GemNews

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Tucson '91

This past February the Gem News editors, along with countless others with an interest in gems and minerals, traveled to Tucson, Arizona, to attend the many concurrent trade shows taking place there. Following are some highlights of this year's event, based on the editors' observations and those provided by other GIA staff members.

Show exhibits of note. Although a number of associations hold annual shows in Tucson during February, the original stimulus for the event is the Tucson Gem & Mineral Show. Each year, TGMS highlights a featured mineral; for 1991 it was azurite. Special exhibits featured outstanding specimens from such institutions as the University of Arizona, Harvard University, and the American Museum of Natural History. The azurites displayed originated from such noted localities as Bisbee, Arizona; Chessy, France; Alice Springs, Australia; and Tsumeb, Namibia. The Sorbonne case also included other, rarer copper minerals such as lavendulan, tetrahedrite, and bornite. Other noteworthy exhibits were the Fabergé jeweled eggs from the Fersman Museum, Moscow, which had not been displayed previously outside the USSR, and the 75-ct Hooker Emerald, from the Smithsonian Institution.

DIAMONDS

Colored diamonds. Although Tucson is not thought of as a "diamonds" show, the number of diamonds offered there increases every year. Particularly notable this year were colored diamonds. These ranged from very small stones of desaturated color – mostly yellows and browns with gray to green overtones – to larger, finer stones with laboratory reports.

However, the majority of the colored diamonds offered appeared to have been treated, most commonly to green, blue, and yellow. The disclosure of treatment appeared to be almost consistently reversed: The fact that a color was natural was "disclosed."

Gem-quality synthetic diamonds from the USSR. Dr. Alexander Godovikov, of the Fersman Museum, allowed the editors and staff members of the GIA Research Department to briefly examine three gem-quality synthetic diamonds that had been manufactured in the Soviet Union (figure 1). All were yellow and small (4 mm on an edge), reportedly grown only for experimental purposes by the high pressure/high temperature method associated with the other known gem-quality synthetic diamonds, using an iron-nickel metal solvent-catalyst. According to Dr. Godovikov, however, the press used is different from the classical belt technology. It is apparently a hydrostatic press, with elements pushing in from six different directions. This reportedly lowers the cost of production. In the very limited time available to examine these synthetic diamonds, we did not see any of the color zoning or graining observed in other types of gem-quality synthetic yellow diamonds.

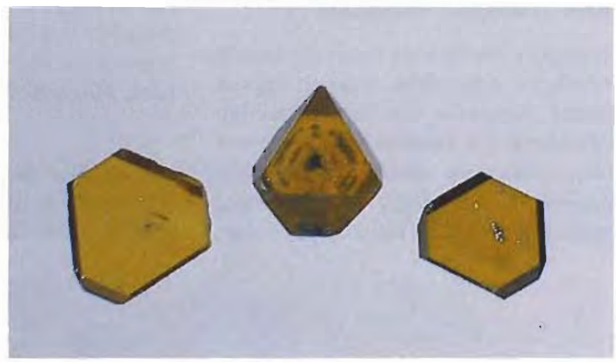


Figure 1. These three yellow gem-quality synthetic diamonds (a 0.29-ct octahedral crystal and two slices, 0.09 ct and 0.15 ct) were grown in Novosibirsk, Siberia, USSR. These samples do not exhibit the color zoning seen in the gem-quality yellow synthetic diamonds grown by Sumitomo and De Beers. Photo by Robert Weldon.

COLORED STONES

Madagascar apatite. In the Summer 1990 Gem News column, we mentioned having seen parcels of saturated bluish green to greenish blue rough apatite that was reportedly from Madagascar. The material was very similar in appearance to some of the tourmaline from Paraíba, Brazil.

This year we saw more of this intensely colored apatite, again identified by vendors as coming from Madagascar. A number of dealers, including Michael and Kathy Williams of House of Williams, Loveland, Colorado, were selling faceted material (figure 2); most of the stones were 1 to 2 ct. The Williamses reported that although large quantities of rough are available, relatively little has been faceted. This is probably due to the extreme sensitivity of the apatite to thermal shock–induced cleaving during fashioning. Mr. Williams has found that the Madagascar material is much more susceptible to such cleaving than is Mexican apatite.

Interesting bead materials. As in past years, a great number of materials were available in bead form. Among the more unusual was dolomite with alternating bands of very dark (blackish) green and light greenish white; the latter gave the appearance of fibrous streaks in the darker mass, producing a sheen at certain angles of observation. Also seen were cylindrical fluorite beads that prominently displayed the material's purple and colorless zoning. Another material available in beads of various shapes was a brecciated pyrite, naturally cemented together with various other materials (figure 3). A vague R.I. reading of 1.54 was obtained on some whitish binding material, indicating that it might be quartz or chalcedony. These may be similar to the pyrite-in-quartz beads described in the Winter 1986 Gem Trade Lab Notes section.

