The New Mexico Facetor

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In This Issue

The Prez Sez:

By Moss Aubrey, Ph.D.

"My Tucson"

I subtitled this column the way I did because that's the excitement of Tucson. The show is different for each of us. The experience is the composite of your mind set going there, where you shop, exactly when you happen to be at a particular spot, and the tone of the interaction between you and the vendor at that moment. Each factor changes the experience. The sum total varies enormously. So, this is about my show.

The first aspect of that event is getting there. I enjoy the drive, particularly through the southern route on I-10. However, I did not want to devote eight hours traveling each direction. So, I flew into Phoenix and rented a car, a fairly common itinerary for travelers attending the show from Albuquerque. You can't argue with Southwest's claim to be the no-frills airline, but it is also hard to disagree with $76 for a round-trip air fare.

Arriving late in the afternoon, driving into Tucson from the north, I decided to stop at the first venue I encountered. The Rodeway Inn has become the center for international artifacts, statues, metalwork, and other sundry items. I see very little jewelry here, except for the occasional vendor. This is what I mean by the different experience for each of us. Most of my gem and jewelry friends would have thrown up their hands and left within minutes of surveying this venue. But, since I have an interest in such, I spent several hours wandering and actually buying. Now my gem and jewelry friends can be upset with me for encouraging these dealers to come back next year.

The next morning, I spent several hours wandering the halls of the Best Western Inn, site of the Arizona Mineral and Fossil show. I found several mineral specimens to collect just as they were. I spent quite a bit of time rummaging through tables and beer flats of miscellaneous crystals, hoping to find material with potential for cutting. I had some success and found some very clear, fine blue Brazilian aqua for a fraction of what it

would command when sold as facet rough. I addition to the aqua, I also found some unusual facet material which I have not seen before in clear crystals. These include epidote, halite, and kyanite. I have no a clue about the cutting characteristics of these materials, but I suppose I will find out when I return home. (Note: I researched these materials in Vargas' book. Suffice to say that these are definitely challenging specialty materials that I will reserve for later projects). All in all, I feel that the time spent at this hotel was worthwhile. Now, off to AGTA, the big and glitzy wholesale gemstone venue.

Whew! It is now 6:30 p.m., and I have been standing, walking, looking, and buying non-stop since 9:00 a.m. Shopping is hard work! I does pay to look around and not to make assumptions about where the bargains are to be found. Some of the sites typically thought to be more expensive (such as the AGTA show, the Broadway Holiday Inn, for example) often do have more of the high-end merchandise and vendors. At the same time, I found material at those shows identical in price or even lower than the same material at other shows, which normally would be assumed to be less expensive. So, you never know. I bought various faceted stones for resale, including large white sapphires for a client. That material is hard to find, and only a few dealers from Sri Lanka have it. I still am searching for the amethyst "church" geode that I was asked to pick up for a friend. Although I have found many of them at several different sites, they were either too large, too pale, too expensive, or too something for my taste. I still have not bought one.

But wait! Maybe the day isn't over quite yet. I drove back to one spot where I had seen amethyst churches earlier in the day. Interestingly, this was not even one of the gem shows, but a local store displaying a part of the inventory from one of the show vendors. It turns out that they had a better selection of premium material than did the show sites I had visited thus far. Perhaps, it hadn't been picked over because no one seemed to know about it. I decided enough was enough, made my selection, and marked that item from my agenda.

It's Saturday morning, but most of the shows do not open until 10:00 a.m. The Tucson Exposition Center opens at 9:00, and, consequently, that is my first stop. I question why this show continues year after year. This year, there is a total of ten dealers occupying only one-fourth of the available space. Here, prices are close to retail, and there is little that cannot be found elsewhere. One dealer specializes in small tools and accessories for flexible shaft machines, and his selection is much better than found at the other shows. I have decided that I will pass on this show unless I need to visit him. *(Editor's note: One of the dealers participating in this show has officially become the new show promoter. He plans to widely advertise the show and hopes to make it much better.)*

Some of the sites are particularly cramped and make for a rather unpleasant shopping experience. I find the Holiday Inn/Holidome to be the worst offender in this regard. The aisles are very crowded for this very popular show, probably because it combines retail and wholesale. Many retail consumers look for a bargain there. I am grateful that baby strollers are no longer allowed! I usually get hot, tired, and claustrophobic before seeing this show in its entirety, which is the case today. I make my Tripps' order, which takes them an hour to fill, so I wander. No gem bargains, but I do see some beautiful beadwork from Huichol, Mexico. I don't buy any, because prices seem to be retail.

Parking, as always, is a challenge. The shuttles are a good idea, and I have found them very convenient in the past. However, I am re-thinking my enthusiasm about the shuttles this year. It seems like half of the people of Tucson are also using the shuttle, causing significant delays in getting from one site to the next. And, please don't get me started on the different standards of hygiene held by many of the visitors, readily experienced on a crowded shuttle van. I am shocked to learn that my ten minute shuttle ride this morning, which took me from where I parked my car to the downtown area, has now become a forty-five minute ride on the return route. This is the result of several stops the shuttle makes on the return route, and it does not include the twenty minute wait for the next shuttle. I opt for a cab. The twelve dollar fare is worth an hour of my time.

Almost ever piece of vacant land has been turned into a temporary flea market. The stretch between the old Pueblo Inn and the Howard Johnson has become a combination of generic flea market and African imports. Interesting pricing strategy; there are no prices marked. When I ask the price on an item, the vendor first carefully looks me up and down and then quotes a starting price, which he probably suspects is consistent with my manner of attire. Remind me to dress down the next time I want to seriously haggle.

Tucson certainly makes for a good people-watching experience. Most folks are casually dressed and seem to blend business with relaxation. There are those formally dressed folks, both men and women, who are seen primarily at the high-end wholesale-only shows. There also are people in various native garb from throughout the world, but most of the attire worn in Tucson is clearly southwestern. The local street people definitely add a colorful note. They appear to be a more consciously counter-culture type, as

opposed to the impoverished and homeless version seen in Albuquerque. Although I continually pass people who are clearly homeless, sitting with their worldly possessions at their feet, none has approached me to ask for a handout. That also is a difference from what I have come to expect in Albuquerque. This difference may reflect a more aggressive policing policy in Tucson against soliciting.

Tucson seems to be more and more a shopping experience for the retail consumer. I have overheard conversations between client and dealer which indicate that the merchandise is for the personal use of the buyer. I witnessed such conversations, ranging from the retiree who hesitated on spending $200 for the tanzanite and gold ring in contrast to the woman, dripping in expensive jewelry, who was deciding exactly how many large (one to three carat) superb rubies she wanted in her custom designed necklace. Even the shows, which supposedly require official wholesale status in order to enter, have many persons wandering about who evidently possess little knowledge of gemstones and jewelry. This situation is most prevalent at the Holidome.

The Rodeway is usually a good site for both gem and mineral hunting. Well, this is a first! A booth consisting only of candles cast in shapes and colors to emulate various gem crystals. No one is even stopping to look, let alone buy.

It is my third and last day. I only have a half day remaining before I need to drive back to Phoenix to catch my return flight. Thus far, I have bumped into several acquaintances. We each have had our interesting finds. I remain very pleased with the few pieces of superb aquamarine that I picked up from a mineral dealer. I see them as having excellent facet potential, while the dealer viewed them as undesirable for mineral specimens. In comparison, that tale cannot compete with Steve's crazy opal story, but that is for him to tell.

On my final day, I am doing my part to keep the flea market aspect of Tucson thriving. I have picked up several items from Africa, New Guinea, and elsewhere. These come from show sites that have gradually evolved to have little association with the actual Tucson Gem and Mineral Show. While these are an annoyance to some, and they do contribute to the sprawl of the show, I enjoy browsing through these areas. But then, my taste has never been described as traditional, but more along the lines of eccentric or "interesting". Still, I am pleased.

One last stop at the newly-named Inn Suites Mineral and Fossil Show. Once again, it pays to look. While I did not see any mineral specimens I wanted, I did locate a mineral dealer from Brazil. He brought with him, as an afterthought, some faceted aquamarine marked significantly less expensive than what I had seen at other gem venues. After some sorting and examination, I find what I think are some passable pairs, I haggle over the price, and I then end my trip with what I feel is a good buy.

This was my sixth visit to Tucson. Each visit has been a different experience for me. I still consider myself a neophyte, although I am beginning to recognize the patterns and the predictable aspects of the show. Is it crowded and congested? Definitely. Is it difficult to find affordable lodging? Absolutely. Can you pay too much for your purchases? Easily done. Can you find some superb material and phenomenal bargains? Yes, with a little diligence. Will I return next year? Without a doubt!

Minutes of the NMFG Meeting

January 8, 1998

By Nancy L. Attaway

President **Moss Aubrey** called the meeting to order at 7:10 p.m. and welcomed all members and visitors. Moss wished everyone a very happy new year.

Treasurer's Report

Treasurer **Bill Andrzejewski** reported:

Heading	*Total*
Previous Balance	$832.59
Expenses	$181.29
Deposits	$467.00
Balance Forwarded	$1118.30

Old Business

Many members expressed positive comments on the Guild Christmas party held December 13th at the Rio Grande Yacht Club. Good food accompanied the fun-filled event. Generous door prize donations provided excitement for the after dinner raffle. Thanks to all whose efforts guaranteed the party's success, including **Susan Wilson** and her raffle assistant, **Steve Attaway.**

Treasurer **Bill Andrzejewski** announced that official and personalized New Mexico Faceters Guild badges are available from **Bill Swantner** for $6.00. Badges identify the Guild and the Guild member and sport the New Mexico Faceters Guild logo.

New Business

The auditors' report of the Guild treasury from auditors **Elaine Weissman and Louie Natonek** was submitted by **Elaine Weissman**. The two auditors checked the spreadsheets against the deposit slips, the expense receipts, and the bank statements. All was found to balance. Thank you, Elaine and Louie.

Assistant Editor **Steve Attaway** requested any e-mail addresses from the Guild membership for publication in the Guild newsletter.

Heidi Ruffner mentioned the February Regional New Mexico Science Fair. **Scott and Susan Wilson** volunteered to be judges and represent the New Mexico Faceters Guild.

Vice-President **Susan Wilson** announced that a spring gem class at the University of New Mexico will be conducted by Dr. Cornelis Klein on "The Mineralogy of Gemstones".

Susan Wilson, also the Guild Librarian, brought more books from the Guild library for members to enjoy. She also mentioned that she taped a recent television broadcast on PBS regarding Cecil Rhodes and the creation of DeBeers. This very informative and remarkable story on the diamond cartel is part of Susan's personal video collection and is available to Guild members upon request.

Herb Traulsen announced that Maria and he will again act as hosts to the representatives of Australian Opal Mines sometime in February. Herb will call all local Guild members when he knows an exact date.

Herb reported that opal recovery operations were not very good in 1997 for Australian Opal Mines, as they suffered power losses and sustained damage to heavy machinery.

