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Tucson 2003

In January-February 2003, the gem and mineral shows in Tucson, Arizona, bustled with activity despite the slow U.S. economy. Although this year revealed fewer novel gem materials or new localities than previously, there were still numerous interesting items on display. Among the highlights was a 44.11 ct intense greenish blue tourmaline that was reportedly from the São José da Batalha mine in Paraíba, Brazil (figure 1). This may be the largest faceted tourmaline from this famous deposit. Of great curiosity was an unusual 18K white gold ring set with calibrated princess-cut jeremejevites from Namibia (see Fall 2002 Gem News International, pp. 264–265), in a range of color from near colorless through shades of blue and violet (figure 2). Another unique piece was shown to us by Edward Johnson of GIA London: a tie pin fashioned into a horse head that made creative use of an unusually shaped diamond crystal (figure 3). Additional items are described in more detail below, and others will appear in the Summer 2003 GNI section. *G&G* thanks our many friends who shared material with us this year.

Figure 1. This 44.11 ct tourmaline is reportedly from Paraíba, Brazil. Courtesy of Sergio Martins, Stone World, São Paulo, Brazil; photo by Robert Weldon.

Figure 2. The calibrated jeremejevites (2.5 and 3 mm) in this ring are from the Erongo Mountains of Namibia. Courtesy of Chris Johnston, Johnston-Namibia C.C., Omaruru, Namibia; photo by Robert Weldon.

Figure 3. The natural diamond crystal (1.5 cm long) in this tie pin, which was manufactured by Manfred Wild of Idar-Oberstein, bears an uncanny resemblance to a horse head. Courtesy of Andreas Guhr, Mineralien Zentrum, Germany; photo by Maha Tannous.

Figure 4. The scenes in these "landscape" agate cabochons (23 mm long) were enhanced by the addition of cobalt salts to create areas of blue "sky." Courtesy of William Heher; photo by Maha Tannous.

COLORED STONES AND ORGANIC MATERIALS

Dyed "landscape" agate. At the AGTA show, William Heher of Rare Earth Mining Co., Trumbull, Connecticut, had some distinctive landscape agate. The agates showed attractive scenes (figure 4), portions of which were created using a proprietary process to add new colors. Approximately 600 pieces were available, in sizes from 12 × 20 mm to over 50 mm. Mr. Heher reported that he purchased the starting material from two old collections in Idar-Oberstein that had been mined years ago in Brazil. Blue colors were created with cobalt salts, and the greens with copper sulfates and other chemicals. The natural landscapes in the agates are sometimes enhanced by heat to improve their appearance (e.g., to improve saturation or change the color from yellow to more reddish hues), depending on the amount of iron staining and the starting color.

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Carved Brazilian bicolored beryl and Nigerian tourmaline. At the AGTA show, gem carver Michael M. Dyber of Rumney, New Hampshire, displayed a collection of carved bicolored beryl from Minas Gerais, Brazil, titled "Optic Art" (see, e.g., figure 5). This collection was created from a parcel of 25 crystals weighing a total of 666 grams, which he purchased from Haissam Elawar, K. Elawar Ltd., Minas Gerais. According to Mr. Elawar, the beryl was mined in 1998 from a pegmatite at the São João mine near Padre Paraiso, Minas Gerais. The production included an unusual variety of beryl colors, from yellow to green to blue. Of the approximately 40 kg of bicolored crystals, about half were gem quality.

Bicolored beryl, mostly from Minas Gerais, has been reported in the past (see, e.g., Winter 1985 Lab Notes, p. 232; Winter 1986 Gem News, p. 246; and A. R. Kampf and C. A Francis, "Beryl gem nodules from the Bananal mine, Minas Gerais, Brazil," Spring 1989 *Gems & Gemology*, pp. 25–29) but facet-grade material is uncommon, and most of

Figure 5. Unusual bicolored beryls from Minas Gerais have been fashioned into attractive gem carvings. Shown here are a 67.50 ct aquamarine/green beryl carving and a 261.1 ct (11.1 × 3.75 cm) bicolored beryl crystal from Brazil. Photo © Sena Dyber, 2003.

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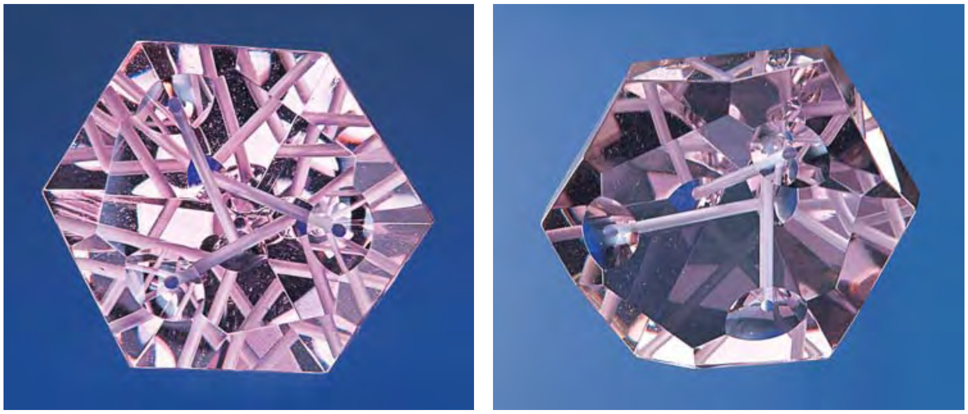


Figure 6. Careful arrangement of facets and tubes in this 89.40 ct carved Nigerian tourmaline produces a clever optical illusion. In the face-up view (left), facet reflections create the appearance of dozens of internal tubes; from the back (right), the true nature of the carving—a mere three tubes—is seen. Courtesy of Michael Dyber; photos by Maha Tannous.

the reported discoveries have been morganite/aquamarine or a combination of colorless beryl (goshenite) with another variety. Aquamarine/green beryl and green beryl/heliodor combinations such as those from the São João mine appear to be considerably rarer. Rains in 2000 collapsed some of the tunnels, but Mr. Elawar reported that there have been recent attempts to reopen this mine, so more of this material may become available in the future.

Also on display at Mr. Dyber's booth was a carving he called "Pink Snowflake," an 89.40 ct Nigerian tourmaline that showed a remarkable optic effect. Viewed through the table (figure 6, left), this carving created a snowflake-like illusion of numerous small tubes intersecting throughout the piece. When viewed from the back (figure 6, right), the true nature became apparent: Only three 1-mm wide tubes had been drilled into the stone, and careful alignment of the tubes and facets created the illusion of many more. The even dimensions and frosted polish of the tubes, called "Luminaires" (see Spring 1999 Gem News, pp. 57–58) were achieved through a proprietary process that Mr. Dyber developed after years of research and experimentation.

Thomas W. Overton

A new saturated purplish pink Cs-"beryl" from Madagascar: Preliminary analyses. One of the most exciting materials to debut at Tucson this year was deep purplish pink "beryl" from a new find in Madagascar. In addition to its color, this material was particularly interesting because it showed anomalous properties for beryl (e.g., higher refractive indices than previously known), which were attributed to very high concentrations of cesium (Cs). The primary suppliers were Polychrome (Laurent Thomas, Chambray-les-Tours, France), Le Minéral Brut (Denis Gravier and Fabrice Danet, Saint-Jean-le-Vieux, France), and MJ3 Inc. (Marc Jobin, New York). The material was sold as "red beryl," "raspberyl," and "hot pink-red beryl." Combined, these dealers had about 5 kg of rough and a small number of faceted stones and cabochons at Tucson, although additional pieces were cut during the show. The largest supplier of rough was Mr.

Figure 7. In mid-November 2002, an usual Cs-"beryl" showing a deep purplish pink color was found at this mine, located near the village of Mandrosonoro in central Madagascar. The underground workings are located to the lower left of the photo. Photo by Laurent Thomas.

Thomas, who had approximately 0.5 kg for cutting faceted gemstones or cat's-eye cabochons, 2 kg that were carving quality, and 1 kg of crystal specimens. The material is referred to here as "beryl" in quotation marks, because work is still in progress to determine its mineralogical identity (see below).

