GEM NEWS

John I. Koivula and Robert C. Kammerling, *Editors*

DIAMONDS

Diamond prospects in Brazil. Current monetary restrictions in Brazil have led some Brazilian mining concerns to solicit foreign investment. In the diamond sector, the engineering and mining group Odebrecht is hoping to dispose of five current prospecting permits and a government-issued "permission" to open four prospecting pits at its Cipolândia alluvial diamond property in Mato Grosso do Sul. This deposit extends for 15 km along the Taboco River, some 90 km from Campo Grande. It contains a high proportion of gem-quality stones, with reserves estimated to be in the range of 150,000 to 500,000 ct.

In 1989, Brazil produced approximately 500,000 ct of diamonds; according to the Departamento Nacional da Produção Mineral, 70% are of gem quality. As much as 84% of the total production was from the activities of independent miners, or *garimpeiros*. (*Mining Journal*, June 15, 1990)

New venture in Botswana. Molopo Australia has reported collecting several kilograms of diamondiferous ore from a 950-km^2 concession adjacent to the Jwaneng mine. This concession contains six of the nine kimberlite pipes identified to date in the Jwaneng field; two of these six have already been developed by Debswana and accounted for 55% of the country's 15.3-million-ct total output in 1990. Molopo currently holds over 9,000 km^2 under 11 licenses. (*Mining Journal*, June 15, 1990)

New Sierra Leone mining policy. The Sierra Leone government has instituted new policies that affect diamond-mining operations in that West African nation. Under the new regulations, designed to curb the smuggling of foreign currency, 60% of foreign exchange earnings must be turned over to the government. Also, diamond exporters must now make an advance payment of US$500,000, in addition to the US$10,000 annual license fee, and pay 2% of the value of exports to cover administrative costs plus an annual royalty of 3% of the value of goods exported. (*Mining Magazine*, June 1990)

Australian firm prospecting in China. Ashton Mining Ltd., the Australian operator of the Argyle mine, has signed an agreement with the Chinese government for the exploration rights to a 100,000-km^2 area in northern Hunan Province. Several potential primary deposits they have identified will be explored this year. The agreement also gives Ashton exclusive rights to the cutting and marketing of the diamonds. In addition, the firm has signed a letter of intent with the Guizhou Bureau of Geology for exploratory work in a 60,000-km^2 area in the northeast of that province. The bureau has already identified lamproite pipes that grade as high as 20 ct per 100 tons of ore in that region. (*Diamond Intelligence Briefs*, July 2, 1990)

Goa, India, seeking diamond merchants. . . The government of Goa, formerly a Portuguese enclave and now an Indian state south of Bombay, is attempting to attract diamond merchants to establish operations there. The state's deputy chief minister has announced plans to build a 100-acre jewelry park in an area of northern Goa where a number of five-star hotels are also planned. The Economic Development Corporation of Goa, Daman & Diu Ltd. reportedly is offering a number of tax incentives to help attract new industrial units. (*Diamond Intelligence Briefs*, June 8, 1990)

. . . But overall, prospects in India worsen. Burdened with approximately six to seven months' worth of unsold stock, the Indian diamond industry has been laying off workers. About 30% of the factories at Navsari are reported idle, as are about 10% to 15% of the cutting units in Palanpur, Vishnagar, Bhavnagar, and Amreli. Factory owners predict that the situation will worsen, since they are not getting enough work from exporting firms. (*Diamond Intelligence Briefs*, June 8, 1990)

Diamond prospecting in India. The Geological Survey of India has reported progress at diamond pipe no. 7 in the Wajrakarur area, Anantapur District, Andhra Pradesh State. According to the Survey, 1,903 diamonds (total weight 345.11 ct) have been recovered from 790 tons of overburden, and 287 diamonds (total weight 35.47 ct) have been taken from 314 tons of kimberlite. Sixty percent of the stones are reportedly of gem quality, with an average weight of 0.17 ct. A 16.3-ct gem-quality stone was recovered from the colluvial material. (*Diamond World*, May–June 1990)

