GEM NEWS

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TUCSON '93

Early February is always an exciting time for the gem community, as the many concurrent gem and mineral shows take place in Tucson, Arizona. These presentations, held in hotels, motels, and other locations throughout the city, attract jewelers, dealers, and mineral and gem enthusiasts from all over the world. As in years past, this Spring issue Gem News column focuses on highlights of this important event, based on observations by the editors and many of their colleagues at GIA and the GIA Gem Trade Laboratory.

DIAMONDS

Show update. Although the Tucson shows collectively are noted for colored stones, mineral specimens, and fossils, diamonds are being seen in ever-increasing quantities. This year, Malhotra Inc. of New York was offering natural green transmitters (diamonds that show green luminescence excited by visible light) from the Panna mine in India. We also saw two nice chameleon diamonds, one over 7 ct and the other approximately 2.5 ct.

One firm was marketing diamond briolettes, including a crudely strung necklace containing over 60 stones. All of the pieces (none of which appeared to be larger than 1 ct) were of fairly low clarity with a brown body color; they were identified as having come from India.

We were also pleased to note that companies offering clarity-enhanced diamonds were openly disclosing the fact of enhancement.

Figure 1. These "Diamond Stars" are fashioned in Israel. The stones shown here range from about 3 to 5 mm in diameter. Courtesy of Fancoldi Registered Trust; photo by Tino Hammid.

Star-cut diamonds. Although we have seen some successful attempts to cut and facet diamonds into five-pointed stars, we were impressed with the brilliancy and consistency of workmanship in the fashioned stones offered by Jeff Pancis of Pancis Inc., Morris Plains, New Jersey, who is the U.S. agent for the Fancoldi Registered Trust, the Swiss company offering the new cut (figure 1). Not only are the diamonds themselves of unusually good quality, but the patented star design incorporates 66 to 76 facets, depending on the size of the stone. The star cuts are also available in fancy colors.

Because as much as 80% of the stone's original weight may be lost during fashioning, the stars are sold by clarity and diameter (i.e., approximating that of a circle drawn around the five points), not by weight. The stones on display at Tucson ranged from 3 mm to 9.7 mm in diameter and averaged about 5 mm.

Marketed under the trademark "Diamond Stars," the stones are all fashioned in Tel Aviv, Israel, and have been in production only since September 1992, according to a Fancoldi spokesman. He added that lasers are sometimes, but not always, used in the cutting process. However, finishing—especially polishing the junctions between points—is the most difficult part of the manufacturing process.

COLORED STONES

Exceptional iris agates. Iris agate is one of the rarest phenomenal gem materials. When viewed at certain angles in transmitted white light, this gem exhibits spectral colors that are caused by diffraction from the many fine, closely packed parallel layers of chalcedony that comprise this material.

At Tucson, we saw several fine iris agates (figure 2), fashioned free-form pieces that ranged from roughly 10 to 25 ct. According to Michael Randall of Crystal Reflections, he had 32 matched pairs and 16 single pieces of this material cut from a single piece of Oregon rough that had been obtained some three years earlier. The phenomenal nature of the material was discovered by accident, when the rough was dropped and the iris effect noted in a small fragment.

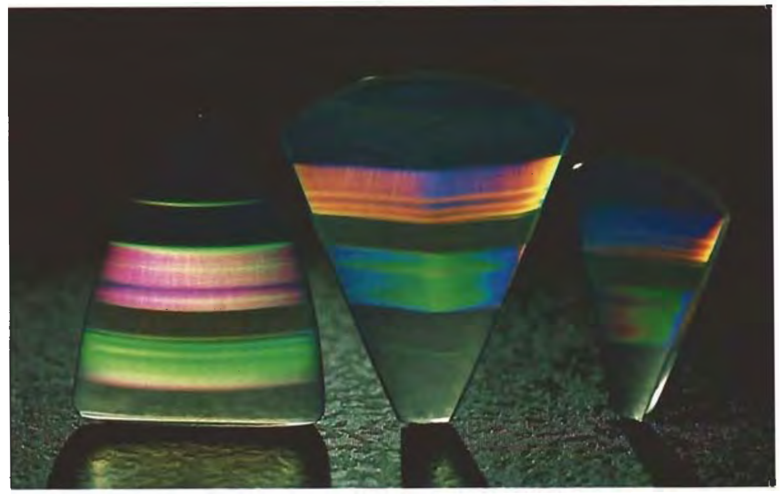

Figure 2. These three tongue-shaped cabochons (13.56–25.61 ct) of iris agate were among several fashioned from a single piece of Oregon rough. Courtesy of Michael Randall; photo by Robert Weldon.

Baltic amber. Several kilograms of Baltic amber were being marketed by Polish dealers, many of whom were attending Tucson for the first time. On display were some large pieces, up to 30 cm in length. It would appear from the quantities available at Tucson, as well as from those reported previously (see, e.g., entries in the Fall and Winter 1992 Gem News columns) that there are still considerable reserves of this material.

Our readers should note that one dealer from Warsaw maintained that it is an accepted trade practice in some countries to treat Baltic amber (including clarification and pressing) without disclosing the enhancement.

Amethyst from Uruguay . . . The Winter 1992 Gem News included a brief entry on Uruguay as a commercial source of agate and amethyst. At Tucson, we visited the booths of firms marketing Uruguayan amethyst in either specimen or fashioned form. The mineral specimens we saw consisted primarily of aggregates of small (approximately 1 cm wide) crystals of good color. We also saw slices consisting of amethyst peripheries and agate cores. The faceted stones we saw were also deeply colored—no light-toned material—and in a range of sizes appropriate for jewelry use.

One of the editors also met Eduardo Casabo, director of the New York–based Economic and Commercial Department of the Uruguayan Government Trade Bureau. This gentleman was in Tucson to learn first-hand about the gem industry, as well as to make available brochures containing useful information relating to such areas as demographics, foreign trade regulations, and foreign trade services in Uruguay.

. . . and amethyst-citrine from Bolivia. For more than a decade, quartz gems displaying distinct amethyst and citrine color components have been available in fashioned form. Because of the lack of rough crystals in the trade, there was some question when this material was first introduced as to whether or not some or all of it had not been produced by heat and/or irradiation treatment of amethyst (see, e.g., K. Nassau, "Artificially Induced Color in Amethyst-Citrine Quartz," *Gems & Gemology*, Spring 1981).