GIA was first notified about this unusual new material by Tom Cushman (Allerton Cushman & Co., Sun Valley, Idaho), who obtained a crystal during a buying trip to Madagascar in December 2002 and subsequently donated it for research. According to Dr. Federico Pezzotta (Natural History Museum, Milan, Italy) and Mr. Thomas, both of whom were in Madagascar during the discovery, the deep pink "beryl" was mined in mid-November 2002 from a pegmatite located a few kilometers south of the village of Mandrosonoro, which is 140 km by dirt road west of Ambatofinandrahana in central Madagascar (figure 7). Mr. Thomas visited the mine soon after the pocket was discovered, but he had to flee the area when he drew gunfire. It is not surprising that foreigners are not welcome there, since Mandrosonoro is considered to be among the most dangerous areas in Madagascar.

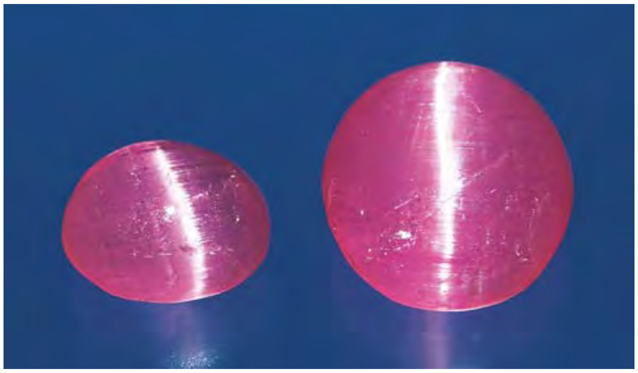
The almost vertical pegmatite, which measures about 4–6 m thick and over 200 m long, was originally explored by French colonists for tourmaline. Recent mining by local people resulted in the discovery of the pink "beryl" about 6 m below the surface. It was recovered from a single large pocket containing mostly smoky quartz, multicolored tourmaline, and pink or yellow-green spodumene; amazonite, cleavelandite (albite), lepidolite, and danburite also were found in this pocket.

The "beryl" has been seen to occur in three different morphologies: (1) large flattened masses (up to 8 cm in diameter) of irregular shape that grew interstitially to other minerals in the pocket; (2) well-formed tabular hexagonal crystals up to 6–7 cm in diameter, occasionally in aggregates (figure 8); and (3) euhedral, small (up to a few millimeters in diameter), tabular-to-elongate crystals on the faces of large tourmaline crystals. The unusual elongate crystals formed by parallel intergrowth of numerous tabular crystals.

Figure 8. Well-formed tabular crystals and aggregates of pink Cs-"beryl" (here, up to 3 cm) created excitement at the 2003 Tucson gem shows. Courtesy of Stuart Wilensky and Irv Brown; photo © Jeff Scovil.

According to Dr. Pezzotta, the production of deep pink "beryl" amounted to 40 kg of crystals and fragments of variable quality, and many tens of kilograms of low-quality fragments and deeply corroded crystals. Gemmy portions in crystals are rare and very limited in size, so faceted stones are typically small and/or contain eye-visible inclusions (figure 9, left). Some of the material is of carving quality, and a small proportion contains microscopic tubes parallel to the c-axis in sufficient abundance to yield attractive chatoyant gems (figure 9, right). The color is similar to pink tourmaline, and in fact one piece of tourmaline was discovered in a parcel of samples that GIA obtained for research.

Figure 9. Faceted examples of the Cs-"beryl" are uncommon, since much of the rough is heavily included. The samples on the left (0.89–1.02 ct, courtesy of Mark Kaufman) show characteristic growth tubes, fractures, and fluid inclusions. The cabochons on the right show attractive chatoyancy; they are courtesy of Mark Kaufman (1.84 ct) and Herb Obodda (4.11 ct). Photos by Maha Tannous.



Six samples were gemologically characterized by contributors SFM and EPQ: two faceted stones (0.89 and 1.02 ct), two cat's-eye cabochons (1.84 and 4.11 ct), one crystal specimen (7.5 grams), and one partially polished crystal fragment (1.64 ct). The properties are reported in table 1. The R.I. and S.G. values are significantly higher than those reported for morganite (e.g., n_o=1.578–1.600, n_e=1.572–1.592, and S.G.= 2.80–2.90; R. Webster, *Gems*, 5th ed., revised by P. Read, Butterworth-Heinemann, Oxford, England, 1994, p. 128), as well as other beryl varieties. In addition, morganite has no characteristic absorption spectrum (Webster, 1994). Although the dealers who supplied the samples were not aware of any clarity enhancement, all samples showed fractures of low relief, some of which contained air bubbles that contracted when exposed to a thermal reaction tester, indicating the presence of a filling substance. Subsequently we learned from Dudley Blauwet (Dudley Blauwet Gems, Louisville, Colorado) that all of the purplish pink "beryl" rough he had purchased was oiled by the local Madagascar dealers. He reported that the oiling enables them to see into the rough more easily (because of the slight etching on most of the crystal surfaces), and it appears to be done with mineral oil that is manually applied rather than pressure injected.

On a separate crystal (5 mm in diameter; figure 10) that was donated by Mr. Thomas to the University of New Orleans, WBS obtained refractive indices of n_o=1.616 and n_e=1.608 by immersion in Cargille oils (in white light, Na corrected). A measured density of 2.97 was obtained with a Berman density balance, and a calculated density of 3.012 was obtained using unit-cell dimensions (from powder X-ray diffraction analysis) and the average chemical composition of the core (from electron microprobe analysis; see below). The relatively low density of this sample, compared to those examined above, is probably due to the presence of numerous fluid inclusions.

Preliminary chemical analyses of two samples with energy-dispersive spectrometry (performed by Dr. Alessandro Guastoni of the Natural History Museum, Milan) revealed high concentrations of Cs, with the strongest enrichment in the rims of the crystals. Quantitative chemical analysis with an electron microprobe at the University of New Orleans was performed by WBS and AUF on the 5-mm-diameter crystal mentioned above. This sample had a purplish pink core and a pale pinkish orange rim that were separated by a sharp boundary (again, see figure 10). Several point analyses of a slice taken perpendicular to the c-axis revealed an average of 13.57 wt.% Cs_2O in the core and 15.33 wt.% Cs_2O in the rim (table 2). This is significantly more Cs than previously reported in beryl (11.3 wt.% Cs_2O in morganite from Antsirabe, Madagascar; see H. T. Evans and M. E. Mrose, "Crystal chemical studies of cesium beryl," *Program & Abstracts*, Geological Society of America Annual Meeting, San Francisco, 1966, p. 63). Minor amounts of Rb, Na, and K also were detected. Inductively coupled plasma (ICP) analysis of a portion of the crystal showed 2.16 wt.% Li_2O. The water content, obtained by the LOI (loss on ignition) method, is 1.72 wt.%. Some of the water, as well as the 0.30 wt.% B_2O_3 measured by ICP, is attributed to the presence of abundant fluid inclusions.

Structural refinement of four samples by FCH showed that the Cs resides (and is dominant) in the 2a site in the channel of the mineral's structure. Cs substitutes for a vacancy in the channel, and electroneutrality is maintained by an accompanying substitution of Li for Be at the tetrahedrally coordinated beryllium site. Minor Na occupies the 2b channel site. The end-member composition could therefore be represented as $Cs[Be_2Li]Al_2Si_6O_{18}$. As such, this interesting gem material has been submitted to the International Mineralogical Association as a new mineral of the beryl group (along with beryl, bazzite, and stoppaniite).

Vis-NIR spectroscopy by GRR showed bands centered at 494 and 563 nm when the beam was polarized perpendicular to the c-axis (figure 11). The maximum transmission was seen near 630 nm (orangy red) and 400 nm (deep violet), which provided the pink-orange color in this direction. When the polarization was parallel to the c-axis, the spectrum was dominated by a band centered at 572 nm. Transmissions in the red and blue-to-violet regions of the spectrum combined to produce the purplish pink color for light polarized in this direction. These absorption characteristics are consistent with Mn^{3+} and are similar to the spectra of pink beryls that have been interpreted in terms of Mn^{3+} (see A. N. Platonov et al., "On two colour types of Mn^{3+}-bearing beryls," *Zeitschrift der Deutschen Gemmologischen Gesellschaft*, Vol. 38, 1989, pp. 147–154).

