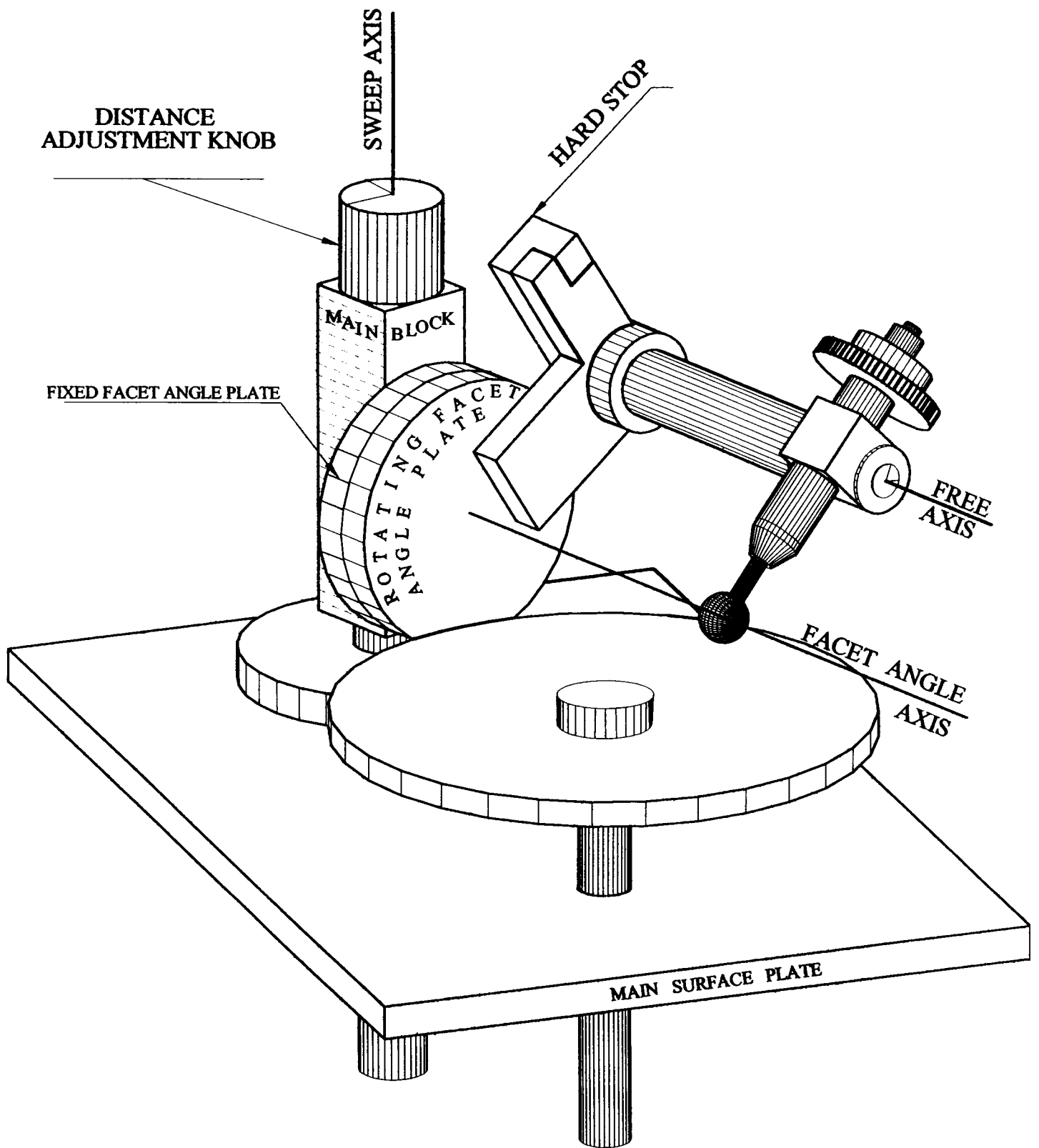
With these basic design principles in mind, I began to sketch out methods that would do the decoupling, as well as have a rigid and compact design that I could build in my very limited machine shop. This endeavor resulted in the following design features. See the enclosed simplified sketch of the "CONCENTRIC" faceting machine (prototype #2 Nov. 1995):

1) The vertical free axis shaft for sweeping the stone and dop across the grinding/polishing lap contains sealed and protected ball and thrust bearings positioned below the main surface plate. This 0.875" diameter steel shaft is limited to only rotation about this sweep axis, with the vertical motions constrained by a single thrust ball. The shaft projects about 5 to 6 inches above the main surface plate. It has a precisely bored and fitted main block mounted to it, permitting the independent control of the vertical position of the facet rotational axis with a screw adjustment.

