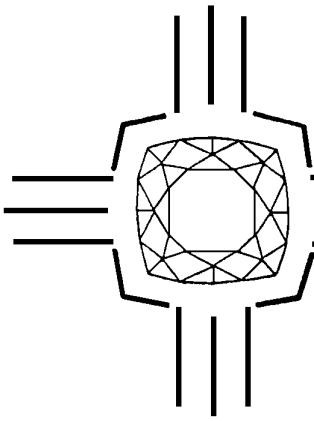


The New Mexico Facetor



Volume 16, No., 3, January/February, 1997

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The Prez Sez

by Moss Aubrey, Ph.D.

To paraphrase Will Rogers, I never met a gemstone I didn't like. Having said that, I really like sapphire. I remember the first time I realized that sapphire came in almost every imaginable color besides the traditional blue. I once admired a tray of variously colored stones, appreciating the wide range of vibrant colors. It surprised me to learn that all of those stones in the tray were Montana sapphires. I've been enamored of sapphire since then, and I hold a special appreciation for the Montana material.

Having said all of that, let me explain the reason why I related this. I have noted with interest, along with some concern, the development of the Montana sapphire industry over the past several years. In particular, I have observed the sapphire marketing efforts and the consequent results by the American Gem Corp. (AGC) of Montana. Many trade journals reported numerous accounts of the development of AGC and its endeavor to create a world market for Montana sapphires. The important issue regarding the marketability of Montana sapphire takes place within the even larger topic of the market for fancy colored sapphire.

Fancies, which I refer to as corundum with any color not blue or ruby, are produced from deposits world wide. Only recently have they commanded a respectable niche in the gem industry. Acceptance of these fancies seems to be changing as a result of factors not entirely attributable to AGC. However, AGC's marketing efforts seem well timed to coincide with the new popularity of fancies in the industry.

As amateurs and hobbyists, why do we care whether or not Montana sapphire becomes commercially viable? We should care for one very important reason: availability.

In years past, any of the several small mining operations in southwest Montana would sell a day's production of sapphire, fresh from the gravel beds. Nowadays, the small mines have mostly been purchased. When I last called to locate a source of mine-run material, I could not find any. I remembered that I bought a sample of heat-treated rough from Eldorado Bar in the late 1980's for \$2 per carat.

The rough sapphire from that parcel came as clean gem material with pieces weighing four to ten carats. This year in Tucson, I saw similar material selling for \$15 to \$50 per carat. Cut stones now sell for \$30 to \$200 per carat for sizes under one carat, with substantially higher prices for larger stones listed up to \$2,000 per carat. If a market really exists at such prices, this lovely material will become unaffordable for anyone except the major players in the gemstone game.

I originally planned to write a column where I reviewed the issues of AGC's efforts to produce Montana sapphire on a large scale. I thought I would also describe how AGC planned to bring this material to a greater acceptance in the world sapphire market. I listened to the concerns voiced by others in the industry that AGC's claims regarding sapphire reserves were not entirely documented by hard facts. If these claims rang true, then the gem industry needed to consider the premise that Montana sapphires could well become serious players in the world gem market.

However, once I began the research for this article, I realized two things. First was that in the general idea of sapphire marketing, the recent interest in fancies and their acceptance needed to be reviewed. Second, while I did discover a few facts about AGC that I found sufficiently "curious", which warranted further scrutiny, sufficient time was not available to conduct as thorough an inquiry as fairness required. I did not want to provide such a cursory review that might jeopardize this column and lose the educational merit. Consequently, I am writing on this topic using two or more President's columns to provide sufficient time for further investigation, as well as to provide sufficient space to further explore this issue.

Do Montana sapphires stand a chance to enter the world market competitively? The material from Montana has been known for over a century, and some of the blues have been well accepted. Sapphire from Yogo Gulch enjoys world-renown for its natural and uniform deep blue color, along with its clarity and brilliance. However, Yogos typically are small, less than one carat when cut. Yogos over one carat and greater are unusual. Several companies found the hard rock mining for Yogos often to be unsuccessful financially. (See the excellent article on Yogo mining by Mychaluk, 1995)

Yogo mining involves underground operations restricted to a very distinct geographic area. However, most of the Montana stones are recovered from alluvial deposits along the banks of several rivers. While a good blue hue is often found, much of the sapphire material recovered consists, instead, of greenish colored material, pale and steely blues, yellows, golds, oranges, some pinks, and bi-colors.

Other than royal blue or ruby red, sapphire never has been highly prized except as collector stones. The

collector market is different from the world retail market. The relatively small amount of fine blue sapphire from Montana has hampered efforts to market it, because suppliers must be able to provide a consistent availability of uniform material in calibrated sizes. There was so little interest in fancies that sales of sapphire, other than blue and ruby, never warranted monitoring. Trade journals report annual trends in gem sales. (See *Colored Stone*, Jan. 1997, p.563)

For example, in 1995, blue sapphire commanded the top selling seat for colored stones, while ruby placed fourth. No records were kept for sales of fancy sapphire then. However, public acceptance of fancies changed to the point where fancy-colored sapphire constituted a separate category of colored stones. Retail sales in 1996 indicated that blue sapphire was, once again, the top seller, with ruby placing second. It was also in 1996, the first year that fancies were tracked, that fancies placed near the top for colored stone sales (placing tenth). Now, sapphire of various colors accounts for three of the top ten categories. I guess I wasn't the only person to recognize the beauty in this material.

Reasons for the increased acceptance of fancies probably include good durability and exceptional brilliance. These factors alone brought sapphire to public attention, proved by continued sales of blue sapphire and ruby over the centuries. A more recent influence is public acceptance of the stones with the new colors that span a wider range of hues than previously shown popular. In the past, the fact that fancies were neither blue nor red posed a hindrance to successful marketing. This impediment appears to be on the wane.

Merely because an increase in interest exists in a stone does not mean that it will become a staple of the gem industry. If supplies are insufficient to meet a consistent demand, then interest will wane. Dealers will hesitate to stock an item that cannot be procured in different shapes and sizes for their customers.

Mark Lurie wrote a nice overview on the topic of supply versus demand in regards to sapphire (Lurie, 1996). He pointed out that the reasons for sapphire consistently ranking very high in sales was a result of its durability, its broad range of prices, and its diversity of colors available. Apparently, consumers in other countries had not been quite as hesitant in their appreciation of the fancy-colored sapphires as the ones in this country.

When reading reports of gem production world wide, the articles primarily focused on either blue sapphire or ruby. Lurie continued to comment that while Asia had been the traditional source of both top quality and top colored sapphire, many of the sources of such quality material have become inactive. As a result, supplies are becoming unreliable. He stated that the previously important sapphire mines

in India and Thailand no longer produce substantial quantities of top grade sapphire material. Because of political problems and the greater need for expensive machinery, the sapphire mines in Cambodia and Myanmar are difficult to operate. Sri Lanka maintains its status as a world renowned sapphire locale, while other sites in Asia and Africa vie for acceptance. Tanzania, in particular, produces small (10 to 40 points when cut) sapphires of varied and often intense color.

Continuing from the same article, Lurie commented on the status of Montana as a potential player in the world sapphire competition. He stated that, in regards to projected potential, **“No material has been more heavily hyped than Montana sapphire.”** (Lurie, 1996, p. 39). He explained that for all the projected millions of carats said to be trapped in the ground, most of it remains just there. He pointed out that, aside from quantity, the quality of the material is also in dispute. He quoted AGC President Greg Dahl as stating that “some of the blue will match up against some of the finest sapphire in the world.” Echoing that enthusiasm is Tom Lee, President of Gem River Corp. of Montana. Lurie quoted Tom Lee as stating that his deposit “is as clear, clean, and gemmy as anywhere in the world that I’ve seen.” In contrast to their optimism, Sid Tucker, of Sid Tucker Gems, is quoted as stating that the material produced is typically commercial to medium grade. The colors always have teal or steel undertones, making these particular stones unlikely to replace blue sapphire from elsewhere in the world.

So, are you confused yet? You should be, at least a little, because not all of the claims about Montana material can possibly be true. (I plan to explore in greater detail some of these seemingly contradictory claims about this material). We have seen sapphire prices increase dramatically, but this is in parallel to the dramatic rise in the stock market. I wonder what would happen to stone prices, especially for a stone without an established market niche, if the stock market were to take that long-predicted “correction.”

This seems a good enough stopping point for now. I will discuss in future President’s columns the history of sapphire mining in Montana, especially the news of recent years. I plan to describe the technology used for the successful heat-treatment of this material, as well as AGC’s efforts in advertising to promote the material as a world class gem.

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March 1&2



Minutes of the NMFG Meeting

January 9, 1997

by Nancy L. Attaway

President **Moss Aubrey** called the meeting to order at 7:15 P.M. Several guests were introduced and welcomed to the Guild meeting. Welcome back, **Herb and Maria Traulsen**. Herb and Maria recently returned from an odyssey to Australia and New Zealand. A detailed report on their journey will appear in a later issue of the newsletter.

Treasurer's Report:

Treasurer **Bill Andrzejewski** reported:

Heading	Total
Previous Balance	\$1,033.50
Expenses	\$381.30
Deposits	\$373.00
Balance Forwarded	\$1,025.20

Old Business:

Susan Wilson remarked that the Guild Christmas party was a success, largely due to the preparation by **Eileen Rossen**, Christmas party chairman. The Guild is a very social group, and the Christmas party provides an opportunity for holiday cheer. Eileen, assisted by Steve Attaway, distributed great door-prizes to lucky winners. Eileen thanks all who donated those prizes, and thanks everyone for participating in the fun-filled event. Anyone having ideas for the 1997 Guild Christmas party needs to contact Eileen.

New Business:

Nancy Attaway mentioned that the Albuquerque Gem and Mineral

Club scheduled their annual Gem and Mineral Show for March 1 and 2, 1997. She asked for faceting demonstrators for the show. The Guild traditionally has demonstrated faceting during the Albuquerque Show.

Paul Hlava, Albuquerque Gem and Mineral Club Show Chairman for 1997, announced the enactment of a new category called "Demonstration-Dealers". Demonstration-Dealers pay a specified booth rate that allows them to demonstrate and legitimately sell their hand-wrought merchandise during the show. Guild members who wish to demonstrate faceting or explain faceting during the show, but who are not registered Demonstration-Dealers, need to contact Moss Aubrey or Steve and Nancy Attaway.

President, **Moss Aubrey** scheduled a Guild Board Meeting on January 15, 1997 for 6:30 p.m. at the home of Bill and Bonnie Andrzejewski. Agenda items listed include: a decision on a prize for the up-coming regional science fair; ideas for programs; scheduling a series of short presentations on many faceting techniques; and possible field trips.

Ernie Hawes brought up an item of business for a vote to declare **Mrs. Helen Huebler** a Guild life member. This would allow her to receive the Guild newsletter at no charge. Helen is the widow of **Al Huebler**, who acted as Guild Gemologist, past Guild President, and author of numerous articles for the Guild newsletter. Ernie Hawes moved in favor of the item, and Nancy Attaway seconded. The Guild voted in favor of the item in memory of **Al Huebler**, with our gratitude.

Show And Tell:

The show and tell case displayed unusual items tonight. Guild members brought interesting faceted and carved gems and objects of art.

Moss Aubrey showed several faceted stones from a parcel of Russian hydrothermal emerald that included a large barion emerald cut, a smaller emerald cut, two small rounds, and a pair of triangles. Moss intended to set the large barion emerald cut into a ring, but the pavilion was too deep. The barion emerald cut is a beautiful pattern with lots of scintillation, but it does result in a very deep pavilion. He then faceted a smaller emerald cut with a step-cut pavilion. That stone fit the ready-made ring mounting much better. Moss used a 43degree culet angle in the step-cuts on the emerald-cut emeralds, along with a crown angle of 23degrees.

Moss set the two faceted rounds into earrings. He related the problems he experienced with faceting two matching triangles slated for the side stones in a ring, as well as faceting two matching stones for earrings. Moss used a 43degree culet angle and a 30degree crown angle for the triangular tribrites in the ring.

The Russian hydrothermal emerald exhibits a lovely deep green color, but the color becomes too dark if faceted only for recovery. This is one example of a gem material where the faceting angles need adjustment in both the pavilion and crown. **Merrill O. Murphy** advised faceters to reduce the crown angles on dark stones. He also recommended reducing the angles where necessary for a faceted stone to fit properly into an existing mounting. Moss used his alumina dyna lap disc to polish all of the hydrothermal emeralds.

Susan Wilson showed a cushion-cut barion triangle faceted from almandine-pyrope garnet material. Susan used an ultra lap to polish her garnet. Besides this pretty red gem, Susan mentioned that she faceted other stones she set in mountings and sent out as Christmas presents.

Angel Ramos, a silversmith instructor at the University of New

Mexico, brought a large knife with a jade handle. Angel fitted pieces of beautiful nephrite green jade on either side of the knife handle. Carbon steel composed the knife blade. Angel worked brass and sterling silver into the knife handle design with the jade. Now, that's a knife!