Remembering social gatherings of the New Mexico Faceters Guild in years past, **Maria Traulsen** mentioned that we should organize a late spring or early summer social event. The membership agreed with her suggestion. Ideas should be submitted to President **Moss Aubrey** or Vice-President **Susan Wilson.**

President **Moss Aubrey** said that Maria's suggestion and other action items will be addressed during a board meeting of Guild officers to be announced.

Show and Tell

The first faceting efforts of 1998 glittered in the show and tell case.

Will Moats brought two stones he faceted, a large round Russian yellow beryl and a small round pink tourmaline. Will related how he originally held high hopes for the pink tourmaline, which was a fairly big piece of rough at the beginning. However, internal stress cracks not readily visible to the eye caused the stone to continuously crumble, and he was able to yield only a small gem. *(Gem rough does not always behave as we would like. The challenge is to yield a well-cut gem from a difficult piece of rough, thus saving it from becoming fish tank gravel.)*

Bill Andrzejewski displayed several stones he faceted, including a very nice square Arizona peridot, a square dark blue tourmaline, a square amethyst, and a triangular apollo cut amethyst.

Bill also faceted a large emerald cut ametrine, experimenting with the color division line by placing it along the culet. Problems arose while polishing the culet, as small conchoidal fractures appeared along either side of the culet. A suggestion was made to cut with a fine-grit lap a long, narrow keel facet in place of a sharp culet and polish out the small fractures. Another suggestion considered the placement of the culet facets of 96 and 48 on a 96 gear index on the polishing lap. If the stone touches the lap only at the culet, then a force similar to flintnapping an arrowhead is produced, shown in Figure 1.

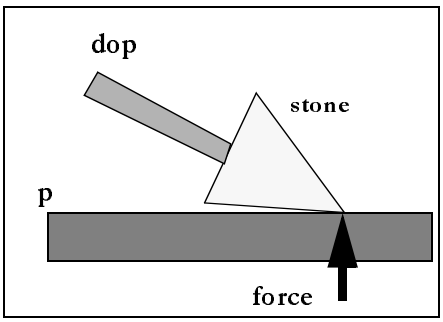

Figure 1. Avoid polishing from culet to girdle; polish from girdle to culet.

To avoid placing high stresses on the culet, begin the polish near the girdle and work toward the culet. Pay close attention to the placement of the stone relative to the rotation of the lap,

as shown in Figure 2. This could help prevent culet chipping.

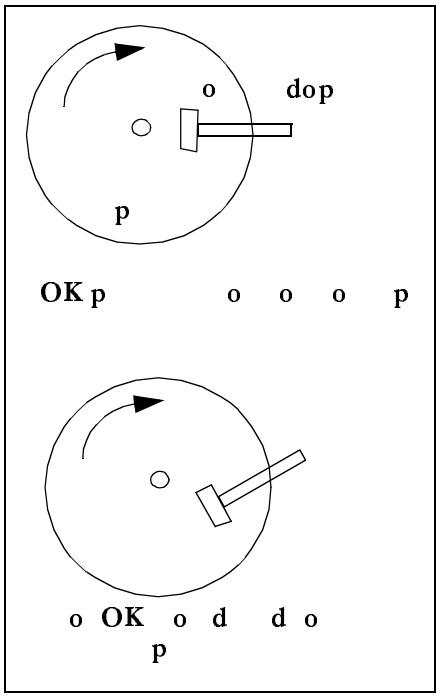

Figure 2. Placement of stone on lap for minimum chipping.

showcased a custom gold ring with a square shank. The ring had gold beads of metal across the top and a 0.12 carat benitoite to one side. Elaine named her creation "California Dreaming", because benitoite is found only in California. She thought that the bright blue hue of the benitoite showed one of the best blue colors and resembled a California sky.

Faceting designer displayed an impressive synthetic ruby he faceted in an emerald cut. Before he commented upon it, Ernie mentioned that the phrase "lab-created" tends to be misleading, as it is used to describe so many types of man-made gem materials. Some are even not true composites of their advertised name, like synthetic or lab-created spinel. There are several different processes for synthesizing gem material, and just two, hydro-thermal and flux-grown, can correctly be described as lab-grown. Ernie thought that vendors need to show more truth regarding their advertisements of man-made gems, and that buyers and faceters should be aware of the differences.

Ernie then explained that the preform he purchased was roughed in at 10x8 mm., a most unfortunate aspect. Instead of yielding a calibrated 10x8 mm. emerald cut, he obtained a stone just under those dimensions. He used a 600-grit lap first and went to 8,000-grit, then a 14,000-grit phenolic lap, and went to a final polish with 50,000-grit diamond on an MDR-25 lap.

Commenting on problems with tourmaline, Ernie related a story about some large pieces of eye-clean tourmaline rough that showed a botryoidal growth on the C axis and revealed, under magnification, evidence of serious internal stress. Ernie thought that the yield from that tourmaline parcel would be small, as the pieces would most likely break.

showed two very nice examples of Uraguayan amethysts he cut in standard round brilliants. Larry wanted to show what dark purple amethyst looked like cut with large facets. These amethysts exhibited a rich purple color with flashes of red. In darker material, it sometimes becomes necessary to adjust the angles of the pavilion and the crown to lighten the color.

faceted a red tourmaline in a barion emerald cut and a green tourmaline in an emerald cut, where she modified the facets. She remarked how improved the color appeared in the green tourmaline when finished as compared to the color seen in the rough. She also faceted three Tanzanian rhodolite garnets in flasher cut (twelve-sided) rounds, and two matched in size and color for earrings. Nancy cut the rhodolites at topaz angles to brighten the stones. She faceted two matching Russian chrome diopside pearshapes also slated for earrings and adjusted the pavilion and the crown angles to lighten the deep green color.

Nancy related that two adjoining facets in the pavilion of one pearshape chrome diopside crumbled during polish but was able to polish out most of the damage. She wondered if the stone had a stress problem there. Guild Mineralogist mentioned that chrome diopside has a cleavage perpendicular to the C axis.
said that the C axis was difficult to determine in the parcel of chrome diopside since all the pieces had been sawed.

Field Trips

The snow and cold temperatures will eventually yield to warm spring conditions. Contact **O** **p** and **o** **o** for possible trips for spring, summer, or fall.

Future Programs

stands ready to present his slide show of some of Australia's opal fields and the Keshi pearl farms for the March meeting. Don't miss this first-hand exchange.

Vice-President (Programs) **o** arranged for **d** to give a presentation on Yogo sapphires for **d** **p** **o** **o** . Jane plans to graduate in May and leave Socorro, and this was the only opportunity to schedule her as a speaker. Jane and her father, Ken Ward, a facetor, performed inventory counts to estimate the value of Yogos for Citibank. Jane Ward spoke to the Guild last September and presented new information on the diamonds of Ghana. **po** **o** **o** **o** **o** **pp** **pp** **o** **x** **o** **o** This spe-

cial February meeting will not entertain any business or have show and tell.

o and will bring baked refreshments to the special February meeting that features Jane Ward.

Guild Mineralogist plans to present an informative discourse on the causes of gemstone phenomenon later in 1998. Paul's talks are filled with interesting technical information that explains the science behind the wonder.

Refreshments

o and d baked refreshments for the January meeting. Thank you very much. and volunteered to bake cakes for the meeting in March.

Program Speaker

Guild Mineralogist explained how light and electrons are the mechanisms responsible for colors found in minerals and gemstones.

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Don't forget: next meeting is March 12, 1998 at 7:00 pm. Dues of $20 are due.

E-Mail From Italy

From Mariani Luigi

I am an amateur stonecutter from Italy, and I subscribe to the New Mexico Facetor. I am writing this letter because I would like to thank you for the faceting designs you sent me that appeared in the November/December 1997 issue.

I take this opportunity to congratulate the newsletter of the New Mexico Faceters Guild. It is very interesting and useful to me. I would like to have e-mail correspondence with the Guild membership and wish to have my e-mail address published in the Guild newsletter.

I like to cut stones from the more unusual designs, and I wish to improve my faceting skills and my knowledge of these diagrams. I would like to correspond by e-mail to the Guild concerning their faceting experiences, especially with the unusual shapes.

I thank you in advance for your kindness and your polite attention to my requests. I look forward to hearing from you.

Yours truly,

Mariani Luigi

via Pestalozzi 11
20035 Lissone (MI), Italy
e-mail is ENVMA@IOL.IT

Updating DataVue2

From John Franke

With the support and encouragement of Bob Long, Robert Strickland, and Grover Sparkman, I have undertaken the DataVue2 1997 update. I am trying to collect all of the designs published in 1997 to include in the update. I am adding them to the database as I get them.

I hope you can spread the word to people who want their designs included in the database (or the publishers of the various newsletters). They can send me designs and publishing information in some sort of Gemcad-compatible format, either as e-mail attachments (ASC files work great this way) or on disk. Copies of published designs in printed form are acceptable, but computer files are appreciated.

I want to be as thorough as possible and will appreciate any contacts or sources that will help locate all published faceting designs to continue keeping the database current.

John Franke
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Port Townsend, WA 98368
phone (360) 385-4520
jfranke@gemcutter.com

Thanking you in advance,

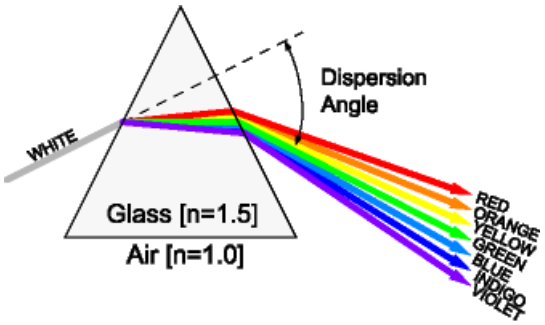
John Franke

FACET SHOPPE: Faceting/Rough & Cut Gemstones
http://www.olympus.net/gemcutter

A Short History of Light: The Spectroscope

By Stephen W. and Nancy L. Attaway

The most familiar spectrum in nature is that splendid spectacle, the rainbow, produced when light from the sun bounces around inside each of millions of raindrops and is sorted out into its constituent colors in the process. In 1666, Newton discovered that sunlight passed through a prism reveals the colors of the rainbow. The arrangement of the colors of the rainbow is called the color spectrum. A very close look at sunlight passed through a prism reveals that the color spectrum is not continuous, but is actually composed of discrete lines of color.



Pulitzer Prize winner, Richard Rhodes[1] wrote this historical account on the connection between the color spectrum and the advancing field of atomic physics: "Spectroscopy was a well-developed field in 1912. The eighteenth-century Scottish physicist Thomas Melvill had first productively explored it. He mixed chemical salts with alcohol, lit the mixtures, and studied the resulting light through a prism. Each different chemical produced characteristic patches of color, which suggested the possibility of using spectra for chemical analysis to identify unknown substances. The prism spectroscope, invented in 1859, advanced the science. The spectroscope used a narrow slit set in front of a prism to limit the patches of light to similarly narrow lines. These could be directed onto a ruled scale (and later onto strips of photographic film) to measure their spacing and calculate their wavelengths. Such characteristic patterns of lines came to be called line spectra. Every element had its own unique line spectrum. Helium was discovered in the chromosphere of the sun in 1868 as a series of unusual spectral lines twenty-three years before it was discovered mixed into uranium ore on earth. The line spectra had their uses." "But no one understood what produced the spectrum lines. At best, mathematicians and spectroscopists who liked to play with wavelength numbers were able to find beautiful harmonic regularities among sets of spectral lines."