2) The vertical position is measured with a precision 10 mm. dial gage (not shown) reading to 0.01 mm.,

which is not part of the screw adjustment mechanism. This provides an independent measurement of the vertical position of the main block for stones up to 20 mm. in diameter. The faceter has the capacity to use a longer stroke dial gage (25 mm.) that would cut stones up to 50 mm. in diameter.

3) The facet angle position is measured with a fixed engraved angle plate and a matching 1/20 th degree vernier plate. The angle plate is 4.000" in diameter and 0.5" thick, with the degree markings engraved on the 0.5" edge. The vernier plate is mounted on a matching 4" diameter, 0.5" thick rotating facet angle plate, which supports the remaining boom and index position mechanism and the dop collet mechanism.



CONCENTRIC FACETER, SIMPLIFIED VERSION

4) There is an additional horizontal free float axis, similar to the ones on all mast machines, that allows the dopped stone to be lowered onto a rotating grinding lap. The free axis is constrained in its down direction by a hard stop that holds the stone's center position on the facet rotational axis. The hard stop provides an electrically isolated contact that is electrically grounded when the horizontal free axis motion is limit-stopped by contact between the fixed and moving parts. This contact closure is used to turn on a high output red LED, located on the main block, that alerts the faceter when the stone center is concentric with the facet angle axis.

5) Backlash-free cheater adjustment devices (not shown) are included to allow small adjustments to the facet angle and index angle settings. The facet angle control needs such a device, because it is almost impossible to manually make a facet angle adjustment fine enough to match the 0.05 degree readability of the vernier setting.

6) The dop is designed to properly control the location of the stone center. It must be set to have the desired center point of the stone, mounted on the dop, concentric with the facet angle axis when it is mounted in the dop holder on the faceting machine. This requires an adjustable collar mounted on the dop, set in a special transfer jig to fix the stone position at the known center distance of the machine. This collar has four centered "v" grooves (with 90 degree spacing) on the face of the collar that mate with corresponding centered "v" ridges on the dop holder. These grooves and ridges provide repeatability in both centering and index position control. It also allows the faceter the luxury of removing the dop for more elaborate examination without losing any accuracy of positioning. This design is, admittedly, more complicated than the more traditional

ones. However, it has position repeatability that is sorely lacking in any other dop-holding scheme that I have ever encountered.

7) The lap drive spindle is designed to have the height of the upper surface of any lap at a fixed position relative to the main surface plate. This permits the faceter to effectively ignore the effects of different lap thicknesses when using the micrometer dial gage to set the facet cutting distance.

These are the main features built into the "concentric" faceting machine needed for facet cutting control. These features make it possible to cut facets to the desired distance without the geometric problems associated with conventional facet machines. There are other details, not covered here, related to dop transfers, etc., that must be kept under control. Careful attention to centering and lap irregularities make it possible to cut fancy shapes down to the fine grinding (1200 grit) stages with only limited examination for correct depth of cut. One of the most troublesome procedures of shaping the stone for polishing is now made easier using the depth of cut control in a "concentric" style faceting machine.

Notice that the ability to use distance data makes it unnecessary to use meetpoint methods to generate the facets of any shape or style stone. However, it is still recommended that the meetpoint cutting sequences be used, as much as possible, to cross check whether the faceting is proceeding down the correct path. It only makes sense to maintain as much control of the procedure as possible.

Another nice feature inherent in this type machine is the ability to cut duplicate sized stones because of the direct control of facet distances. The rigid construction, inherent in this style machine because of its compactness, as

well as the independence of each function, also makes polishing easier to control. In many of the cases where I have used this machine, I could polish the table without the need for an offset dop holder to limit squealing. This aid is directly attributable to the rigid construction and to the "distance controlled" offset dop holder to quiet this problem.