Steve and Nancy Attaway displayed several ametrines and amethysts, along with an Oregon sunstone and a Lightning Ridge opal. Nancy faceted a square ametrine, a crescent-shape ametrine, a kite-shape ametrine, and a raindrop ametrine, which were all displayed during the November meeting. She brought them again to show how Steve carved the culet area of these pavilions. Well-placed diagonal lines and concave circles worked well with the square, the kite, and the raindrop. The crescent moon also saw the use of a large round diamond tool to realize its crescent-like shape.

Steve sliced an ametrine, and Nancy faceted a series of step cuts for the pavilion and crown. The slice resulted in a tablet with two polished tables. Steve carved a scene in reverse intaglio on one of these with his Seldom Seen diamond carving tool and diamond bur. The scene depicted a hummingbird hovering over three flowers. Steve incorporated the yellow and purple color zones of the ametrine to give the flowers their colors. He set the ametrine slice in a hand-made gold pendant accented with an amethyst square barion faceted by Nancy.

Nancy showed a pair of matching square barion amethysts she planned to set into earrings. She also showed two twelve-sided round flasher cut amethysts. She empathized with Moss in regard to faceting a matched pair of stones alike in size, cut, and color.

Steve carved the Oregon sunstone to have swirling curves to highlight its famous copper schiller. The Lightning Ridge opal carving resembled drapery

that accented its blue-violet color. Like Susan, Steve and Nancy remarked that they also rendered other pieces not available for show and tell.

Herb Traulsen brought several paua shells from New Zealand with brilliant peacock-blue color and bright pink hues. Herb explained that these colors were natural, and that the paua shell shared the same family as the abalone. He also related his problems in expediting these shells through customs.

Maria Traulsen, a serious opal aficionada, wore a stunning brooch with a large Keshi pearl in the center surrounded by splendid quality pear-shape crystal opals. Herb and Maria chose the opals and the pearl, and they worked out the design with the goldsmith. What a lovely souvenir! Herb then explained the long and very pain-staking process involved in farming Keshi pearls.

Future Programs:

Susan Wilson, Vice-President (Programs) arranged for **Kirk Brock** of Rock Solid Jade to speak during the March Guild meeting. Kirk's topics include jade, ruby, spinel, and their locales. He visited the Orient many times in his search for gems. Kirk plans to share an interesting experience when he visited a ruby mine on the border of two Asian countries where both countries claimed the mine.

Susan also scheduled a presentation by **Ralph Dawson** on crystal growing for the May Guild meeting. Ralph Dawson grows crystals for Sandia National Laboratories.

Paul Hlava plans to give the Guild a slide presentation on gemstone phenomenon later in the year. Susan also arranged a talk from a representative of Vadja about his gem-buying trips. Herb Traulsen consented to give a slide presentation covering his travels to Australia and New Zealand. Herb intends to

share his interesting stories regarding opal mining and pearl farming.

Delicious refreshments were baked by **Eileen Rossen and Elaine Weisman**. Thank you very much! Heidi Ruffner and Nancy Attaway volunteered to bring refreshments to the Guild meeting in March.

Program/Speaker:

The intrepid **Paul Hlava** provided the Guild with a very lively discourse on his recent travels in South Africa. Paul and his wife, Marge flew to Johannesburg last November. Marge Hlava presented a technical paper during a conference held in Pretoria, the main purpose of the trip. Paul accompanied her to serve as the official luggage handler and primary trip photographer.

Paul and Marge toured gold and diamond mines outside of Pretoria. Paul's many slides also showed the unique bird and animal populations inhabiting South Africa's Kruger Park, as well as those in the Cheetah and Rhino Reserves. He explained that South Africa's wealth was not limited to gold and diamonds, but also included a rich variety of birds and animals. Several of Paul's wildlife slides were worthy enough to be published in National Geographic.



A Tribute To Norman W. Steele, Jr.

By Ernie Hawes

On Sunday, February 9, the day following the funeral, Robert Long very kindly sent me the following obituary from the Seattle newspapers:

"Norman W. Steele, Jr. Age 72, passed away January 31, 1997. He was a graduate of the University of Washing-

ton School of Engineering. Norman was a World War II U.S. Army veteran who served in the Pacific. He was employed with Boeing Co. as an engineer for over 35 years. He pursued hobbies of mineralogy and photography and was very active in numerous organizations relating to those avocations, often judging, publishing, and giving presentations. He is survived by two sisters, Viola Moore, of Olympia, Washington, and Mary Stoa, of Seattle; and a brother, George Steele, of Renton, Washington; also numerous nieces and nephews. Visitation will be Friday 9 a.m. to 9 p.m. and Services Saturday, February 8, 1997, 4 p.m. Both at Evergreen-Washelli Funeral Home 11111 Aurora Avenue North, Seattle. Memorials may be made to donor's choice."

In his communication to me, Robert added the following brief message: "I went to the service yesterday. There was a big crowd. The chapel was full."

Newspaper obituaries say everything, while really saying nothing. A few brief lines sum up the facts of a person's life, but seldom say more. When I first learned of Norman's heart attack, and shortly thereafter his death, I was shocked. Giants don't die. They go on forever. How could this be?

For over thirty years, Norman Steele has been an extraordinary influence on the faceting hobby. The scope of his contributions is enormous. If you are a faceter, you probably used, at least, one design by Norman Steele.

"**Datavue2**", the faceting database Norman co-authored with Robert Long, holds 310 references to over 260 different designs that Norman created. These designs date back to 1966, well before the availability of computers that now aid us in our design work. You most likely own one or more of Norman's meetpoint design books, also co-authored with Robert Long.

For many years, the Long and Steele partnership provided us with a wealth of facet design information, not only through their books, but also through the quarterly publication, "*Seattle Faceter Design Notes*". In addition, Norman wrote a number of articles that were published and republished in guild newsletters around the world. Norman was a frequent presenter at faceting meetings and symposia, and he was often asked to judge faceting competitions.

Although Robert Long and Norman Steele ceased their joint book publishing efforts a few years ago, Norman continued writing and editing the "*Seattle Faceter Design Notes*". He continued to renew the designs in "**Datavue2**" and was working on an update to this extremely valuable resource at the time of his death.

Norman Steele and Robert Long also co-authored ray-tracing programs that formed the basis for many of the design evaluations published in the "*Seattle Faceter Design Notes*".

Although I have read almost everything Norman Steele wrote on faceting, and, thus, knew him well as an author and a gem designer, I only once had the privilege of meeting him in person. I met Norman at the International Faceters' Fair in San Jose, California back in 1981. I remember that we held a brief discussion about the pros and cons of various faceting machines. Over the years since that conversation, I received several written communications from Norman. Sometimes he responded to inquiries from me, and at other times he sent information he thought I would be interested in having. His correspondences were always helpful and enlightening. I felt honored that he took the time to share his wisdom with me.

It is impossible to measure the loss to the faceting hobby of a man like Norman Steele. He left contributions to each of one of us that go far beyond anything we might imagine. Will someone, can someone, pick up his work where he left off? Hopefully, there are individuals in the Seattle area who knew Norman Steele well enough, and who understood the work he was doing well enough, to pick up where Norman left and continue the effort. Clearly, "**Datavue2**" and the "*Seattle Faceter Design Notes*" should not be allowed to die. These publications need to continue, as they provide valuable resources and tools for faceters everywhere. They should stand as living monuments to the men who created them.

Norman, wherever you are, thank you for the wonderful gifts you have given us. You have been a great friend to our hobby. We will miss you.



In The News:

Russian Amber Reclassified

Source: Colored Stone Jan/Feb 1997

In an effort to halt the massive theft of amber from shoreline deposits along the Baltic Sea, politicians from both Kaliningrad and Moscow reclassified amber from a mineral to a precious gem. This policy gives complete control of amber to the Russian Committee for Precious Metals and Stones, in hopes that centralized marketing improves the economy.

Reports state that nearly half of the 600 tons of amber removed yearly from the Baltic region is sold on the black market, mostly by the mafia operating in Russia. Annual losses calculated from black market amber ventures run near

one billion dollars, with one ton loads smuggled daily.

Creatures in Borneo Amber

Source: New Scientist Nov. 2, 1996

One never knows the path that research will follow. Jon Noad intended to examine and interpret 20 million year old rocks in the rainforest of Borneo for his fieldwork in his doctoral thesis in sedimentology. His plans originally only included the study of Miocene sediments to discover what the ancient environment had been like.

First, Jon located large ancient sand dunes gouged deep by weathering, where he found ancient birds footprints trapped in sandstone. This led Jon on a search for what the birds had eaten. He found a petrified forest with logs half-buried in the mudstone. In this fossil forest, where silica replaced wood, Jon found many brown pebbles of amber. The amber revealed perfectly preserved specimens of spiders, millipedes, ants, leaves, and spores. Reddish-colored amber pebbles held the fossilized remains of scallops, mollusks, and crabs from a former marine environment. The amber contained crabs complete with their breastplates and pincers.

Massive Kill of Oysters in Japan

Source: National Jeweler Jan. 1, 1997

Japan's pearl industry in Uwa Bay announced the death of over 148 million of its pearl producing oysters. Estimates of the value lost reached 18.2 billion yen. Less than half of the oysters lost were not nucleated, but more than half had been. Consequently, this massive kill affects both the upcoming pearl harvest and pearl harvests three years in the future. Half of the 1997 pearl harvest was declared lost.

The combination of toxic plankton, polluted water, and the introduction of formaldehyde (a known carcinogen) in the water effected this massive oyster kill. The waters near Kyoto account for 70% of Japan's oyster production and 35% of its cultured pearl production. These waters are also home to the popular and expensive fish delicacies, the Tai and Fugu fish (one is used in sushi, and the other is an extremely poisonous puffer fish with neuro-toxins). Amazingly enough, the formaldehyde was intended to eliminate the parasites afflicting the Fugu and Tai fish.

It is unknown if the water now allows the replacement of new oysters. Pearl cultivators, looking on the bright side, forecast higher quality pearls from future harvests. They base their reasoning upon having less oysters in the water, which eliminates overcrowding and generates less competition for food.

Diamond Divorce Aftermath

Source: Modern Jeweler December 1996

Argyle Diamonds announced to India's diamond industry that the ties severed from DeBeers were permanent. Argyle claims to have enough above-ground diamond-producing ore reserves to last between five and seven years. When that time arrives, Argyle must face the difficult decision to either develop new under-ground mining techniques or to close their mine location.

Argyle is considering an untested method of under-ground diamond mining known as gravity block caving. This is same method used in mining molybdenum in Questa, New Mexico. Instead of the preferred method of blasting from the top downward, block caving involves digging a deep shaft down to the basement floor of the ore mass. Miners then blast sections up toward

the surface, allowing each section to collapse upon the previously dug section after the ore has been extracted. Argyle remains uncertain as to whether this method will work on their lamproitic ore.

Meanwhile, Argyle recently transferred personnel to an important diamond deposit in Canada.

A Russian Diamond Scandal

From National Jeweler Jan. 1, 1997

Gem dealers in Russia live in interesting times. The Russian government ordered Golden ADA, a Russian diamond factory, to pay the Russian government \$165 million. Records showed that Golden ADA received more than \$100 million in diamonds from the Russian Committee on Precious Stones and Metals, known as the Komdragmet.

The story involving Golden ADA reads like a plot written for a compelling best seller. Several 'new' entrepreneurs in 1992 combined resources, including their families' connections to Russia's secret service and President Yeltsin's security service. From that alliance, a new company emerged that quickly held negotiations with the Komdragmet.

Questions arose as to the business practiced by Komdragmet. Reports stated that Komdragmet frequently shipped diamonds without any deposit required and with no distinct payment schedule.

The owners of Golden ADA converted the merchandise into cash and embarked on a shopping spree. Court papers declared the purchases of such items as yachts, mansions, condominiums, three luxury cars, a Gulfstream jet, a helicopter, and a downtown office building.

Heat from Russian investigators soon brought the simmering scandal to a boil. Criminal investigations in Russia

and in the United States continue, including contentions from the IRS. One partner lost his job. Another went into hiding. They are still looking for the missing millions.

New Rules in Tanzania

From the Gem Source Web Site

The government of Tanzania enacted a new policy in 1996 regarding both the mining and the sales of gems from Tanzania. The Tanzanian government shut down all mining and exporting of gems from Tanzania for over a month until the new policy was in place.

The new ruling emphasizes Tanzanian control of gems by granting master dealer licenses to Tanzanian national companies. A master dealer's license allows a company to export rough and finished stones mined in Tanzania. The Tanzanian government grants companies with partial foreign ownership a lapidary license that allows only the export of finished gemstones. The Tanzanian government stipulates that these companies with foreign ownership need a joint venture agreement with Tanzanian nationals to meet the requirements for a lapidary license. The government requires the posting of a bond for \$50,000 for such a joint venture. To maintain a lapidary license, each company must export at least \$1,000,000 in finished gemstones per year.

The Tanzanian government grants claims only to Tanzanian nationals in the Tunduru mining region. To emphasize small scale mining, the government allows only one person to own up to three claims there, and each claim is limited in size of 200 meters by 100 meters. The government prohibits any mechanized mining in the Tunduru area. The gem industry rates highly the quality of the sapphires mined from the Tunduru area.