TABLE 1. Properties of six samples of purplish pink Cs-"beryl" from Madagascar.

Property	Description
Color	Purplish pink with moderate dichroism: pink-orange (ω ray) and purplish pink to pinkish purple (ε ray)
R.I.	n_o=1.616–1.617, n_e=1.608; spot reading = 1.61 (cabochons)
Birefringence	0.008–0.009
Optic character	Uniaxial negative, with two samples showing anomalous biaxial optics, possibly due to strain
S.G.	3.04–3.14, with most values near 3.10
Chelsea filter reaction	Orangy pink to pink
UV fluorescence	Inert to long- and short-wave UV radiation
Absorption spectra	With the desk-model spectroscope, all samples showed an absorption band at approximately 485–500 nm, and five samples showed weak lines at 465 and 477 nm and a weak band at 550–580 nm
Internal features	Growth tubes, fractures, "fingerprints," and fluid inclusions; two samples contained low-relief, birefringent inclusions

In heating experiments by GRR, crystal fragments heated at 250°C and 350°C for two hours maintained their color. A fragment heated at 450°C for 2 hours suffered near total loss of color. The sample regained nearly all its pink color upon irradiation with 6 megarads of Cs-137 gamma rays. This sensitivity to heating and irradiation suggests that the color is caused by radiation-induced color centers involving Mn^{3+}. However, the color and optical spectrum of the new Cs-"beryl" are different from those of the red beryl from Utah, which is also colored by Mn^{3+} (Platonov et al., 1989).

Raman spectrometry of the Cs-"beryl" showed shifts in some peak positions and intensities when compared to morganite and near-colorless beryl from Brazil. Likewise, some of the bands in the infrared spectrum were shifted in comparison to morganite and near-colorless beryl. The powder X-ray diffraction pattern was unique, with missing peaks and slight shifts in peak positions, as compared to the beryl pattern. Evans and Mrose (1966) also documented intensity differences in the X-ray diffraction patterns of Cs-rich beryl. Likewise, Cs has been shown to increase R.I. values (P. Černý and F. C. Hawthorne, "Refractive indices versus alkali contents in beryl: General limitations and applications to some pegmatitic types," *Canadian Mineralogist*, Vol. 14, 1976, pp. 491–497). Since Cs is a relatively heavy element, high concentrations of it would also be expected to increase S.G. values, as recorded in the samples we examined. Further information on this Cs-"beryl" is being prepared by these researchers for publication in the mineralogical and gemological literature.

Figure 10. This crystal of Cs-"beryl" displays a pale pinkish orange overgrowth over a purplish pink core. Electron-microprobe analyses showed slightly more Cs in the rim. Courtesy of Laurent Thomas; photo by W. Simmons.

TABLE 2. Chemical analyses of a Cs-"beryl" from Mandrosonoro, Madagascar, with a purplish pink core and a pale pinkish orange rim.[a]

Chemical composition	Core	Rim
Oxide (wt.%)		
SiO_2	56.52	55.99
Al_2O_3	15.60	15.68
Sc_2O_3	0.03	0.03
BeO calc	8.05	7.99
MnO	0.09	0.06
Li_2O[a]	*2.16*	*2.16*
Na_2O	0.52	0.46
K_2O	0.15	0.03
Rb_2O	0.76	0.68
Cs_2O	13.57	15.33
H_2O[a]	*1.72*	*1.72*
Total	99.17	100.13
Ions[b]		
Si	6.050	6.024
Al	1.968	1.988
Sc	0.003	0.003
Be	2.070	2.065
Mn	0.008	0.006
Li	0.930	0.935
Na	0.107	0.097
K	0.021	0.004
Rb	0.052	0.047
Cs	0.619	0.703

[a] *Except for Li and H_2O (one bulk analysis each, by ICP and LOI, respectively), data represent averages of nine analyses of the core and eight analyses of the rim, by electron microprobe. Below detection limits (in wt.%) were TiO_2 (0.002), FeO (0.02), MgO (0.01), and CaO (0.07).*

[b] *Calculated per 18 oxygens (water excluded, Be+Li=3).*

Figure 11. Vis-NIR spectra of a 5.08-mm-thick slice of Cs-"beryl" were dominated by bands centered at 494 and 563 nm when polarized perpendicular (⊥) to the c-axis, and a band centered at 572 nm when polarized parallel (||) to c. The difference in these absorptions accounts for the moderate dichroism in purplish pink (ε ray) and pink-orange (ω ray).

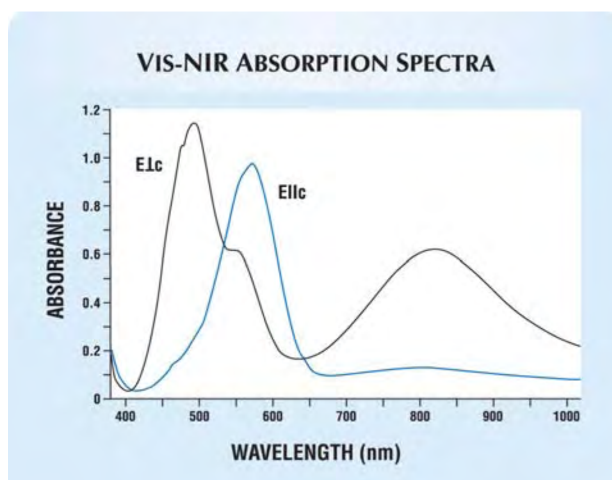


Figure 12. Bill Larson (left) and Nicolai Kuznetsov examine some of the demantoid rough that was recently recovered from the Kladovka mine in Russia's Ural Mountains. Photo © Jeff Scovil.

Figure 13. These rough nodules (up to 4+ grams) and faceted stones (3.31 and 4.21 ct) show the range of color of demantoid from the Kladovka mine. Photo © Jeff Scovil.

Acknowledgments: The contributors thank the following for loaning and/or donating research specimens: Mark Kaufman, Kaufman Enterprises, San Diego; Dudley Blauwet; Laurent Thomas; Denis Gravier and Fabrice Danet; Tom Cushman; Alain Andrianjafy, Antananarivo, Madagascar; Marc Jobin; Herb Obodda, H. Obodda, Short Hills, New Jersey; Stuart Wilensky, Stuart and Donna Wilensky Fine Minerals, Wurtsboro, New York; and Irv Brown, Irv Brown Fine Minerals, Fallbrook, California.

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BML

A new find of demantoid at a historic site in Kladovka, Russia. At the AGTA show, Bill Larson of Pala International, Fallbrook, California, had large quantities of rough and fine cut demantoid garnets from a recently rediscovered primary deposit in the historic Sissertsk district in the Ural Mountains (figure 12). The Kladovka mine is located about 10 km from the city of Kladovka, which is a two-hour drive south of Ekaterinburg. In the past, primary deposits in this area produced mostly mineral specimens, while nearby placers yielded significant amounts of gem rough (W. R. Phillips and A. S. Talantsev, "Russian demantoid, czar of the garnet family," Summer 1996 *Gems & Gemology*, pp. 100–111).

Mr. Larson and his partner, Nicolai Kuznetsov of Moscow-based Stone Flower Co., helped fund an Ekaterinburg team of prospectors who began exploring the area in May 2002 after researching the historic localities of this czarist gem, first discovered in Russia in the mid-19th century. By July 2002, the prospectors were on the verge of abandoning their search in the heavily forested area when they rediscovered an old mining pit and exposed a "vein" containing demantoid. The garnets formed rounded nodules and aggregates along this vertical horizon in the sheared serpentinite host rock, which varied from a few centimeters up to 50 cm wide.

According to Mr. Larson, Pala International has obtained 8.3 kg of rough of variable color, from yellowish or brownish green to bright green. Approximately 600 grams is of top cutting grade. A significant portion will cut stones exceeding 1 ct each; however, gems over three carats (see, e.g., figure 13) are very rare. The largest gem faceted so far weighed 6.71 ct. "Horsetail" inclusions are present in some of the material.