In 1913, Niels Bohr was studying the orbit of electrons around an atom. He was the first to connect the spectrum lines to the orbits of electrons. Bohr established the relationship between the orbiting electrons and the lines of spectral light. "***Bohr proposed that an electron bound to a nucleus normally occupies a stable, basic orbit called a ground state. Add energy to the atom, heat it, for example, and the electron responds by jumping to a higher orbit, one of the more energetic stationary states farther away from the nucleus. Add more energy, and the electron continues jumping to higher orbits. Cease adding energy, leaving the atom alone, and the electrons jump back to their ground states. With each jump, each electron emits a photon of characteristic energy."***

Thus, light is made up of photons of energy. Each photon has a characteristic energy associated with the transition of an electron moving from one state to another. The color of light is related to the amount of energy needed to move from one state to another. Light shone on certain metals knocks electrons free. However, the energy of the electrons knocked free of the metal does not depend upon the brightness of light, but, instead, hinges upon the color of light, on its frequency.

As light passes through a gem, the specific wavelengths of light can be absorbed. If you take light that has been passed through a gem and use a prism or a diffraction grading spectroscope to spread the light into a wide band, these absorbed wavelengths manifest as lines or areas of darkness in the spectrum. It is possible to measure the actual wavelengths that are absorbed and use them for identification. The most common approach to gemstone identification is to use the pattern of lines. Matching the absorption spectrum is the fastest way to determine the chemical composition of large or small numbers of stones. The red gems, like spinel, ruby, and tourmaline all have distinctive spectra. There are well defined absorption spectrums for synthetic verneuil sapphire, for blue synthetic spinel, and for almandine garnet, just to name a few. In real life, the absorption spectrum lines you see from a gemstone are really faint, fuzzy, and hard to see. The most realistic drawings available are found in the *Handbook of Gem Identification* by Richard T. Liddicoat, Jr.

1.*The Making of the Atomic Bomb*, Richard Rhodes, 1986.

The Causes of Color in Minerals and Gemstones

By Paul F. Hlava, Mineralogist

Quiz?

What colors would you expect minerals to be that contain:

- Iron - Fe^{2+}
- Iron - Fe^{3+}
- Cobalt - Co
- Sulphur - S
- Copper - Cu
- What causes the color in yellow sapphire?

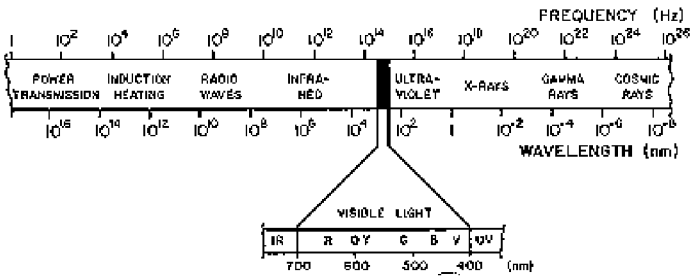
Answers: Iron gives the green in peridot, gives the yellow, orange, and red like in epidote; cobalt colors a mineral blue, pink, and purple like in cobalt calcite, sulphur colors lapis lazuli blue, copper colors minerals red, blue, and green like in cuprite and turquoise, and that seven mechanisms exist for the yellow in sapphire (see the *Winter 1987 Gems and Gemology by Kurt Nassau*).

Purposes/Goals/Outline

1. Discuss the nature of light a little bit.
2. Mention about our perception of color.
3. Introduce the 15 causes of color.
4. Describe Transition Metal Absorption Colors and use ruby, emerald, and alexandrite as examples.
5. Describe Intervalence Charge-Transfer Color and use sapphire, amazonite, and lazurite as examples.

Light is Part of the Electromagnetic Spectrum

Light is a from of energy that makes up part of the electromagnetic spectrum. Visible light, however, comprises only a small part of what is referred to as the electromagnetic spectrum. Other parts of the spectrum include Infrared (heat), Ultraviolet, X-Rays, Gamma rays, and Cosmic Rays. Generally, the higher the frequency, the higher the energy. Light is a wave, just like a radio wave, but it also can behave simultaneously like a particle known as a photon.

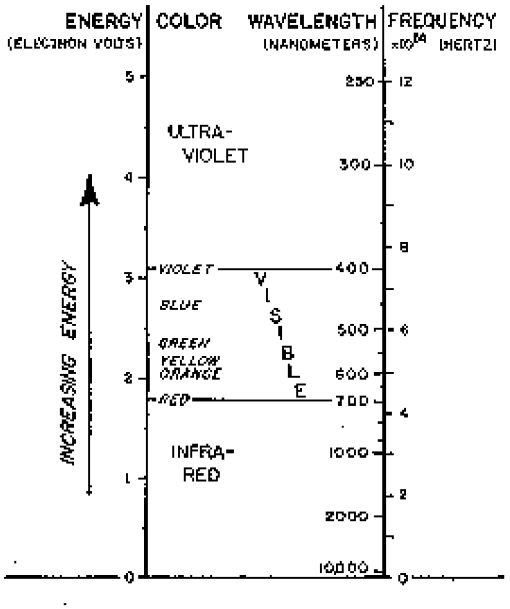


Seven colors comprise the spectrum: red, orange, yellow, green, blue, indigo, and violet. The wavelengths of white light may be divided into:

- Red 700.0 nm to 640.0 nm
- Orange 640.0 nm to 595.0 nm
- Yellow 595.0 nm to 575.0 nm
- Green 575.0 nm to 500.0 nm
- Blue 500.0 nm to 440.0 nm
- Indigo
- Violet 440.0 nm to 400.0 nm

Light is also a Form of Energy

In addition to wavelength and frequency, colors have energy units associated with them. Infrared and red light represents low energy, and ultraviolet and violet light denotes high energy. Color can be used to determine the temperature (a measure of energy) in black bodies or black iron bars that are heated.

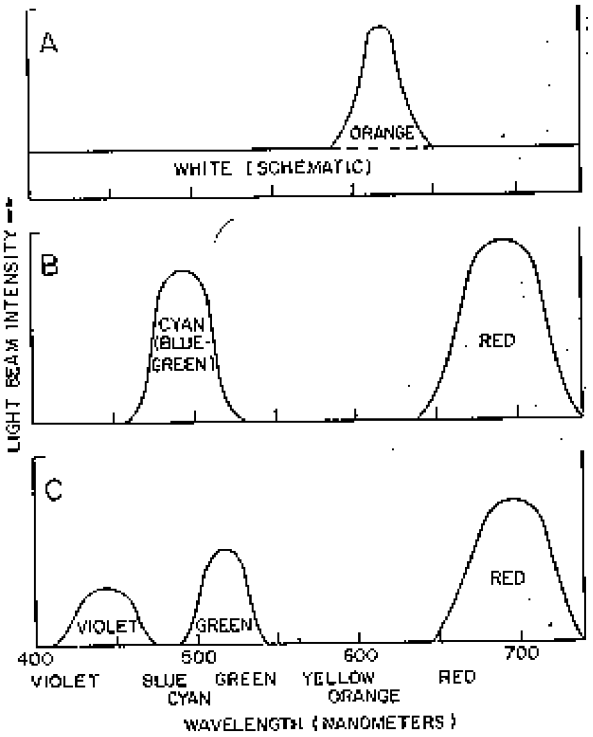


Perception of Color

We each see light in our own way. If a number of sounds are mixed, one can usually distinguish the various frequencies coming from different sources (i.e. different instruments in an orchestra). However, mixed frequencies of color produce one perceived final color. The same final color can be achieved by several different combinations of color. The wavelength of violet light, for example, is about half that of red light.

Same Color By Different Paths

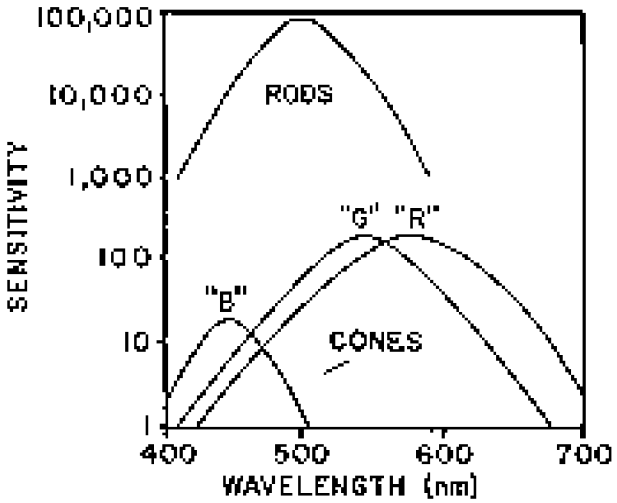
An illustration showing three ways of achieving the same color - pink. In the diagram A, light that is orange is mixed



with white light to make pink. In diagram B, red light is mixed with a blue-green light to make pink. In diagram C, violet, green, and red are mixed to make pink.

Human Eyes

Human eyes contain rods, which "see" black and white, and three sets of cones (red, green, and blue) that produce all the colors by mixing their signals. The eyes of animals contain more rods than do human eyes to detect movement (hunter versus prey). When you mix frequencies of light, the human eye perceives only one color. In color-blindness, the eye loses its ability to distinguish red, because red light has the weakest and lowest energy. Blue light has the strongest energy.



The Human Eye is Most Sensitive in the Center of the Solar Spectrum.

CIE* Chromaticity Diagram

* Commission Internationale de l'Eclairage

Since the color of light perceived may reflect a mixture of different light frequencies, we need a way of measuring color that is independent of frequency. The Chromaticity Diagram was established in 1931 as an international standard for color measurement. Just so you know, a science of color measurement exists. A chromaticity diagram chart can be set up to define any color on the basis of CIE coordinates, which are often used in technical literature and in correspondence between scientists.

The 15 Causes of Color

Vibrations and Simple Excitations

Here, the electrons simply get excited and, upon falling back to their normal state, give off light. The color is proportional to the distance that the electron fell.

1. **d** - Flames, Lamps, Carbon Arc.
2. **x o** - Vapor Lamps, Lightning, Auroras, some LASERS.
3. **o d o o** - Water, Ice, Iodine, Blue Gas Flame.

Translations Involving Ligand Field Effects

A ligand is a bonding field between atoms. Most elements found in minerals do not produce color because their electronic configurations remain stable. Silicon, aluminum, calcium, lithium, beryllium, boron, carbon, nitrogen, etc. remain white and colorless.

Transition (and R.E.E. or rare earth elements) metals have inner shells that are not filled. When the shells are filled, the electrons pair up to have a positive and a negative direction. The transition metals occupy different places and are un-paired. They become excitable, are then mobile, and soon available.