This year at Tucson, however, rough as well as fashioned material was being offered. All reportedly comes from the Anahi mine in eastern Bolivia, close to the border with Brazil. Joseph A. Rott of Tropical Imports, New York, had 50 kg of facet-grade rough and 20 kg of mineral specimen–quality material. Mine owner Ramiro Rivero, of Minerales y Metales del Oriente S.R.L. (Santa Cruz, Bolivia), was showing several faceted specimens as well as some rough crystals.

Some of the crystals were fairly well formed, singly terminated prisms; others appeared to have been strongly etched (see, e.g., figure 3). The color zoning ranged from moderate to distinct and in some cases clearly ran the length of the crystal. The presence of so much rough material and the first-hand information from reliable professionals who have visited the source provides abundant evidence that amethyst-citrine occurs naturally.

Apatite from Brazil and Madagascar. We saw approximately 100–200 ct of an intense, dark greenish blue apatite that the dealer, Luizhélio Barreto da Silva Nen, reported was discovered in 1992 at Ibira, a locality near the town of Jacobina in Bahia, Brazil. The material occurs as heavily etched crystals in association with jasper and feldspar. Mr. Barreto also showed us crystal fragments of a very dark, saturated blue apatite from this same locality that, he indicated, has been available for about three years.

We saw greater amounts, both rough and cut, of the bright greenish blue to bluish green apatite from

Figure 3. This strongly etched 836.5-ct amethyst-citrine crystal and 22.32-ct faceted stone are from the Anahi mine, in eastern Bolivia. Crystal courtesy of Joseph A. Rott; stone courtesy of Ramiro Rivero; photo by Maha DeMaggio.

Madagascar that we first noted in the Summer 1990 Gem News section. One dealer was marketing it as "Paraibite." Rudi Cullmann, of Idar-Oberstein, reported that the same area of Madagascar was producing a dark, slightly bluish green apatite that is generally very clean and exhibits no change in color with heat treatment up to 450°C. Subsequent gemological testing on one sample obtained for study revealed properties within the published ranges for this gem material.

Uncommon cat's-eye gems. One firm was offering a 10.90-ct cat's-eye alexandrite (reportedly from Brazil) that exhibited an attractive color change. Another showed a 7.55-ct stone with an attractive, though somewhat less spectacular, color change that is reportedly from Orissa, India. Also seen was a 9.40-ct bicolored tourmaline with the eye centered down the middle of the stone at the junction of the red and green halves.

Gems with natural crystal surfaces. Our Spring 1991 show report included an entry on drusy gems—fashioned gem materials that prominently displayed natural surfaces of minute crystal faces. Drusy gems noted this year include chrysocolla in quartz, sphaerocobaltite, and a bright white pectolite from New Jersey. We noted other materials prepared for gem use with one or more natural surfaces intact. These included a fine-grained black schist embedded with small pyrite crystals and a pyrite with iridescence produced by an intentional acid treatment (according to Bill Heher of Rare Earth Gallery, West Redding, Connecticut; figure 4).

Beryls from the Ukraine. Our Spring 1992 Tucson report contained a brief entry on golden beryl and aquamarine identified as being of Russian origin. This year, some exceptionally large (up to 0.5 m long), transparent yellowish green to greenish yellow beryl crystals and faceted stones, along with rough and cut aquamarine produced by heat treatment, were being offered by Wicast Ltd., Norman, Oklahoma, with the source identified as a large pegmatite at Wolodarsk in the Ukraine.

According to an article in the October 1991 issue of *Mineralien Magazin Lapis*, the pegmatites around Wolodarsk have been known for about 100 years. A Polish geologist, Gottfried Ossovski, was the first to find beryl as well as topaz in these deposits; mining began about 60 years ago. At the time this report was published, the large pegmatites producing gem-quality crystals were being worked at depths of 100 to 150 m. Ninety-six different minerals have been found, although topaz, quartz, and beryl remain the most important. All can occur as large single crystals, some as long as 2 m.

The distinctive surfaces of the beryl crystals (see, e.g., figure 5) are, according to the above-referenced report, the

Figure 4. This 83.29-ct pyrite section was fashioned to display its natural surfaces and then acid treated to induce an attractive iridescence. Courtesy of Bill Heher; photo by Maha DeMaggio.

Figure 5. A large pegmatite at Wolodarsk, Ukraine, produced this 314-gram beryl crystal. Courtesy of Wicast Ltd.; photo by Sky Hall.

result of secondary crystallization. We also learned through a colleague the heat-treatment conditions being used to produce blue stones from the greenish yellow to yellowish green material. First the stones are slowly heated in air to 350°C. This temperature is maintained for roughly 12 hours, at which time the oven is turned off and the stones are allowed to cool slowly. A dealer involved in the treatment and marketing of this material indicated that it is very consistent in its response to heat. It is therefore possible to predict fairly accurately the color that will result by the depth of color and strength of the green component prior to heating.

One of the editors (EF) had been shown similar beryl crystals of Ukrainian origin in Idar-Oberstein, Germany, a few years ago. This material reportedly has been making its way to Europe for several years. What we saw this year at Tucson appears to be the beginning of a serious promotional effort in the United States.

Miscellaneous notes on emeralds. A number of dealers exhibited fine-quality Zambian emeralds, which were deep, slightly yellowish green and had fewer eye-visible inclusions than is typically seen in this material. Most of these stones are said to come from a new vein. Idar-Oberstein dealer Rudi Cullmann reports that the Nigerian "emerald" deposit, which created a debate in the trade over the nomenclature of the green beryls found there, is temporarily inactive.

We also saw emerald from Madagascar. This material, available for some time in Europe, is only starting to surface in the United States. It is slightly darker than average, and slightly yellowish green with a "brightness" that one dealer compared to green cubic zirconia. Specimens examined by one of the editors were relatively clean, with the feldspar inclusions that seemed so prominent in early material from this source conspicuously absent.