I can be contacted via E-mail at: deaz@buffnet.net, by Snail-Mail at: 310 Chairfactory Road, Elma, N.Y. 14059, or by phone at 716-655-9951. Use the E-mail if possible. I will have a hard copy record, and it is a lot cheaper than a phone call. W.R.D.



DESIGNER'S WORKSHOP

By Ernie Hawes

Charles Covill recently sent two new designs to our editor, Nancy Attaway, for use in our newsletter. I'm very happy to present them here. The first is a cut-corner rectangle, which Charles calls FANTASY NO. 1. The second is a triangular cushion simply titled FIFTEEN SIDED TRIANGLE. While I have not yet had time to cut either of these designs, both appear to be attractive and should be good designs to add to any faceter's repertoire. (Charles likes to give a degree of difficulty for his designs. As you can see, both of these fall in the easy to moderate in difficulty range.) Be sure to note that the refractive index listed for the FIFTEEN SIDED TRIANGLE is 1.61. It is common practice to use the R.I. for quartz when creating new designs, with the expectation that the cutter will interpolate the angles for whatever material he/she intends to facet. However, there is no rule that says designers must do this. Sometimes a designer has a piece

of rough that he/she would like to try something new with, and the results can produce the occasional design created for a different refractive index. My guess is that this is what happened here. It really makes no difference, as long as you interpolate the angles correctly.

The death of Norm Steele marks a tragic loss to the faceting world. Many of us depended upon Norm to maintain the gem database Datavue2. Following Norm's death, Bob Long was given the opportunity to go through Norm's papers. Bob found nearly a year and a half's worth of work that Norm had nearly completed in his preparation for updating the database. Bob could not allow this work go unfinished, and he prepared one last update of designs through January, 1997. The update is now available over the internet on John Franke's website <<http://www.olympus.net/gemcutter>>. If you don't have access to the Internet, nor the update, it is basically FREE! For \$5.00 to cover the cost of mailing four 3.5" floppies, mailers, etc., you can order this update from one of the following persons:

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You do, of course, need an earlier version of Datavue2 in order to update. If you do not have this, you can then download it from John Franke's website listed above. Probably, one or more of the sources listed for the update also has the original database that came on five 3.5" disks with a cost \$25.00, a very nominal fee for such a valuable resource.



Tucson 1997 Report

*By John Rhoads of D&J Rare Gems.
Ltd. in Salida, Colorado*

<http://rainbow.rmii.com/~raregems/>

Tucson, at its best, is a gamble. Some years are good, some are not so good, while others are outright poor. The reasons for this can be under our control, or they can be dictated by events and actions where we have no control. Few dealers will report 1997 as a great year in Tucson. Most will say it was fair. For some, it may spell the end of their business.

The 1997 Tucson Show was fair for us. Our expectations were great, as our inventory was the best that we ever had to offer. We were riding high after the fabulous Tucson Show we experienced in 1996.

For this year's Tucson Show, there were reasons for apprehension. The show promoters were not united in their productions. The main body of shows were spread out over a three week period, instead of the traditional two. Where this may have given buyers more time to attend the shows and, hopefully, may have opened up more hotel rooms (they still were as expensive as ever or even more expensive than ever), it tended to dilute the buy-

ers. This made the crowds much smaller.

A number of very fine gem and jewelry shows were held at the same time in various locations in the United States and abroad. We heard about shows in Tokyo, New York, Miami, and Las Vegas slated for the same time as Tucson. Each of these shows could well effect the attendance at Tucson. In the past, promoters in other cities would never have dreamed of scheduling a show at the same time as Tucson. With the deterioration of services and the increase of costs experienced by dealers in Tucson over the last few years, certain promoters took a chance that, if successful, may severely hurt the Tucson Show in years to come.

Competition within the show has increased. More dealers were offering rare gems, either as a main part of their offering, or in addition to their other fine gems. Although this can be a healthy sign of a dynamic market, it can also effect the results experienced by dealers when this expansion goes beyond what the market can handle. It will be interesting to see if this trend can be sustained or whether some dealer shrinkage may be seen as soon as next year.

Certainly, we made some errors in marketing. Some we can correct, while others may be a part of our business strategy and not so easily changed. We have always labeled our gems with prices to allow customers a clear view of our gems and prices without having to ask about costs. This policy can be used against us by dealers who are less up front, who can shop us, and then adjust their prices to undersell us. This may work well for them in the short run. However, if their sources are charging less than ours, it may result in lower profits for them that could adversely affect their businesses in the long run.