Cat's-eye beryllonite. One of the most unusual phenomenal stones seen was a cat's-eye beryllonite from Afghanistan (figure 4). The 8.49-ct stone, purchased for GIA's permanent collection, has a white body color and an exceptionally strong chatoyant band, so that it looks very much like the fibrous mineral ulexite. This stone,

Figure 2. Faceted blue apatite from Madagascar, like this 0.70-ct round brilliant cut, is similar in color to some of the tourmaline from Paraíba, Brazil. Photo by Maha Smith.

Figure 3. These approximately 15.5-mm disc-shaped beads are composed of a brecciated pyrite. Photo by Maha Smith.

Figure 4. The chatoyancy in this 8.49-ct beryllonite (15.70 × 9.45 × 6.60 mm) is an unusual phenomenon for this material. Photo by Maha Smith.

Figure 5. At 2.89 ct, this is the largest faceted clinohumite that the editors have seen. Stone courtesy of Bill Pinch. Photo by Maha Smith.

however, also exhibits interference colors at both ends which are somewhat reminiscent of an adularescent effect.

Large clinohumite. Clinohumite is a fairly rare collectors' gem from the Pamir Mountains of the Soviet Union. This year we saw an attractive medium dark brownish orange, oval modified brilliant-cut stone that, at 2.89 ct, is the largest that the editors have had the opportunity to examine (figure 5). Magnification revealed primary fluid inclusions and distinct growth zoning. All gemological properties were consistent with those reported in the literature for clinohumite.

Update on corundum. Sapphires, as always, were quite prevalent at Tucson. Many of the larger stones being offered were identified by presumed country of origin and appeared to be priced more on this criterion than on quality. There was again a wide variety of both blue and fancy-color sapphires from Montana. By some estimates, tens of thousands of carats were available. There were a fair number of the yellowish orange stones that some in the trade refer to as "padparadscha." Most prevalent were blue stones and yellow stones of approximately half a carat. Most of the material, with the exception of the blue sapphires from Yogo Gulch, is reportedly heat treated. There appeared to be a general effort to market the Montana sapphire as an American gem. For example, the firm Rio Grande Albuquerque offered Yogo blue sapphire in calibrated sizes separate from other blue sapphires in its Tucson show catalog.

A few dealers offered color-change sapphires. One firm had 19, ranging from under a carat to several carats.

In the 1990 Tucson report, we mentioned sapphire from Brazil. This year we received a number of independent reports of sapphire mining in Minas Gerais and saw several fine-quality stones of over 1 ct that were reportedly from this source. Some of the stones display a color change.

We also saw a large supply of bright red-orange sapphires from the Umba region of Tanzania, stones with a distinctly more saturated color than the so-called African "padparadschas" and with a darker tone than is generally seen in "padparadscha" sapphires.

Rubies from a number of sources were also seen. Cabochon-grade material recently produced in Mozambique is similar in appearance to ruby from Tanzania. It was also learned that the Greek-operated sapphire and ruby mine in neighboring Malawi ceased operation this year due to government intervention. A report on rubies and sapphires from Vietnam is provided in the entry on Vietnamese gem materials below.

Unusual colored stone cuts from Thailand. The Winter 1990 Gem News section carried a report that Thailand, long a colored-stone cutting center, is now fashioning large quantities of cubic zirconia for export. Apparently some of the precision cutting and newer cuts being used on this man-made material are also being applied to different natural gems. D. W. Enterprises of Boulder, Colorado, not only has CZ cut in Chanthaburi, Thailand, but also peridot, amethyst, aquamarine, and andalusite, among other gems. The resulting square and rectangular brilliant cuts are very efficient optically. In the case of andalusite, the cutting also enhances the eye-visible pleochroism of the finished gem (figure 6).

Figure 6. The pleochroism of this 1.78-ct andalusite (8.65 × 5.60 × 4.75 mm) is accented by the gem's rectangular brilliant cut. Photo by Maha Smith.

Figure 7. These brooches in 18k gold feature diamonds, pink tourmalines, and carved drusy agate. Gem carving by Dieter Lorenz, Germany; brooch designs by Susan Helmich, Monument, Colorado. Photo © Sky Hall.

Figure 8. A relatively new find of emeralds and green beryl from the Ural Mountains has entered the world gem market. These stones, the largest of which is 1.70 ct, are representative of a parcel of purportedly Uralian emeralds that were purchased in Israel. Photo © GIA and Tino Hammid.