Extraterrestrial gem materials. Many collectors find the most fascinating of gem materials to be those that originate from beyond our own planet. At the 1992 Tucson show, we noted jewelry set with "Gibeon class" iron-nickel meteorite from Namibia (Gem News, Summer 1992). There was even more of this material this year, being sold as acid-etched blocks and plates ranging from a few grams to over a kilogram.

Although the editors saw only a few faceted pallasitic peridots like those featured in the article by Sinkankas et al. (*Gems & Gemology*, Spring 1992), at least two vendors were selling free-form "gems" of nickel-iron with peridot (see, e.g., figure 6). This material was reportedly fashioned

Figure 6. This 29.99-ct tongue-shaped cabochon was fashioned from a pallasitic meteorite. Photo by Maha DeMaggio.

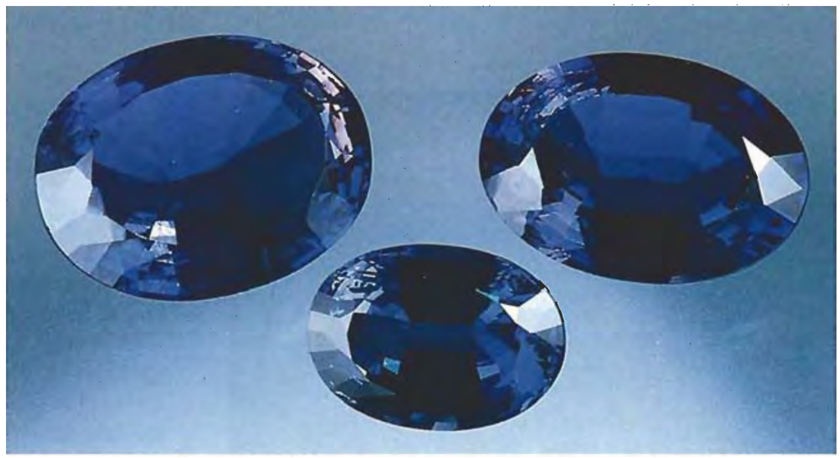

Figure 7. At 43.69, 97.78, and 111.02 ct, these Indian iolites are exceptionally large. Courtesy of Anil B. Dholakia, Adris Oriental Gem & Art Corp.; photo by Nicholas DelRe.

from parts of the large pallasite found in Esquel, Argentina, that was mentioned in the above-referenced article.

A number of natural glasses (known as tektites) were also available. While there is still debate as to whether these are of extraterrestrial origin, it is now more widely accepted that other-worldly forces were involved in their formation (e.g., the impact of meteors). Moldavite was again present in both rough and fashioned form, while tektites such as the black "Indochinites" from Thailand and a similar-appearing material from neighboring China were seen as rough. Also noted were irregular lumps of light yellow Libyan desert glass.

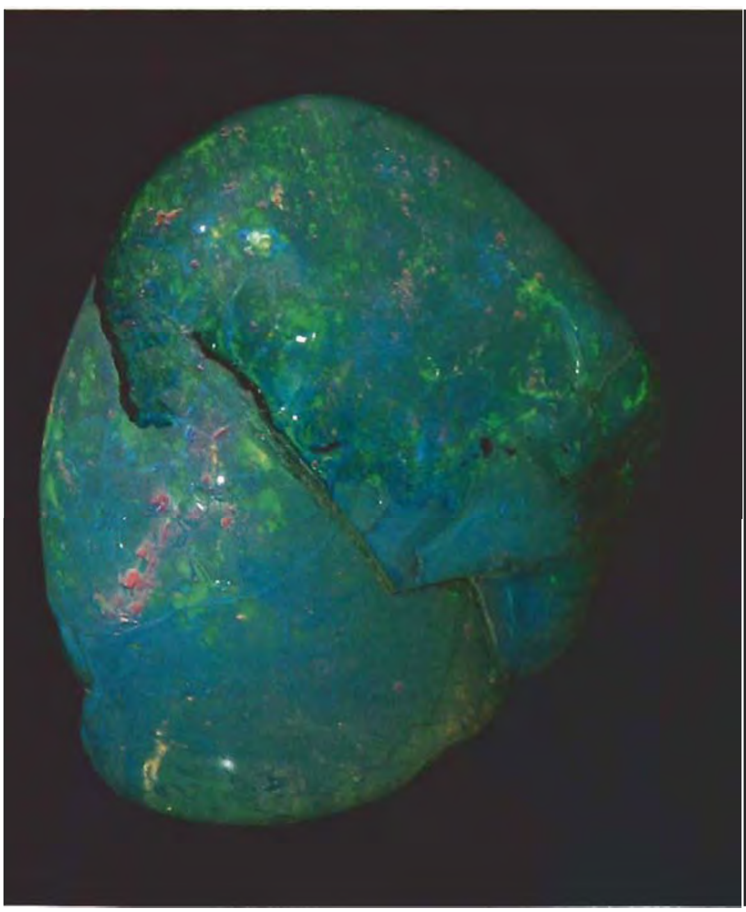

Figure 8. This 600-ct opal was found in northern New South Wales, Australia. Courtesy of Robert and Brendon Cleaver, Silver Orchid, Australia; photo by Robert Weldon.

Some unusually large gems. We saw a number of exceptionally large gemstones this year. Mark Smith from Bangkok had one of the largest faceted sinhalites the editors have seen, an attractive 240.60-ct light brown cushion shape that reportedly was cut from a 465-ct piece of rough recovered at Elapata Village, approximately 6 km north of Ratnapura, in Sri Lanka. The stone is so large that one can actually see doubling of the pavilion facet junctions through the table with the unaided eye.

A number of dealers offered large (up to 17 ct), clean, brown faceted sphenes (titanites) from Sri Lanka. The strong dispersion was nicely enhanced by the medium dark brown body color.

Art Grant, of Coast-to-Coast Rare Stones, Martville, New York, exhibited a fine 673.14-ct faceted pink fluorite from Pakistan that was cut in a modified hexagon. Mr. Grant did not know of any larger faceted pink fluorite from this locality.

The editors have seen few faceted iolites larger than about 10 ct. It was thus with some surprise that we came across three very large stones at one exhibitor's booth. The 43.69-, 97.78-, and 111.02-ct stones (figure 7) reportedly were all cut from a single crystal of Indian origin.