Revised figures for Kalimantan. The Indonesian Diamond Corp. (formerly Acorn Securities Ltd.) has issued revised development proposals and figures for diamond-gravel reserves at their Kalimantan (Borneo) operation. The program is based on combined proven (2.94 million m^3), probable (15.32 million m^3), and possible (29.79 million m^3) gravel reserves, with proven/probable diamond production for the first five years of operation estimated at more than 550,000 ct. Capital costs are

anticipated to be US$23.6 million, while operating costs are projected at US$5.5 per cubic meter of pay gravel mined, or US$60 per carat of diamond recovered. The firm plans to market its diamonds, mostly sawable goods in the 0.3–1 ct range, directly through Antwerp dealers rather than through the CSO. (*Mining Magazine*, June 1990; *Diamond Intelligence Briefs*, June 8, 1990)

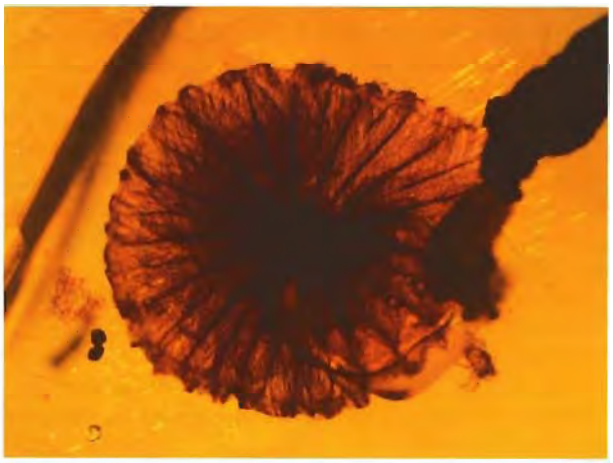
Sri Lanka attracting diamond industry investment. The Greater Colombo Economic Commission (GCEC) has identified the Sri Lankan diamond industry as an industrial sector for attracting new investments. To this end, they have drawn up of plans for establishing a diamond guild and an exclusive diamond zone near the airport.

Recently, a GCEC delegation visited firms in Antwerp and obtained sponsorship for a diamond-cutting project from two Belgian firms. When maximum capacity is reached, this project is expected to employ 235 workers. (*Mining Magazine*, June 1990)

Thailand auctions smuggled diamonds. The Thai Customs Department recently auctioned 2,236 diamonds, with a total weight of 403.51 ct, that had been confiscated over the last two years from smugglers bringing them in from Belgium. Approximately 30% of the proceeds from the sale went to informers. (*Diamond Intelligence Briefs*, June 8, 1990)

New diamond discovery in USSR. According to *Radio Moscow*, a new, major diamond deposit has been discovered approximately 100 km from Arkhangel'sk in the far north of the Russian Federation. The diamonds reportedly are of very high quality, with about 50% described as "suitable for use in the jewelry industry." Western involvement through a joint venture has been proposed for the development of the deposit as well as possibly for the processing of the stones. (*Mining Journal*, June 22, 1990)

Figure 1. The delicate gills are clearly evident in the ventral view of this 40-million-year-old mushroom encased in amber from the Dominican Republic. Photo courtesy of Dr. George O. Poinar, Jr., University of California at Berkeley.



Soviet delegation visits Israel. This past May, a delegation representing the Soviet diamond industry paid its first visit to Israel. Included among the Soviets were high-level executives of Almazjuvellirexport, the marketing arm for polished diamonds in the USSR; Kristal, that country's largest diamond-cutting plant; and the Department of Precious Metals and Diamonds, which was formed only recently—as a result of the Soviet Union's economic restructuring—to bring into one department segments of the diamond industry that had previously been under separate ministries. According to one of the Soviet officials, technical developments in diamond processing in Israel seem to be paralleling those in the Soviet Union. (*Israel Diamonds*, April–May 1990)

Eastern Europe opens to diamond cutters. The dramatic changes in Eastern Europe are apparently leading to positive developments for the diamond industry in that part of the world. Recent reports indicate that two Israeli diamond manufacturers were opening a plant in Warsaw, Poland. Initially the plant, which will specialize in baguettes and tapered baguettes, will employ 25 workers.