Drusy gems in jewelry. Among the most interesting materials at Tucson this year were gems that could please both lovers of fashioned stones and lovers of minerals in their natural forms: Although their outlines were shaped by man (some also featuring carved areas), these gem materials prominently displayed natural drusy surfaces of minute individual crystals, the faces of which produced a multitude of scintillating reflections.

Among the gem materials fashioned in this manner, we saw drusy chrysocolla in quartz and drusy pale purple and dyed black quartz, as well as fine-quality lapis lazuli from Afghanistan that displayed broad areas of finely aggregated pyrite inclusions. Bill Heher of Trumbull, Connecticut, had what appeared to be the most extensive selection of these drusy gems: chrysocolla in quartz; white, gray, and orange agate; dioptase; hematite; psilomelane; pyrite; and rhodochrosite. Mr. Heher and others also had bright pink to purplish pink cobaltocalcite, reportedly from Zaire. Many of these gems had been carved in free-form shapes and set with other gem materials (figure 7).

Uralian emeralds. One of the more notable "new" materials to surface at Tucson this year was emerald and green beryl from the Ural Mountains of the Soviet Union. Barbara Lawrence, of Boston Findings, loaned GIA a few faceted specimens for study (figure 8). Most of the stones we saw were fairly small, approximately 1 ct and under. They are slightly yellowish green of light to medium tone and medium to high saturation.

Morganite from Mozambique. Morganite is again being produced in Mozambique, at Alto Ligonha in the border area adjacent to Malawi. The crystals are etched; some are naturally pink (in very light tones), and others are a "peach" color that can be heat treated to pink.

Brazilian opal. A few dealers were selling white opal from the deposit in Piauí State, Brazil. According to James T. Drew, Jr., of Star Gems (Brazil and New York), large, steady quantities of material are now being produced, with significant amounts sent to Hong Kong monthly for cutting.

David Stanley Epstein reports that black opal has also been found in Brazil, near Boi Morta, also in Piauí State. Some of this material seems to be rather porous and does not polish well; according to Mr. Epstein, a number of dealers treat it with Opticon. Some of the material has a very distinct, layered structure to its play-of-color, with blue at the base, followed by successive layers of green, yellow, orange, and—at the top—red.

Cultured pearls. Large quantities of cultured pearls were again available. Numerous sources at the show reported that last year's harvest in the Tahitian Islands was the best since culturing activities began there in earnest in the 1960s. Many strands of black cultured pearls were offered for sale, particularly in the 11 mm to 16 mm range. Strands of the more traditional white South Seas cultured pearls were also available in the same larger sizes.

Arizona peridot. Arizona is the major commercial source of peridot in smaller sizes. Large quantities of both rough and cut Arizona peridot were seen at Tucson. One vendor displayed almost 200 kg of "fairly clean" rough that he claimed would cut 1/4-ct stones.

Some exceptionally large peridots were also for sale this year, including a good-color 131.89-ct stone that was reportedly of Burmese origin.

Bicolored quartz. Amethyst crystals are commonly color zoned, with alternating purple and near-colorless triangular sections. In fashioning, these stones are usually oriented to mask the color zoning, producing a fairly uniform purple when viewed face-up.

The firm of Star Gems has chosen to emphasize rather than obscure this zoning in some of the Brazilian material they cut. The interesting bicolored gems that result are part amethyst and part rock crystal (figure 9).

Cat's-eye rose quartz. There are several varieties of quartz, including some that display optical phenomena. Although asteriated rose quartz is seen with some regularity, cat's-eye rose quartz is much less common. At Tucson, we saw one 8.35-ct oval single cabochon that displayed a strong chatoyant band across the length of its dome (figure 10). We carefully examined the stone to see if it exhibited any intersecting bands around the base—as might be expected were this an intentionally misoriented star stone—but saw none.