Huge Sapphire Unearthed

From the Gem Web Site

Madagascar yielded late last year an eighteen kilogram piece of rough blue sapphire. The football-sized 89,850 carat chunk shows large surface areas of blue with transparent and translucent zones. The Asian Institute of Gemological Studies confirmed the rough as sapphire.

This 36 pound rough blue sapphire joins the ranks of other hefty gem rough notables. Included in this list is the largest uncut Burma ruby, discovered in 1996, that weighs 21,450 carats and measures 7 inches by 4.5 inches by 4 inches.

Gold at Four Year Low

Source: Reuters Ltd. on the Web

Gold prices fell to their lowest fixing price in nearly four years on Friday, February 7, 1997 to \$340.90 an ounce. Dealers predict prices to fall down to the \$330s per ounce.

The price of gold experienced a steady decline for much of 1996. The trend accelerated during last summer as gold producers increased selling to protect their income against falling prices. Reports confirmed that the Dutch central bank sold 300 tons from their gold reserves. From this trend, more affordable jewelry may be made using higher karat gold.

New Diamond Material

Source: New Scientist Jan. 18, 1997

Benjamin Dorfman, a materials chemist with Atomic Scale Design in New York, announced the invention of the lightest hard substance yet known. Called Quasom, this new carbon-based material has a structure based on a combination of graphite and diamond. Its inventor sees Quasom as building the

micro-devices of the future, including small medical implants and protective coatings on construction materials for the aerospace and motor industries.

Quasom is composed of flat planes of carbon atoms, similar to graphite, joined together in a three-dimensional crystal lattice. The lattice structure resembles diamond by its arrangement of silicon and oxygen atoms. The combination of carbon atoms with three bonds and carbon atoms with four bonds gives Quasom a strength comparable to diamond. It also produces a density less than half that of diamond.

Quasom is a result of fragmenting a simple organic compound that contains carbon, silicon, and oxygen. The charged ion-radicals from this combination are accelerated by an electrical field onto a heated silicon-based material, where they split apart to form new bonds. Quasom contains very small planes held rigidly in place. Pure Quasom acts as an electrical insulator. When combined with iron and nickel, Quasom becomes a good conductor.

Special features of Quasom include a high resistance to chemical attack, the highest fracture toughness of its kind, and near consistent mechanical properties. Quasom also expands regularly with temperatures up to 400degrees C. Micro-mechanical sensors built from Quasom would hold accurate readings over a wide temperature gradient.

Colorado Diamonds Update

Source: Gems and Gemology Winter 1996 Issue

Thomas Hunn reported that the mine at Kelsey Lake owns 16.9 million tons of potential ore reserve, lists a monthly production of 2,000 to 4,000 carats, and is estimated to have a seven year production life. He examined more than 1,000 carats of diamonds mined there.

The mine run examined contained a mix of both gem quality and industrial diamonds. Of the 1,000 carats studied, 20% to 25% weighed one carat and over, 50% to 75% weighed 0.25 to one carat, and 10% to 20% weighed less than 0.25 carat. Some crystals weighed more than 9.5 carats. The mine recently listed the sale of a 28.3 carat diamond crystal.

Thomas Hunn identified most of the diamond crystals in the parcel as dodecahedra or octahedra twinned

crystals. He recognized some modified dodecahedra crystals and noted the presence of a few macles.

Thomas determined the diamond crystals to vary in color from near colorless to a very dark brown. Only 10% to 20% fell in the near colorless range. Most of the crystals showed a light "copper" brown color. The parcel contained very few yellows.

Although he noticed that the presence of feathers (fractures or cleavages)

seemed common throughout the parcel, Thomas declared that half of the crystals he viewed showed enough clarity to be considered cuttable. Thomas located a garnet crystal in one of the diamonds.

The mine owners, Redaurum Ltd., currently are in discussion with several firms regarding the possibility of having all of its Colorado diamond production focused through the market in the United States.



DESIGNER'S WORKSHOP

By Ernie Hawes

Some years ago, when the Guild first began as an organization, we selected a logo to symbolize both faceting and the state of New Mexico. Many people may not have realized it, but the gem pictured on the logo is an actual faceting design. I have always had a special liking for cushion cuts, and this one especially caught my eye when it was first published. The design is called the Cushion Square Barion by Robert Long, and it first appeared in the July, 1982 Issue of "Seattle Faceter Design Notes". I have cut this design in various low refractive index materials including peridot, orthoclase feldspar, and rose-de-France amethyst, all with very attractive results.

The design was shared among the Guild members at the time. Some of us cut stones from the design and mounted them in our New Mexico Faceters Guild badges. A 7X7mm. stone fits the badge just about right.

It seems we never published this design in our newsletter, nor ever stated that it was the actual design used in our logo. This turned out to be a good thing, because, for a little over a year ago, our logo intrigued noted gem designer Fred W. Van Sant. The result of Fred's efforts yielded another new design with, of course, our Guild's name attached. Mr. Van Sant completed the design, which he appropriately named the "New Mexico Faceters Logo Cut". He did not send it to us

until very recently, and the Guild newsletter is the first to publish the design. As with all of Fred W. Van Sant's designs, this one cuts a very attractive gem. With directions given for a CAM preform, the design presents little difficulty for any cutter.

Give these designs a try. I'm sure you will like the results from both. Try cutting a 7X7 mm. if you think you would like to mount one in your badge. Bigger stones look great, too. I faceted one 14X14 mm. stone for my collection that I display when I demonstrate faceting. That stone always receives a lot of comments.

Happy faceting.



Grit Size Paradox

by Stephen W. Attaway, Ph.D.

In the early 70's during the heat of the space race, grinding and shaping of brittle solids became a vital part of the effort. The heart of the problem was how to design very hard materials that could withstand the heat of re-entry into the atmosphere from outer space. Before space age materials, such as the

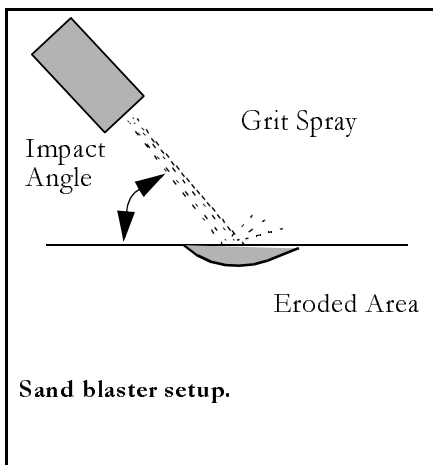
ones used on the space shuttle were invented, many researchers believed that the best heat shield could be made from solid sapphire. The big problem was how to grind and shape them quickly into the desired shape.

Well, we still have that same grinding and shaping problem today. However, I did run across some very interesting research published by the

National Bureau of Standards in their Special Publication 348, "The Science of Ceramic Machining and Surface Finishing," a proceeding of a Symposium Sponsored by the American Ceramic Society, the Office of Naval Research and the National Bureau of Standards. The Symposium was held Nov. 2 to 4, 1970 in Gaithersburg Md. After seeing this very technical report, I wish I could

have attended that symposium. I would have participated in some of the heated discussions after hours over drinks. (In 1970 I was not old enough to drink.)

One of the more interesting reports given was presented by H.L. Oh, K. P. L. Oh, S. Vaidyanathan and I Finnie. The report listed test results from an experiment where they measured the amount of glass eroded by a spray of silicon carbide particles impacting the glass. They set up the experiment to determine the angle of impact that maximized the amount of material removed.



The experiment varied the angle of impact for a very high speed jet of particles. They used a particle velocity of 500 feet per second or 340 m.p.h. (Wow! Now, that's what I call a SAND BLASTER!). This high speed may sound like something we would never see in lapidary. However, the ultra high-speed rotary handpiece often turns at greater than 300,000 RPM. If you use a 2 mm. bur in these handpieces, then the tool will be moving at speeds greater than 200 feet per second.

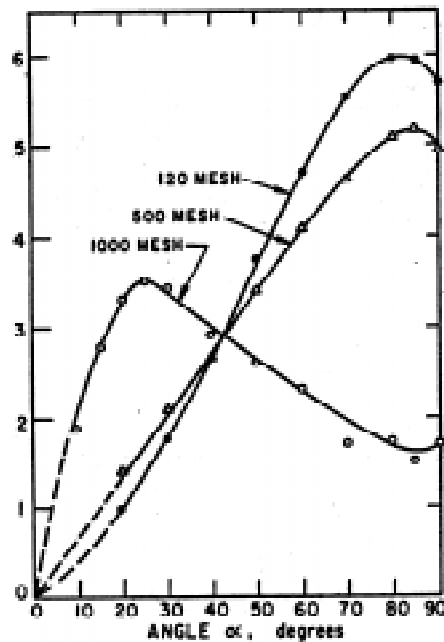
The results of these tests are shown in the figure shown below. The experiment used three different grit sizes in the test: 120 mesh, 500 mesh, and 1000 mesh. For the coarser abrasives, the fastest material removal rate occurred when the spray was aimed almost directly down upon the glass. The max-

imum removal rate was at about 10 degrees off axis from vertical for both the 120 grit and the 500 grit abrasive, with removal rate for the 120 grit being greater than the 500 grit. The surprising result was that for the finer 1000 mesh abrasive, the maximum removal rate was at an impact angle of approximately 30 degrees. The 1000 mesh abrasive actually removed more material at 30 degrees than the 120 mesh abrasive. The 1000 mesh removal rate at 30 degrees was over twice the removal rate of the 120 mesh.

What's going on here? There appears to be some sort of size effect on the strength of the glass. Why should the smaller grit remove more material than the larger grit at any angle?

What do you think?

Have you seen any similar behavior when grinding with very fine abrasives?



Erosion as a function of impact angle

Does this have ramifications for a good pre-polish?



SUCCINITE/AMBER/ WHEELERITE -or WHATEVER

*By Merrill O. Murphy, with
dopping advice from Scott Wilson.*

General Succinite? Wheelerite? Who ever heard of such minerals? Strange as it may seem, succinite seems to be the official mineral name of “true amber.” Wheelerite is the name applied to an “amber-like” mineral found in the coal fields of northwestern New Mexico.

All types of amber exhibit an “amber color”. They appear also in pale to bright yellow, milky yellow, orange-yellow, and brown or brownish-red. Amber is generally transparent, but inclusions of various debris or countless tiny bubbles may leave it merely translucent.

That only marks the beginning of a mineral nightmare surrounding amber. Amber is found in scattered areas around the world. In small quantities, it appears in various parts of North America and in the Caribbean Islands. There may be small differences in the chemical makeup of the various “ambers”, and several of these sport local names.

The far northern cape of Alaska, Point Barrow, has produced small pieces of amber. The Eskimos find it washed up on the beaches and call it “auma”, meaning “live coal” in their native language. A similar material from a Kansas location is called “jelinite” after George Jelinek, who first found it. Fairly large quantities have come from Manitoba, Canada, on the southwest shore of Cedar Lake, where it is called “chemawinite” or “cedarite”.

Still farther to the northeast, amber has been reported in Greenland. Amber found in Sicily is called “simitite,” that

from Myanmar (Burma) is “burmite,” and amber from Romania is “romanite.” Small bits of amber are sometimes pressed together at just under melting temperature, which is called “amberoid.”

So, what really is this stuff called by so many names? Chemically, amber is a hydrocarbon, running about 75% carbon, 10% hydrogen and 10% oxygen. These percentages vary somewhat depending on the source location. Amber is not a single compound, but is a mixture of several compounds, plus ingredients having no known effect on the mineral properties.

A major component of amber formation is a compound called succinic acid, hence, the mineralogical name, “succinite”. Most amber seems to have developed from the sap of an extinct evergreen tree similar to our American *Thuja Occidentalis*, better known as *Arborvitae* or white cedar. The juices of certain legumes also contain succinic acid and may have been the source of other amber or amber-like resins.

Amber and the amber-like resins are often termed “fossil resins”. I have a small problem with that term when applied to amber. To me, a fossil is a mineral in which some or all of the structure has been replaced by silica or some other mineral. If the external shape is retained in a replacement, but the internal structure is not, then that specimen is a pseudomorph after the original substance. Amber doesn't fit either description. Ages ago, it was a gummy fluid so sticky as to adhere to everything that it touched. Then, along with wood and other vegetation, it was buried under many layers of soil, sand, gravel, and water. Under moderate pressure and temperature, the molecular structure slowly shifted to accommodate the changed environment. What had been liquid became a soft, but stable, solid resin. That is my understanding of its transformation.

But all amber-like resins are not exactly the same. They look alike. They cut alike. They soften at about 150 degrees C. and melt at between 250 and 325 degrees C. When set aflame, they all burn with a smoky, sooty flame and smell of pine forests.

The hardness of the various ambers falls in the range between 2 and 2 1/2 on the Moh's scale. That means they are about as hard as your fingernail and about as tough and resistant to scratching. These ambers can be filed, hand-sanded, hand-polished, and engraved with steel tools. The specific gravity varies between 1.05 and 1.10, more or less, depending on the presence (or lack thereof) of included debris or lots of tiny bubbles. The refractive index lies close to 1.54, like quartz, and varies little regardless of the source. These various ambers are not crystalline and, therefore, exhibit no birefringence.