Also seen was an approximately 600-ct opal found in the 1920s at Tintenbar, in northern New South Wales, Australia (figure 8). This unusually large piece of white opal, which shows good play-of-color, formed in a basaltic environment.

Jadeite from the Russian Federation. Although Myanmar (formerly Burma) is the best known and commercially the most important source of jadeite, other localities (e.g., Guatemala) have also produced this gem material. This year at Tucson we were shown jadeite from the Russian

Figure 9. These jadeite cabochons (15.92 and 18.44 ct) were cut from material mined in the Sajany Mountains of the Russian Federation. Photo by Maha DeMaggio.

Federation. Representatives of the renowned Fersman Mineralogical Museum in Moscow were offering some semitranslucent, strongly mottled, grayish green cabochons that resembled Guatemalan material (figure 9), which reportedly came from the Sajany Mountains. The firm White Nights/USIM had small slabs of semitranslucent green jadeite with a very saturated color that a representative identified as coming from south-central Siberia, near Lake Baikal, which is just east of the Sajany Mountains. Therefore, the different specimens may actually originate from the same source.

Gemological testing of a 15.92-ct grayish green round cabochon obtained from the Fersman representatives revealed properties consistent with those published for jadeite, including a strong 437-nm absorption line. X-ray diffraction analysis then confirmed the identification. Examination of a small fragment of the more saturated green material with a desk-model spectroscope revealed the strong absorption lines in the red that are attributed to chromium in jadeite.

Lapidary art. Among the large number of excellent gemstone carvings available at Tucson this year, of particular interest were those that took advantage of the internal features of the host gem to add significantly to its appearance.

Judith Whitehead, of San Francisco, had a pair of 33-mm-long oval cabochons of rock crystal quartz that had been fashioned to place a prominent band of bright red inclusions right down the center of each (figure 10). Magnification revealed the inclusions to be transparent, with the general appearance of hematite or lepidocrocite.

Kusum S. Naotunne, of Ratnapura, Sri Lanka, showed us the unique 14.19-ct zircon illustrated in figure 11. The numerous iridescent discoid fractures that create the aventurescent effect resulted from metamict breakdown of the host. In this instance, the lapidary very carefully placed this layer under the table facet and at an angle just off parallel to the table plane so that the aventurescence would be seen without distracting light reflections from the table surface itself.

Opal from Canada. The February 1993 issue of *Lapidary Journal* contains an article by Paul B. Downing on a recent find of opal in British Columbia, Canada. At Tucson, one of the editors examined some of this material and spoke with Professor Downing and Robert Yorke-Hardy. The latter is involved in the prospecting and recovery of the opal.

The material is found in basalt—sometimes with chalcedony—at a site within approximately 40 km (25 mi.) of the town of Vernon. The opal ranges from transparent to opaque; most exhibits a yellow-to-brown body color reminiscent of material from Mexico, although colorless opal with strong play-of-color has also been found (see, e.g., figure 12), as well as much common opal. Mr. Yorke-Hardy volunteered that most of the effort to date has gone into exploration rather than recovery, and that the true extent of the opal field has yet to be determined.

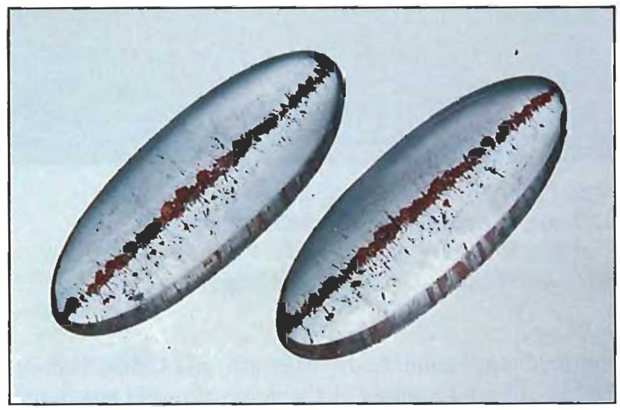

Figure 10. Each of these 33-mm-long quartz cabochons is highlighted by a distinctive band of bright red inclusions. Photo by Maha DeMaggio.

Figure 11. The aventurescence in this 14.19-ct zircon was created through careful orientation of the inclusions. Photo by Maha DeMaggio.

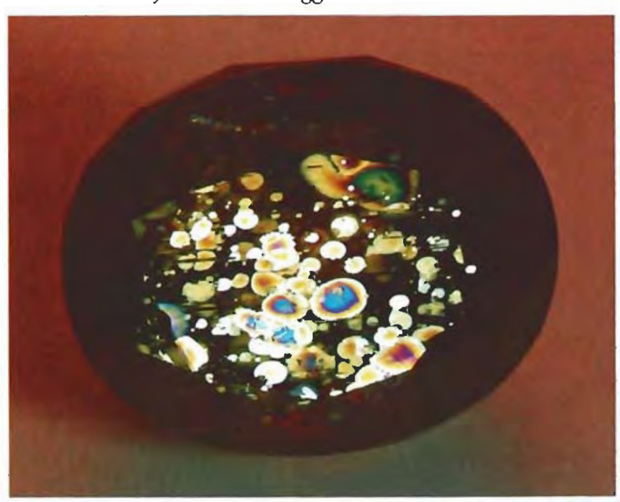

Figure 12. This opal in basalt matrix (32.5 × 29.3 × 31.5 mm) is from British Columbia, Canada. Courtesy Robert W. Yorke-Hardy, Y-H Technical Services Ltd.; photo by Maha DeMaggio.

Cultured pearls from Tahiti, Australia, and China. Tucson dealers offered a number of the cultured pearls purchased at the October 9–10, 1992, auction held in Papeete, Tahiti. This auction is held annually by G.I.E. Poe Rava Nui, an organization that represents several hundred family and cooperative pearl farms in French Polynesia. Approximately 50,000 Tahitian cultured pearls, divided into 120 lots, were offered; all but one lot sold. The average price per cultured pearl was US$100, with the highest price—US$445 each—paid for a lot of 411 pearls in the 10–13 mm range. The success of the auction was primarily attributed to G.I.E.'s emphasis on quality over quantity in their selection of materials. They also limited each lot to one shape (rounds, ovals, etc.) and to goods of comparable value. On our return from Tucson, however, we learned that a devastating cyclone hit French Polynesia in the Tuamotu Archipelago on February 10, causing extensive damage to the cultured pearl industry.