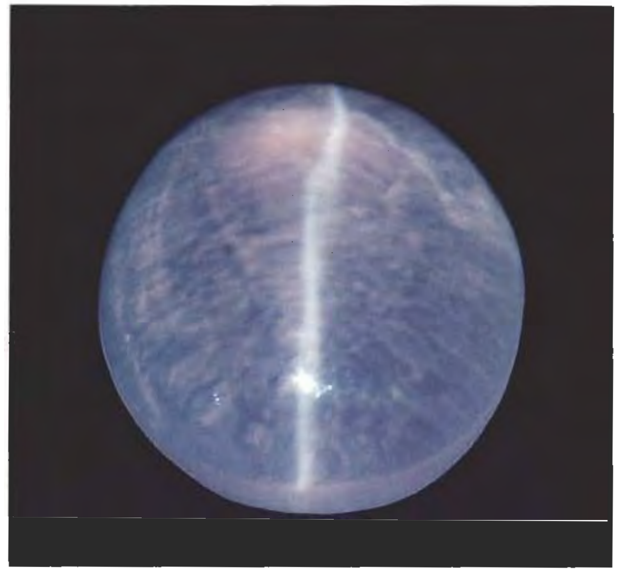


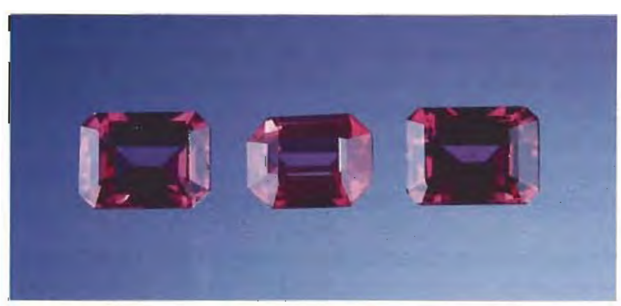
Figure 10. This 8.35-ct rose quartz cabochon displays distinct chatoyancy rather than the more common asterism. Photo by Maha Smith.

Rhodolite from Orissa. The Indian state of Orissa has gained a reputation as a producer of colored stones. In our Spring 1989 Tucson report, we noted almandine garnet coming from this locality; this year we saw rhodolites. We obtained three of these stones (figure 11) for the GIA collection from Amar Jyoti Jain of Fine Gems, in New York. When viewed with fluorescent lighting, the garnets appear fine medium-dark reddish purple; with incandescent lighting, they look more purplish red, a color approaching that of some dark rubellite tourmaline. According to Mr. Jain, the stones come from a mine called Nakta Munda which was discovered in early 1990. The largest rough found will cut stones up to 20 ct, but there are few clean, good-color stones over 10 ct. Most of the better-quality material cuts stones no larger than 4 to 5 ct.

Gemological testing on the three rhodolites we obtained showed that all were within the published ranges for this type of garnet.

Figure 9. The color zoning was intentionally emphasized in cutting these bicolored quartzes (2.14 and 2.30 ct). Photo by Maha Smith.

Figure 11. Orissa, India, is reportedly the source of these three rhodolite garnets (1.86–2.33 ct). Photo by Maha Smith.



Violet cat's-eye scapolite. Scapolite is actually a solid-solution series with end-members marialite and meionite. Considered a collectors' stone, it is seen most commonly as colorless to light yellow and pink to purple transparent gems. Because many of its gemological properties may overlap those of quartz, it may be confused with rock crystal, citrine, and amethyst. Scapolite is also seen in chatoyant form, with reported localities including Burma and Sri Lanka.

One of the more unusual stones we saw this year was a 7.87-ct dark violet cat's-eye scapolite (figure 12) that is strongly reminiscent of iolite. According to the owner, Mark Smith of Bangkok, the stone was mined in Burma. Like iolite, this scapolite also displays strong pleochroism, with dichroic colors of very light grayish blue and dark violet. The other gemological properties determined were consistent with those reported in the literature for the scapolite series. We resolved a uniaxial interference figure from this very dark stone by rigging a small portable polariscope to an intense fiber-optic light source. The birefringence, determined on a polished area of the stone's base, was 0.009. While this is within the range reported for scapolite, it is considerably lower than the 0.016 value reported in Arem's *Color Encyclopedia of Gemstones* for a cat's-eye scapolite of Burmese origin.

Figure 12. Burma is the reported origin for this 7.87-ct cat's-eye scapolite. Photo by Maha Smith.

Update on tanzanite. Reports in the trade press early this year indicated that the Tanzanian government had stepped in to halt the illegal production and distribution of tanzanite. Further clarification was obtained from a number of dealers at Tucson. They report that the Tanzanian army entered the Merelani area without prior notice, and removed as many as 25,000 illegal miners. The army is now patrolling the area and has made the legal miners erect barbed wire fences around their claims. The government has also encouraged patrols by small private armed forces hired by the mining companies; a representative of one mining company told a GIA staff member that they had 40 men under arms.

This activity, however, apparently has not affected the availability of material, as tanzanite was present at Tucson in the greatest ranges of size and color that either editor can remember seeing. In addition to a wealth of stones in the usual size range for jewelry applications, we saw some exceptionally large stones. Pala International of Fallbrook, California, reported that the 77.69- and 122.09-ct tanzanites in their stock were mined only in the second half of 1990. Also noted were some eye-clean, calibre-cut cabochons and the rare greenish material.