Amber can be faceted, cut en cabochon, or carved. Wonderful beads, both smooth and faceted, are made from amber, partly because it is so light in weight. Actually, the ambers will sink in fresh water and float in very salty water. This characteristic provides us with a very easy test for detecting imitations that sink in water no matter how salty.

So far, I have not mentioned one discernible difference between the various ambers or amber-like minerals. However, one strong difference does exist. “True amber” is not dissolved, to any extent, by alcohol. Wheelerite is readily dissolved in alcohol. Why, I do not know. Perhaps, a small chemical difference exists between ambers that dissolve in alcohol and those that do not. Perhaps, their widely different ages and their time spent underground result in a physical difference. Anyway, this one characteristic affects the way we clean all ambers. Since we have no certain means of determining which amber we have, we clean NONE of them with alcohol.

Areas along the southeastern shores of the Baltic Sea currently produce about 90% of the world's gem-quality amber. The Dominican Republic in the Caribbean produces much of the remaining 10%. Most of that is brown to brownish-red.

Ambers as old as 120 million years are known. The Baltic amber seems to be between 30 and 60 million years of age, and amber from the Dominican Republic is younger still. Ambers of the United States and Canada range in age from contemporary with the Baltic material to considerably more recent than that from the Dominican Republic. The Baltic ambers are often referred to as "true amber," suggesting in a snobbish way that other ambers are inferior or even not amber at all. That inference is untrue, of course, but the great age of the Baltic ambers may suggest that age has something to do with the solubility in alcohol regarding some of the ambers. The wheelerite of New Mexico is one of the younger ambers and is one of those dissolving readily in alcohol.

Amber is found only in weakly-compacted sedimentary formations, usually in association with lignite or other soft coal. Often amber contains partially decayed wood or other plant bits. If the amber had been subjected to greater compaction and/or any considerable temperature, then it would have been destroyed long ago.

Since this is an article for the New Mexico Facetor, it would seem appropriate, at this point, to include some New Mexico amber locations. There is probably some amber in all of the north and northwestern New Mexico coal veins. There even may be an occasional piece found on the dumps of abandoned mines in that area. However, there is no assurance that looking over the dumps of any of these mines will yield cuttable pieces. I certainly do not recommend entering any of these mines, especially the abandoned ones.

Some amber found there will be wheelerite. If you care which you have, you might place a bit of it in a shot of vodka. If the amber dissolves in an hour or less, don't drink that shot. It is wheelerite, and who ever heard of drinking tincture of wheelerite? Beyond this, I do not know a good way to tell which amber you may have found.

Locations:

Sinkankas (GEMSTONES of NORTH AMERICA, 1959) suggests: 1) the Sugarite Mine and the Yankee Coal Bed in the Raton coalfield of Colfax County, "abundant as large lumps and streaks". 2) "amber-like irregular lumps in the Gallup-Zuni coals of McKinley County and abundant in the coal south of Devil's Pass, twelve miles northeast of Thoreau and elsewhere in McKinley County". 3) "Wheelerite is abundant in the coal of the Upper Cretaceous in the Rio Puerco field of Sandoval County". 4) "in the Durango-Gallup field of San Juan and McKinley Counties". Northrop in MINERALS of NEW MEXICO, 1959, gives similar locations while not mentioning the Raton area.

Sizing:

Most amber pieces will require cutting to size before faceting or other lapidary work. I suggest cutting with a sharp, thin diamond saw blade. Push the amber gently against the blade while maintaining a firm grip on the piece. It takes very little sideways pressure to fracture amber. Be very sure that the blade is getting copious amounts of coolant. If your saw has a vise or moving table, then use it. The blade may clog with some of the adhering amber bits. If so, brush the particles from the diamond-charged edge and return to cutting. Remember, amber is somewhat brittle and melts easily from friction-generated heat. Amber conduct heat

very poorly and retain the heat at the point of generation.

Dopping:

This is one of the critical parts of the game. If you cannot dop your amber, then you cannot facet it or cabochon-cut small pieces. Low temperature dopping wax and stick shellac both melt at temperatures below the melting point of amber. However, both contract as they cool, thus stressing the brittle amber.

Another problem appears when the finished "stone" is removed from the dop. The safest way seems to be to place the dopped amber in a pan of water, add a little liquid detergent, and heat the pan of water to boiling. At this point, the amber may be slipped off the dop, with the adhering wax quickly wiped away using a soft cloth. I have used green dopping wax to dop amber for cabochon cutting, but I have never been comfortable with it. A little wax is bound to remain on the amber. Chipping it off with a knife or a fingernail may well result in damage.

Five-Minute Epoxy might do the trick, but I am wary of the strong solvents it contains. A better answer seems to be the "super glues" (cyanoacrylates). Use the smallest drop you can get from the container. Place it on the end of the dop chosen. Place the glue end of the dop against the flattened amber surface and press gently. Hold in a fixed position until the super glue sets, about a minute or two. The easiest way to maintain a steady, but gentle pressure is to use the transfer fixture. The amber can be set on a flat dop. The second dop, with super glue in place, can be locked loosely in the opposing position, then pressed down to meet the amber.

Cabochon Cutting and Carving:

Cabochons can be cut on fine-grit grinding wheels. Machine sanding with

400- or 600-grit belts is possible, but I prefer hand sanding. Carving can be done with small machine tools or hand tools. In either case, I like to polish by hand with a bit of tin oxide or Linde A on firm, wetted leather.

Facet Cutting:

If an amber piece is small, then rough-cut the pavilion facets with a 325-grit (or thereabouts) diamond lap. A well-worn 180-grit lap is more practical for larger pieces. Use a medium to low lap speed with a fast water drip rate. Pre-polish with a 1,200-grit diamond lap at a very low speed, retaining that fast water drip rate. Use a very light hand pressure.

Polishing:

Various texts recommend a wax lap for facet polishing. I do not own one, but they can be purchased through mail-order sources. Instructions are sometimes found for making them. However, the literature indicates that wax laps will cause considerable facet edge rounding. So, I tried all the old conventional laps and polishes. All produced poor, scratchy polishes. I finally went to my old technique of Trewax Brand paste floor wax on a hard, fiber-impregnated plastic lap. The polishing compound was Linde A sprinkled sparingly on and rubbed gently into the hard wax film. I polished at a very low speed with a light hand pressure and a fast water drip. It worked wonders and rendered a good polish with only minor edge rounding. I suspect that the same wax surface on a tin or lead-tin lap would yield even better results. For information on waxing a lap, refer to my article, "Prepolishing Gems" page 13 of the *New Mexico Facetor* September/October 1996. In that article, I described prepolishing using no water. When the waxing technique is used for polishing, a water drip is probably necessary.

Be adventurous. Try amber. In the words of that comedian, "Try it. You'll like it." I certainly do.

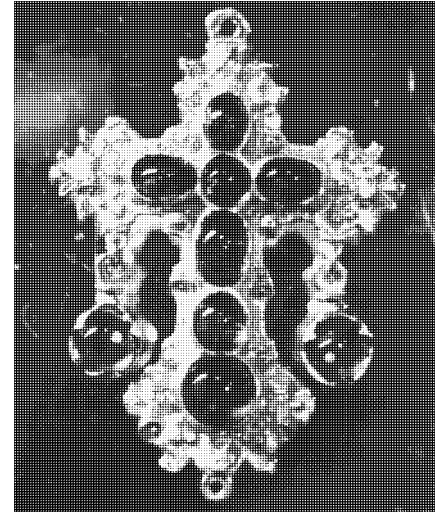
Transfer Dopping:

With super glue, transfer dopping of faceted amber is a little tricky but not impossible. Using the transfer fixture and super glue, attach the second dop as described above. Now the amber is cemented to two opposing dops but still in the transfer fixture. The dop originally attached must now be removed. Use hot water to do that little trick. Release the transfer fixture clamp from the original dop. Set the fixture, with dops in place, in a metal pan at least three inches deep. The original dop should rest against the bottom of the pan. The dop that is to remain in place will be pointing upward. Place the pan on a burner of the kitchen range, then pour in cool water to a level about 1/16 inch above the top of the original dop. Add a few drops of dish-washing liquid and heat the water to a gentle boil. Turn off the heat and let set for, perhaps, 10 minutes. Test for glue release VERY GENTLY until the lower dop drops free. If you apply any significant pressure, the dop will come free but with a flake of amber still adhering.



Never Confuse the Customer!

By Stephen W. and Nancy L. Attaway



A photo by Stephen W. Attaway of the famous emerald and gold cross displayed at a local retail store.

An exhibit from the *Nuestra Senora de Atocha* traveled across the country last year. A splendid array of silver coins and gold and emerald jewelry distinguished the *Atocha* exhibit that also included many artifacts and pieces of equipment from the ship's wreckage. The famous gold and emerald cross featured with the gold and emerald jewelry has been photographed in many publications. This gold and emerald cross holds a special fame.

The *Nuestra Senora de Atocha* was a heavily armed rear Spanish galleon that ferried New World treasures to Spain. On its last voyage to Spain, the ship left Havana harbor amid the hurricane season of September 1622. The ship's manifest listed a cargo that included 901 silver bars, 161 gold bars or disks, approximately 225,000 silver coins, and many copper ignots. The emeralds brought on board by the Spanish nobles were not listed on the

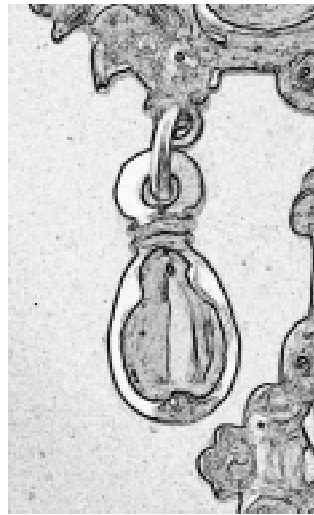
manifest. A ferocious hurricane sunk the Nuestra Senora de Atocha and smashed it against the reefs of the Florida Keys. During the 1970's and the 1980's, Mel Fisher, a treasure hunter, led many undersea expeditions in search of the treasure of the Atocha. He and his group extracted much of the Atocha treasure that had lain hidden in the shallow waters for nearly 350 years.

Last October, a jewelry store advertised in the local newspaper a four day exhibit featuring the Atocha treasures. The advertisement mentioned the display of many artifacts, including the famous gold and emerald cross. Steve and I waited in the long line during the last day specifically to view the famous gold and emerald cross.

Among the numerous artifacts under glass included ship's nails, bones of animals, and some personal items of those aboard. I spied the gold and emerald cross and felt thrilled to finally have seen it. Steve snapped several photos of it as it lay under the glass. The store's insurance policy did not allow the cross to be shown outside the glass case.

Upon closer inspection, the emeralds in the cross had a very dark green color with exceptional clarity. The oval cabachon shape of all of these emeralds seemed very uniform. The symmetry of the domed tops seemed to be consistent, too. The quality of the emeralds in the cross appeared too good to be true.

I located one of the regular store employees and inquired about the authenticity of the emeralds. The employee retorted, "Tom Chatham wasn't around back then to make emeralds. The emeralds in the gold cross are real." I remarked that the emeralds in the cross looked too good to be natural judging from the emeralds I had seen over the years. He assured me that the emeralds in the cross were natural.



A sketch of the famous emerald cross shown on the cover of the Winter 1989 Issue of Gems & Gemology

Upon returning home, we searched through our literature on the Atocha and located a picture of the "same" gold and emerald cross on the cover of Gems & Gemology. The Winter 1989 Issue of Gems and Gemology featured a cover article on the Atocha treasure. When we compared the gold cross shown on the cover of Gems & Gemology with the cross we saw displayed, and later with the photos Steve shot of the cross, we were perplexed. Either two gold crosses sank with the Atocha, or one of the crosses was a replica.

A closer examination of the gold and emerald cross photographed for the cover of Gems and Gemology revealed emeralds with non-uniform cabachon shapes and less than perfect cabachon domes. The emeralds were also a much lighter shade of green and not very clear. The cover photo showed some inclusions in the emeralds set in the cross. Those inclusions were not present in the emeralds set in the cross that we saw displayed in the jewelry store. The goldwork also differed from one cross to the other.

There is no problem with displaying a replica of the gold and emerald

cross. With something as particularly valuable as this cross, it can easily be understood why the owner chose not to risk damage during shipment or loss from theft. The problem with the display in the store was the confusion of the genuine article with a replica. Perhaps, store employees were not informed of the use of a replica for the famous cross.

One of the worst things a retailer can do is confuse the shopper. Purchasing an expensive item involves enough of a complex process. Adding anything unnecessary to the complexity of that process renders a buying decision that much harder.

While viewing the Atocha display, store employees presented shoppers with "real" artifacts (old coins, silver bars, loose emeralds) displayed for sale along with "Atocha coin replicas". The only way that we could discern the difference between the "real" artifacts and the replicas was by the price. It would require us to be experts in old coins before we would truly know the difference.