We also noticed a very sharp decline in visits to our booth from our regular customers. This marked our sixth year attending the Tucson Shows as dealers. During that time, we have had many individuals who have come by to see us each of these years. Those numbers were off dramatically this year. The reason for that may be a matter of speculation that we will evaluate and react upon accordingly.

Overall, we hope to make some changes that will yield growth next year. This may mean borrowing some of the ideas used by our competitors to become more competitive. However, it will also mean establishing new sources with better prices, while continuing to serve our loyal customers, who remain the lifeblood of our business.

Business in Tucson:

Several items stood out that sold well for us in Tucson. We displayed a very good inventory of peridot from Pakistan in sizes ranging from 2 to 12 carats. We originally thought that this would be a very competitive area. However, we found few dealers offering similar goods, and, as a result, our material sold very well.

The color change pyro-spessartite garnets from Sri Lanka also sold well. We were very pleased to see that our prices were very competitive, with even the dealers from Sri Lanka. The only drawback we experienced was that we saw a many fine color-change garnets over 1 carat in size, but not in very large quantities. A few had a green color in daylight. We found a very fine piece of rough weighing 2 grams that had a remarkable blue color in daylight that changed to purplish red. However, our attempt to purchase it fell short of success.

Fine natural heliodor that we cut from Tajikistan sold very well. We only had one heliodor remaining at the end

of the show. The sunstone from Oregon that we cut also sold well. We acquired a large amount of gem rough material at the show that should allow us to continue offering fine Oregon sunstones in the future.

The imperial precious topaz that we cut did very well, also. We purchased a fine parcel of rough in Denver that we have since cut. This parcel yielded many fine gems that sold well. Some of the individuals who purchased these gem commented how they appreciated the cutting, since it was not like the traditional cutting often done in Brazil.

Rare gems that we cut sold very well. The bulk of our sales in rare gems involved gems that we personally cut. To our surprise, we sold several rubies and sapphires. This is an area where competition is very tough. We hope this is an indication that we are, at least, a little competitive in this market. All in all, we made some purchases of gem rough that will allow us to both expand our offerings in the future and enable us to remain a competitive force in the gem business.

Tanzanite:

Many of you may have noticed that within the past few months prices for tanzanite has dropped. We were finally able to obtain tanzanite that we could offer at prices approaching the lowest ever. We did some inquiring in Tucson and discovered the reason behind this drop.

A few years ago, the deposit of tanzanite was divided up into concessions and awarded to foreign mining interests in partnership with Tanzanians and controlled by the Tanzanian government. Apparently, one of these concessions was not being worked by the European company who held it. A group of native Tanzanian miners even-

tually grew frustrated and took over this concession by force. They proceeded to mine it as quickly as possible, subsequently releasing all their production onto the market at once. This produced a temporary glut in the market of rough and cut tanzanite, and the prices have reacted accordingly.

Those people who are closely involved in the marketing of tanzanite feel that this glut may last up to six months before supplies, once again, tighten, thus driving prices up again. Whatever your position in the market, if you use a lot of tanzanite, then now is the time to buy.

New Namibian Tourmaline:

The only gems that we could consider new at the Tucson Show was Namibian tourmaline. This material was featured in an article in the show guide. We were fortunate to be located only a few booths away from where this material was being marketed. As a result, we were able to see just how good it really is.

We purchased one of these fine gems. Upon first examination, they appear very similar to Afghanistan tourmalines. When we placed our purchase of Namibian tourmalines next to our Afghanistan tourmalines, the difference was very noticeable. The color of these Namibian tourmalines is much more saturated. The high-end Namibian tourmalines offered for sale were very similar to Paraiba tourmalines, showing vivid and excellent color intensity.

Prices asked seemed very high to us initially, as the lower-end gems in the one carat range were priced at \$300 per carat. We discovered, however, that for multiple purchases, the prices were reduced to as little as 1/5 the asking price. This made the gems much more reasonable in price.

Watch for more of these Namibian gems on the market. They may give the tourmaline market the boost it needs to get out of the rut it has been in for the past few years.