Abe Suleman of Tuckman International, Seattle, Washington, provided us with some additional information. Before the military involvement, four new tanzanite-producing holes were struck. Some of the crystals from these new finds have terminations with a pronounced green color due to strong pleochroism; this material heat treats to a "steely" blue color. Other material has a very light appearance that, contrary to expectations, heat treats to a good blue-violet color.

Paraíba tourmaline. The most talked-about stone of last year's show, the cuprian elbaite tourmaline from Paraíba, Brazil, was again at Tucson. Dealers indicated that little gem material has been found outside the hill that constitutes the original claim. Two dealers reported that, to minimize damage, the material is now heat treated at low temperatures (225° to 250°C) for as long as three days.

More on Vietnam gem finds. A number of items have appeared in the international jewelry press recently concerning rubies being mined in Vietnam. Carlo Mora and Saverio Repetto, of Fimo, a Swiss concern, report that they have formed a joint venture between one of their subsidiaries and a government-owned Vietnamese company to set up a cutting and evaluation operation in Ho Chi Minh City. They confirmed the discovery in 1987 of gem-quality rubies and pink sapphires in the Luc Yen area, north of Hanoi. Messrs. Mora and Repetto supplied us with several samples of material that they obtained in Vietnam (figure 13).

Preliminary gemological testing was carried out on 15 faceted stones ranging from 0.14 to 1.45 ct. The refractive index of the ordinary ray ranged from 1.768 to 1.776 and that of the extraordinary ray ranged from 1.760 to 1.768, with a corresponding birefringence of 0.008 to 0.009. The reaction to long-wave ultraviolet radiation ranged from weak to strong red with some zones (corresponding to blue color zones in the stones) being inert. The short-wave reaction was very weak to

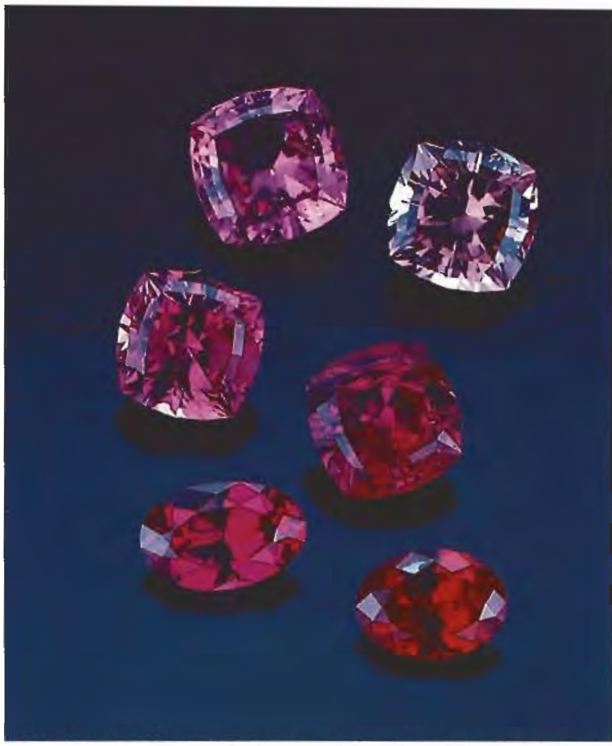


Figure 13. These rubies (the largest is 0.36 ct) are reportedly from the Luc Yen area of Vietnam. Photo © GIA and Tino Hammid.

medium red. Magnification revealed a number of structural features, including strong transparent graining, strong color zoning in red and colorless and/or blue, and laminated twinning. Other internal features noted were secondary healing planes, orangy limonitic(?) staining in fractures, fine pinpoint inclusions in stringers and planes, and small transparent included crystals.

At Tucson, Messrs. Mora and Repetto, and their colleague Madeleine Florida, also supplied samples of sapphires that had been recovered from the Di Linh and East Nam Bo region of southern Vietnam (figure 14). They report that economically exploitable quantities of these blue sapphires as well as some zircon, red spinel, and pyrope garnet have also been found in the country. To date, however, Luc Yen is the only area in Vietnam where organized mining is taking place.

A detailed report on gems from Vietnam is being prepared.

ENHANCEMENTS

Plastic-treated ammonite. René M. Vandervelde of Korite Minerals Ltd. provided information about the iridescent fossilized ammonite mined in Alberta, Canada. He said that his firm continues to recover good quantities of material and showed one of the editors a large (approximately 10 in. [25 cm] in diameter), exceptionally fine specimen that had been mined recently. The material is recovered at depths below 30 ft. (about 10 m).