The demantoid was produced from a pit measuring about 500 × 200 m and up to 12 m deep, which was excavated from the low hillside using backhoes and manual labor. A pump is used to remove water from the pit. The mining season lasts just four to six months, and as many as six miners worked the pit this past summer. Depending on the weather, this year's season should start in May.

Mr. Larson indicated that unlike the demantoid from the Karkodino mine (also in the Ural Mountains)—much of which is treated by a simple heating process to remove the brownish color component—the material from Kladovka has not been treated in any way. For more information on the Kladovka demantoid, visit the Web site www.palagems.com/demantoid_garnet.htm.

BML

Figure 14. At Juniper Ridge, in southern Oregon, fire opal is mined from a shallow pit. Here, fee diggers are extracting opal with simple hand tools. Photo by Ken Newnham.

Fire opal from Juniper Ridge, Oregon. At the GLDA show, Terry Clark and Don Buford of Dust Devil Mining Co., Cloverdale, Oregon, showed one of these contributors (BML) some attractive faceted fire opal from the Juniper Ridge deposit in southern Oregon. The samples were provided to them by Ken Newnham of Klamath Falls, Oregon, who is one of the claim owners. The diggings (figure 14) are located on the border of Klamath and Lake Counties, south of Quartz Mountain, at an elevation of about 6,000 feet (1,830 m).

According the Mr. Newnham, who has worked the deposit since the late 1990s, the opal forms as seams and nodules within a volcanic host rock (figure 15). The largest nodule found so far weighed about 12 pounds (5.4 kg), and fist-size pieces are common (figure 16). Transparent colors range from very light "lemon" yellow to a saturated brownish orange, and translucent-to-opaque material is white to brown and black. The distribution by diaphaneity is 32% opaque, 40% cabochon grade, 20% "commercial" facet grade, and 8% fine facet grade. Some of the material contains attractive dendritic inclusions.

Not until 2002, when about 1,000 pounds (454 kg) of

Figure 15. The Juniper Ridge fire opal commonly forms large nodules in the volcanic host rock. Photo by Ken Newnham.

Figure 16. Fist-size pieces of fire opal are common at Juniper Ridge. Photo by Ken Newnham.

Figure 17. These fire opals (1.39–5.48 ct) show the range of color of transparent material from the Juniper Ridge deposit. Courtesy of John Bailey; photo by Maha Tannous.

rough fire opal were recovered, did the mine prove to be a commercial source. Most of this material was produced via fee digging (again, see figure 14), and Mr. Newnham estimates that the mine owners and fee-dig patrons have faceted about 1,000 stones and cut a few hundred cabochons over the past two years.

To date, most of the mining has been done with hand tools and jackhammers. The mine owners plan to use an excavator during the upcoming mining season, which typically runs from June to October. Mr. Newnham reported that crazing of the opal is not problematic, but as a precaution the rough is cut into pieces and "cured" for at least one year in the dry atmosphere of Klamath Falls before it is fashioned. A damp cloth or damp sand is positioned nearby to buffer the drying process. The material is not treated in any way.

Mr. Newnham and his colleague John Bailey (also of Klamath Falls) donated several rough and faceted samples of the fire opal to GIA. Six faceted stones (figure 17), which weighed from 1.39 to 5.48 ct and represented the range of color from this locality, were selected for gemological examination by one of us (EPQ). The following properties were obtained: color—reddish brown-orange, brownish orange, and brownish yellow; R.I.—1.459 to 1.462; singly refractive with weak to strong anomalous double refraction; S.G.—2.15 to 2.18; the brownish yellow opals were inert to long-wave and had only a very weak chalky green fluorescence to short-wave UV radiation, and all the other samples were inert to both wavelengths. Microscopic examination revealed a hazy appearance, fluid inclusions, crystals (near colorless and birefringent), a flow-like structure, and color zoning. Two of the stones contained interesting black opaque plume-like dendrites.

BML and
Elizabeth P. Quinn
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Figure 18. This "Diamond in a Pearl™" pendant and the matching earrings were created from black freshwater cultured pearls (8–9 mm in diameter), each set with diamonds weighing 0.04 ct that are mounted in 14K white gold. Photo by Maha Tannous.

Cultured pearls with diamond insets. Jewelry designer Chi H. Galatea of San Dimas, California, has developed a new procedure for setting small diamonds into cultured pearls (figure 18). The "Diamond in a Pearl™" jewelry (patent pending) was shown at the Galatea booth at the AGTA show. The process involves setting small (up to 0.20 ct) diamonds into a drilled hole in a cultured pearl using a gold or platinum sleeve. Both freshwater and Tahitian cultured pearls are used. Some of the Tahitian cultured pearls are further enhanced by carving into fanciful designs. The resulting gems have been used for rings, earrings, and pendants.

Thomas W. Overton

Effect of cutting on the appearance of spinel. At the AGTA show, David Clay Zava of Zava Master-Cut Gems, Fallbrook, California, had a parcel of 13 red spinels that were all cut from a single piece of rough. The waterworn crystal weighed approximately 300 grams and was mined from He An, Vietnam. Although fractured, it appeared to be of homogenous color before cutting. The faceted stones ranged from 1.41 to 7.94 ct, with a total weight of 59.25 carats. The shapes included pear, shield, cushion, oval, trillion, round, rectangle, and parallelogram.

As seen in figure 19, the stones show some significant variations in color and overall face-up appearance. This suite provides an interesting example of what a single, homogeneous spinel crystal can produce when various faceting shapes are used for the different sizes.

BML

INSTRUMENTS AND TECHNIQUES

Gem*e*wizard™ gem communication and trading software. This new computer program was unveiled at the International Colored Gemstone Association (ICA) Congress in January 2003; hands-on demonstrations were later provided in Tucson by Gem*e*wizard Ltd. (Ramat Gan, Israel) and Stuller Inc. (Lafayette, Louisiana) at the GJX and AGTA shows, respectively. Developed by Menahem Sevdermish of Advanced Quality (Ramat Gan), this patent-pending system is designed to assist jewelers and gem dealers in communicating gem colors, managing their inventories of gemstones, and special ordering loose diamonds and colored stones for their customers. It is being distributed in the U.S. by Stuller Inc.

Mr. Sevdermish reported that Gem*e*wizard's gem color communication scheme is based on the colored stone grading system taught in GIA's Graduate Gemology program, and was developed from a database of more than 11,000 digital gem images. It is capable of displaying 1,296 gem colors and nearly 20,000 recreated gem images, directly on a laptop or desktop computer screen. Although the developers recognize that colors may appear different from one monitor to the next, they feel that newer LCD monitors (developed over the last two years) provide good consistency of color across most computers.

According to the company's Web site (www.gemewizard.com), the program can operate in two different modes: Gem*e*mode for colored stones (see figure 20) and Diamond Mode for diamonds. Gem*e*mode has two separate color selection systems. Using the first, Gem*e*square (see figure 21), users can specify hue, tone, saturation, and shape from "sliding rulers," and then search for these parameters among gems in their inventory or the inventories of various suppliers. Using Base Square (Stuller Square in the U.S.), users can display the color spectrum of gemstones available in a supplier's inventory. Base Square can adjust pricing to reflect a jeweler's markup. Information on individual stones can be called up as needed, including measurements, quality of cut, and an image of the actual stone, in addition to gem lore that can assist in the selling process.

Diamond Mode allows the selection of diamonds with various combinations of the "4 Cs." The user can also search based on the presence of a report from a specific laboratory.

The program is intended to serve as a merchandising and marketing tool at the point of sale or over the Internet, allowing users to integrate their own inventories with those of their suppliers for display to customers. Pricing can be shown per carat or per stone. Also available is a gem and diamond market price guide based on actual wholesale transactions. Although the program is a stand-alone system capable of performing most activities without being connected to the Internet, current inventory and pricing information can be automatically updated each day over an Internet connection.