Valence electrons from these shells are un-paired and can be excited into unstable levels, absorbing energy to do so, and, thereby, creating colors. Sometimes they can absorb invisible colors, like infrared and ultraviolet, but they usually absorb colors in the visible spectrum. Chrome imparts red in rubies and green in emeralds. The same ion or coordination number on the C.I.E diagram that shows the oxygen surrounding ruby and emerald are in the form of an octahedron. However, the transition levels are different. For example, emeralds fluoresce red. Also, vanadium introduced into corundum makes synthetic alexandrite.

4. **o o po d** - Turquoise, Azurite Malachite, and many other pigments.
5. **Transition Metal Impurities** - Ruby, Emerald, Alexandrite, and some Tourmalines, Red Iron Ore, and many others.

Transitions Between Molecular Orbitals

6. **O o po d** Most Dyes, Biological Colorants, and some Fluorescence and Lasers.
7. Blue Sapphire, Lapis Lazuli, Amethyst, Magnetite, and many other pigments.

Charge transfer or intervalence charge transfer appears when an electron arrives at the valence stand of one atom and moves to the valence stand of another atom. Atoms of titanium and iron bounce ions back and forth to make sapphire appear blue. In the same way, sulphur atoms also bounce ions around to impart the intense blue color seen in lapis lazuli. Amethyst is yet another example of charge transfer, where the iron atoms perform the same activity and affect the color.

The color in both amethyst and citrine are due to impurities of iron in part per million kind of levels. The iron substitutes for silica in the quartz structure. The iron is three valent and gives the yellow color seen in citrine. If it is irradiated, most of it will turn purple, but not all will change color. Perhaps, the presence of hydroxals keeps the iron in the three valent state. Ametrine is a trigonal mineral, a three-fold mineral (not hexagonal, but it appears as hexagonal) with two pairs of zones that alternate amethyst and citrine color.

Transitions Involving Energy Bands

Examples of transitions involving energy bands are:

8. Copper, Silver, Gold, Brass, and "Ruby" Glass.

9. **o d o** Silicon, Diamond, Galena, Cinnabar.

10. **op d o d o** - Blue and Yellow Diamond, LED's, and some Lasers and Phosphors.

11. **o o** - Smoky Quartz and Desert "Amethyst" Glass.

Geometrical and Physical Optics

12. **p o o o** - Rainbows, Halos, Sun Dogs, and Fire in Gems.

13. - Star and Cat's Eye Gems, Rainbow Moonstone and Obsidian, Blue Sky, Red Sunsets, Blue Moon, Blue Eyes and other biological colors, and Raman Scattering.

14. - Labradorite, Oil Slick on Water, Soap Bubbles, Camera Lens Coatings, and some Biological Colors

15. **o** - Opal, Diffraction Gratings, Aureole, Glory (the spray of rays from clouds on the horizon at sunrise and at sunset), some biological colors, and most liquid crystals.

In Paul's presentation, he also talked about the causes of color in emerald, ruby, and alexandrite. He used some black lights to show how each interacted and fluoresced. Paul, a fountain of technical information, went into more detail than we can report here. You really had to be there.

Did you know....

When sapphire is heat-treated, the impurities, like ilminite, are melted, and the electrons intermingle within the corundum. In padparadcha, two coloring agents are at work at the same time. The pink and orange color is due to the presence of manganese and chrome.

Tourmaline can have up to four coloring agents working simultaneously to produce color. Tourmaline, being a non-central symmetric structure, has a crystal stop in bi-colored material. Along the C axis is a line marking the boundaries where manganese produces pink and iron produces green. This is an example of crystal field effects.

Crystal field effects are also found in peridot. In the volcanic melt, olivine with high concentrations of nickel appear in the first stages of crystallization. Distorted sites in peridot are responsible for nickel to quickly diminish in concentration during the melt.

Most Colors are Produced by Absorption

Most colors are caused by electrons interacting, mostly absorbing, some wavelength of light. Only the color not directly caused by electrons is the color of water and ice, which are colored by molecular vibrations. White light is a mixture of all the visible colors. Most colors are produced by the absorption of light. If something removes specific energies from the white light, then the complimentary color remains. Electrons in atomic orbitals "just happen" to do exactly that when they become excited. Electrons are responsible for fourteen causes of color. Where the human eye detects color in the narrow band of the light spectrum, which is mostly invisible, is where the transitions of electrons occur.

More Quiz?

- What makes the sky blue?
- What is opalescence?
- What causes the moonstone effect?
- What causes color in diamonds?
- What causes play of colors?
- What cause "fire" in diamonds?

Yogo Sapphires

By Jane R. Ward (and Nancy L. Attaway)

Jane Ward shared her knowledge of Yogo sapphires and explained the geology and the history of these unique Montana beauties. She began by citing several references: *Yogo: The Great American Sapphire* by Stephen M. Voynick, *Corundum* by Richard W. Hughes, and *Heat Treatment of Ruby and Sapphire* by Ted Themelis. Jane and her father, facetor Ken Ward cataloged Yogo sapphire inventory for Citibank, organizing and sorting the Yogos into specific parcels.

Four primary deposits yield Montana sapphires: Missouri River, Rock Creek, Dry Cottonwood Creek, and Yogo Gulch. The Yogo Gulch sapphire deposit is "in situ", an extremely rare geologic occurrence for sapphires. Most Montana sapphires are sifted from alluvial (glacial) deposits of sands and gravels along riverbanks that originate from an unknown source a long time ago.

Yogo sapphires are quite different from the other sapphires found in Montana. For example, Yogo sapphires are not heat-treated, yet their color ranges in hue from cornflower to royal blue. An occasional violet blue or red color has been found. By comparison, other Montana sapphires show a rich diversity of color. The sapphires from the various Montana locales require heat-treatment to enhance their colors, a technology not made available until the 1970's. Yogos are generally free of inclusions, while other Montana sapphires contain mineral inclusions. Glass and fluid cavities are also common in other Montana sapphires, showing as interference patterns. The other Montana sapphires exhibit crystal growth zoning, while Yogos show little or none. Yogos exhibit a characteristic trigon pattern that sometimes forms two interlocking triangles resembling the Jewish Mogan-David hexagonal star.

Yogo Gulch is located in Judith Basin County, Montana, east of the other sapphire mining sites. The Yogo sapphires are found in the Madison Limestone. This limestone was formed three hundred million years ago, when an inland sea covered Montana. The resulting sediment of silt and shell animals combined to produce a layer of limestone. This limestone layer is a part of the Big Snowy Group that includes shales, sands, and silts.

A fault that trended northeast/southwest sliced through the limestone. Groundwater percolation through the faulted limestone hollowed out caves (karst topography) near and at the center of the fault. The collapse of the caves formed breccia (broken rubble).

The sapphires were conceived at depth and were brought to the surface along the fault. Three hundred thousand years ago, dike material intruded along the fault system around the breccia fragments. Geologists date the dike as post-Pennsylvanian and call it a Lamprophyre. The dike is nearly vertical, measuring three to twenty feet thick. It lies seven thousand feet deep and runs five miles long, with a descent of eight hundred feet from Judith Meadow to the walls of Yogo Canyon. The dike brought fine-grained crystals of pyroxene, biotite, anorthite, olivine, nepheline, along with diopside, orthoclase, magnetite, ilmonite, pyrite, hematite, zircon, feldspar, apatite, lencite, and spinel.

More limestone solution occurring around the fault generated additional caverns. Sediments collapsed the caverns, and the dike fell in with the silts and sandstones.

The chemical formula reads as:

$$Al_2SiO_5 + SiO_2 + NaAlSiO_4 => Al_2O_3 + NaAlSi_3O_8$$

Kyanite plus quartz plus nepheline converts to corundum plus albite. The presence of nepheline is significant, because nepheline provided aluminum to make aluminum oxide. The cause of the strong saturation of blue is from an intervalence charge transfer, where iron and titanium combine and share an electron, replacing aluminum. The concentration of the iron and titanium ions determine the saturation level of sapphire. The blue hue of the Yogo sapphire trends toward purple, rather than green. The few rubies from Yogo Gulch obtain their red color from chromium 3^+.

The slow crystallization of Yogo sapphires, over approximately fifty million years, produced clean sapphire crystals having a relatively even distribution of color saturation. It also allowed time for the foreign materials to be pushed out of the crystal matrix.

Sapphire mining in southwest Montana evolved from the gold rush during the 1860's. Drawn by the promise of vast riches, people traveled great distances to search for gold in Montana. Those prospectors with gold mining experience in California constructed wooden sluice boxes to separate the gold from the river gravel. Heavier than gravel, the sapphires sank to the bottom of the gravel concentrate and clogged the sluice boxes. Most of the goldminers threw away these "nuisance" pebbles.

Gold prospector, Ed Collins first discovered Montana sapphires in 1865. He correctly identified as sapphires the unusual small colored translucent pebbles found in the sluice mixes. He judged their value to be significant and sent parcels to Tiffany and Co. and to M. Fox and Co., both of New York. The sapphires that Ed Collins collected were from the Missouri River and did not have the strong blue color of Yogo sapphires. Quality was lacking, and this gave sapphires from Montana a bad name.

Working another area, goldminer, animal trapper, and mountain man, Jake Hoover collected the blue pebbles from Yogo Gulch and in 1894 sent them to George F. Kunz of Tiffany and Co. in New York. Hoover soon received a check for $3750 from Tiffany for "sapphires of unusual quality". He formed the New Mine Sapphire Syndicate in 1894. A London jewelry firm purchased all the shares and changed the name to the English Mine. The English Mine was in production under the direction of Charles Gadsden and sold in 1922 for $150,000.

Jim Eiten, a sheepherder, noticed a row of gopher holes corresponding to the fault line. He filed a claim on Yogo Gulch and sold it to Hoover for $2,450.

Since most of the recovered Montana sapphires from other locations were of pale colors, they attracted little interest in the gem markets at that time. Marketing the Montana sapphire hues proved difficult in an era when the classic royal blue color from Kashmir and Ceylon stood as the benchmark of comparison in all of Europe. The lack of an American cutting and marketing organization also contributed to the problem of promoting Montana sapphires. However, the natural blue hue of the Yogo sapphires interested the London marketeers, who sold the Yogos as sapphires from the exotic and romantic location of Ceylon. Yogo sapphires compared well with the sapphires from Ceylon, but Yogos did not have the intense color saturation as the sapphires from Kashmir.

Charles Gadsden, who was quite familiar with mining techniques, began work at the English Mine in 1902. He reworked the old mining tailings, installed timber shorings, and organized bucket brigades. He allowed the rock time to weather for a year or so, which was all very time consuming, but in the end, was most efficient.

Burke and Sweeney filed claims west of the English Mine and formed the American Gem Syndicate in 1901, which was sold to the American Sapphire Company in 1904 for $100,000. The English Mine purchased the American Mine in 1908 for $80,000 and sold it in 1913.

A cloudburst from a severe storm flooded the English Mine in 1923, destroying holding dams and washing away weathering piles. The mine closed in 1927. During World War Two, four million carats of Montana sapphires were used in the war effort for abrasives, bearings, and jewels in watches. Siskon, Inc. purchased the Yogo Mine in 1965 for $75,000, and he promoted the area to California investors in 1968 as a "sapphire village" tourist mecca.