He also informed us that since 1989 other individuals had been selling some plasticized ammonite. It consisted of surface-collected material that had become unstable due to frost shattering. Apparently, when the Alberta government offered the entire province for mining bids in 1989, there was a rush to stake as much land as possible. The results have been very disappointing, and plasticizing the surface-collected ammonite was one way to salvage at least some of the bid money. By the end of 1990, most of the surface material had been collected, so there is less new plasticized material entering the market today.

Enhanced Paua shell. A number of iridescent shells are used as ornamental materials. One of these is the Paua shell, a type of abalone from the South Pacific. The natural body color is a light, silvery blue, although we have seen material that has been dyed a deeper blue and, in some cases, plastic coated.

One vendor at Tucson was selling a variation on this theme: material that had been dyed a rich green and plastic coated (figure 15). It was being marketed as "Ocean Emerald."

Colored Opticon for emeralds. The use of various substances to fill and thereby obscure surface-reaching fractures in emeralds is widespread. Although most often these substances are used in their natural—essentially colorless to light yellow—states, green oils may be used to impart a darker color to paler stones.

Today, in addition to the more "traditional" oils and natural resins, prepolymer synthetic resins are gaining in popularity, in part no doubt because they can be "set"

Figure 14. These sapphires (the largest is 0.38 ct) are reportedly from southern Vietnam. Photo © GIA and Tino Hammid.

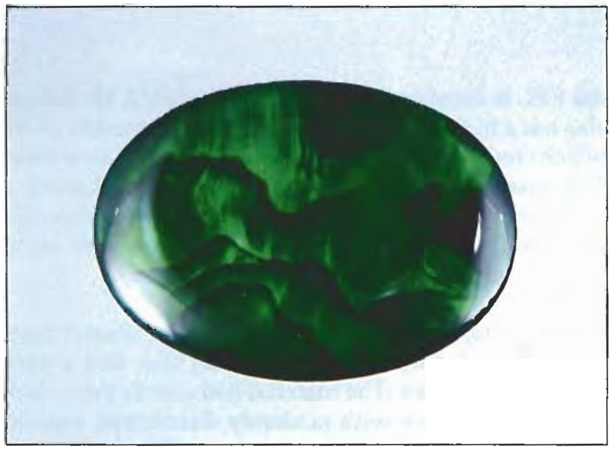


Figure 15. Green dye and a plastic coating have been used to enhance this 8.26-ct (24.90 × 17.90 × 3.47 mm) cabochon of Paua shell. Photo by Maha Smith.

Figure 16. The Czochralski "pulling" method was used to produce these synthetic alexandrites, 3.63 ct. and 1.14 ct Photo by Maha Smith.

(hardened) at the point of entry into the stone, thus sealing the liquid resin within the fracture and enhancing the treatment's durability. The best known of these materials is a colorless substance marketed under the trade name Opticon. At Tucson we learned for the first time, from two Brazilian dealers, that some treaters are adding a green coloring agent to the Opticon.

Heat treatment of ruby in Sri Lanka. To assist the GIA Research Department with its upcoming experiments in heat treating rubies, we approached various ruby dealers to learn more about the techniques used. Of particular interest, Sri Lankan dealers indicated that in their country virtually all rubies are heat treated by a very primitive method, using a blowpipe. The stated purpose is to "diffuse" the color (i.e., reduce color zoning) and remove blackish or violetish areas. The dealers we spoke with reported a 20% to 30% success rate.

More on diffusion-treated sapphires. Gem Source of Las Vegas, Nevada, and Bangkok, Thailand, was again offering blue diffusion-treated sapphires. Jeffery Bergman of Gem Source told one of the editors at the start of the show that he had on hand over 10,000 ct. He also stated that he is seeing a strong demand for calibrated stones, with strongest demand in the 2- to 10-ct range. A number of big stones were being offered, the largest being 21.60 ct; Mr. Bergman said that they were in the process of trying to treat a 37-ct stone. Current capacity is such that over a six-month period Gem Source could produce 100,000 ct of diffusion-treated stones of one carat or less.

In response to our question about the diffusion treatment of colors other than blue, Mr. Bergman stated that he had heard that other people had had some success in producing red colors with the diffusion process, but to date his own efforts had not been satisfactory. His attempts to diffuse chromium oxide into the stones had resulted in the simultaneous development of a blue color component due to the presence of the appropriate chromophores in the starting gem material. The end product has been stones with a purplish cast rather than the desired purer red. He speculated that he might get around this problem by beginning with very pale pink, approaching colorless, rough.

SYNTHETICS AND SIMULANTS

New synthetic alexandrite. J. O. Crystals of Redondo Beach, California, was marketing a new synthetic alexandrite made by the Czochralski "pulling" method. Two specimens (figure 16) were subsequently loaned to GIA for gemological examination.