We recalled Gary Werner's problems with "natural, treated, and simulated" turquoise. Gary found that if the buyer was confused about the types of turquoise, they would not purchase any of the genuine, high quality turquoise. The customer then expected a very low price on what was thought of as the low quality or simulated turquoise.

Unfortunately, too few dealers understand the need to minimize the confusion for the customer. Too often, we see genuine and synthetic stones displayed together in the same case. Pick up one of those thick mail-order catalogs and locate the ruby ring section. Try to tell which cut stones in the jewelry are natural and which cut stones are synthetic. Not clearly labeling the jewelry made with natural gemstones from the jewelry made with synthetic gemstones confuses the shopper. We won-

der if they are not trying to confuse us all.

Our belief is that if a customer needs to ask, "Are the stones shown here natural?", then the vender should respond with a simple one line answer. We think the dealer should say something like, "The stones in this case are natural, and the stones in that case are synthetic."

Seldom do you see platinum and silver jewelry displayed together. Why? Because the potential to confuse the

customer is much too great. Platinum and silver have their own individual styles of design. Customers usually associate platinum with diamonds and silver with turquoise.

Likewise, care should be taken not to confuse the customer with natural versus synthetic gemstones. There is nothing wrong with displaying and selling stones cut from cubic zirconia or any synthetic stones. However, our experience shows that both the natural and the synthetic gemstones sell better

if they are not displayed side by side in the same display case.

The lesson we learned from this "real" versus "replica" display is that a confused customer becomes a doubting customer. A doubting customer questions the integrity of the merchandise. If a customer suspects that a vendor could mislead him or her into making a bad buying decision, then the customer becomes confused and walks away. As a result, the potential for any sale is lost.



GETTING "BURNED" WITH FIRE OPAL

by Edna B. Anthony, Gemologist

Using the loupe to examine gemstones is not one of my strengths. This weakness caused me considerable embarrassment following the September 1996 Denver Gem and Mineral Show. During negotiations for the purchase of some nice tanzanites and a beautiful red spinel, the vendor brought forth a parcel of fire opals purported to originate from a new source in Mexico.

The colors of the fire opals were truly lovely. I chose an especially bright reddish orange trilliant cut and a deep rich "cherry" red marquise to complete the transaction.

Several days elapsed before I began the usual gemological confirmation tests of each gem I acquired at the show. The polariscope soon revealed the expected singly refractive nature of both "opals", but I was in for a shock when I placed the "cherry" red one under the microscope. Prominent doughnut shaped bubbles glowed amid syrup-like swirl marks inside the stone.

The refractometer showed a refractive index reading of 1.52, a much higher reading than the usual 1.42 to 1.43 for Mexican fire opal. The density also deviated from the normal range of

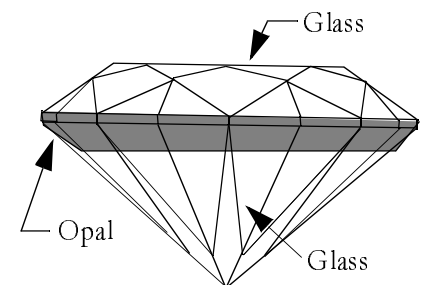
1.99 to 2.25 for the red-orange variety. The stone sank in 2.57 heavy liquid and floated in 2.62.

The trilliant cut exhibited properties abnormal for opal as well. A refractive index reading of 1.53 and a specific gravity between 2.62 and 2.67 indicated a paste (glass) simulant. All doubt vanished when both stones were immersed in alcohol. This final test disclosed the presence of a distinct layer of color between the colorless crowns and pavilions. I had, indeed, been "burned" with *tripler imitations* of Mexican fire opal!

Naturally, I returned them to the vendor. He confirmed through GIA testing that the lot had been "salted" with a number of additional imitations. Shortly afterward, Nancy Attaway provided me with an excellent specimen of natural Mexican fire opal, along with a copy of a report from *GEMOLOGY WORLD* published by the Canadian Institute of Gemology.

Dated August 8, 1995, the report stated that the GIA Gem Trade Laboratory issued an alert concerning two stones purchased in Mexico that had been submitted for identification. Of particular interest here was that a chemical analysis revealed the presence of selenium in the imitations. Cadmium sulfo selenide and cadmium selenide are known agents used to produce the red-orange "selenium glass". The report described the specimens as "a transparent red that might easily be mistaken for high quality 'cherry' opal", and a "slightly less transparent orange resembling much of the "Mexican" opal seen in the gem trade".

It seems we are encountering many more very good synthetics and imitations of the inexpensive gemstones in the market, as well as those for the



Triplet design: An opal sandwich.

expensive ones. This episode emphasizes the need for increased vigilance to protect ourselves and our clients. The erosion of customer confidence poses a very real danger to all of us in our pro-

fession if we do not maintain our integrity with full disclosure policies.

(Editors: We wholeheartedly agree with Edna regarding full disclosure of the merchan-

dise we sell. We all depend upon our vendors for proper identification of gemstones, whether rough or cut, as well as valid information on their point of origin. Honesty is the best policy when dealing with our customers. We expect the same treatment from our vendors.)



Let's Talk Gemstones: OPAL

by Edna B. Anthony, Gemologist

My story, "Getting "Burned" With Fire Opal" in this issue of our newsletter, prompted me to make opal the subject of this article. Opal is a fascinating gemstone with an ancient history. Pliny the Elder gives an eloquent description of opal, comparing its many colors to that of the finest of ruby, emerald, sapphire, topaz, and amethyst. Romans prized opal so highly that one citizen of the highest rank suffered permanent exile for refusing to relinquish ownership of a magnificent hen-egg sized opal to the emperor.

Any discussion of opal involves an extensive vocabulary not usually associated with other gemstones. Few reference works on opal make use of the terms group, species, variety, and other words common to gems with crystal structures. For this reason, the format for this article includes a glossary of terms associated with opal. I added comments where I thought appropriate. Some of these terms describing opal are seldom used today, but reference works abound with them.

Opal - an amorphous composition of microspheres of cristobalite, $\text{SiO}_2 \cdot n\text{H}_2\text{O}$, precipitated from silica gel into layers or nodules in veins and cavities of volcanic and sedimentary rocks in numerous areas of the earth. Water is always present in opal, but the amount varies considerably. This accounts for the frequent practice of storing opal in water or oil. The diaphaneity of opal varies from transparent to opaque.

True Opal - refers to the characteristic of an uninterrupted display of fine colors when viewed from any surface angle. It does not refer in any way to the chemical composition or other properties of opal. All precious opal has this quality.

Play of Color - the result of the regular arrangement of remarkably uniform sized microspheres of silica with its corresponding regular array of the tiny three dimensional "holes" that form a diffraction grating for visible light. At various angles, the different wavelengths of diffracted incident white light, when split into its spectral colors, are reinforced by each other, and we observe the play of color. With the exception of the *Contra Luz* variety of opal found in the volcanic areas of Australia's east coast and in Mexico, the display of colors is absent when opal is viewed in transmitted light.

Precious Opal - top grade solid opal which displays one or more surface colors in a variety of patterns in reflected light. With the exception of some Queensland boulder opal, where an especially thick layer of precious opal has been deposited on ironstone, precious opal includes neither matrix nor rock. It is semi-transparent, at best, but is usually translucent or opaque. A cloudy milk-white or a slight blue or pearly grey body color is typical. A pronounced red, yellow, green, black, or blue body color is rare. In volume 2 of his book, *PRECIOUS STONES*, Max Bauer speaks of a "magnificent exam-

ple" of very rare rose-red opal in the "Green Vaults" in Dresden, Germany.

Harlequin Opal - "True precious opal showing a regular mosaic-like pattern in rounded, angular, or roughly square patches of about equal size, presenting a spangled appearance--". This definition is found in *A Field Guide To Australian Opals* by Barrie O'Leary. He also states that "Harlequin opal is precious opal in which the colors shine as patches and spangles." The harlequin pattern occurs in other types of opal and should not be confused with solid true precious harlequin opal.

Black Opal - natural opal with a black, very dark grey, or dark brown body color. It absorbs most of the light striking its surface, thus, creating a dramatic contrast to the colors caused by the diffraction of reflected light. Another black opal is that formed by the natural deposition of transparent precious crystal opal onto black potch, allowing the body color to be clearly visible. O'Leary makes a point that the term, "black opal", does not include matrix opal nor boulder opal.

Neither should the term apply to doublets or triplets created by the use of a veneer from black opal. Noble opal is the correct term to use in such cases if the quality warrants it.

Crystal Opal - that in which the play of color emanates from a transparent colorless body, frequently associated with black opal

Celestial Opal - precious opal.

Oriental Opal - Hungary was the source of nearly all of the best opal supplied to Europe in early times. It was usually sent from the mines near Czerwenitzza to Constantinople and forwarded to various European cities.

This term came to be known as oriental opal. The Imperial Natural History Museum in Vienna has the largest known specimen from the source mentioned above. The stunning, nearly 600 gram wedge-shaped uncut opal may be the larger portion of a stone that yielded the remarkable hen-egg sized gem in the Imperial Treasury there.

Sedimentary Opal - opal deposited in the voids and crevices of sandstone formations. Until opal was discovered in Queensland, Australia in 1872, all opal was recovered from rocks of volcanic origin.

Opaline - a term formerly used by jewelers to denote Australian opal when it came on the market to distinguish it from the Hungarian opal.

Noble Opal - all brilliantly colored opal, other than solid precious opal. According to O'Leary, this includes top quality doublets and triplets.

Boulder Opal - opal found in ironstone concretions within sandstone formations. This opal often is so thin that the finished gem must include the natural matrix backing. Yowah nuts and pipe opal are types that yield solid opal. Small hollow ironstone concretions that resemble nuts were first found near Yowah, hence, the name. Sometimes these contain a solid core of precious opal. Long finger-like concretions, called pipes, yield precious opal of consistent quality. These can be cut into matching high-domed cabochons that are especially valuable.

Potch Opal - transparent material where the voids between the regular array of the microspheres have been filled with silica cement that prevents the diffraction of light and the play of color. Good grades of potch, both black

and white, are used as backs in the manufacture of doublets and triplets. When partial cementation distorts and reduces the size of the voids and the power of diffraction, various types of opal can be the result.

Hydrophane - a porous potch exhibiting a weak play of color only when wet. Its porosity causes it to adhere to a moist surface.

Hyalite - a colorless transparent glassy potch.

Fire Opal - transparent amber to orange to red potch. It is often faceted and is very sensitive to heat and stress. Mexico is an important source. **Glass imitations are marketed.**

Cherry Opal - a rich red fire opal.

Girasol - a term, at times, applied to other gemstones, but here, it denotes a semi-transparent opal with a billowy blue sheen. The effect resembles moonstone and can also exhibit a red play of color.

Sun Opal - very transparent, bright yellow fire opal.

Mexican Water Opal - a colorless or pale brown opal exhibiting a single colored schiller.

Common Opal - mostly opaque without any play of color.

Agate Opal - interspersed layers of agate and common opal.

Milk Opal - white translucent opal with a pearly luster.

Porcelain Opal - opaque whitish opal.

Moss Opal - porcelain opal including dendrites.

Cacholong - white or yellowish, translucent to opaque, common opal with a mother of pearl luster. It is often dull. Because it is very porous, it adheres to a moist surface.

Honey opal - translucent yellow opal.

Prase Opal - apple green, semi-transparent to opaque, common opal. Once known as chrysopal because of its resemblance to chrysoprase. Nickel gives it its color.

Wax Opal - also called resin opal; a waxy, lustered, opaque yellow-brown opal.

Menilite - liver opal; grayish brown, concretionary opal. It yields a brilliant luster when polished. An excellent picture of it is published in Walter Schumann's *Gemstones Of The World*, page 152.

Catseye Opal - material where the play of color forms an "eye" or a band. Tabasheer refers to opaline silica deposited in the joints of bamboo.

Opal Pseudomorphs - the deposition of opal in casts (molds) of fossil bone, teeth, shell, belemnites (ancient relatives of the cuttlefish), crinoids (sea lillies), wood, fir cones, and even skeletons of large prehistoric animals. Many of these fossilized forms contain exceptional quality of noble opal. An especially interesting example is the opal "pineapple" found at White Cliffs in Australia. A pre-existing crystal of the mineral glauconite dissolved, resulting in a cast filled with opal.

From the preceding definitions, one can begin to comprehend the vastness and the complexity involved in the study of opal. The sources are numerous, and the judgment of its quality and value is very subjective. An excellent source of concise information is Joel Arem's *Color Encyclopedia Of Gemstones*. Lack of space precludes a discussion of its synthesis (many are on the market) and its imitations. Much of the gemological information has already been well covered, so only the following data need be given.

Another opal reference book recommended is the book "*Opals*" by Fred Ward, G.G.