Chikara Kunisaki, one of the sapphire village partners, purchased the Yogo Mine and formed the Sapphire International Corp. in the early 1970's. He invested $5 million in constructing a 3,000-foot-long tunnel going eastward into the dike at the old American Mine site. Sapphire International Corp. closed in 1976. Intergem contracted to purchase the Yogo Mine in 1981 from Sapphire International Corp., now Roncor, Inc. However, Intergem failed to make their payment deadlines, and ownership reverted back to Roncor, Inc.

Sapphire-Yogo Mines, Inc., headed by Victor di Suervo, leased the Yogo Mine property in 1978. With his idea of an grand advertising and marketing campaign for Yogos, di Suervo sought and won official trade recognition for Yogos. He wanted the Yogo sapphire to also become the official American gemstone. Many complications led to his subsequent failure.

Other individuals and companies leased the Yogo Mine, including American Yogo Sapphire, Ltd., who attempted an ambitious fund-raising campaign. Later, Amax core-drilled and opened up a new area fifty feet down. Jeff Kunisaki, G.G. currently heads Roncor, Inc.

Perhaps, one of the most famous Yogo sapphires was the one chosen to be set in a ring for a princess. Lady Diana Spencer received from England's Prince Charles a magnificent nine-carat oval Yogo sapphire that was set in a gold ring and surrounded by diamonds to mark their engagement. The rest, as they say, is history.

Stories of riches and ruin surround Yogo sapphires. Many perceived the true value of Yogos and recognized their great potential. Many companies attempted to extract them commercially and failed. One difficulty is that such hard rock requires weathering to loosen the Yogos from their source. Blasting only fractures the sapphire crystals. Today, a small market for Yogos exists.

In the News

More on Moissanite

Source: Francoise Jones <Francoise@bc.sympatico.ca>

Discovered by Professor Henri Moissanite in 1904, moissanite is the natural hexagonal polymorph of Silicon Carbide (SiC). It occurs in meteorites and has just been found in kimberlite rocks from Yakutia in Russia, but those occur only in small grains (around 1mm) in colors of green, blue, black, yellow, and transparent. Moissanite has a hardness of 9.50, a specific gravity of 3.218, and a refractive index of 2.654 to 2.697. Fracture is conchoidal. Cleavage has not been determined.

There are also unnamed natural cubic forms of SiC and a natural trigonal form of SiC. The synthetic form of SiC is called Carborundum and has all the same properties.

In 1907, the first application of silicon carbide was produced as an abrasive and cutting material. Today, SiC has been called the "material for the future" due to its many applications. For people in the jewelry trade, SiC or synthetic moissanite is a very exceptional good imitator of diamond. It has a high thermal conductivity, a hardness of 9.50 compared to diamond's hardness of 10, a refractive index of 2.65 compared to diamond's R.I. of 2.42, and a specific gravity of 3.21 compared to diamond's S.G. of 3.5. This material is the closest to diamond than any of the other gem materials. Jewelers who have seen it mistakenly identified synthetic moissanite as diamond!

C3, Inc. plans distributing its artificial gemstone during the first half of 1998. C3, Inc. is taking a very strong position about the full disclosure of the qualities of synthetic moissanite. Synthetic moissanite will cost more than cubic zirconia but much less than a natural diamond, maybe $50 to $70 per carat. The annual market for cubic zirconia at present is over $200 million.

Three characteristics of synthetic moissanite are: 1) it is doubly refractive, 2) it has white ribbon-like inclusions, 3) it doesn't show an absorption spectrum line at 415nm as 95% of the natural diamonds do.

More on Radioactive Cat's Eye

Source: JCK January 1998

Several radioactive cat's eye chrysoberyls found at a show in Los Angeles had been shipped from India. A dealer who carried the stones around the show developed an unusual skin condition. A geiger counter revealed the stones to be highly radioactive, and the stones were placed in a sealed lead container on hold for the original dealer.

More Troubles for American Gem Corp.

Source: JCK January 1998

Citing costly sapphire production and very low sales, Montana sapphire dealer American Gem Corp. announced on September 27, 1997 that the company is restructuring in their attempt to remain in business. Since it began in 1992, AGC has reported millions of dollars in losses and spent millions of dollars on the purchases of property and heat-treatment facilities. AGC contracted Great Northern of Australia to mine the Gem Mountain area, but they later withdrew to Australia with the mining equipment.

New Machine at G.I.A.

Source: JCK January 1998

G.I.A. in Carlsbad, California purchased a Raman Laser Microspectrometer, a computer-operated laser that determines the identity of gem materials and the inclusions within the materials. The laser probe also determines gemstone treatments.

Five Stores Busted on TV

Source; National Jeweler January 1, 1998

The television show, Dateline NBC, busted five major jewelry stores for allegedly selling treated emeralds and rubies without disclosures. A hidden camera showed customers who purchased four emeralds and one ruby with the understanding from the sellers that the stones were all natural and not enhanced. Laboratory tests performed by C.R. "Cap" Beesley, president of the American Gemological Laboratories in New York, proved the existence of treatments in all five stones. The five stores busted include: Tiffany & Co., Bailey, Banks, & Biddle (a subdivision of Zale Corp.), Macy's, Fortunoff, and Diamond Quasar. All five either blamed their gem suppliers or pleaded ignorance to the treatments.

Tahitan Pearl Farms Survive

Source: National Jeweler January 1, 1998

A cyclone devastated over 100 pearl farms in the Cook Islands and killed American seeding specialist Dan Emery, but about 95% of the underwater oyster beds survived. Since large amounts of silts, sediments, and mud in the water can lead to disease in the oysters, the resulting stress damage to the oysters will not be known until the harvest.

U.S. Diamond Mine for Sale

Source: National Jeweler January 16, 1998

Redaurum, based in London, wants to sell its 22-acre diamond mine in Colorado reported to yield 22,000 carats a year. The company also lists for sale the Avontuur mine in South Africa and its interest in the River Ranch Mine in Zimbabwe.

South Sea Pearl Treatments

Source: National Jeweler January 16, 1998

Australian and Indonesian South Sea pearls are enhanced to improve overall appearance. Some white South Sea pearls are bleached and coated with an artificial polymer luster enhancer. Many of the golden South Sea pearls are stained or dyed to improve their color. The South Sea Pearl Consortium plans an advertising campaign to address pearl enhancement disclosure issues.

The I.R.S. Versus Chatham

Source: National Jeweler January 16, 1998

Chatham Created Gems won its litigation appeal with the Internal Revenue Service over income taxes on memo goods. The IRS determined that all goods on memo were sales, defining memo as a sale in the form of a return contract. A final decision allowed for Chatham owning the goods until invoiced as sales.

News on Fracture Filling

Source: JCK February 1998

JCK provided an in-depth report on the fracture filling of diamonds, describing the process, disclosure to customers, and detection methods.

Moissanite Advertisement

Source: Lapidary Journal February 1998

A full page advertisement appeared in Lapidary Journal for lab-created moissanite gemstones from C3, Inc. sold as a diamond substitute.

Undercarating of Diamonds

Source: National Jeweler January 16, 1998

The Massachusetts Office of Consumer Affairs investigated four major jewelry store chains and discovered that they all engaged in undercarating diamonds. Ames Department Stores, Service Merchandise, Macy's, and Filene's Basement overestimated carat weight and failed to disclose the use of inexact weights, violating F.T.C. Guidelines.

Arizona Chrysocolla

Source: Colored Stone January/ February 1998

A deposit of chrysocolla was discovered in the Ray Copper Mine near Kearny, Arizona last August. Most of the material is not gem quality, but the deposit yielded large quantities of chrysocolla. Mineworkers carried specimens out of the mine during workdays, and some even entered the mine after dark to raid it for more chrysocolla. In response, the mine owners dynamited the deposit shut.

The Diamond Business

Source: The Economist December 20, 1997

The DeBeers Diamond Cartel is one of the most amazing success stories in the world. It has manipulated the diamond market with its control on prices, its stockpiles of diamonds, and its advertising campaigns. The cartel has created an illusion that diamonds are the most precious commodity in the world. The diamond marketeers appeal to the vanity of owning a diamond by spinning stories of a diamond's myth and magic. The cartel has successfully established the diamond as a powerful symbol of love and devotion.

Akoya Pearl Epidemic

Source: National Jeweler February 1, 1998

A mysterious virus has killed about 150 million mollusks used in the Akoya pearl industry in Japan. Production levels have fallen over 31% and will affect pearl sizes larger than 7mm., making those sizes harder to obtain. China plans to farm the pearl sizes below 7mm.

New Benitoite Deal

Source: Modern Jeweler February 1998

AZCO Mining, Inc., a copper mining corporation, negotiated an option to purchase the benitoite mine area in San Benito, California. The deal includes an exclusive option to explore, evaluate, and purchase the only known source for benitoite to estimate the potential for large scale commercial production.

Altering Color in Diamond

Source: Modern Jeweler February 1998

Russian scientists have been successfully experimenting with diamond color alterations to whiten diamonds with a color bleaching method that involves subjecting diamonds to intense heat and pressure.

Designer's Workshop for Faceters

By Ernie Hawes

Recently, Merrill O. Murphy and I were discussing his Tri-Polar design. I mentioned that I had seen this design used as the master level competition pattern in numerous faceting competitions over the past several years. We agreed that it was the type of design that would test the skills of experienced faceters. Then, Merrill said something that inspired me to do some research, and, eventually, render a reconstruction of the design in GemCad. Merrill said that many of the drawings of the design that had appeared in guild publications showed the table to be noticeably smaller than it should be, certainly smaller than the tables on the several examples of the design that Merrill had cut. I found the design in the October, 1972 ***Lapidary Journal*** and saw nothing that would suggest anything other than an approximately 50% table. Glen and Martha Vargas' book, ***Diagrams for Faceting***, ***Volume 1*** (1975) includes the Tri-Polar on page 70. It also appeared to be about the size Merrill said it should be, although I did notice some variation in the appearance of some of the other facets. I looked up a few faceting guild newsletters that had published the design, and suddenly I saw what Merrill was concerned about. The table was noticeably smaller. Then, I looked the design up in DataVue2. To my surprise, the table was small. When I imported the design into GemCad and looked at it closely, it became apparent that something was amiss; several facets did not meet. Something was really off, so I decided to reconstruct the design.

Using the DataVue2 imported file, I began changing facets to see what needed to be done to have everything fit. I also compared the settings and angles given in the ***Lapidary Journal.*** In the process of entering the design in DataVue2, the two facets next to the table (steps and) were erroneously listed as one set instead of two, and the angle for these facets was incorrectly listed as 35 degrees, instead of 33. Also, one of the main pavilion angles in the publications I reviewed did not quite coincide with what I found in DataVue2 via GemCad – a change that definitely seems to work. What we end up with is an error affecting the crown in several publications and another error affecting the pavilion in some others. Step on the pavilion has always been given as either 41 degrees or the culet angle. Long and Steele adjusted that to 41.26 degrees. Steps and on the crown have been listed sometimes as crown angle less 9 degrees or as 33 degrees (both are correct), but in DataVue2, they were listed as one set of angles to be cut at 35 degrees.