Large, white baroque cultured pearls from Australia were also available, as were high-quality tissue-nucleated cultured pearls from China. The Chinese are working to develop perfectly spherical cultured pearls by means of tissue nucleation.

Figure 13. These natural freshwater pearls and non-nacreous concretions (5.5–8.5 mm in diameter) are from Quebec, Canada. Courtesy of Claudette Bouchard; photo by Robert Weldon.

Natural freshwater pearls from Quebec. Claudette Bouchard and Jean Boisvert, of Aux Pierres Fines Enr., Alma, Quebec, loaned the editors seven natural freshwater pearls and nonnacreous concretions from Quebec (figure 13). These ranged in diameter from 5.5 to 8.5 mm. Some of the concretions were only partially covered with nacre, and a reddish brown one had none. The nacreous parts and pearls showed white to pinkish white body color, and one was purplish pink. All had very high luster. Some had minor holes, indentations, and blemishes; some were "circled" or "ringed." The largest Quebec pearls documented thus far are 9.8 and 10.5 mm in diameter. One pearl and one concretion had been sawn in half; note in figure 13 the concentric-layer structure typical of natural pearls. The X-ray luminescence of these pearls was a weak white glow, as would be expected from river pearls of these body colors.

All of these pearls and concretions had been harvested during the preceding few summers, initially by chance and then by curiosity. They form in a freshwater mollusk from the *Unio* family, which is found in the waterways north of the Lac St. Jean area, around the 50th parallel. These mussels measure between 15 and 20 cm and generally show barbs on their shells. The temperature in this area is known to dip as low as –40°C, and one wonders how these mollusks can survive in such an extreme environment.

"Peeling" pearls. Charles Yousling, of Charles of Fairhaven in Burlington, Washington, encountered uncommon success at Tucson in finding and extracting spherical black cultured pearls—from within their baroque casings. Mr. Yousling recovered the 10.5-mm round pearl illustrated in figure 14 by carefully peeling (with a knife) a baroque Tahitian cultured pearl similar to that shown in the upper left-hand corner. He repeated his success only a few days later, as evidenced by the partially peeled pearl on the right. The "shell" of nacre removed from that specimen is

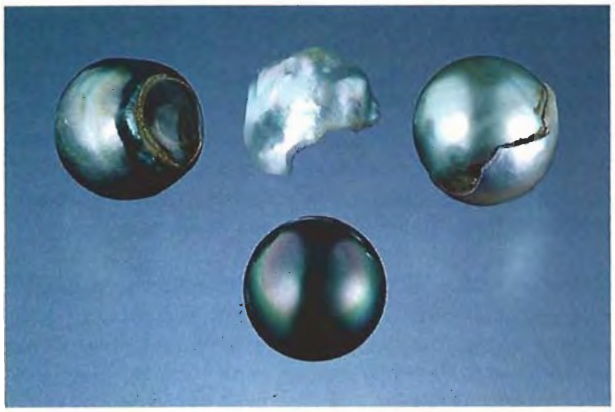

Figure 14. The 10.5-mm round black cultured pearl at the bottom was recovered by peeling a baroque cultured pearl similar to the one at the upper left. Another round cultured pearl (far right) is in the process of being peeled, with the original "skin" shown here in the upper center. Courtesy of Charles Yousling; photo © GIA and Tino Hammid.

shown here in the center. Of the 80–100 baroque Tahitian cultured pearls Mr. Yousling has peeled over the past five years, he has uncovered 10 round pearls. In selecting a possible candidate, he first looks for one that has enough weight to justify the peeling and does not rattle when shaken. Another clue is the ability to transmit light through the first translucent layer of nacre to the one below. A small flashlight is a great help here and, surprisingly, a toothpick: Sometimes the round pearl inside the top layer of nacre can be rotated by careful manipulation through a surface flaw with a toothpick—the trick Mr. Yousling used to find the 10.5-mm pearl. He only selects relatively inexpensive pearls (the one that produced the round bead shown here cost US$20) because of the uncertain outcome of the peeling process. Note from the exposed seed on the baroque cultured pearl in the upper left of figure 14 that the nacre was too thin to enclose a nacreous round bead.

Peridot from Ethiopia. One of the benefits of attending Tucson is the opportunity to see gem materials from new localities. This year proved no exception, with peridot from Ethiopia making its "Tucson debut." Among other dealers, Rudi Cullmann was offering rough that he had received via Nairobi. He and a colleague indicated that the material had first become available in mid-1992.

According to a brief report by Dr. N. R. Barot in the February 1993 issue of the *ICA Gazette* ("Gem deposits discovered in Ethiopia and Somalia"), the peridot was found near the villages of Mega and Magado in the far south of Ethiopia, within the Mega escarpment and about 110 km northeast of Lake Turkana. This represents the northernmost gem deposit found to date in the Mozambique orogenic belt, which runs from Mozambique, through the gem-rich areas of East Africa, to Somalia on the Gulf of Aden. The peridot occurs in basalt "balls" that are scattered on a desert plain. Dr. Barot states that clean, facetable material over 2 grams is rare, an observation consistent with what we saw in Tucson.

In terms of color and the irregular shape of the rough, the material is reminiscent of peridot from the San Carlos Apache Indian Reservation in Arizona. Unlike San Carlos material, however, the Ethiopian rough appears more consistent in color from piece to piece. Seven rough pieces and seven faceted stones were purchased for further investigation (see, e.g., figure 15). Gemological testing revealed properties consistent with peridot from other localities. With magnification, we noted the following internal features in one or more of the fashioned stones: roughly circular decrepitation halo cleavages ("lily pads"); partially healed fractures, some with yellowish staining (possibly limonite); nearly opaque, dark reddish brown octahedra (possibly chromian spinel); and translucent, somewhat brown inclusions, possibly distorted spinel crystals. Also noted were wisp-like streamers that, when abundant, imparted a hazy appearance to the host that was different from a similar effect sometimes seen in peridot because of its strong doubling. All of these internal features have been noted in peridot that formed in similar environments such as Arizona and China.