TABLE 1. Gemstone Properties

<i>SPECIE</i>	<i>Opal</i>
Ultraviolet Fluorescence	Variable. Strong white, medium blue, dull white, bright blue, pale yellow, brownish, bright green (indicates U minerals), brownish. Fire opal often greenish brown. Black opal usually inert. Common opal often green. Phosphorescence sometimes strong.
Spectra	none
Color Filter	no information
Solubility	Etched by HCL
Thermal Traits	VERY SENSITIVE TO HEAT an sudden temperature changes
Treatments	dyes, sugar cooking, and smoking
Inclusions	

TABLE 1. Gemstone Properties

<i>SPECIE</i>	<i>Opal</i>
Composition:	SiO ₂ .nH ₂ O
Varieties:	See above list
Colors:	all
Phenomena:	play of color and girasol effect
Streak:	
Crystal System	amorphous
Habit:	layers, veins, nodules, and pseudo-morphs
Cleavage:	none
Fracture:	conchoidal and brittle
Fracture Lustre:	
Lustre:	vitreous, waxy, and pearly
Specific Gravity	Variable 1.98 to 2.25
Hardness	5.5 to 6.5
Toughness:	poor
Refractive Index	Variable 1.44 to 1.47 Mexican opal as low as 1.37 Usually 1.42 to 1.43
Birefringence:	
Optic Character	isotropic
Dispersion:	Very low
Pleochroism	pale brown, yellow green-brown, green-brown, blue



Our South African Adventure

by Paul Hlava (photos by Paul and Marge Hlava, John and Mary Kimmel)



The Non-accidental Tourist.

Introduction:

My wife Margie, my in-laws, John and Mary Kimmel, and I travelled to South Africa in November of 1996. We flew out on the 1st and returned to the states on the 17th. The trip came about because Marge was invited to present a paper during a conference to be held in Pretoria on the 14th. She asked me if I wanted to carry her bags, and I said "Sure!" She then spent parts of several months gathering information from nearly 20 pounds of books, brochures, maps. She asked her folks if they wanted to go with us.

A trip to South Africa was a life-long dream of theirs, and they didn't even have to carry Margie's bags to be invited! Margie checked with a South African colleague to help arrange the itinerary. He provided valuable advice for booking the flights, the rental car, and most of the lodgings. Margie accomplished all this in her "spare" time. I think arranging tours is one of Margie's hobbies. She has a gift.





But, but,....we ARE smiling!

General Impressions:

We found South Africa nice, friendly, and relatively inexpensive once we arrived there. It was easy to visit. A lot of the landscape and climate reminded us of home. Essentially everyone speaks English to some degree. The road signs are bilingual, using English and Afrikaans. Of course, we had to drive on the wrong side of the road! The distances are measured in kilometers. We kept having to convert Rand into dollars (~Rand 4.50 = \$1.00 at the gambios, but you get better rates if you use automatic teller machines). The food is much like the old meat and potatoes cuisine of my youth. Some food oddities are available if you search for them. South Africans are also big on braais (bar-b-ques). A braai was standard with every cabin we rented.

Kruger National Park:

We spent half of our stay in South Africa visiting Kruger National Park. It cost us Rand 65 to get into the park (Rand 25/car and Rand 10/person.

Those costs are per entry, so we stayed inside the park boundaries. Within the park, we mostly stayed at rest camps at a cost of Rand 395 for two to Rand 595 for four. The thatched roof “huts” were immaculate and came complete with electricity, hot & cold running water, ceiling fans, comfortable beds with clean bedding, towels and soap, etc. At the “primitive” bushveldt camp of Sirheni, the modern and spacious hut came with a completely outfitted kitchen (bring your own food) for Rand 485 (\$85.00). These were designed to hold 6 to 10 people.

During the days, we prowled both paved and dirt roads and stopped every 15 minutes or so when we met some animals. At night, we returned to camp to freshen up, and usually dined at the local restaurant for a seven course meal (Rand 37.50- \$8.28 each). At Sirheni, we bar-b-qed impala steaks and kudu steaks. We served these entrees accompanied by fresh potatoes or rice, veggies, curried chicken, etc.

Our main purpose in Kruger wasn't to eat all of the time, but to see the wildlife. And we DID see the wildlife, even if we had to stay in our vehicle all the time (or else!). (Park rules say so for our protection.) We photographed elephants, cape buffalo, rhinos, giraffe, lions, kudu (greater and lesser), wildebeest, impala, waterbuck, hartebeest, tsessebe, hyenas, zebra, baboons, monkeys, lizards, tortoises, dung beetles,



Remember, only elephants need to wear ivory.



That's Mr. Big Bird to you!

warthogs, termite mounds, ostrich, bushbuck, hippos, steenbok, etc., etc. We also saw an impressive list of birds (3 times as many varieties as the other animals), trees, other plants, and ecosystems. In general, the birds usually were colorful (many were iridescent), weirdly shaped, exotic looking, or some combination of these. Many of the plants and trees grew thorns of impressive size.

Other Animal Reserves:

We also visited two animal reserves that specialize in rearing some of the more endangered species of the region. One afternoon at the DeWildt Cheetah Reserve, we saw normal and king cheetahs, wild dogs, brown hyenas, servals, caracols, blue dik-dik, suni, and a number of large birds. Our last night in South Africa, we stayed at the Rhino and Lion Reserve near Krugersdorp. We photographed white rhino, eland, sable, black wildebeest, red hartbeest, bleesbok, as well as the more common species, such as zebra, giraffe, ostrich, crocks, spingbok, common wildebeest, impala, etc.Mine Tours:

We arranged tours of two mines on our trip inbetween the animal safaris. The tour of the Premier Diamond Mine



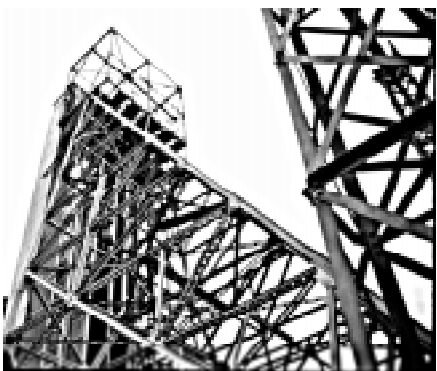
So many diamonds, so few pockets!

was not very exciting. For Rand 18, we merely received a nicely illustrated lecture and tour of the grounds. We were not permitted to pick up even a smidgen of rock from the ground. The security was very, very tight.

For Rand 200 each, John, Mary, and I received a splendid tour of the East Dreifontaine Gold Mine. Mine personnel bussed us from Johannesburg to the mine and served us a light breakfast as they described the details of the regional geology and the workings of the mine. The guides also showed us an extensive tour of the surface workings.

We changed into authentic miners' clothing, and we ordinary tourists then traveled 1800 meters underground. (Mary stayed behind). We viewed a number of parts to the workings, and, eventually, we arrived directly to the working face of the mine.

There, the mine superintendent tapped the driller on the shoulder to get his attention. The driller ceased work-



Head frame leading to 1800 meters (that's over a mile) underground.

ing, and the superintendent described what we were looking at. The work was done in 30 to 32° C. heat, 100% humidity, and in a meter high opening. My glasses fogged up, my hearing-aid shorted out, and I was filthy dirty and wet. It was wonderful! We traveled on our hands, knees, and butts. We were even allowed to pick samples of the ore and keep them for souvenirs.



Taking a Power Nap

After a shower and clothing change, the guides treated us to the excitement of watching the mine workers pour three 33 kilogram bars of gold. Mine rules allowed us to handle a bar that was poured days earlier and had, therefore, cooled. For a final touch, they took us to the recreation centers for an open bar and a substantial hot lunch with wine.

We began at 7:00 a.m. from Johannesburg and returned at about 3:45 p.m. We then drove to Pretoria to rest, change, dine, and attend the opera to see "Der Fleigenden Hollander". The performance showed some very



Hand over the bag of crackers and no one will get hurt!

impressive staging, and we listened to the singing of a few good voices.

Bwana Paul



Tucson Review

Photos by Stephen Attaway

We asked some of our Guild members who attended the 1997 Tucson Gem and Mineral Show to summarize their Tucson experiences. You will find their reports printed below. We would like to receive a report from every Guild member. Please send us your articles, and they will be published in future issues.



My First Time at Tucson

Larry Plunket

First, we would like to thank Nancy and Steve Attaway and Bill Andrzejewski who generously offered to spend a valuable amount of the short time they had available to take us around the show. Nancy, Steve, and Bill helped register my wife Glenda and I for the wholesale shows restricted to licensed dealers only.

The enormity of the show really can't be imagined. This show gives meaning to the cliché 'you gotta see it to believe it'.

Would we go back? You can count on it. Whether you are buying or looking, it is entertaining, fascinating, and educational. It is certainly worth a few vacation days. There is plenty to see even if you cannot get into the "dealer only shows". But see the dealer shows if you possibly can.

We spent the better part of two days viewing only half of the following shows: (This is less than half of the shows there. So, you see, we saw half of

less than half and took two day doing it.)

- The Gem & Lapidary Dealers Association at the Holiday Inn City Center
- The American Gem Trade Association at the Convention Center
- The Gem & Lapidary Wholesalers at the Holiday Inn/Holidome
- The Gem & Jewelry Exchange in the big tent across the street from the Convention Center. Of what we saw, this one had the best rough selection and prices.
- The Congress Street Expo across the freeway from the Holiday Inn City Center

Things We Saw:

- Hotels jammed with dealers.
- Lobbies filled with dealers.
- Hallways lined with dealer tables.
- Often, there was not enough room for people to pass one another.
- Hotel rooms filled with displays. (What happened to the beds and the other furniture?)
- Meeting rooms jammed with dealer displays.
- Parking lots with huge tents jammed with dealers.
- Parking lots filled with small tents.
- More than a mile of frontage road lined with small tents, tables, tailgates, etc.

People From All over the World

Countries of people I talked to:

- Japan
- Russia
- Australia

- India
- Thailand
- Brazil
- Germany
- U.S.A. (yes, there were a few of those).

Gems and Jewelry

- Loose gems of every type, size, and quantity.
- Emeralds, sapphires, tsavorites, rhodalites, and others gems that were inches across in size.
- Small jewelry sized gems in bags of 5000 carats.
- Set jewelry of all kinds.
- Custom pieces with large stones.
- Custom pieces with hundreds of small stones.
- Fabulous metalsmithing.
- Carvings.
- Large carvings.
- Small carvings.
- Fabulous works of art.
- Not! fabulous works of art.
- Production pieces that were very nice.

Supplies and Equipment

- Common tools.
- Uncommon tools.
- Really neat tools.
- Not so neat tools.
- Supplies by the ton.
- Demos, if one has the time for them.
- Books and literature on everything.

Fossils and Minerals

- Big fossils.
- Small fossils.

- Polished fossils.
- Carved fossils.
- Fossils in jewelry.

Rough

- Rough in general (garden specimens and fishtank gravel).
- Small quantities of rough here, there, and everywhere; you had to look for the rough.
- Rough is a very small part of the show.
- Facet grade rough of all kinds.
- Not so good facet grade rough; you had to look at it closely
- Overpriced rough (and this was supposed to be dealer prices).



How I Spent The Money For My Summer Vacation

Heidi Ruffner, Ph.D.

Each February, Tucson turns into a Mecca for gem and mineral dealers and also for collectors from around the world. I included here some tid-bits from my own personal pilgrimage.

Tanzanite received a great deal of attention this year. The light to medium colored faceted material appeared to be stable in price, but the very dark larger pieces (greater than 5 carats) listed the lowest prices that I had ever seen. The color of this material showed an intense, rich bluish purple. While I saw genuine tanzanite available at good prices, many of its simulants were priced to move.

An example of a popular tanzanite simulant was Coranite™-purple. This is a garnet-based simulant with a hardness of approximately 9, and a refractive index of greater than 1.80. While Coranite™ shows the beautiful color

of genuine tanzanite, it lacks the dichroism and, therefore, is easily discerned from its natural counterpart. Both dealers and buyers remain confused about the availability of "synthetic" tanzanite (man-made tanzanite chemically and crystallographically identical to the natural stone). True synthetic tanzanite is not yet available, although I saw several people supposedly offering it for sale!

The freshwater pearls looked magnificent this year, having more colors, shapes, and sizes available than ever! The shapes included rice, corn, potato, biwa, baroque, discoid, etc. The whitest color still tended to be slightly creamy (yellowish) compared to cultured pearls. However, the natural pinks and oranges looked fabulous and have become even more affordable. A word of caution for pearl fans: the round freshwater pearls look more like cultured pearls. This freshwater pearl variety is lovely and makes an excellent and inexpensive substitute for cultured pearls, which have increased significantly in price every year.

The opal selection this year seemed a mixed-bag. Some dealers showcased nice opal material at reasonable prices, while other dealers displayed crazed and cracked opals throughout their inventories. I suspect that as the demand for natural opal grows and the supply dwindles, more of this unstable material will surface and reach the marketplace.

Unfortunately, some opal may appear to be stable at the time of purchase and command top dollar, only to craze 6 months later and become worthless. In my experience, opal crazing has been an all-or-nothing phenomenon. Either all of the material from a parcel (or location) crazes, or none of it does. With this rule-of-thumb in mind, I avoid parcels (and frequently entire businesses) that contain any crazed opals.