OK, we all make mistakes, and the editors who toiled hard to put the DataVue2 database together can easily be forgiven for an occasional error. (A "3 o'clock in the morning" type error seems to have been made when they entered data for the pavilion, causing step 6 to be overcut when imported into GemCad. This is easily corrected, and the pavilion then works as they intended.) The question that arises, though, is this: if the design as presented here works in cutting, was Merrill's design in error from the beginning? Long and Steele apparently determined that step will overcut if it is faceted at 41 degrees. It needs to be about a quarter degree above that, or 41.261 degrees, to be exact. My opinion is, no, Merrill did not make a mistake, at least not by the standards and precision available at the time. Remember that when Merrill designed this pattern, we did not have our wonderful personal computers and programs like GemCad. Most design angles were proven by cutting, and back then we didn't have protractors that were adjustable to tenths of a degree. Any facetor with a minimum of experience knew that some facets were cut-in to fit and not cut to a hard stop at a precise degree setting. Frankly, it's amazing to me that Merrill could come up with such a great design without the help of a computer! It's an excellent design for larger stones that are light colored. It does wonders for quartz and other lower refractive index materials. As already indicated, it's not a beginners stone, but certainly one to try for anyone much beyond the beginner stage. (*Editor: It's one of my favorites.)*

Coincidental to my conversation with Merrill and reconstruction of the design in GemCad, the February 1998 issue of ***ANGLES*** published a preform for cutting the Tri-Polar. No author or source was given, so I'm not sure whether or not the preform pattern is original or if it came from another publication. I've included it on the back of the design in this issue of ***The New Mexico Facetor*** as an added incentive to get folks to cut this outstanding classic.

A much simpler cushion triangle pattern is the o by well known designer Alexandre Wolkonski. I've chosen this as our second design for this issue to give you a less complex design in the same shape as the Tri-Polar. However, don't equate less complex with less attractive. This is an excellent design that cuts a brilliant and beautiful gem. It is well suited to a variety of stone sizes and is attractive in materials of many different shades. Cut it, you'll like it.

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o is recommended for use in phenolic resin bond systems to improve the mechanical retention characteristics of the diamond. It improves grinding wheel life and surface finish.

opp o is recommended for use in polyimide resin bond systems to provide chemical adhesion and mechanical retention.

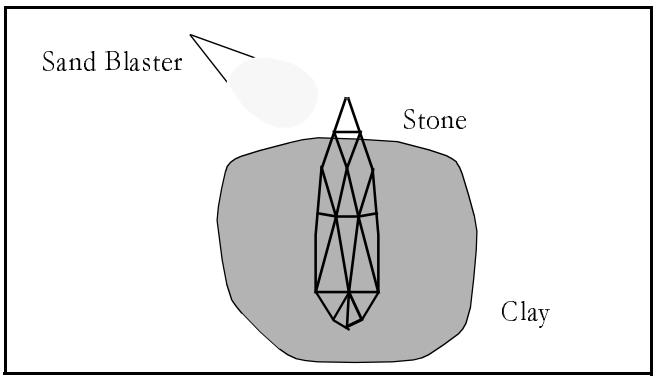
Briolette Air Abrasive Update

By Steve Green

Until now, I have recommended masking the briolette with tape prior to air abrading the tip. Recently, I found a simpler and more effective method that yields faster and more controllable results than with tape.

Using a small amount of modeling clay, imbed the briolette into the clay and leave only that portion of the briolette to be abraded exposed. The entire briolette should be encased in clay. Trim a small portion of clay from the tip of the briolette with a razor blade, exposing the tip for abrasion. Begin air abrasion with the layer of the clay over the protected surface.

The clay method is quick, precise, cheap, and easy to control. I found that the older tape method was harder to control and led to less precise masking capabilities. The tape was more difficult to wrap around the conical portion of the briolette, due to both the small size of the briolette and the limited flexibility of the tape. None of these problems occur with the clay method, which should make the job easier and more precise without increasing the expense.



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Lets Talk Gemstones

By Edna B. Anthony, Gemologist

Dioptase: A Cyclosilicate

Dioptase incorporates the native metal, copper in the Si6O18 ring structure with water to form the only gem material that so closely approaches the finest color of emerald. The small and well-defined deep green rhombohedral crystals develop in oxidation zones of weathering copper ore deposits. Its growth in voids of dolomite and limestone formations and irregular druse cavities is often in association with malachite and smithsonite, but admixtures and inclusions seldom occur.

Alluvial finds in nodular form attest to its chemically stable nature and its resistance to corrosion. Crystals exhibit characteristic dense striations of the rhombohedral faces. Numerous readily visible internal cleavage fractures frequently impart a pearly lustre and cause unusual reflections from within the transparent stones. This dictates the use of only the purely transparent ends of larger crystals for faceted gemstones and also presents difficulties in making table and step cuts. Thus, gems of more than a carat are extremely rare. Cabochons are sometimes fashioned from compact fine-grained translucent nodules.

According to Jaroslav Bauer and Vladimir Bouska in *A Guide In Color To Precious And Semi-Precious Stones*, the first known crystals of dioptase were brought to Semipalatinsk in Kazakhstan from the Kirgiz Steppes in Siberia in 1870 by the Bukharan merchant Akhir Mahmed. They were found on the western slopes of the Altai Mountains on calcite deposited in the numerous crevices of the limestone hill of Altyn-Tyube. Specimens sent to the Academy in St. Petersburg were identified by member German mineralogist R. Ferber as an emerald variety and named "achrite". Its low hardness made it less valuable than emerald, and it became known as "emerald for the poor". When it was determined in 1801 to be a new mineral, the French mineralogist Rene Just Hauy used the Greek words dia (through) and optasis (vision) to create the name dioptase. This describes the visible reflections on the internal cleavage cracks. "Copper emerald" is a name also used by some collectors of mineral specimens, and this term appears in almost all collections.

The discovery of some fairly large worn crystals extracted from the gold-washings in the Yeniseisk area and the failure to discover other deposits led to the assumption for many years that Siberia was the only source of the mineral dioptase. Fine cuttable dioptase material now comes from Reneville in Zaire's Congo. The Otavi Range at Guchabo in Namibia produces small amounts of dioptase. Pinal County, Arizona in the USA, Copiapo in Chile, Baita in Romania, and Peru are other world sources for dioptase. Despite its beauty, fragile dioptase is not suitable for use in jewelry.

The Mineral Museum at the New Mexico Institute of Mines and Technology in Socorro showcases a magnificent dioptase specimen that is worth the drive to Socorro to view it. Many other mineral museums have wanted this particular dioptase specimen for their collections, but, hopefully, it will remain in Socorro.

More on Cordierite

In regards to my cordierite article in the January/February 1998 issue of the New Mexico Facetor, I wish to clarify the spelling on both "praseolite" and "prasiolite". According to An *Illustrated Dictionary of Jewelry* by Harold Newman, "praseolite" is a variety of iolite that is leek-green. From the same source, "prasiolite" is a variety of amethyst from Montezuma, Brazil that has been changed by heat-treatment to a leek-green color. Newman says that the name is deprecated, owing to confusion with "praseolite", which was earlier so named. A variety of amethyst discovered in Arizona has been similarly changed by heat. The "e" in "praseolite" denotes the association with iolite, while the "i" in "prasiolite" applies to quartz. To add even more confusion to this topic, we also have "prase", the cryptocrystalline translucent leek-green variety of quartz.

It is interesting to note that the prefix "pras" originates from the Greek word "prason", which means leek. This term has been used in conjunction with several varieties of gemstones, including prasopal.

TABLE 1. Gemstone Properties

SPECIE	*Dioptase*
Composition:	Cu6(Si6O18)6H2o (a hydrous copper silicate)
Class:	Silicate (Cyclosilicate)
Species:	dioptase

TABLE 1. Gemstone Properties

SPECIE	*Dioptase*
Crystal System:	hexagonal (trigonal)
Varieties:	dioptase
Colors:	intense green and blue-green
Phenomena:	none
Streak:	pale blue-green
Diaphaneity:	transparent to translucent
Habit:	stubby six-sided columns and compact fine-grained nodules
Cleavage:	one perfect (Joel Arem); three perfect (Richard T. Liddicoat)
Fracture:	conchoidal, uneven, and brittle
Fracture Lustre:	greasy
Lustre:	vitreous
Specific Gravity	3.28 to 3.35
Hardness	5
Toughness:	very poor; brittle with cleavage
Refractive Index	o=1.644-1.658 e=1.697-1.709
Birefringence:	0.053
Optic Character	uniaxial positive
Dispersion:	0.022 (Walter Schumann), 0.036 (Joel Arem); 0.028 (Jaroslav Bauer and Vladimir Bouska)
Pleochroism	weak emerald green-blue green
Ultraviolet Flourescence	inert
Spectra	strong absorption of violet and blue; band at 5500
Color Filter	no information
Solubility	rapid etching/dissolution in HCL, HNO3, and ammonia
Thermal Traits	avoid thermal shock
Treatments	none known
Inclusions	rare; darker color caused by traces of iron

TABLE 1. Gemstone Properties

Faceting Pallasite Peridot

By Nancy L. Attaway

Every once in a while, the opportunity arises that allows a facetor to work on extremely rare gem material. In this case, a meteorite dealer presented me with two pieces of pallasite peridot to facet for a private collection.

Pallasite is the unique combination of an iron-nickel alloy with olivine, a meteorite dotted with interplanetary peridot dated at 4.5 billion years old. The German geologist, Peter Simon Pallas (1741-1811) wrote the first description of this material in 1776 using a piece found in Siberia. The best known finds of pallasite were discovered in South America, in Chile's Imalac and in Argentina's Esquel. Many of the olivines

in pallasite are barely thick enough to facet, which is why pallasite is mostly seen as slabs that can be set in pendants, sometimes accented with diamonds. These slabs resemble stained glass windows. The facetable pieces usually yield stones between 10 to 30 points and exhibit a drab shade of olive green.

Geologists explain meteorites as chunks of original solar system material that once orbited the sun in an attempt to form another planet between Mars and Jupiter. However, these blocks were unable to merge into a planet due to the enormous gravitational field around Jupiter, and they remained in orbit as asteroids. It is thought that pallasite sustained meltdowns in outer space while still in the asteroid stage, and this effect caused the iron-nickel cores to fuse with the olivine mantles. One possible theory for the meltdown is the intense heat produced by the quick-decaying radioactive isotopes in the original material. The resulting high temperatures pushed the metal in the core out toward the mantle and then mixed it with the olivine from the mantle at the interface between the mantle and the core.

When I examined the two pieces of pallasite peridot, I found that one was thick enough to render a traditional pavilion and still keep the critical angle in mind. The other one had the appearance of an irregular triangle with not much depth. I enjoy faceting peridot, but these two would certainly challenge me. Both contained darkened areas and serious cracks that would definitely present me with faceting problems.