The faceted stones are rather striking when observed face-up. According to Judith Osmer, each piece is carefully oriented in cutting to take advantage of the strong pleochroism in addition to the color change. These synthetic alexandrites are relatively lighter in tone than what we have come to associate with pulled synthetic alexandrite from other firms such as Kyocera; even in larger sizes this new material is of medium to medium dark tone.

Testing revealed properties generally consistent with those reported in the literature for pulled synthetic alexandrite. Ms. Osmer indicated that the smaller stones she has had cut appeared at first inspection to be quite clean, but some of the larger ones contained minute gas bubbles. Our subsequent examination of 1.14-ct and 3.64-ct faceted specimens revealed growth zoning in both and many minute bubbles in the larger of the two.

Update on Chatham production. Among the items of interest being shown by Chatham Created Gems of San Francisco, California, were some recently grown synthetic emerald crystals that were distinctly "cleaner" than the usual production-run material. These had a slightly flattened habit and weighed 40–60 ct. Also on display were two 1,000+-ct synthetic ruby crystals, with large areas of transparency, that were reportedly grown over a three-year period.

Thomas Chatham offered some statistics relating to production over the past year: 1 million carats of

Figure 17. These 8-mm silicon beads (left) are being marketed as a "lighter" alternative to hematite (right). Photo by Maha Smith.

synthetic ruby, with a 7% to 20% yield in cutting; and 1.4 million carats of synthetic emerald, with a 4% to 20% yield (13%–14% average). He reports manufacturing fewer than 20,000 ct per year of synthetic blue sapphire. Although the firm did produce minor amounts of synthetic "padparadscha" sapphire a few years ago, this production was largely experimental and relatively little of it ever reached the market. According to Mr. Chatham, there are currently no plans to manufacture it commercially.

More on synthetic emeralds. The Biron hydrothermal synthetic emerald, produced in Australia and once promoted as the "Pool Emerald," is now being marketed in the United States under a new name, Kimberley Created Emeralds, by the firm of the same name in New York City.

The firm of Aviv, Inc., of Houston, Texas, is now marketing Soviet hydrothermally grown synthetic emeralds under the name "Émsprit Emerald." Aviv reports that they are currently selling all of the material that they receive from the USSR, approximately 5,000 ct per month.

Man-made hematite simulant. Hematite is a popular gem material for intaglios and beads. To some extent, however, its use in the latter is restricted by its high density: With a specific gravity around 5.20, even relatively short necklaces of larger hematite beads can be very heavy. The most convincing of the man-made simulants, "Hemetine," offers no advantage in this area, having an S.G. of 4.00–7.00.

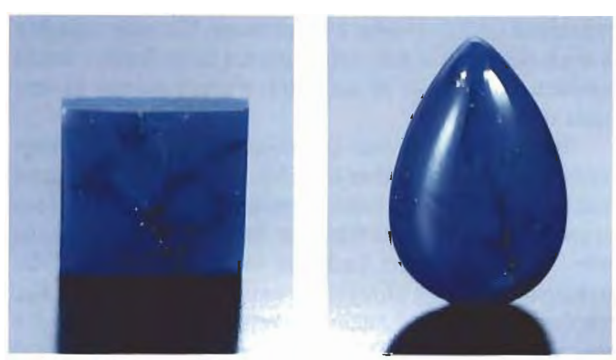
Gems Galore of Mountain View, California, has addressed this "weighty" issue by marketing jewelry items made of silicon, which is produced from a refined melt by the Czochralski method primarily for use in solid-state or semiconductor devices. Sold as beads, earrings, and cabochons under the name "Hemalite" (figure 17), this material has less than half the density of hematite. As we confirmed on a piece donated to GIA, the S.G. is consistent with that of silicon, 2.33. Silicon also has a higher Mohs hardness (7) than hematite (5–6), which could translate to greater "wearability" over time. The material is quite convincing visually, having a medium gray body color and metallic luster, although the natural material has a somewhat darker body color, close to black.

Imitation lapis lazuli. Also seen was a material marketed as "reconstructed" lapis lazuli that had a very natural appearance. The material had a fairly even, dark violetish blue color with randomly distributed, angular grains of pyrite. Two fashioned pieces (figure 18) were purchased for gemological testing. These revealed a spot R.I. of 1.55 and an S.G. of 2.31 ± 0.01. The material was inert to long-wave U.V. radiation and displayed a weak, chalky yellowish fluorescence to short-wave U.V. With magnification, we saw that the pyrite inclusions were raised slightly above the blue host material, indicating that the pyrite was the harder of the two. Some random, shallow whitish areas were also noted.