Some of the most impressive and unusual cut gems that I saw this year included large (4-10 carat) yellow sphenes. The color appeared lemon-yel-

low, but the high dispersion of sphene (.051) resulted in a very intense red and green color play around the crown facets. These gems reminded me of traffic lights.

Diamond prices have been relatively unstable recently as a result of the increase in Russian and Australian supplies, as well as the consequent actions taken by DeBeer's. Many of us expected to see a dramatic decrease in the price of small diamonds (melee), but were disappointed. While I located a few bargains on diamonds, the price of well-cut and clean melee had not, in general, changed significantly. Poorly cut melee sold for approximately 20-25% less than last year.

For the first time ever, lab-grown (synthetic) diamonds became available at the Tucson Show. But don't panic. Only yellow and yellow-brown synthetic diamonds may currently be purchased. I plan to tell you more about detecting synthetic diamonds in the next New Mexico Faceters Guild Newsletter. Until then, happy cutting.



A Tucson Gem Show Report

Nancy L. Attaway

Tucson never ceases to amaze me with its wide range of goods for sale and its variety of people attending the show. People from all over filled shopping lists during their search for special items at the best prices.

The combined shows at the 1997 Tucson Show spanned twenty-two days, and I met several persons who intended to remain at Tucson during its entirety. Most people attended parts of the show, because they could not afford the time, nor the expense, to stay for it all.

This year I saw something that was very rare at previous shows. Empty booth spaces! I saw many empty booth spaces that had been reserved for dealers for several of the individual shows. These empty spaces were filled during previous shows at Tucson. The empty booth syndrome plagued shows at the AGTA, the GLW, the AKS, and the Arizona Mineral and Fossil Show.

AGTA

The American Gem Trade Association (AGTA) Gemfair Show, held at the Convention Center, usually notes a full attendance at Tucson. The AGTA vendors are known to showcase high-end faceted gems and finished jewelry. Poor attendance marked the AGTA Show this year. I heard one buyer compare it to visiting a morgue. One vendor, who had served on the Board of AGTA, later remarked to me that he predicted a poor showing this year because the different shows at Tucson were spread so far apart. Also, the dates chosen coincided with the scheduled dates for several other major gem and jewelry shows in our country and also for a show in Japan.

GLDA

Not all of the rooms were filled with dealers as per last year during the Gem and Lapidary Dealers Association Show (GLDA) held at the Broadway Holiday Inn. Less people walked the narrow aisles there. Some of the vendors even appeared bored.

I visited there with Michael Dyber, one of the most famous gem carvers in the United States. Michael stated that he never dops a stone, but just hand-holds every stone that he carves. I asked Michael if working with bi-colored gem materials would become a trademark for him. He told me that he simply enjoys carving the bi-colored tourmalines and has done well with them. I asked him about working with the Russian bi-colored topaz. He mentioned

that he would not work with that material, because all of it fades.

Steve Walters also displayed his distinct gem carvings there. In past years, the usual feeding frenzy associated with the sales of Steve's fabulous carvings soon left him with empty showcases. This



year, Steve sold out during the first day. We kept bumping into him at the other shows. Steve and I think that the gem carvings rendered by Steve Walters show exceptional skill in design and in the finish. We consider him to be one of the world's best gem carvers. The February 1997 Issue of Lapidary Journal featured a cover article on his work.

The Dust Devil Mining Company displaying their beautiful Oregon sunstones at the Broadway Holiday Inn. These people are the friendly folks who Scott and Susan Wilson visited last year and wrote about. (See the trip report from the Wilsons in the November/December Issue of the newsletter.)

Steve always enjoys viewing the magnificent gemstone carvings rendered by the artisans from Idar Oberstein. This year's wonderful new collection showcased fish, reptiles, bears, and birds all beautifully done from high quality gem materials.

GJX

The Gem and Jewelry Exchange Show (GJX), held in the big tent near the Broadway Holiday Inn, proved, once again, to be a place of action. We visited with John Rhoads of D.&J. Rare Gems, Ltd., who showed us the latest faceted gems in the collection. We also saw Forrest Broadley of Santa Fe. You may recall that Forrest presented a very lively account of his gem buying trips at a Guild meeting sometime back. His

assistant showed me several absolutely gorgeous strands of light colored tanzanite beads.

Catalog In Motion

Rio Grande of Albuquerque/River Gems hosted their Catalog In Motion at the Hilton. Steve and Scott spoke to a representative from the 3M Company about special abrasives. Steve, as usual, could not resist the temptation to purchase the latest in grinding tool technology.

GLW

We met Fred Ward, G.G., at the Gem and Lapidary Wholesalers Show (GLW) in the Holiday Inn/Holidome, where Fred sat stationed for his book-signing. I purchased his new book on opals, and Fred graciously personalized the inside cover for me. We talked for a good while.

Fred Ward's new book on "*Opals*" continues his excellent "gem series" books that feature noteworthy gemstones. His gem series books include research on rubies and sapphires, emeralds, diamonds, pearls, jade, and gem care. His meaty text educates us about gems, and his superior photographs reveal the beauty found in gemstones.

Fred asked what subject I would like to read about next, and I said that I would enjoy a book on aquamarine and the other beryls. (Fred authored one already on emeralds.) Will Moats mentioned that he would like one on tourmaline, and Fred thought that a good idea. He also said that he was considering a book on garnets.

We met **Michael and Kathy Williams** who own and operate the House of Williams. They set up their display of rough and cut gemstones inside the Holidome tent. We also met associate member, **Karen Blisard**, who helped Michael and Kathy work the booth. They kindly allowed a special discount

for Guild members on purchases of facet rough. Michael, who facets with an Ultratech, regularly travels to South Africa and Thailand to facet and procure faceting rough. Also a faceter, Karen mentioned that she would assist the Guild in a workshop sometime this year, as she has experience running faceting workshops. Karen resides in Silver City, New Mexico.

The Arizona Mineral and Fossil Show

The Best Western/Executive Inn hosted the Arizona Mineral and Fossil Show, where vendors display much of the premier mineral specimens. The dealers here seem to favor one particular mineral each year, judging from what I found prevalent throughout the hotel in previous shows. This year many dealers featured specimens of the light green fluorite from China. It certainly surprised me how high in price the dealers marked these specimens, and I wondered how long the market would bear this.

At this show, two exceptional items stood apart from the others. One dealer there showed a large faceted pearshape anglesite originally from Morocco and said that it was sold. This extraordinary golden gem appeared to be about two inches long, an inch and a half wide, and about an inch deep! (Later, I spied a large yellow anglesite crystal in matrix on display.) Another dealer there displayed one of the largest tanzanite crystals I had ever seen. He mentioned that it had sold. I can well imagine the price. The fact that both the large tanzanite crystal and the large faceted anglesite were sold during the show reflected the healthy state of the economy.

Congress Street Expo.

The many tents erected along Congress Street housed dealers selling large mineral specimens, tools, and machinery. Among the minerals, jewelry, and pottery in one tent, we met one of the partners involved in mining for the Utah red beryl. He displayed the largest rhyolite specimen yet found that contained red beryl crystals in its matrix. I inquired about the status of the lease agreement they signed with Kennecott. He told me that Kennecott invested over a million dollars for improvements



to the site leased for one year. He also said that Kennecott desired to extend the lease agreement for another year in order to sell the lease to another company. This partner stated that he would not agree to another year's lease and expected Kennecott to purchase the mine site as specified.

Atrium Productions Show

When you become tired of seeing gems and jewelry, visit the interesting Atrium Productions Show at the Pueblo Inn. You may find wood carvings, rugs, clothing, rock fountains, large rock carvings, new age items, etc. Some mineral and gem dealers still remain, but the show bears more resemblance to a market bazaar than a gem show.

Pacifica/AKS Trade Shows

Many of the dealers who previously occupied the Desert Inn found spaces in the Holiday Express. These vendors sold minerals, gem rough, cut gems, and beads. Gary Werner sold turquoise in a room at the Howard Johnson's.

Where the Desert Inn once stood now lies a concrete pad. Tucson leveled the old hotel to give way to a new frontage road still under construction. As the road continues eastward on 22nd Street, it will displace the tent sites near the Pueblo Inn, the Howard Johnson's, and the Holiday Express that housed many dealers. Access to these shows next year might present some problems. I expect to see a few of the shows combine with other shows. It also would not surprise me to learn that one or two of the shows may fold.

For the shows not requiring proper credentials (a copy of your business license, a copy of your tax certificate, and your business card), I noticed that the dealers encouraged the public to attend. Some even erected signs welcoming the public. Many of these dealers marked their merchandise at retail prices and were not very interested in negotiating with legitimate wholesalers.

Show organizers usually distribute the show contracts for next year's Tucson show to dealers during the current Tucson show. I imagine the dates set for shows at Tucson 1998 will not change much from 1997, which may not be good for dealers.



Our Tucson Trek '97

Susan and Scott Wilson, Ph.D.'s

The Tucson Gem and Mineral Shows beckoned us once again. We drove from Albuquerque and spent several days shopping the gem show while enjoying the warm Tucson weather. Besides searching for items on our shopping list, we wanted to visit specific people at the show who we met during our rock hounding adventures. We also looked for those people who we had become well acquainted with during our previous trips to Tucson.

Our first stop found us at the booth set up by the Dust Devil Mining Co. at the GLDA Show in the Holiday Inn on Broadway. We met the Dust Devils, Don, Terry, and Steve at their mine near Plush, Oregon last September. The Dust Devils' showcases displayed many carved, faceted, and rough sunstones in colors that ranged from deep red, orange, peach, and the occasional green. The distinguished members of the Idar-Oberstein group were located next to the American sunstone miners. We helped the Dust Devils sort their faceted stones by color and cut to assemble color suites, all the while "ooh-ing and ah-h-ing" over the gorgeous material.

The two faceted stones of remarkable quality that we thought really stood out in their showcase listed the names, the "Vortex" and the "Whirlwind". The "Whirlwind" truly exhibited the unique pleochroic nature of sunstone. When viewed perpendicular to the table, the stone looked pale emerald green. However, when viewed from the side, the stone became reddish orange! This unique stone received a lot of attention.

The "Vortex" described a pale yellow stone we thought reminiscent of Pueblo Park Labradorite. A single row of facets on the pavilion showed a facet

cut every four marks on a 96 gear index wheel. The same pattern, likewise, composed the crown. A unique optical effect occurred with this faceting pattern. When you rotated the stone and your line of sight was through the table, then a vortex, similar in appearance to that from a tornado, appeared to move within the stone.

At the tent at the Holiday Inn/Holidome, we met our Russian friend, Anatoly Klimenko of Wintra Corporation. This year, Anatoly displayed some of the first pieces of Russian lab-grown red beryl, both cut and rough. The pieces of red beryl boule appeared a saturated berry red and came in shapes to yield beautiful cut stones with little waste.

Other unique items we saw in Tucson included a 2.69 carat natural blue-green spinel and a gahnite spinel colored by nickel. We also found some magenta colored garnet rough identified by the dealer as almandite garnet from Brazil. In the manufactured jewelry category, the most unique piece displayed was a tennis bracelet composed of 31 perfectly matched, canary yellow Burmese sapphires (35 carats total weight) set in 18kt. yellow gold. What a great accessory to my navy suit!

The weather in Tucson could not have been better. We took time from our busy schedule to hike about thirteen miles in Sabino Canyon, located northeast of town. We spied a coatimundi scurrying across the road near dusk. A coatimundi is a tropical American animal related to the raccoon, but has an elongated body, a long tail, and a flexible snout.

On our way home, we drove the scenic route through Globe, Showlow, and onto Holbrook to meet Interstate 40. Just out of Showlow, a bobcat ran across the road in pursuit of "lunch". Further down the road, we watched a bald eagle catch a thermal and spiral into the clouds.



The Tucson Quick Shop

Moss Aubrey, Ph.D.

Much of the rough I looked at held no appeal. Either the rough was of such poor quality or it was too expensive. I heard the same old sales pitches of how reasonably priced the rough was. However, I did find some bargains. I located some orange colored beryl, a color I had never seen before. I also bought some Russian lab-grown alexandrite that is clean and shows an excellent color change.

I experienced several interesting scenarios while shopping for melee diamonds. Many dealers showed them and claimed that their prices reflected the lowest per carat. However, the apparent quality of the stones varied widely. I consistently asked to see the same goods, melee from 0.03 points to 0.06 points in size, G to HI in color and SI-1, 2, 3 clarity range. What I was shown varied from sparkly, reasonably white and eye clean to total junk.

One dealer showed me a parcel of melee he listed at \$250 per carat. I returned the next day ready to purchase it, but he showed me a parcel different from the first one. This second parcel of melee appeared distinctly yellow. When I pointed this out, he said that the display lights changed the color. He then placed better quality melee on the counter for a comparison. When I pointed out how they differed, he said "It's because these are on the left, and the angle of the light is different." I then reversed the position of the two trays of melee, and, lo, the color of that first parcel still remained yellow! I told him I did not appreciate his sales approach and said he had lost a sale.