Red quartz from Mexico. David R. Hargett of New York showed the editors some unusually bright, slightly brown-

Figure 15. Southern Ethiopia is the reported source of these three faceted peridots (the square-cut stone is 2.76 ct). Photo © GIA and Tino Hammid.

Figure 16. This 8.65-ct partially polished piece of red quartz and the accompanying faceted stone appear to be colored by inclusions of the fibrous form of cuprite known as chalcotrichite. Courtesy of David Hargett; photo © GIA and Tino Hammid.

ish red quartz (figure 16) from Mexico. With magnification, we saw a multitude of tiny, randomly oriented red fibers throughout this material. The appearance of the inclusions and the fact that the red quartz was found in the walls of a copper mine in Zacatecas, suggests that they might be the fibrous form of the copper oxide cuprite known as chalcotrichite. EDXRF analysis showed a very high copper content and virtually no iron in the quartz. Previous examples of red quartz have been found to be colored by some type of iron compound such as hematite-stained limonite.

Mr. Hargett indicated that the supply of this red quartz seems to be quite limited, but the actual reserves are not known. Mining for copper minerals is ongoing in the area.

Miscellaneous fashioned curiosities. Art Grant, of Coast-to-Coast Rare Stones, again offered a number of unusual faceted materials, including: a 2.45-ct near-colorless faceted ezcurrite from Argentina (difficult to cut because it "shreds" on the lap); a 2.00-ct probertite from Germany; a 0.14-ct light brown mooreite (as slippery as mica); and a 20.18-ct near-colorless brucite from the Russian Federation.

Gilles Haineault, from Montreal, Quebec, had a roughly square-shaped 1.22-ct faceted leifeite from Mont St. Hilaire, Quebec. Although relatively abundant at Mont St. Hilaire, leifite rarely occurs in transparent pieces.

Transparent rhodochrosite from Colorado. One of the most spectacular gem materials seen at Tucson was rhodochrosite from the recently reopened Sweet Home mine near Alma, Colorado. According to a representative of The Collector's Edge, a firm displaying and marketing this material in both mineral specimen and faceted form, some very rich pockets were uncovered in the latter half of 1992. One of these (the Good Luck pocket, found in September) produced some 500 pieces. Among the faceted stones were a 51.58-ct cushion shape, a 33.39-ct rectangular brilliant, and a 21.51-ct round brilliant, all cut by Michael Gray. These stones were not only exceptionally large, but they were also lighter in tone and more transparent than is typically seen in such material (figure 17). Among the unfashioned specimens was a euhedral crystal, measuring about 10.5 × 10.5 × 6.0 cm, on matrix.

Update on rubies. Rubies from Myanmar (Burma) appeared to be more available this year than last, with several dealers even offering calibrated Burmese melee, a sure sign that the material is abundant. Rubies from Vietnam were also more widely available this year, and the overall quality appeared to be higher. In addition, we saw more truly red stones than previously, when a significant number of the Vietnamese "rubies" offered were actually pink sapphires.

Several dealers had very attractive Afghan stones, some truly red, up to approximately 1.5 ct. These came from renewed production at the well-known Jegdalek locality. Many specimens on matrix were available at the mineral shows. Gary Bowersox, of GeoVision Inc., had one cabochon that was bicolored blue and red, indicating that blue sapphire might be present at the same locality.

South India has long been known as a source of a generally low-end commercial grade of star corundum. This material, which typically shows pronounced hexagonal zoning and a pale brownish red to purple color, is sometimes referred to as "mud ruby" in the gem industry. This year we saw for the first time another type of red to pink

Figure 17. This 5.87-ct rhodochrosite was fashioned by Michael Gray from material recovered in 1992 from the Sweet Home mine near Alma, Colorado. Courtesy of Ralph Mueller and Assocs., Scottsdale, Arizona; photo by Maha DeMaggio.

Figure 18. These ruby and pink sapphire cabochons, ranging from 2.72 to 3.44 ct, are from southern India. Courtesy of Ketan and Anil B. Dholakia, Adris Oriental Gem & Art Corp.; photo by Maha DeMaggio.

corundum, reportedly from Karnataka, about 160 km (100 mi.) south of Mysore in southern India. Although no better than translucent in diaphaneity, the material appeared evenly colored and was a far more attractive, saturated color (figure 18) than the asteriated stones described above.

Miscellaneous notes on sapphires. As one of the most popular of colored stones, sapphires were abundant in Tucson. Thailand, Australia, and Sri Lanka were well represented, with smaller amounts from sources such as Colombia, Montana, Tanzania, and Vietnam.

The firm Gemstone International was offering 20 color-change sapphires, most in the 1- to 3-ct range, although the largest was 7.16 ct. Uncut black "star" sapphires from Mato Grosso, Brazil were also seen this year, as was an unusual collection of parti-colored sapphires from Montana that had been cut to emphasize the color zoning.

Figure 19. These two well-formed crystals (8.62 and 8.38 ct) and faceted stone (3.93 ct) of spessartine garnet are from a recently rediscovered source in Africa. Courtesy of Israel Eliezri, Colgem Ltd.; photo by Maha DeMaggio.

Spessartine garnet from Africa. Also introduced at Tucson this year was an intense orange garnet from a locality in Africa. Various dealers identified the source as Namibia or the Kunene River (which runs along the border between Namibia and Angola). At one of the shows, mineral specimens of this material were labeled "Marienfluss," reportedly the name of a town in northern Namibia.

The vast majority of the material we saw was being marketed by Colgem Ltd. of Ramat-Gan, Israel. It was represented as "Hollandine" in honor of the House of Orange, the royal family of the Netherlands. According to information provided by Israel Eliezri of Colgem, the material was originally found in the late 1800s, by a Dutch adventurer who died before he could start mining. Subsequently forgotten, the locality was only rediscovered recently.