Using a nearly-new 600-grit dyna lap and a 96 gear index wheel on my Facetron, I carefully shaped the thicker one into a 6.5 x 6.5 mm. cut-corner square. I modified the square barion design and cut at 55 degrees the four facets: 96, 24, 48, and 72. The corner facets: 12, 36, 60, and 84 were cut at 44 degrees, and the facet pairs: 93 and 3, 21 and 27, 45 and 51, 69 and 75 were cut also at 44 degrees. I cut twelve long slivers of facets at 43 degrees on facets: 9, 15, 33, 39, 57, 63, 81, 87, 96, 24, 48, and 72 for a starburst culet. After transferring to the crown, I cut two rows of parallel step facets, one at 45 degrees and one at 35 degrees, and then I cut a table.

I wished that I had room for a tiny parallel row of step cuts at 25 degrees. I really like to have those on squares and emerald cuts, as they give that extra detail. There really was not enough room for them, and I wanted to leave a thick girdle. I also did not want any of the internal inclusions coming to the surface as pits or chips, and I cut the crown just enough to keep them contained within the stone. A good polish was accomplished with 60,000-grit diamond slurry on the Last Lap.

The finished square gem weighs 1.29 carats and sparkles. The modified angles reflect the light with no windowing, although the table is a bit too large. Only one of the inclusions rose to the surface, where one small piece of a veil came off from a corner girdle facet during polish. I saw its small outline before I polished it, and, subsequently, a tiny piece fell out of a cut corner girdle facet.

I attempted to facet the other one in the apollo-cut triangle, a neat and simple cushion-cut design. I had cut two sides on the pavilion when the third side crashed. The darkened area with cracks broke from the stone and broke a small chunk from the second side. I polished what facets I could and placed the dopped stone in acetone to loosen it from the dop. To eliminate the resulting damage, I redopped the stone to cut a series of facets fanning out in an arc at 55 degrees with corresponding girdle facets. I cut only a table facet on the crown. The finished stone weighs 0.28 of a carat and resembles a shield. The idea of fanning out a series of facets in an arc at 55 degrees worked well to reflect the light.

Steve was very happy with the square starburst design, and he was quite surprised that I rendered a stone at all from the second piece. In both designs, I had to consider carat retention, facet composition, and overall beauty. The use of a 600-grit dyna lap left little subsurface damage and allowed a polish to quickly appear. The crystal integrity of peridot can show the effects from the origins of its very violent past.Whether it is from Arizona, Pakistan, or outer space, peridot can be both beautiful and unpredictable.

Louie's 80th Birthday

By Nancy L. Attaway (and Betty Annis, Ph.D.)

Between 1989 and 1991, the New Mexico Facetor featured a column written by Betty Annis that described the very special people in faceting. Her columns related their life stories and explained what led them to become faceters. Her column in the June 1990 issue featured Louie Natonek. On March 25, 1998, Louie Natonek, Guild Vice-President of Faceting Workshops and Guild Faceting Instructor, celebrates his eightieth birthday.

I learned to facet in 1987 when Louie led me through three faceting diagrams, a standard round brilliant, a cushion square old mine scissors cut, and a supernova oval. Louie stressed the importance of meetpoint faceting, correctly rendering the complicated diagrams, and showed how to obtain

a complete polish. In-between faceting instructions, Louie regaled me with stories of friends in the New Orleans jazz scene during the 1960's.

During the late 1980's, Louie guided Steve and I around the Tucson Gem and Mineral Show and helped us purchase gem rough. In those days, we walked long distances through throngs of people. Louie set a brisk pace. We returned the favor by showing others around.

Louie has been the Guild's faceting instructor for many years. He taught a lot of us how to facet and helped many Guild members to translate the faceting diagram to the dopped stone. Many workshops held in his home brought faceters together to discuss techniques.

From a past interview with Betty Annis, Louie Natonek was born and raised in Cicero, Illinois. He graduated from Norton High School in Cicero, held a job at the Cicero Ber-Wyn Life newspaper, and then worked for Zenith-Hazeltine in Chicago, Illinois.

In 1937, Zenith-Hazeltine contracted with the U.S. War Department to build a new electronic device called IFF, Identification Friend or Foe. Louie worked as an electronics technician on the IFF classified project. The IFF used encrypted code sequences known by U.S.airplane pilots, who would respond with the correct code upon request from another U.S. airplane radar-man.

Louie was exempted from the draft in World War Two since he was needed for the IFF project. His status changed when he was transferred to a division of Zenith-Hazeltine that studied radio transmissions for the U.S. Army tank corps. He was assigned to the U.S. Navy to maintain the new electronic systems installed in ships and planes. Louie earned this assignment after he passed the rigorous test known as the Eddy Test and was sent to electronics school at Wright Junior College, part of Oklahoma A & M in Stillwater, Oklahoma. He served in the U.S. Navy as an electronics technician until 1946.

Louie left Zenith-Hazeltine in 1947 to work construction jobs in downtown Chicago. He purchased a tavern in 1958 with a business partner, bought the partner's interest in the tavern in 1962, and owned the tavern until 1975. He met his wife, Harriet while he lived in Chicago, and they married in 1964.

Louie and Harriet moved to Albuquerque in 1975 when their son attended the University of New Mexico on a football scholarship. Louie and Harriet traveled to Mexico during the late 1970's, and they met a Baptist missionary who was an amateur facetor. He loaned Louie a copy of Glenn Vargas' book *Faceting for Amateurs*, and that sparked Louie's interest in faceting. Another facetor in Yuma, Arizona helped Louie cut his first stone on a Graves machine. Louie purchased a Facetron at the 1983 Tucson Gem and Mineral Show.

In 1980, Louie met Eldon Fleck and Ernie Hawes in Albuquerque when Eldon demonstrated faceting at the Albuquerque Gem and Mineral Club Show, held then at the State Fairgrounds. Eldon and Ernie discussed forming a faceters guild and were entertaining a list of names for membership. The next year at the Albuquerque Gem and Mineral Club Show, Ernie demonstrated faceting and spoke to Louie again about a faceters guild. From there, they formed the New Mexico Faceters Guild in 1981. Louie hosted the first meeting of the New Mexico Faceters Guild at his home in May of 1981.

Louie competed in several regional faceting competitions, winning first place and second place honors. Louie's favorite faceting designs are the Ultima cuts by Clint Fruitman and the Barion series by Basil Watermeyer. Louie developed the Cloud Nine and the Twelfth Nite diagrams. Both feature a round composition of facet slivers in the pavilion with fans of facets at specific intervals on the crown breaks. Not easy to do.

The New Mexico Faceters Guild thanks Louie Natonek for his dedication to faceting. The Guild recognizes his outstanding service in faceting instruction and appreciates his continued support during all these years.

D&J Rare Gems Reports on Tucson 98

By John Rhoads

First of all, we would like to thank all of our customers who took the time to stop by and shop with us at the Tucson Show. We had a very good show, thanks to the purchases made by both our established and new customers. We look forward to continuing our service to all of our Tucson customers during the coming year.

We saw little of anything new being offered at this year's show. We did see for the first time demantoid garnets from the new discovery in Namibia. These garnets come in large sizes when compared to demantoids from Russia or Italy. However, of the ones we saw, we thought that the color was

less exciting, not having the intensity or strong green tones of the finest Russian gems. In addition to the new demantoids from Namibia, we noticed a very good selection of Russian demantoids, as well as demantoids from Mexico and a very limited number from Arizona. Our opinion is that we saw enough new production to possibly affect a drop in demantoid prices for ones of average quality if production remains at current levels.

Rumors of tanzanite shortages were unfounded, and the word around the show was that prices in Tucson were lower than those being offered in Arusha, Tanzania. Although the possibility of prices increasing exists, many dealers felt that prices cannot rise too much or they will compete with sapphire prices and loose sales to sapphires.

We continue to see additional selections of very fine gems from southern Tanzania. We saw a small parcel of purplish blue sapphires from Tanzania that were splendid, but we were unable to acquire any. We were told that the sapphire deposit is large, and that within a few months, these sapphires should be readily available on the market. Watch for these, as the ones we saw certainly impressed us. We hope to have some of these sapphires to offer our customers by May of this year.

Our sales at the show were interesting, to say the least. Our rhodochrosites from Colorado were by far the best sellers. We also had a good selection of chrysoberyls in the 3-4 carat size that sold out. Our mint green grossular garnets from Tanzania also sold out at the show. We had strong sales in sapphires, as well. We also sold a number of our Vietnamese spinels.

One gem that yielded a surprising number of sales for us was our natural zircons. We had a large display of zircons from Sri Lanka, Tanzania, Thailand, and Cambodia, and we had strong sales in zircons from all these areas. Particularly popular were the earth tone zircons from Sri Lanka in larger sizes. We received a number of requests for zircons from Australia, both at the show and from our mail-order customers. We are currently working to meet this demand.

One area that fell short of our expectations was in our rare gems. We felt that we brought to the show one of our best selections of rare gems ever. Outside of our Colorado rhodochrosites, we sold only five rare gems. We sold more rare gems from our February 1998 newsletter than we did at the Tucson Show.

In listening to other dealers, and judging from our own experience, we definitely noticed a drop in sales to the Asian markets. Although there were many Japanese customers at the show, we did not see them making the purchases they did in the past. Dealers who depended heavily upon Asian customers were off substantially in sales. Two years ago, almost half of our sales were to customers from Japan, Korea, Taiwan, Hong Kong, and Singapore. This year our sales to customers from these areas represented only 2% of our totals. I blame the Asian economic crisis. Fortunately, our domestic sales remained strong.

Another factor that surely affected the sales, not only ours but other dealers, was the appearance of our suppliers participating as dealers at our show. It used to be that we would meet with many of these suppliers prior to the show, and then resale what we were able to acquire at wholesale prices. This year, we counted five of our suppliers at our show alone. This makes competing with them very difficult, as they then turned around and sold to the customers at the show gems at prices the same as or close to the price they sold their gems to us. This is good for the customer shopping in Tucson and for the dealers making the sale at the show, but it erodes the customer base for our supplier. We will now be hesitant to purchase from them in the future if they are going to be in direct competition with us.

Discounting was also heavy this year in an effort to gain sales. Those who waited until the end of the show found that dealers were much more willing to give a hefty discount to make the sale.

Good rough gems were in very short supply. As usual, fine tourmaline was available from the Middle Eastern dealers, but only if you were willing to purchase entire lots at outrageous prices. Vietnamese spinal rough was available at prices similar to what we have been offering our cut gems. Gem rough over 2 grams in size was being offered at $625 per gram. Although this material is nice, it does not command the per carat price that $625 per gram rough necessitates to produce a profit.

All in all, we enjoyed the Tucson Show and were glad to greet our many customers who attended. We renewed our contract for next year's show at the Gem & Jewelry Exchange. We hope to better prepare our inventory to be even more competitive in more areas with the other dealers at the show.