Other diamond dealers showed similar disregard for honesty in their attempts at selling. One dealer guaran-

teed in writing (on the receipt) the diamond grade I requested, even though the stones exhibited an inferior quality. I should note that both of the above dealers did not represent U.S. companies, but came from countries overseas. After wading through many diamond dealers, I finally located melee close to the actual diamond grade claimed by the dealer and struck a deal.



Straight from Tucson

Bill Andrzejewski

Since the Tucson Show began the last week in January and lasted until mid February, I sat down with my co-workers to decide when we would actually be in Tucson. My co-workers are primarily interested in minerals, while my wife and I are mostly interested in gems and jewelry. This meant that some of the shows might be closing while others might not yet be open. We decided upon a short stay and agreed to attend the show Friday, January 31st and leave Sunday February 2nd.

We found the attendance to be generally smaller at each of the shows. We walked from the remote parking lot to the Rodeway Inn, because the "shuttle bus had not been on time yet", according to the lot attendant. When we arrived at the Rodeway Inn, we found numerous parking attendants and police directing everybody out of the lot and not letting any cars through. The only purchases we made there were some blue topaz rough that ranged from \$0.40 to \$2.00 per gram from a Brazilian dealer and some silver parts from the Blake Brothers Co.

The Desert Inn was entirely gone. A new Hampton Inn had been built near the Rodeway Inn, but was not yet part of any show. We cruised through the Congress Street Expo just to see the shipping crates full of the large beauti-

ful amethyst cone/geodes. We saw a few empty spaces and a few dealers just setting up in the big tent, but made no purchases there. I dashed into the Crystalite tent to purchase a Last Lap.

We walked to Boatners' gas station, where I tried to buy 10 lbs of fluorite for carving. No deal, because I had to buy the whole flat of 26 lbs. I thought I would find more fluorite down the road. I bought some quartz crystals for cutting for \$5/lb. from a dealer who had a vast selection of material. He negotiated with me and even threw in some extra crystals. A look towards Carl's Restaurant showed plenty of booths set up, but no dealers occupied them yet. Carl's has traditionally been the spot where you can find almost anything.

We arrived early at the Holiday Inn/Holidome and kept busy shopping there for most of the morning. Bonnie usually finds numerous earrings, pins, chains, etc. at bargain prices and buys in bulk. (Fifty pairs of earrings? Well, okay. They look unusual and will probably sell.) In the past, we found it quite difficult to move through the crowded aisles at the Holidome, but not on this trip. We noticed fewer people there. My only purchase was a few emerald cut ametrines at the not so bargain price of \$1.50 per carat.

I shopped for the first time at the Tucson Exposition Center, a small group of dealers in a very large building near the Holidome. We talked to one dealer from Sri Lanka who had some nicely cut clear topaz at \$1 to \$2 per carat. He was really there to solicit customers for his cutting factory. His cutting price schedule showed he would cut rounds, ovals, and step cuts to about 10 mm for \$0.60 per stone. The harder materials Mohs >8 were priced slightly higher at \$1 per stone. Wow! Why are we in this business?

Only one dealer had a selection of rough, but that is where we met Moss

Aubrey. We talked for a few minutes and then headed for the La Quinta Inn. We made only a brief stop at the La Quinta, because this show primarily has minerals and most of dealers were just setting up.

Back on the road again to stop at my favorite two places, the Pueblo Inn and the Howard Johnson's (formerly the Discovery Inn). Almost every face-table material is available at these locations: tons of quartz crystals, peridot, and untreated tanzanite preforms. We made a few purchases here of top quality amethyst and chrome diopside from Thomas Schneider. (Those dollars per carat really add up quickly.) We closed out the day here and met with co-workers to head for dinner. When we arrived at the restaurant, we were overwhelmed by the hordes of people standing at the doorway to get in. We opted for a smaller restaurant.

On Sunday, we stopped at the Quality Inn, where one dealer from Pakistan displayed a Smithsonian quality tanzanite mineral specimen on matrix for a mere \$15,000. He also had several large parcels of peridot for "Three and half". "Three and half what"? "Why, \$3,500, of course. People always expect to get something for nothing." He would not negotiate on the price either!

To close out our visit, we stopped at the Holiday Inn Express. Again, we saw plenty of dealers but not very many buyers. I found some ametrine rough from a Brazilian dealer, who stated that the material is what he finds in his mine. He answered my question about having naturally occurring ametrine.



Notes from Tucson

By Will Moats

This year, Anne and I had only three days to attend the 1997 Tucson Show. Thus, we were only able to get to the AGTA, G&LW (Holidome), the Arizona Mineral and Fossil Shows at the Executive Inn, and Ramada Inn. This was the first year that the jewelry/gem shows started so early. Most dealers I spoke with were unhappy about this situation and were somewhat dissatisfied with the business they had done so far.

This was the first year that either one of us attended the AGTA Show. This show is so large that I was only able to see (quickly), perhaps, only 70% of the dealers. Because much of the offered material at the AGTA was high-end and our budget small, we did little buying at this show. We acquired only a few carats of 2.5 mm. round sapphires and rubies. So much for being a high roller! Because of my interest in Montana sapphire, I probably enjoyed looking at the booth of American Gem Corporation (AGC) the most. The "rainbow suites" offered by AGC showed an incredible range of color. They also offered matched stones (fancy colors and blue) for earrings, which we thought were very tempting.

Most of our time was spent at the G&LW Show at the Holidome. Unlike the AGTA and GJX Shows, where mostly loose cut stones and pearls are offered, the G&LW Show has, perhaps, the greatest variety of gem and jewelry related merchandise. This includes lots of gemstone and precious metal beads, cultured Akoya and Chinese fresh-water pearls, carvings, findings, mountings, gem rough, tools, books, finished jewelry, and cut stones. We did most of our buying here, and it was the only place where we saw other members of the Guild in Tucson.

One highlight of the G&LW Show was the chance to meet noted author Fred Ward and have him sign my copy of his new book on opals (which I recommend). I enjoyed talking to him about gemstones.

Although hydrothermal emerald faceting rough was available from many dealers, B&B Gems probably had the best bang for the buck -- eye-clean hydrothermal emerald rough at \$6.00 per carat. Nancy and Steve Attaway took me over to AB Neves' booth, where I was able to buy a few pieces of some morganite, green beryl, and imperial topaz rough at reasonable prices.

Curiously enough, Anne noticed a perplexing lack of inexpensive Chinese "rice kernel" pearls this year. Instead, most dealers were carrying "potato" pearls at about 3 to 5 times the price. (These are still an excellent buy for what you get and are a much better deal than Akoya pearls at many times the cost.) We also wanted to buy some charoite beads this year, but they were scarce. Wholesale costs were high, at about \$75.00 per strand for mediocre quality beads. As it turns out, I'm glad we didn't go for the charoite beads we saw at the G&LW Show.

Most of the gem rough we obtained was from dealers at the Executive Inn. Here, we obtained a large aquamarine and a red tourmaline from Alvaro Lucio Minerals of Brazil. These were being

sold by the piece as moderately priced mineral specimens. Although these were not very good as specimens (broken or having no terminations), the two pieces we bought have excellent cutting potential. Because we ran out of money, we left several other tourmalines behind. (Maybe, we can get them next year?) We also bought some "specimens" of heliodor (from Volin, Ukraine) from Genody Skoublov, a mineral dealer from St. Petersburg, Russia. These should cut some nice large stones. Russian heliodor is what I consider real heliodor to be -- a GREENISH-YELLOW beryl. Also at Genody Skoublov's room, we found the charoite beads we wanted and at a great price. The beads were already strung and poorly finished on tiger-tail cord with a cheap base-metal clasp. Some quick work at home with the scissors, restringing the beads on nylon cord and adding a 14Kt. gold clasp, we ended up with two very nice charoite necklaces!

The fossil show at the Ramada Inn was spectacular as always. For those who have money trees, a couple of juvenile stegosaurus skeletons were being offered by one dealer. Dinosaur eggs were common, and amber was available by the truckload. I found a great bargain at the booth of Three Little Pigmaites (in the tent), where I purchased two pieces of facet grade rose quartz (from Madagascar) at \$0.20 per grams in 50 to 60 gram chunks.



Every year, some bad things happen at Tucson to some unfortunate dealers. The biggest disaster of the 1997 Tucson Show that I heard of involved a mineral dealer at the Executive Inn who thought it would be a great idea to hide \$64,000.00 in receipts between the trash-bag liner and the inside of the trash can in his hotel room. The next morning, the maid emptied the trash.



Food for Thought:

By Prof. Howard J. Spero at the University of California in Davis

Many of us pursue our careers in search of knowledge, strive to work hard, attempt to develop a power base and try desperately to find the time needed to make some money so we can enjoy life. We can reach a new understanding of the secret to wealth and success by applying some very simple algebra to some universally accepted, albeit trite, phrases, and clichés :

1. Knowledge is Power
2. Time is Money
3. Power is Work over Time (as every engineer knows)

By substituting algebraic equations for these time worn bits of wisdom, we get:

$$K = P \quad \text{Eq (1)}$$

$$T = M \quad \text{Eq (2)}$$

$$P = \frac{W}{T} \quad \text{Eq (3)}$$

Now, do a few substitutions:

$$K = \frac{W}{T} \quad \text{Eq (4)}$$

$$K = \frac{W}{M} \quad \text{Eq (5)}$$

Now we've got something. Translating this back into English, we can see

that Knowledge equals Work over Money... what this MEANS is that:

- The More You Know, the More Work You Do.
- The More You Know, the Less Money You Make.

Solving for Money, we now get:

$$M = \frac{W}{K} \quad \text{Eq (6)}$$

(Money equals Work Over Knowledge) which means..

- Money approaches infinity as knowledge approaches 0, regardless of the Work done.
- The More you Make, the Less you Know.

Solving for Work, we get

$$W = MK \quad \text{Eq (7)}$$

(Work equals Money times Knowledge) which shows that...

- Work approaches 0 as Knowledge approaches 0.
- The stupid rich do little or no work.

Working out the socioeconomic implications of this breakthrough is left as an exercise for the reader.

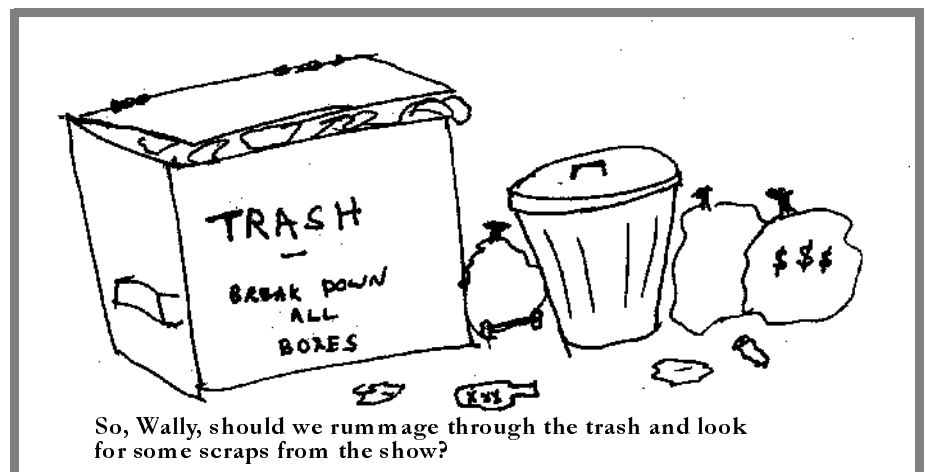


TABLE 2. Shows of Special Interest

<i>Name</i>	<i>Location</i>	<i>Date</i>
First Annual New Mexico Gem & Mineral Show	Bingham, New Mexico	Feb 26 - March 2
Albuquerque Gem and Mineral Club Show	UNM Continuing Education Center Albuquerque, New Mexico	March 1 & 2
Gem and Mineral Show	Big Spring, Texas	March 1 - 2
Deming Gem and Mineral Show	Deming, New Mexico	March 6- 9
Phoenix Fine Art and Jewelry Show	Phoenix, Arizona	March 7- 9
31st Annual World of Gems	Scottsdale, Arizona	March 7 - 9
The Southwest Gem and Mineral Society Show	San Antonio, Texas	March 14-16
Gem Faire	El Paso, Texas	March 21 - 23
Fort Collins Rockhound	Fort Collins, Colorado	March 21 - 23
The Spring Show in the Rockies	Denver, Colorado	April 25 - 27
Santa Fe Symposium on Jewelry Manufacturing Technology	Albuquerque, New Mexico	May 18 - 21
Convention and Show; Rocky Mountain Federation of Mineralogical Societies	Durango, Colorado	June 6 - 8

In the next issue:

A letter from overseas.

A possible spring field trip?

More In the news!

A new faceting machine design.

More Tucson reports.

Featured Gemstone:
Sillimanite



Advertisements:

Faceting Machines for Sale

Al Tlush, master faceter, lists for sale two American Facetor faceting machines that have been stored in their original boxes and never used. Please contact Al at 864-2145 in Belen, New Mexico for details and prices. Al played a big part in the design and manufacture

of the American Facetor faceting machine some years ago.

Nearly New Faceting Machine

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

Rebuilt Faceting Machine

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