According to Mr. Sevdermish, four versions of Gem*e*wizard will become available. The Jeweler's Pro, intended to be used by retailers, is currently being released. The Dealer's Pro, intended for colored stone and diamond dealers, will include enhanced inventory-management capabilities, and is scheduled to be released by the end of April 2003. These Pro versions will be sold only to members of the trade; a monthly subscription from the Gem*e*wizard Support Center will give the user access to updated price lists, inventory information, upgrades, enhancements, proprietary gem color rulers, and new program functions. The Education version, set for release in

Figure 19. These spinels from Vietnam (1.41–7.94 ct) were all cut from the same piece of rough. The differences in appearance are due to variations in the size and shape of the faceted gems. Courtesy of Zava Master-Cut Gems; photo by Robert Weldon.

*Figure 20. Using Gem*e*wizard's color selection systems, gem dealers and retailers can search for colored stones in their own and their suppliers' inventories. The software can be used to specify gem properties and display color options. Courtesy of Gem*e*wizard Ltd.*

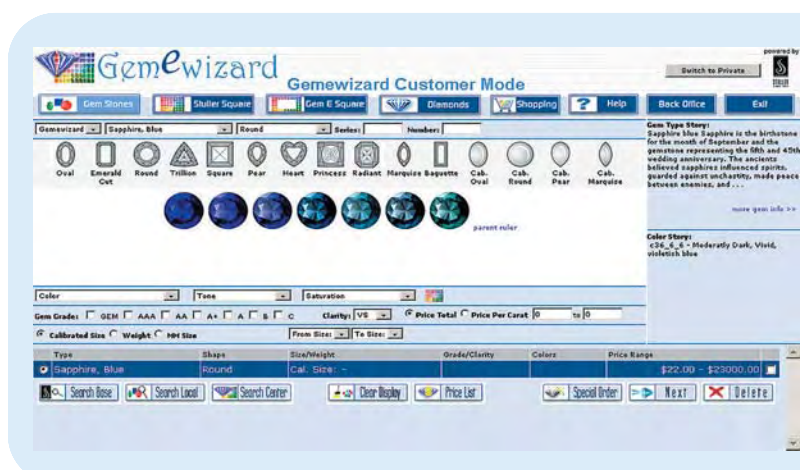

Figure 21. The Gemesquare function provides a comprehensive color communication system that allows users to specify tone and saturation for 36 possible hues. The color nomenclature is based on the colored stone grading system taught at GIA. Courtesy of Gemewizard Ltd.

June 2003, will be tailored to students in gemology. This version will have an enhanced tutorial and gemological section, but with fewer trading capabilities (e.g., it cannot trade gems over the Internet). Finally, the Lab version, scheduled for release in July-August 2003, is planned to offer a more comprehensive and detailed color system.

Thomas W. Overton and BML

CONFERENCE REPORTS

AGTA corundum panel. On February 7, the American Gem Trade Association hosted the panel session "Beryllium Diffusion Coloration of Sapphire—A Summary of Recent Research," which was moderated by Kenneth Scarratt of the AGTA Gemological Testing Center, New York. The panel focused on the controversial bulk diffusion treatment of corundum.

Richard Hughes, of Pala International, Fallbrook, California, recounted the history of the beryllium treatment controversy, saying that dealers and laboratories in the U.S. became suspicious in fall 2001, when large quantities of orange corundum appeared on the market. He added that some of these treated goods had already been sold in Japan undetected.

Dr. Dietmar Schwarz, of the Gübelin Gem Lab, Lucerne, Switzerland, announced that bulk diffusion–treated blue sapphires have now entered the gem trade. These stones are particularly challenging to identify because the diffusion-induced color penetrates the entire stone. The blue color, he said, can resemble that of fine Sri Lankan sapphires. Dr. Schwarz also reported that the treaters are now trying many other types of additives, such as lithium, to create various colors, and warned that the difficult-to-detect blue material could undermine the market for sapphires.

Tom Moses, of the GIA Gem Trade Laboratory in New York, reported that bulk-diffused rubies have also appeared on the market. Clues to this new treatment process include the unusual color (resembling red spinel), the presence of inclusions that have been significantly altered by the treatment process, and—most importantly—by a shallow orange color zone along the outline of the stone.

Mr. Moses stressed that the terms *bulk* or *lattice* diffusion had been established long before this corundum came to market at the end of 2001. "Labs did not invent these terms. They simply are the scientific terms used to describe the process."

Dr. John Emmett, of Crystal Chemistry, Brush Prairie, Washington, said that currently the only reliable test to identify bulk diffusion treatment in those sapphires where the treatment penetrates the entire stone is chemical analysis using methods such as secondary ion mass spectrometry (SIMS). If beryllium or other elements not found in natural corundum are detected, this proves that the stone has been diffusion treated. While this test is 100% accurate, it is too expensive—at least $500 per stone, Mr. Scarratt pointed out—to be practical for the general run of commercial material.

Mr. Scarratt also noted that some of the corundum is subjected to a second heat treatment after the bulk diffusion process, which helps create the attractive blue color. He reported that treaters now have access to very sophisticated furnaces for heating stones, which can tightly control the temperatures to better regulate the treatment process. He also pointed out that some of the treated corundum shows traces of a synthetic overgrowth that formed during the high-temperature heating process.

Shane McClure, of the GIA Gem Trade Laboratory in Carlsbad, told the audience that it is "unacceptable" for treaters to try to legitimize a new treatment process by attempting to pass it unnoticed through laboratories. "Even if they do get through at first, we will find out eventually."

Terry Coldham, of Sapphex, Sydney, Australia, said that the treaters were experts in particular types of corundum, and could process rough in such a way as to make detection of the treatment very difficult.

At a press conference held the next day, Douglas Hucker, of AGTA, Dallas, Texas, reported that the Jewelers of America, Jewelers Vigilance Committee, American Gem Society, and AGTA were issuing a five-point communiqué regarding this treatment. This communiqué (1) confirmed that the corundum is being subjected to a bulk/lattice diffusion treatment that creates new colors or alters existing colors; (2) maintained that this treatment must be disclosed at all levels of the trade, per Federal Trade Commission Guidelines and industry practices; (3) warned that recutting some of the treated stones could affect their color; (4) recommended that buyers consider establishing written vendor agreements stipulating terms of disclosure; and (5) affirmed that U.S. laboratories would continue efforts to identify the treatment, support the trade, and protect the consumer.

The following week, the Chanthaburi Gem & Jewelry Association (CGA), comprised of some of the biggest players in heat treatment, agreed to disclose the use of beryllium to enhance the color of some types of corundum. The action was welcomed by the gem trade worldwide. The 60 association members present unanimously agreed that:

- Chrysoberyl is being intentionally added to the crucible during the new heat treatment as a source of beryllium to enhance color in corundum.
- All association members are obligated to disclose and differentiate the new treatment to customers. The CGA agreed to add the code letter "A" to invoices of such treated material.

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GNI Regular Features

DIAMONDS

European Commission approves the De Beers Supplier of Choice initiative. The European Commission (EC) granted formal approval of the De Beers Diamond Trading Company's (DTC) Supplier of Choice initiative on January 16, 2003. This confers a legal stamp of approval on De Beers's marketing and distribution system for rough diamonds.

However, the EC registered an objection to the DTC's five-year agreement with Alrosa, Russia's principal diamond mining and marketing operation, to sell $800 million worth of rough diamonds on the Russians' behalf.

The DTC has begun preparing for the formal implementation of the Supplier of Choice initiative in July 2003. It is surveying current and potential clients to determine their distribution and marketing programs, especially with the view of having them commit more funds and resources toward helping downstream retailers and jewelry manufacturers increase diamond sales. Clients are also required to sign a series of "Best Practice Principles," which ban trading in conflict diamonds altogether and trading in treated diamonds without proper disclosure.

Once the questionnaires are completed, the DTC will assess each client's position in the market, effectiveness in serving that market, and ability to increase diamond sales. The company will use that information to determine future diamond allocations for existing clients, to possibly drop some clients from its active list, and to appoint new clients now on the potentials list. The DTC must give six months' notice to clients it drops from its active list. In turn, the DTC agrees to tailor diamond allocations more closely to clients' actual needs.