More Tsavorite from Tanzania

We purchased additional tsavorites from Tanzania prior to the Tucson Show. We now have a very good selection in 1 to 2 carat sizes in medium green colors with a few medium dark to dark chrome green colors in stock. We also have a

couple gems over two carats in size and one monster gem at 6.07 carats in a medium green color. Many tsavorites will be listed in our newsletter, and we hope to add even more in the future.

We understand that the mining of this material has increased since the tanzanite deposits have been closed, resulting in an increase of tsavorite on the market. However, we saw a limited amount at the show. Prices should hold steady, and we hope it to be a regular item.

Pakistan Peridot

Last year, our peridot from Pakistan was very popular and one of our biggest sellers at the show. This year, we saw quite a bit more of peridot from this location at the show. We saw many large gems (over 10 carats in size) that were purchased for very good prices. Evidently, the mining season was good this year for new production.

Keep a watch on this material, as it has been reported that future production from known deposits may decrease as these deposits are worked out. The finer gems in larger size will be go up in price.

El Nino and I Do Tucson

By Nancy L. Attaway

Wind, Rain, and Mud

Crowds of buyers fueled a healthy spending economy at the February Tucson Show, despite the obstacles strewn in their path by Mother Nature and the city of Tucson. Spring storms bringing gusty winds and wet weather had intrepid customers negotiating their way through mud and standing water. Road construction along 22nd Street created walking hazards and made access to the hotels along 22nd Street very difficult. Dirt parking lots became mud quagmires, and few show promoters filled their muddy parking lots with fresh gravel. Some show promoters covered the existing parking lots with tents to house more dealers and eliminated even more parking. People also paid more to park this year.

Wind disaster and mud kept Steve and I from visiting the tool and equipment tents along Congress Street. The tent stakes had not been installed properly, and the high winds blew a tent over. This occurred during the night, and, fortunately, no one was killed or injured. However, display cases and merchandise were damaged and destroyed. They re-set the tent, but the area turned into a muddy quagmire. Being a civil engineer, Steve was appalled that a small wind could blow down the tent. Someone failed to do their homework on tent design.

The ever-expanding GJX tent (and well-constructed tent design) was erected behind the high-rise construction of a new federal building. New gravel paved the lot, but the narrow access bottlenecked the flow of traffic.

Business & Prices Were Up

The AGTA Show entertained more buyers this year. The dealers said that sales had greatly increased from last year. Prices for cut tanzanite listed for more per carat this year. Tourmaline prices remained high for the pinks and reds. Dealers showcased all sizes, colors, and qualities of Chinese freshwater pearls and South Sea pearls. Prices and selection for pearls have never been better.

We spoke to Abe Suleman, a dealer in tanzanite and mine owner. He said that the tanzanite mines remained closed for most of 1997. However, block D, where much of the high quality tanzanite had been mined, was re-opened recently. Given the harsh mining conditions, a steady supply of tanzanite may not be guaranteed.

In our search for more peridot rough from Pakistan, Pakistani dealers quoted enormous prices per gram, even for large lots. Since peridot can only be mined during one month at altitudes of 13,000 feet, the dealers decided to charge premium prices for the rough. My attempt to explain what such price gouging would do to the price per carat of faceted peridot fell on deaf ears.

What was new and different at Tucson this year? Not too much, really. I saw many large pieces of the new aquamarine from the Pedra Azul locality in Brazil. These resemble chunks of deep blue glacial ice, and I saw them displayed everywhere. The cut stones I saw from this source appeared lighter in hue than I expected.

Rutilated quartz is a hot item, and its popularity has increased the price of the rough dramatically. Many of the gem carvers work with rutilated quartz. An unusual piece of carved rutilated quartz set in gold won an AGTA Spectrum Award. Having a very large spray of golden rutile in clear quartz seems to be the most desirable.

It appeared that South Seas pearls and opals caught the Asian economic flu this year. We noticed that vendors slashed the prices for high quality opal. Some opal dealers remarked that their customer base had fallen greatly because of the eco-

nomic troubles in Asia. The dealers explained how, before the economic crisis, their customers spent $20,000 to $40,000 on one piece of fine opal. Customers believe that opals bring the wearer good luck. However, it was nice to see such gorgeous opal for sale in our country once again. I noted that the very large diameter pearls were not as expensive as they had been. I ooohed over a splendid strand of fine golden South Sea pearls and over one of the rich black Cook Islands pearls.

In addition to the AGTA show, the convention center hosted the Manufacturing Jewelers and Silversmiths of America (MJSA). MJSA displayed jeweler supplies, advertised refiners, and showcased the work of some famous jewelers. The booth for Otto Frei-Jules Borel Company became the gathering point for some of the more famous goldsmiths. They all had to handle the jewelry-making tools and comment on their use. Steve compared it to a bunch of guys hanging out at the local hardware store. We met Spectrum Award winner Kevin Pope, and he discussed his choice of jewelry-making tools.

More NMFG Members Work the Shows

We greeted more familiar faces at the GJX show. New Mexico Faceters Guild Vice-President **o** worked a booth in the GJX tent for an Italian jeweler and an American turquoise supplier. D and J Rare Gems, Ltd. faceters **o o d d K** . showcased many new gems, both beautiful and rare. Mark displayed three stunning, large rhodochrosites from Colorado's Sweet Home Mine that he faceted, including a heart-stopping 58 carat pearshape.

Along 22nd Street, we finally located the booth where New Mexico Faceters Guild members **d o** displayed their goldwork. Bruce and Sally devote full time to rendering gold jewelry, both hand-fabricated and wirewrapped. They are scheduled to participate in many gem and jewelry shows during the year.

Feeling brave, Steve and I waded through the narrow aisles filled with people in the Holiday Inn/Holidome. Doing business inside the Holidome always presents a challenge, as there is barely enough room to stand and much less room to make a purchase. We greeted New Mexico Faceters Guild member **K d** who worked the House of Williams booth.

More Carvers

One area in the Broadway Holiday Inn showcased work by the Gem Artisans of North America (GANA). Steve and I attended the annual meeting of GANA, where they voted upon a set of by-laws. GANA members must work in material having a minimum hardness of 5. GANA allows three classifications of membership in the society: an artist member who has a recognizable style and who must be voted upon, a professional member from the gem industry or from a museum, and an associate member who supports gem art. The Carnegie-Mellon Museum in Pittsburgh, Pennsylvania recently showcased work by GANA artists during a special four month exhibit organized by gem carver Kreg Scully and Carnegie-Mellon museum curator Marc Wilson, Ph.D.

We met gem carver Larry Woods at his booth in the GJX tent. The February 1998 issue of Lapidary Journal featured an article on the gem carvings rendered by Larry Woods, including the cover photograph. The polar jade dealers of jade from British Columbia displayed in GJX a very large horse head jade sculpture beautifully rendered by gem carver Elizabeth Beunaiche.

Two hotels housed mineral dealers this year, and we greeted famed gem carver Thomas Hart Ames in one. Steve spent time talking to Thomas about tools and techniques. Thomas liked Steve's frog carved in peridot and set in a gold pin that Steve wore on his jacket lapel.

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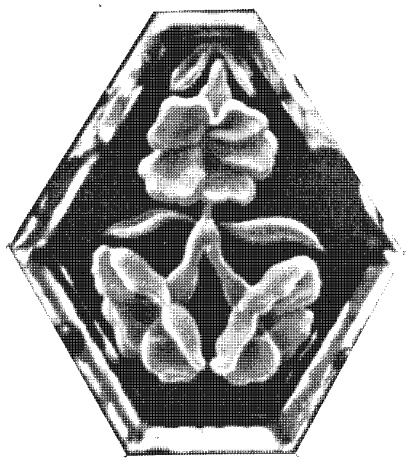
We greeted famous gem carver Michael Dyber at his booth in the Broadway Holiday Inn. Michael displayed several new pieces rendered in rutilated quartz, a popular medium at this year's show. My favorite was the carved aquamarine having the double-keeled carved pavilion. Upstairs in the Broadway Holiday Inn, we found the Idar-Oberstein Group of gem artisans, including Hans Ulrich-Pauly. Hans is a master gem carver who still mixes diamond with virgin olive oil on his carving bits.

Nearby, we located several noted gem carvers gathered at the booth for the Dust Devils, miners and dealers of Oregon sunstone. One carver was Charles Kelly. Charles showed us his latest work, an amazingly intricate carving of a Central American hummingbird with a Quetzal-like long tail. Lapidary Journal featured carvings by Charles Kelly, including the hummingbird in Oregon sunstone and the remarkable puzzlestone carved from interlocking pieces of turquoise and black jade. Also there was gem carver Ron Wilson and Charles Vargas, who heads the Arizona peridot mining operation.



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Can Tucson Get It Together

I find it absolutely amazing how badly the city of Tucson treats the dealers and the customers for this major show. The sales and tax revenues generated during the month spent in Tucson by people attending the show adds up to a significant sum of money. Hotels double their room prices, the city of Tucson tries to levy more taxes on the vendors, shuttles are very unreliable, available parking continues to diminish, and road construction snarls traffic. The city of Las Vegas, Nevada still courts the Tucson Show. The show could move.

The show needs to stay together and not separate into categories, judging from last year's disastrous experience doing just that. The many facets of the show, from cut gems, rough, and jewelry to tools, equipment, minerals, and fossils, fill the needs of many consumers. Tucson and show organizers need to work together to make the stay in Tucson a positive experience for conducting gem show business between dealers and buyers.

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Don't miss the Albuquerque Gem and Mineral Club's Annual Jewelry, Gem, and Mineral Expo! March 6-8 at the Continuing Education Building.

TABLE 2. Shows of Special Interest

Name	*Location*	*Date*
Garcia Civic Center Rock Show	Deming, New Mexico	Mar. 5 - 8
International Gem and Jewelry Show	Denver, Colorado	Mar. 6 - 8
Grand Gem and Jewelry Show	Deming, New Mexico	Mar. 6 - 8
Albuquerque Gem and Mineral Club's Annual Jewelry, Gem, and Mineral Expo 1998	Albuquerque, New Mexico	Mar. 7 & 8
Deming Gem and Mineral Society's Annual Rockhound Roundup	Deming, New Mexico	Mar. 12 - 15
Bead Expo '98	Santa Fe, New Mexico	Mar. 25 - 30
Geo Expositions Spring Show in the Rockies	Denver, Colorado	Apr. 17 - 19
PHT Promotions, Ltd. Rockin' Into Spring	Denver, Colorado	Apr. 24 - 26
Lubbock Gem & Mineral Society Annual Spring Show	Lubbock, Texas	May 2 & 3
Santa Fe Symposium on Jewelry Manufacturing Tech.	Albuquerque, New Mexico	May 17 - 20
Northwest International Faceters Conference hosted by the North Puget Sound Faceting Guild	Mount Vernon, Washington	May 23 & 24
JCK International Jewelry Show	Las Vegas, Nevada	June 3- 9
12th Annual American Gem and Mineral Show	Flagstaff, Arizona	June 11 - 13
International Gem and Jewelry Show	Denver, Colorado	June 19 - 21