The euhedral crystals typically exhibit 24 faces, with either gyroidal or trapezohedral morphology. Cut stones average 2 ct, with the largest fashioned gem to date weighing 13.77 ct. Two crystals and one fashioned gem (figure 19) were subsequently loaned to the editors for examination. Gemological properties determined on the fashioned piece were as follows: R.I. of 1.791; S.G. of 4.10; and a weak, desaturated orange appearance through the Chelsea filter. Absorption features noted with a desk-model prism spectroscope were an absorption cutoff at about 445 nm, a distinct diffused band just above 460 nm, a stronger and wider diffused band between 480 and 490 nm, and a weak diffused bank from about 525 to 545 nm. Magnification revealed angular and roiled graining throughout the stone; semiparallel, curved fibrous inclusions resembling bysso-

Figure 20. Note the three distinct color zones in this 21.88-ct zoisite. Courtesy of Cynthia Renée; photo by Shane F. McClure.

Figure 21. This unit, the larger of two "LubriGem" systems, was developed in Israel to fill fractures in emeralds.

lite asbestos; and somewhat rounded, transparent, near-colorless crystals (possibly apatite) in a cluster and in association with dark, opaque angular crystals, possibly a manganese oxide.

On the basis of the criteria established by Stockton and Manson (see *Gems & Gemology*, Winter 1985), this garnet should be classified as spessartine. Note, however, that it is not a pure spessartine, as EDXRF analysis identified the presence of a significant amount of Fe and traces of Ti. The very saturated color, which led a number of gemologists at the show to hypothesize that this was pure spessartine, is actually due to Fe–Ti charge transfer absorbing considerable blue light, in addition to the expected Mn features.

Tourmaline from Paraíba, Brazil. The distinctive cuprian tourmaline from Paraíba, Brazil, was again available, although not in great quantities. Most of the stones we saw were small, less than 1 ct. For example, the firm Organizações Manoel Nogueira Ltda. of Minas Gerais, Brazil, had about 1,000 ct of round melee 2.6–3.5 mm. This firm also had an exceptional 4.80-gram bicolored—violetish blue and blue-green—crystal with no eye-visible inclusions, although the well-formed prism faces exhibited distinct striations. A number of dealers had slices of concentrically zoned—watermelon-type—material from Paraíba. We did see some faceted stones in the 2- to 4+-ct range, some reportedly of natural color and others identified by the vendors as having been heat treated.

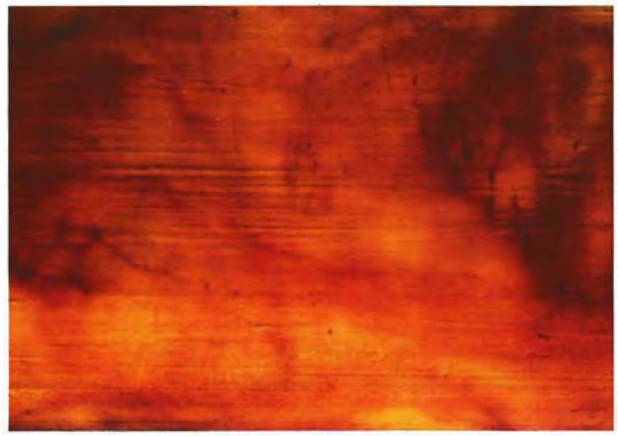

Figure 22. Grain boundaries are evident in this 62-gram reconstructed amber produced in Czechoslovakia. Photo by Maha DeMaggio.

We also saw crystals of dark yellowish green tourmaline with highly reflective, yellow metallic-appearing

Figure 23. Crystal-pulling techniques are being used increasingly to produce materials with gem applications, such as these specimens of synthetic corundum (e.g., the red boule, 18 cm long × 7.5 cm in diameter) and YAG (e.g., the blue wedges, 2.8 cm long × 1 cm thick). Courtesy of Manning International; photo by Nicholas DelRe.

inclusions (see Gem News, Fall 1992, p. 205, for a faceted example). According to Luizhélio Barreto da Silva Nen of Recife, Brazil, this material is found below the levels from which the brightly colored crystals are recovered. Further down, only black schorl is found.

Staff members were also shown some blue-green Paraíba-like tourmaline—the largest, a 52.96-ct pear shape—that was said to come from a new find near Araçuaí in northeast Minas Gerais. A knowledgeable dealer informed one of the editors that tourmaline recently discovered from another locality was being misrepresented as Paraíba material. Although this newer material might resemble that from Paraíba, it reportedly does not respond as well to heat treatment; that is, the resulting colors are not as saturated.

Parti-colored zoisites. A Gem Trade Lab Note in the Winter 1992 *Gems & Gemology* describes and illustrates a distinctly bicolored (violetish blue/yellowish green) 2.52-ct zoisite. We saw a small number of similar-appearing fashioned stones this year at Tucson. One firm, DW Enterprises of Boulder, Colorado, had four faceted stones ranging from 1.50 to 4.29 ct. We also saw a distinctive 21.88-ct cabochon that displayed a green section between two blue zones (figure 20).

When GIA staff members examined some of the rough material described in the article "Gem-Quality Green Zoisite" (N. R. Barot and E. W. Boehm, *Gems & Gemology*, Spring 1992), they noted blue zones in several pieces. Thus, it is quite possible that additional bicolored stones will appear in the trade.

ENHANCEMENTS

Apparatus for fracture filling gems. The Fall 1992 Gem News section contained an entry on a kit for color treating emeralds. This system included a green oil-based dye and used heat—but no pressure or vacuum apparatus—to facilitate penetration into surface-reaching breaks.

This year we saw another system being promoted to enhance the appearance of emeralds (figure 21). Marketed as "LubriGem," it was developed by Zvi Domb, an engineer from Ramat-Hasharon, Israel.

The apparatus uses a thick-walled metal cylinder that is filled to about 50%-60% of its volume with the substance of choice. Mr. Domb has found that cedarwood oil works best with Colombian emeralds, and paraffin works well with Zambian stones. He indicated that synthetic polymers such as Opticon can also be used in his system.

After the filler has been melted and/or reduced in viscosity through heating in the cylinder to approximately 95°–100°C, the stones to be treated are placed in a perforated glass cup and immersed in the filling medium. A spring-driven metal piston is then inserted into the top of the cylinder and tightened by hand to pressurize the contents. Stones are treated from 30 minutes to 12 hours (longer times are recommended for better results), after which the heating element is turned off, and the stones are removed and cleaned with a piece of cloth. The system is available in two sizes, one that accommodates several small cups at a single time, and the other—a portable unit—that can handle only one cup.