Disputes between clients and the DTC will be handled by an ombudsman, appointed by the DTC and approved by the EC. If no agreement is reached within 25 days, the matter will be determined by arbitration in London.

The EC objected to the DTC agreement with Russia because the DTC's 50% share of Russian production would enable the company "to maintain its dominant share of the diamond market." Russia and De Beers have begun talks to alter their marketing agreement to address EC objections. In this regard, *Idex Magazine* and Russian press sources say that the DTC would scale down its Russian purchases by 25%.

Russell Shor

A type IaB diamond showing a "tatami" strain pattern. The SSEF Swiss Gemmological Institute recently examined an unusual type IaB diamond. During the initial grading process, observation of this colorless 3.54 ct stone with the SSEF Diamond Spotter revealed that it was transparent to short-wave UV radiation. UV transparency is characteristic of both type II and type IaB diamonds. While type II diamonds do not contain enough nitrogen to be detectable with an infrared spectrometer, type IaB diamonds contain a variable concentration of nitrogen atoms (clustered in so-called B aggregates), with a major infrared absorption centered at 1175 cm^{-1}. FTIR spectroscopy of this diamond confirmed that it was type IaB with a low nitrogen concentration—less than 10 ppm. This nitrogen estimate was determined from the absorption coefficient value at 1282

Figure 22. In cross-polarized light, a tatami strain pattern was observed in this 3.54 ct type IaB diamond with a low nitrogen concentration. Photomicrograph by J.-P. Chalain, © SSEF.

cm^{-1} (see S. R. Boyd et al., "Infrared absorption by the B nitrogen aggregate in diamond," *Philosophical Magazine B*, Vol. 72, No. 3, 1995, pp. 351–361).

Microscopic observation of the diamond between crossed polarizing filters showed a crosshatched or "tatami" strain pattern (figure 22). This pattern was described by R. E. Kane more than two decades ago ("The elusive nature of graining in gem quality diamonds," Summer 1980 *Gems & Gemology*, pp. 294–314). More recently, T. M. Moses et al. documented this particular strain pattern in a large population of HPHT-treated diamonds ("Observation of GE-processed diamonds: A photographic record," Fall 1999 *Gems & Gemology*, pp. 14–22). In a subsequent article, C. P. Smith et al. underlined that the tatami pattern is not necessarily indicative of HPHT treatment ("GE POL diamonds: Before and after," Fall 2000 *Gems & Gemology*, pp. 192–215).

Like colorless type II diamonds, colorless type IaB diamonds may be HPHT treated (see B. Deljanin and E. Fritsch, "Another diamond type is susceptible to HPHT: Rare type IaB diamonds are targeted," *Professional Jeweler*, October 2001, pp. 26–29). Therefore, before grading the diamond, low-temperature analysis (at approximately -120°C) was performed to establish the origin of its color. UV-Vis spectroscopy showed features typical of type IaB diamonds: total absorption at 225 nm and a triplet absorption feature with two major peaks at 230 and 236 nm. Photoluminescence spectrometry, together with the data collected in the infrared and UV-Vis regions, proved the diamond to be naturally colorless.

The continuous, three-dimensional propagation of strain through a diamond crystal is hampered by the presence of nitrogen (see Chapter 3 of R. Berman, Ed., *Physical Properties of Diamond*, Clarendon Press, Oxford, 1965). Thus, most type II diamonds, with almost no nitrogen, show "tatami" strain, which extends throughout the sample with approximately the same magnitude in all directions. In contrast, type Ia diamonds usually show banded strain, with one direction strongly dominating the strain distribution. The 3.54 ct diamond reported here had enough nitrogen to show that it is grouped in B aggregates (as evidenced by the FTIR spectrum), but not enough to disturb the strain distribution significantly, if at all (as shown by the tatami pattern). Moreover, in the past SSEF examined a type IaAB diamond that showed both a weak tatami strain pattern and a slight short-wave UV transparency (as seen with the SSEF Diamond Spotter). From the FTIR spectrum, the total nitrogen content was estimated at 14 ppm. Therefore, that type IaAB diamond also contained very little nitrogen and likewise showed a tatami strain pattern.

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COLORED STONES AND ORGANIC MATERIALS

Poldervaartite from South Africa. Poldervaartite, a very rare Ca-Mn-silicate, was described as a new mineral from the Wessels mine in South Africa nearly a decade ago (Y. Dai et al., "Poldervaartite, $Ca(Ca_{0.5}Mn_{0.5})(SiO_3OH)(OH)$ . . .," *American Mineralogist*, Vol. 78, 1993, pp. 1082–1087). Few examples were known until recently, when approximately 5,000 specimens were recovered during the mining of manganese ore at the nearby N'Chwaning II mine, from October 2001 to February 2002 (B. Cairncross and J. Gutzmer, "Spektakulärer Neufund. . . ," *Lapis*, Vol. 27, No. 5, 2002, pp. 30–34). No additional specimens have been found since then. In the vast majority of specimens, the poldervaartite occurs as druses of "creamy" white opaque crystals. The best poldervaartite specimens form ball-like aggregates of "amber" yellow, pink, or nearly red crystals on a dark brown matrix; the translucent-to-semitransparent material can yield interesting, if rare, cut gems (figure 23).

Six faceted stones (0.57–6.06 ct, all cut from one spherical aggregate) were examined for this study. They showed a distinct color change—brownish yellow in day light, pinkish orange in fluorescent light, and orange in incandescent light—with very weak pleochroism. The smaller stones (under 1 ct) were semitransparent, whereas the larger stones were translucent (again, see figure 23). They were biaxial, with measured refractive indices of 1.670–1.690. However, considerably lower R.I.'s—n_x=1.634, n_y=1.640, and n_z=1.656—were given by Dai et al. (1993). Specific gravity, measured hydrostatically, was 3.03–3.12; this range is much higher than the original description (2.91). In a polariscope, these samples had the appearance typical of anisotropic aggregates, due to the fibrous structure of the spheres. All of the stones fluoresced deep red to short-wave UV radiation, but were inert to long-wave UV. No absorption lines were observed with a hand-held spectroscope.

Because the R.I. and S.G. values of this material were

Figure 23. Poldervaartite from the N'Chwaning II mine in South Africa forms attractive spherical aggregates (here, up to 2.1 cm in diameter); photo by Jeff Scovil. A small number of translucent to semitransparent gems have been cut from this material, as shown in the inset (6.06 and 0.78 ct). Inset photo by Jaroslav Hyrsl; daylight-equivalent illumination.

somewhat different from the reported values, one of the faceted samples was analyzed further by Dr. William B. (Skip) Simmons at the University of New Orleans. EDXRF spectrometry showed a composition that was consistent with poldervaartite, and powder X-ray diffraction yielded a pattern that was very similar to the reference spectrum for this mineral.

Because of its low hardness (5 on the Mohs scale), it is unlikely that much of this material will be faceted, especially since high-quality poldervaartite specimens are prized by collectors. However, the attractive color, distinct color change, and fluorescence of poldervaartite make it a very interesting collector's gemstone.

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Triphylite inclusions in quartz from Brazil. Phosphates are quite common in many granitic pegmatites, but only rarely do they form eye-visible inclusions in quartz. Recently J. Koivula described large (up to 10.5 mm long) mica-like inclusions of lithiophilite in quartz (see "Unusual inclusions in quartz," *Australian Gemmologist*, Vol. 20, No. 11, 2000, pp. 481–482). The locality was given as Madagascar, but this contributor knows of similar material from Brazil. Other phosphates that have been found in quartz include blue lazulite (Madagascar) and apatite and triploidite (Brazil).

Four samples of faceted quartz with some unusual inclusions were purchased by this contributor in Brazil in July 2002 (see, e.g., figure 24). The samples contained sharp, elongated crystals up to 8 mm long and about 1 mm wide. These crystals were pointed on one end, but flat on the other, and had a lozenge-shaped cross-section. They appeared colorless, but when viewed down the c-axis they were pale green in daylight and red-brown in incandescent light. The inclusions had good cleavage perpendicular to their length.