A Profound Quote Regarding Tucson

From Modern Jeweler April 1997

“You forget that the vast amounts of any gem you see at Tucson represent a good deal of the entire world supply of that gem,” observes designer Ron Hallet. “So when you see so many of one gem (i.e. black pearls or tanzanite) under one roof, it is hard to imagine that the gem is, or was, ever rare. Tucson is a mind-bender that can just as easily distort reality as it can depict it.”



Tucson From the Other Side of the Booth

*By Karen Blisard (a lady faceter from
Silver City, New Mexico)*

The February spring show in Tucson has become my favorite vacation of the year. In fact, I now PAY someone to cover for me back home while I am away. I arrive the first day of the show and stay for two weeks. However, this year the show ran longer than in past years.

My first stop in Tucson is the Rodeway Inn. I met many dealers there in past years, as I frequented the GLW Show in Detroit when I resided in Cincinnati, Ohio. As most of you know, it is always advantageous to buy as much as possible from a few dealers, because the price gets better and better.

One of my favorite dealers at the Rodeway Inn is Pankaj, a delightful Indian fellow who sells beads and cut stones. Although I do not work with a lot of beads now, I did a lot of bead-work when I lived in Ohio. Pankaj probably has one of the best selections of beads at the best price.

Another favorite dealer is the couple who operate World of Gems, George and Barbara Manojlovich. Crazy George, as he is known, became my “cousin” when he discovered that I had been a pathologist. George had been an immunologist, and he decided that our similar backgrounds made it close enough for us to be “cousins”. George’s business philosophy is such that he does not need to make a fortune on each sale. He prefers to offer his good customers excellent prices on merchandise.

This year at Tucson, I only had two days to shop by myself before I was scheduled to meet with my bosses, Mike and Kathy Williams from Colorado. Mike and Kathy own and operate the House of Williams. As with the dealers at the Rodeway, I also met Mike when I lived in Ohio. He has always displayed such great gem material. I purchased so much from him that he offered me a position at their booth if I ever visited the Tucson Show. So, when my husband and I moved from Ohio to New Mexico, I took Mike up on his offer. This year marked my fourth year working for him.

Mike, Kathy, and I usually allow two or three days to hit the other shows before our set-up at the Holiday Inn Holidome. Set-up time is quite chaotic, as we run from show to show in search of that pre-show bargain we then resell. Unfortunately, I do not always get the chance to view everything that I want. However, that is a trade-off for me as I watch and learn from Mike and Kathy. They graciously share their business

knowledge with me, and I have obtained quite an education from them in those four years.

Besides shopping for gem rough this year, I shopped for antiques with Kathy. I found the perfect gift for my husband who collects antique telegraph keys.

The set-up at the Holidome marks the end of my free time and the beginning of my fun with selling. We cart all of the cases, lights, merchandise, etc. into the Holidome, and we have it all well orchestrated as to who does what. Security is a major concern. One of us stands guard inside at the booth, and one remains outside with the van. Mike handles the actual moving.

The set-up continues with the inevitable discussions (and arguments) regarding the arrangements of cases and merchandise. I generally visit the ladies’ room at this point. After Mike and Kathy settle upon a plan, things go pretty smoothly. We all enjoy greeting friends who we have not seen since the last show. Dinner plans arrange themselves in a hurry.

The House of Williams is known for selling very high-end facet rough and finely cut gemstones. Gem rough is sold in small lots, by the piece, or in kilo parcels. Mike and Kathy have business arrangements with certain cutting factories in Sri Lanka. Mike and Kathy control the quality of overseas cutting, and they also employ several American cutters for stones with custom cutting. For this year’s show, Mike obtained a terrific parcel of tanzanite, which had been cut into nearly 800 carats of beautiful stones. Some rough was still available. I thought Mike’s tanzanite display was truly awesome.

My job is to be the “Booth Bimbo”. I clean the glass in the cases, bring coffee, and take money. Of

course, I actually do a lot more. Mike asked me to work for him because we shared the same business ethics, and we trust one another.

I have also become much more acquainted with Kathy. We made a pact: no bikinis and no mini skirts allowed in our dress code. We have all established a good working relationship with our repeat customers.

Opening day at Tucson is always exciting, as well as nerve-racking. What will sell? This year, we had a great first day. Our rhodolite garnet from Tanzania, that sat so quietly all last year, sold like hotcakes.

Virtually no tanzanite sold, which worried Mike. I tried to reassure him and told him it was because tanzanite was so expensive. Customers needed time to think about such an expensive purchase. They will return, which they did in some cases.