SYNTHETICS AND SIMULANTS

Reconstructed amber. Amber was abundant at the shows this year. One substitute for natural block amber seen was reconstructed amber, also known as "pressed amber" and "ambroid." This material, marketed by the firm Solar-X International, was available as unfinished cylinders and blocks, as well as in sectional bracelets. According to a representative of the firm, the material is produced in Czechoslovakia from Baltic amber recovered from the Kaliningrad region of Russia. The representative also volunteered that nothing was added to the amber during reconstruction (R. T. Liddicoat's *Handbook of Gem Identification* [1989] indicates that linseed oil is usually added).

One sample, a 62-gram cylinder (figure 22), was purchased for examination. The material exhibited an aggregate reaction between crossed polarizers and no strain colors; a variegated luminescence to U.V. radiation (long wave—weak to strong chalky bluish white and faint to weak dull brownish yellow; short wave—faint to weak, dull chalky brownish yellowish green); 1.53 spot R.I.; and 1.06 S.G. In addition to enhancing the veil-like brown outlines of the individual pieces of amber (which can also be seen with the unaided eye), magnification revealed several small, round gas bubbles. However, no stretched gas bubbles, which are sometimes associated with pressed amber, were noted.

More "pulled" synthetic materials available. As noted in the Winter 1992 Gem News column, much of the crystal-growth research that has potential relevance to the gem industry involves Czochralski and other pulling techniques. Last year at Tucson, we saw "pulled" blue, green, and pink synthetic sapphires; yttrium aluminum garnet (YAG) in a number of colors; and synthetic alexandrite.

This year the above materials were again being offered, as were synthetic ruby and synthetic pink sapphire in a wider range of tones. According to one vendor, such pulling techniques generally produce large crystals of very uniform color. He indicated that his firm had sold 400,000 carats of "rough" synthetics during the first two months of 1993. Some representative colors of synthetic corundum and YAG are shown in figure 23.

Miscellaneous emerald simulants. Emerald is typically one of the more highly included single-crystal gem materials, and lower-quality stones often exhibit reduced diaphaneity. Therefore, materials with aggregate structures can be faceted to imitate translucent emeralds. Three such materials were seen at Tucson this year: chrysoprase chalcedony from Australia, dyed green chalcedony, and aventurine quartz from India. In particular, about 200 carats of the quartz were being offered by one firm, all emerald cut. The uneven color distribution might cause someone to believe that the stones were low-quality emerald or beryl that had been treated with a colored fracture filler.

UPDATE

1993 Burma Emporium. Prior to making a return visit to the Mogok Stone Tract, Robert E. Kane and Dr. Edward Gübelin attended the 30th annual Gems, Jade, and Pearl Emporium, which was held February 18–28, 1993, in Yangon, Myanmar (formerly Rangoon, Burma). They provided Gem News with the following report.

The Myanma Gems Enterprise (MGE) 30th Emporium concluded with total sales of US$14,657,185, just short of the record $14,839,891 sales at the 27th (1990) Emporium. A total of 654 people, from 16 countries, attended the 1993 Emporium.

Jadeite jade attracted the majority of buyers (458 from Hong Kong alone) and commanded the highest dollar amount, with total sales of $11,472,889. Of the 540 jade lots offered, 343 sold; the reserve asking price was not met on the other 197 lots. It is interesting that this year's auction also featured a small selection of rough maw-sit-sit from the Tawmaw area, in the jadeite-mining district of upper Myanmar.

Pearls cultured in the Mergui Archipelago region of southern Myanmar brought in $642,255. The 179 lots of "gems," the Emporium's third auction category, sold for a total of $1,008,629. These lots were primarily composed of rubies and sapphires (most already cut, although some rough was offered). This year the auction also included small quantities of peridot, various colors of spinel, green tourmaline, danburite, almandine garnet, aquamarine, diopside, enstatite, zircon, colorless topaz, and scapolite. A 21-kg piece of lapis lazuli that sold reportedly came from a deposit just beyond the Dat Taw ruby mine in Mogok. Thirty-three lots comprising 106 faceted diamonds were offered, but only 61 stones in 17 lots sold.

As reported in the article "Status of Ruby and Sapphire Mining in the Mogok Stone Tract," which appeared in the Fall 1992 issue of *Gems & Gemology*, there is an important new mining district in Myanmar, at Monghsu. At the 30th Emporium, 14 lots of Monghsu ruby were offered. Three lots each contained 1,000 carats of small (1,033 pieces in one lot, 1,300 in each of the other two), untreated ruby rough from this exciting new locality. Because the MGE had always taken pride in the fact that none of the rubies and sapphires offered at the Emporium had been subjected to heat treatment, the fact that the 11 remaining lots of faceted Monghsu ruby were prominently labeled as heat treated represented a historic first for the MGE Emporium. However, heat treatment of these stones is necessary to remove the distinct blue, hexagonal zoning (which is oriented down the center of the crystal, along the c-axis) in this naturally dark to very dark, slightly purplish red material. The resulting color is a very attractive medium to dark red that is comparable to fine rubies from Mogok. Mr. Kane and Dr. Gübelin also saw a great deal of faceted, heat-treated Monghsu ruby in Bangkok.

ANNOUNCEMENTS

We are proud to report that *Gems & Gemology* won first place for best professional journal in the 1992 Gold Circle Awards competition sponsored by the American Society of Association Executives (ASAE). In addition, the article "Rubies and Fancy Sapphires from Vietnam" was awarded a certificate of achievement in feature writing—scientific/education, the second highest award in that category. Authored by Robert E. Kane, Shane F. McClure, Robert C. Kammerling, Nguyen Dang Khoa, Carlo Mora, Saverio Repetto, Nguyen Duc Khai, and John I. Koivula, the article appeared in the Fall 1991 issue of *Gems & Gemology.* Of particular interest, given the journal's reputation for fine graphics and color reproduction, is the fact that the "feature writing" award was awarded on the basis of the text only, as required by the rules of the contest.

Editor Alice S. Keller traveled to Washington, D.C., to accept the two awards at the ASAE's 10th Management Conference (figure 24).

Figure 24. Gems & Gemology *Editor Alice Keller (right) accepts the 1992 ASAE award for best professional journal from ASAE Executive Director Quincalee Brown.*

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