One crystal near the surface was removed and analyzed by X-ray diffraction. Surprisingly, it proved to be a member of the triphylite ($LiFePO_4$)–lithiophilite ($LiMnPO_4$) series, but closer to triphylite. This is the first occurrence of triphylite in quartz known to this contributor. Gem-quality triphylite (see, e.g., Fall 1988 Lab Notes, p. 174) is known from several pegmatites in the vicinity of Galiléia (east of Governador Valadares) in Minas Gerais, Brazil. Rough material found about three years ago at the Cigana mine near Galiléia yielded about 500 carats of faceted triphylite

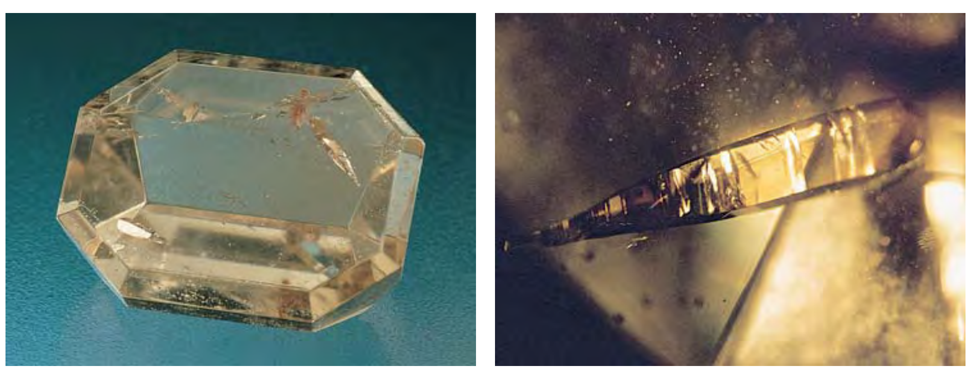

Figure 24. The 58.00 ct faceted quartz on the left contains some unusual eye-visible inclusions that proved to be triphylite. On the right, note the cleavage breaks perpendicular to the length of this 8 mm long triphylite inclusion. Photos by Jaroslav Hyrsl.

in sizes up to approximately 10 ct; these stones were greenish brown in day and fluorescent light but appeared red in incandescent light. The quartz sample reported here may have come from the same region.

Jaroslav Hyrsl

SYNTHETICS AND SIMULANTS

LifeGem synthetic diamonds. Synthetic diamonds created from the remains of a deceased loved one have been offered since May 2002 by LifeGem of Elk Grove Village, Illinois. This patent-pending product is intended as a more personal and individualized memorial than traditional burial and cremation methods, and is available for both people and pets.

The production process requires that the remains be cremated at a funeral home equipped with LifeGem's proprietary technology, which collects organic carbon normally lost in cremation. According to the LifeGem Web site (www.mylifegem.com), about halfway through the standard cremation process, the carbonized matter is captured in a unique "carbon curing" container. Typically, enough carbon can be collected from the average human body to make at least ten 1 ct synthetic diamonds. The carbon is purified and converted to graphite, although traces of many elements found in the body (particularly boron) are not entirely removed during the purification.

Diamond synthesis is carried out by Lucent Diamonds of Lakewood, Colorado, which has the worldwide exclusive production rights. This company has grown synthetic diamonds (formerly sold as Ultimate Created Diamonds) for several years (see Spring 1999 Gem News, pp. 47–48). According to Lucent Diamonds president Alex Grizenko, the synthesis process uses presses designed by a team of scientists in Russia, and employs the temperature gradient method using a flux solution of iron alloys. Synthesis occurs in the range 5.0–6.0 GPa and 1,600–2,000°C. Because of the presence of trace amounts of boron in the recovered carbon, the synthetic diamonds are type IIb. Currently, faceted sizes up to 1 ct with a light to medium blue color are being produced.

LifeGem and Lucent Diamonds are constructing a production facility outside of Denver, Colorado, that is scheduled to open in 2004. This center will have 15 presses in its first phase, with plans to expand significantly over the next several years.

Permission was obtained from family members for GIA to examine two LifeGem synthetic diamonds (see, e.g., figure 25). According to Shane McClure at the GIA Gem Trade Laboratory in Carlsbad, these blue type IIb samples, 0.23 and 0.25 ct, had properties that were consistent with those reported for other synthetic blue diamonds (see, e.g., M.-L. T. Rooney et al., "De Beers near colorless-to-blue experimental gem-quality synthetic diamonds," Spring 1993 *Gems & Gemology*, pp. 38–45; Spring 2000 Lab Notes, p. 62). Both contained metallic inclusions (from the solvent) and were attracted to a magnet. EDXRF spectrometry of the 0.23 ct sample by senior research associate Sam Muhlmeister showed only traces of iron (boron cannot be detected with our instrument). At the present time, the Laboratory does not know of any nondestructive method to identify the source of the carbon in synthetic diamonds.

BML and Thomas W. Overton

Figure 25. This 0.23 ct LifeGem synthetic diamond was grown using purified carbon that was derived from human remains during cremation. Courtesy of LifeGem; photo by Maha Tannous.

CONFERENCE REPORTS

SME 2003 annual meeting. A session on "Diamonds and Other Gem Minerals" was part of the technical program of the 2003 Annual Meeting of the Society of Mining, Metallurgy, and Exploration (SME), which was held in Cincinnati, Ohio, from February 24 to 26. **Howard Coopersmith** of Great Western Diamond Company, Fort Collins, Colorado, began the session with a review of numerous diamond exploration projects ongoing in both Canada and the U.S. Although North America contains the largest area of diamond potential in the world, this continent was largely overlooked by geologists until recently. Diamonds from Canadian mines that are either in operation or in the final stages of development will soon represent over 10% of the world's production. **Dr. Roger Mitchell** of Lakehead University, Thunder Bay, Ontario, Canada, described in general terms the geology of lamproite diamond deposits in Australia, India, and the U.S., and discussed in more detail the evaluation of potentially diamondiferous lamproites adjacent to the famous Prairie Creek (or Crater of Diamonds) deposit in the Murfreesboro District of Arkansas. **This GNI contributor** discussed the importance of accurate gem identification and complete information disclosure for ensuring consumer confidence in the gem marketplace. Also described were some current challenges in the identification of diamonds and other gemstones, with particular focus on how gemologists recognize synthetic and treated diamonds and simulants.

Kimberley Scully of SGS Lakefield Research Ltd., Lakefield, Ontario, discussed the importance of quality assurance for mineral testing laboratories that support diamond exploration efforts. Such attention to detail will minimize the possibility of mineral contaminants or the loss of crucial grains of indicator minerals from a collected sample, which could cause a diamond area under investigation to be mistakenly overvalued or not recognized. In the final presentation, **Leigh Freeman** of Downing Teal Inc., Denver, Colorado, described current operations to recover and market blue sapphires from the famous Yogo Gulch deposit in Montana, which is the largest *in situ* source of sapphires in the Western Hemisphere. Since its discovery just over a century ago, this deposit has produced more than 20 million carats of blue sapphires, of which more than 3 million carats were gem quality. The strong attendance (75+) at this session reflects the interest of mining geologists in the occurrence and exploitation of gem deposits. *JES*

ANNOUNCEMENTS

AGTA Spectrum Awards competition. The AGTA Spectrum Awards recognize outstanding natural-color gemstone and cultured pearl jewelry designs from North America, as well as achievements in the lapidary arts. The deadline for entering this year's competition is September 22. Winning entries will be displayed and award recipients honored at the 2004 AGTA GemFair in Tucson and the 2004 JCK GemFair in Las Vegas. As there have been changes in the Cutting Edge Awards for the lapidary arts, entrants are urged to review the new guidelines on the AGTA web site. For entry forms and more information, visit www.agta.org or call 800-972-1162.