When placed over the end of a high-intensity fiber-optic illuminator, the material was semitranslucent, passing more light than is typical of natural lapis; only the pyrite inclusions were truly opaque. When viewed through a Chelsea filter while so illuminated, the stone became almost invisible: It apparently absorbed all those wavelengths of visible light passed by the filter's two transmission windows. The stone took on a slightly dark reddish brown cast, however, when viewed through the Chelsea filter with reflected light. The thermal reaction tester produced a weak acrid odor, whitish discolorations, and slight melting (all of which indicate that a plastic-type binder may be present). X-ray diffraction analysis revealed a strong pattern for barium sulfate ($BaSO_4$); it also confirmed that the metallic inclusions were pyrite. Infrared spectrometry identified the bonding agent as a polymer.

Gold in quartz doublets. Whitish vein quartz is the common host rock for gold. Occasionally, native gold in

Figure 18. These pieces of imitation lapis lazuli have a very natural appearance. Photo by Maha Smith.



its quartz matrix — "gold quartz" — is cut into tablets and cabochons for use in jewelry. This year, Canadian Placer Gold Ltd. of Vancouver, B.C., Canada, was marketing assembled stones fashioned from this material. These doublets (figure 19) consist of a relatively thin, flat top section of gold in quartz backed with a somewhat thicker layer of white ceramic. The pieces are sold both loose and as inlay (which protects the edges) in jewelry such as rings.

According to Mark Castagnoli, who fashions these assembled stones, most of the gold quartz he uses comes from mines in Sierra County, California, including the 16-to-1 and the Rush Creek, although some is from British Columbia's Caribou mine. Some of the material is extremely fine grained, bordering on chalcedony, and some pieces also have crystals of pyrrhotite.

Figure 19. A thin (approximately 1.5 mm) layer of gold in quartz is backed with white ceramic to produce this 17.10 × 5.00 × 3.50 mm assembled stone. Photo by Maha Smith.

More Soviet synthetics. Perhaps the greatest novelties at Tucson this year were synthetic gem materials from the Soviet Union. A large variety of these materials were available, some of which are totally new to the gemological community. Many of these materials, however, were only present in very small quantities.

Flux-grown synthetic spinel was available but only in the purplish red color previously reported in Gem News. However, other colors of synthetic spinel reportedly have also been produced.

Flux-grown synthetic alexandrite was also seen, the crystals being relatively small and flat (less than 5 mm thick). The color change is moderate, with a slightly brownish component reminiscent of that seen in natural alexandrite from Sri Lanka.

Hydrothermal synthetic beryl in a range of colors was seen. All of the crystals were small (less than a few centimeters long), with a typical flattened habit. Colors seen include green (synthetic emerald); purplish red, similar to natural red beryl; light blue, similar to natural aquamarine; violetish blue, resembling tanzanite; brownish green, reminiscent of andalusite and some tourmaline; a "turquoise" blue that looked like some Paraíba tourmaline; and an orangy pink that was quite similar in appearance to "padparadscha" sapphire.

A curiosity was an apparently flux-grown synthetic emerald overgrowth on tumbled aquamarine seeds. The material is not really gem quality but shows a beautiful combination of prismatic, basal, primary, and secondary pyramidal crystal faces on the overgrowth material.

Several dealers were offering large quantities of synthetic quartz. Perhaps most noticeable was a medium dark cobalt blue, darker than the cobalt blue quartz previously grown. A rough crystal, several carvings, and faceted stones were loaned to GIA by Stephen Schwartz of Stephen Schwartz & Associates, Los Angeles. Mr. Schwartz reports that the greater depth of color is due to a different position of the cobalt ion in the quartz structure. Some of this material was rather deceptively advertised as "Siberian Blue Quartz." We saw tens if not hundreds of kilos of this material being offered, perhaps in part because of its alleged metaphysical properties.

Other colors of synthetic quartz seen were purple (synthetic amethyst), yellow (synthetic citrine), green (a tourmaline-like color), and a brownish orange reminiscent of dark, heat-treated citrine.

It was also reported by Peter Flusser of Overland Gems, Los Angeles, that gem buyers visiting crystal growers in the Soviet Union have been asked if they are interested in synthetic tanzanite or synthetic tourmaline, thus suggesting that these two materials can be readily grown. Some caution, however, is necessary in interpreting such an offer, as there is apparently no distinction in the Russian language between *synthetic* and *simulant*. Therefore, these inquiries may simply refer to imitation tanzanite and tourmaline, consisting of appropriate colors of synthetic beryl such as those mentioned above. Similar confusion in the past led to a "report" that extremely large gem-quality synthetic diamonds were being grown in the USSR. Clarification later revealed that the "synthetic diamonds" were in fact large CZ crystals.

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