The second day, we showed no sales until well after 1:00 p.m. We were frantic by then. Towards closing, a large sale saved the day for us. You can never predict the customers.

The questions I am asked by customers are sometimes astounding. I once had to explain why morganites were not pink diamonds. Another customer thought that the hydrothermal emeralds were peridot. Some had a difficult time in grasping the difference

between amethyst and tanzanite. Many of these folks wear badges that say they work in a jewelry store. One can only wonder.

The last day of the show brings both relief and sadness. We remain busy as we pack away goods and display items. I miss my dogs, and I am anxious to see my husband (sometimes he arrives in Tucson for the last day). In spite of all the stress, I am sorry to see the show end. As Mike says, we look forward to the Tucson Show all year, we complain the during the entire show, but we are ready to plan for the next show as the last day of the show ends.

During my vacation, I work ten-hour days. What do I get in return? Mike and Kathy provide my room and board. I can display for sale the stones I faceted. I have the opportunity to select gem rough and/or cut stones. I am excited about cutting the dynamite piece of tanzanite rough I found. Most of all, I have the chance to enjoy two weeks of the Tucson experience, think of nothing but rocks, and be with very good friends.



Advertisements:

Faceting Machines for Sale

Al Tlush, master faceter, lists for sale two American Facetor faceting

machines that have been stored in their original boxes and never used. Please contact Al at 864-2145 in Belen, New Mexico for details and prices. Al played a big part in the design and manufacture of the American Facetor faceting machine some years ago.

James Westcott lists for sale a nearly new Ten-Tec faceting machine with all index gears and many supplies. The faceting machine set-up includes an electronic stop, all dops, some dyna laps, a transfer block, and four steel laps. Asking price is \$1900.00. Please contact James in Tyrone, New Mexico at 505-534-0727.

Ernie Hawes lists for sale a used Facetron faceting machine acquired from an estate sale. Ernie, our local Facetron dealer, cleaned and refurbished the faceting machine himself. Please call Ernie in Albuquerque at 821-3201 for details and price.

John Roberts lists for sale his Taylor faceting machine, updated for right or left rotation and multi-speed. Set-up includes a 64, a 72, and a 96 gear index wheels, transfer block, and assorted dops. Asking price is \$350.00. Please contact John in Albuquerque at 505-299-8209.

<i>Show Calendar</i>		
<i>Name</i>	<i>Location</i>	<i>Date</i>
Lubbock Gem and Mineral Society Show	Lubbock, Texas	May 3 & 4
Santa Fe Symposium Jewelry; Manufacturing and Technology	Albuquerque, New Mexico	May 18 to 21
Golden Spread Gem and Mineral Society Show	Amarillo, Texas	May 31 to June 1

Show Calendar

<i>Name</i>	<i>Location</i>	<i>Date</i>
Convention and Show; Rocky Mountain Federation of Mineralogical Societies	Durango, Colorado	June 6 to 8
Mile High Rock and Mineral Society Show	Westminster, Colorado	June 19 to 22
San Juan City Gem and Mineral Society Show	Farmington, New Mexico	July 4 to 6
Four Corners Gem and Mineral Society Show	Durango, Colorado	July 11 to 13
Ute Mountain Gem and Mineral Society Rockhounds' Roundup	Cortez, Colorado	July 19 & 20
Colorado Federation of Gem and Mineral Societies Show	Buena Vista, Colorado	August 8 to 10
Rockin' in the Rockies Gem and Mineral Show	Lake George, Colorado	August 15 to 17
Front Street Merchants Association's Gem and Mineral Show	Fairplay, Colorado	August 16 & 17
Atrium Productions Gem, Mineral, and Jewelry Show	Tucson, Arizona	Sept. 4 to 7
Pacifica Trade Shows	Tucson, Arizona	Sept. 4 to 7
Great American Gem, Jewelry, Mineral, and Fossil Show and Sale	Denver, Colorado	Sept. 9 to 14
USGE Gem, Mineral, Fossil, and Jewelry Show	Denver, Colorado	Sept. 10 to 14
Colorado Mineral and Fossil Show	Denver, Colorado	Sept. 10 to 14
Gem and Mineral Show	Denver, Colorado	Sept. 12 to 14