Exhibits

GIA Museum exhibits in Carlsbad. "From the Vault," an exhibition of notable gifts to the GIA collection, will be displayed in the Rotunda Gallery May 5–November 5, 2003. In the Tasaki Gallery, the exhibit "Opal and the Dinosaur—Discover the Link" featuring opalized fossils and other opal from Australia concludes May 17. The Gallery will reopen with "All Natural, Organically Grown—Gems from Plants and Animals," from July 7 through June 2004, and will feature pearls, shell, amber, ivory, jet, tortoise shell, and coral. Educational displays will cover how these materials form, where they are found, and how they have been used in jewelry, as well as related environmental and endangered-species issues. Contact Alexander Angelle at 800-421-7250, ext. 4112 (or 760-603-4112), or e-mail alex.angelle@gia.edu.

Gems at the Bowers Museum extended—again. The highly popular run of "Gems! The Art and Nature of Precious Stones" at the Bowers Museum in Santa Ana, California (announced in Winter 2001 *Gems & Gemology*, p. 342), has been held over, to August 31, 2003. Visit www.bowers.org or call 714-567-3600.

Fabergé at the Walters Art Museum. "The Fabergé Menagerie," featuring more than 100 miniature animal sculptures created by the firm of Carl Fabergé from various gem materials, will be on display at the Walters Art Museum, Baltimore, Maryland, through July 27, 2003. Visit www.thewalters.org, call 410-547-9000, or e-mail info@thewalters.org.

Conferences

CIM Montreal 2003. This mining conference and exhibition will take place May 4–7, 2003, in Montreal, Canada. The technical program will include sessions on Canadian diamonds and rare-element mineralization in granitic pegmatites. There will also be a workshop on diamond exploration. Visit www.cim.org/MCE/montreal2003.

GIA GemFests 2003. Save the date for these informative sessions at the following locations: Italy—Vicenza Fair, June 8; Thailand—Bangkok Gems and Jewelry Fair, September 11; Hong Kong—Hong Kong Jewellery and Watch Fair, September 20; U.S.—Dallas Fine Jewelry Show, Texas, September 20. Contact Jan Tilton at jtilton@gia.edu.

Field Symposium in Urumqi. Titled "Paleozoic Geodynamic Processes and Metallogeny of Chinese Altay and Tianshan," this meeting will be held August 9–21, 2003, in northern Xinjiang, China. Included in the 11-day field excursion will be a visit to the Keketuohai No. 3 pegmatite, a source of gem-quality tourmaline and aquamarine. Visit www.nhm.ac.uk/mineralogy/cercams/activities/2nd%20Circular%20Final.doc or e-mail jingwenmao@263.net.

13th V. M. Goldschmidt Conference. Held in Kurashiki, Japan, September 7–12, 2003, this conference will host a symposium titled "Geochemistry of diamond, a window to the deep earth," featuring recent progress on the mineralogy of diamond and its inclusions, HPHT experiments to investigate diamond formation, and the isotopic geochemistry and physical properties of diamond. Fax 81-3-3263-7537, visit www.ics-inc.co.jp/gold2003, or e-mail gold2003@ics-inc.co.jp.

JCK Show – Las Vegas. Held at the Sands Expo & Convention Center May 30–June 3, this international gem and jewelry trade show will also host a comprehensive educational program beginning May 28. Scheduled seminars will cover sales and marketing strategies, industry trends, and developments in gemology. To register or for further information, call 800-257-3626 or 203-840-5684, or visit http://jck.expoplanner.com/vegas.html.

The AGTA GemFair, Cultured Pearl & Jewelry Pavilion will be held as part of JCK Las Vegas from May 29 to June 2 at the Venetian Hotel. AGTA will be offering educational seminars and gemological testing. For more information or to register, call 800-972-1162 or visit www.agta.org/consumer/tradeshows/jckvegas.htm.

Faceters Symposium 2003. Held in Ventura, California, June 6–8, this conference will feature speakers on various aspects of gem faceting and a three-level faceting competition. For information, contact Glenn Klein at glennklein@yahoo.com.

Jewelry 2003: Honoring the Sataloffs. The 24th Annual Antique & Period Jewelry and Gemstone Conference will be held July 12–17 in Hempstead, New York. The program will cover such topics as hands-on jewelry examination techniques, methods of construction, understanding materials used throughout history, and the constantly changing marketplace. Jewelry collectors Ruth and Dr. Joe Sataloff, founders of the original Antique Jewelry Course in Orono, Maine, will also be honored. Visit www.jewelrycamp.org, call 212-535-2479, or e-mail jwlrycamp@aol.com.

FIPP 2003. The 13th International Gemstones Show will take place August 19–22 in Teófilo Otoni, Minas Gerais, Brazil. Seminars and excursions to local gem mines will be offered. Visit www.geabrasil.com or e-mail geabr@geabrasil.com.

Diamond 2003. The 14th European Conference on Diamond, Diamond-like Materials, Carbon Nanotubes, Nitrides & Silicon Carbide will take place September 7–12 in Salzburg, Austria. Sessions will include diamond growth, optical properties, and mechanical applications and properties of diamond and other superhard materials. Contact April Williams at 44-0-1865-843089 (phone), 44-0-1865-843958 (fax), e-mail a.williams@elsevier.com, or visit www.diamond-conference.com.

Figure 26. On the left is a kibatama ojime *bead carved from a mammal tooth; on the right is a hornbill "ivory"* ojime. *Photos by Robert K. Liu; courtesy of and © 1977* Ornament *magazine.*

ERRATA

1. In the Letters section of the Winter 2002 issue (p. 292), the photos of the hornbill ivory and kibatama mammal tooth *ojime* were inadvertently transposed (corrected in figure 26). *Gems & Gemology* regrets the error.

2. In the Winter 2002 issue, the entry for the Zoë Diamond Cut™ in the appendix to "Legal Protection for Proprietary Diamond Cut" (p. 323) incorrectly indicated that ownership of the design was shared between Gabi Tolkowsky and Suberi Brothers. In fact, the design and name are wholly owned by Mr. Tolkowsky, and the stones are cut exclusively by Mr. Tolkowsky's company in Antwerp. *Gems & Gemology* thanks Mr. Tolkowsky for bringing this to our attention.

   Elsewhere in the appendix, the entry for the Elara cut diamond describes the design as "probably patented." The patent for this design is in fact J. D'Haene, *Gemstone*, U.S. patent D338,851, issued August 31, 1993. *Gems & Gemology* thanks Howard B. Rockman of Chicago, Illinois, for the information.

   Last, U.S. adoption of the Madrid Protocol, discussed on pp. 315–316, was signed into law by President Bush in November 2002. The changes will be implemented by the U.S. Patent and Trademark Office over the next year.

3. Also in the Winter 2002 issue, on p. 296 of the article "Chart of Commercially Available Gem Treatments," the two photomicrographs in figure 2 were inadvertently transposed (see corrected placement in figure 27). *Gems & Gemology* regrets the error.

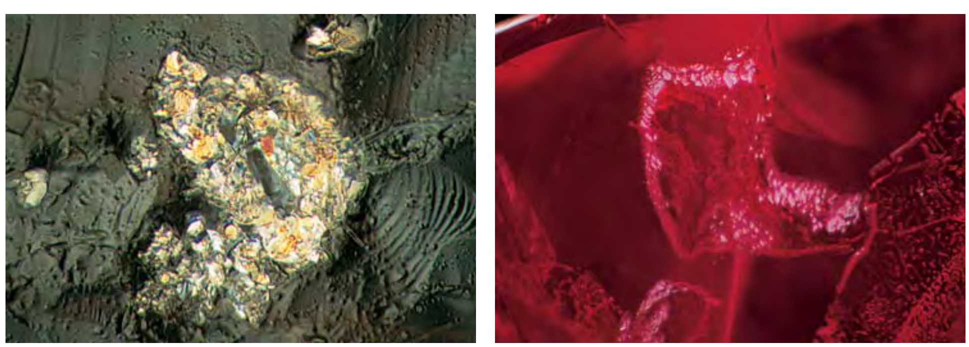

Figure 27. On the left (magnified 33×), platelets of synthetic corundum formed on the surface of a sapphire treated by a Be-diffusion process. On the right (40×), small platelets of synthetic corundum line the bottom of a glass-filled cavity in a Mong Hsu ruby. Photomicrographs by Shane F. McClure.