Another plant is being set up in Bucharest, Romania, by a partnership between a Romanian and an Israeli firm. The facility will initially employ 60 workers and will cut small rounds. (*Diamond Intelligence Briefs*, July 2, 1990)

Diamond rush in Australia. Diamond exploration is booming in Australia, with over 90 companies now involved in the search. Among the areas being prospected are Kununurra, North Pilbara, Halls Creek, Norseman, Geraldton, Nullagine, and Philips Range in Western Australia; Regional in the Northern Territory; Armidale, Sofala, and Copeton in New South Wales; Roxby Downs and Quorn in South Australia; Wooragee in Victoria; and Camooweal in Queensland. Twenty-three other projects are under way to locate diamonds off Australia's coastline. (*Diamond Intelligence Briefs*, June 8, 1990. The listing of locations is abstracted from a table compiled by Min-Met Information Services that was included in the referenced report.)

COLORED STONES

Ancient mushroom inclusion in amber. The University of California at Berkeley has announced the discovery of the oldest and best-preserved mushroom ever found, which was identified in a 40-million-year-old amber specimen (figure 1) by Dr. George O. Poinar, Jr. The amber came from a commercial mine in the northern

mountains of the Dominican Republic. The mushroom, identified by botanist Rolf Singer of the Field Museum of Natural History in Chicago, represents a previously unknown genus and has been named *Coprinites dominicana*. It is the only known fossil mushroom from the tropics. According to Dr. Poinar, "the mushroom points out how amber can preserve very delicate organisms, and gives us hope for discovering a great deal more from that time."

Greenish blue cat's-eye apatite. In the Summer 1990 Gem News column, we reported seeing quantities of greenish blue apatite from Madagascar at the February Tucson show. The color of some of this material was very similar to new colors of tourmaline coming from Paraíba, Brazil, and some of the apatite was being sold as "Paraíba apatite" or simply as "Paraíba."

At a recent gem and mineral show in Santa Monica, GIA Instructor Yianni Melas was shown a chatoyant, medium dark greenish blue 5.72-ct oval double cabochon that was presented as a cat's-eye apatite (figure 2). The owner, Manu Nichani of Temple Trading Co., Encinitas, California, subsequently loaned the stone to GIA for investigation.

The stone measured 11.58 × 8.66 × 7.09 mm; it was translucent and exhibited a fairly sharp chatoyant band. Magnification revealed the cause of chatoyancy as numerous parallel growth tubes, some of which were partially filled with an unknown residue. Pleochroism was distinct but not strong, in grayish yellowish green and greenish blue; the stone appeared brownish green through the Chelsea color filter. With a desk-model spectroscope, we were able to resolve a weak absorption band at approximately 594–618 nm; there was also some weak general absorption from 633 to 700 nm. The stone had a spot R.I. of 1.64, an S.G. of approximately 3.16, was doubly refractive, and was inert to long- and short-wave U.V. radiation.

Figure 2. The greenish blue color of this 5.72-ct cat's-eye apatite is very unusual for this gem variety. Photo by Robert Weldon.

Although we had not previously seen chatoyant apatite in this color, all properties were consistent with apatite. Because of the possible overlap in properties with greenish blue cat's-eye tourmalines, we asked C. W. Fryer of the West Coast GIA Gem Trade Laboratory to perform an X-ray diffraction analysis of a powder sample from this stone. The pattern matched that of apatite.

Zimbabwe emerald update. This past June, Tom L. Lee of Victoria Mines Ltd. visited emerald-producing mines and developing prospects in southern Zimbabwe. Some of these had not previously been visited by outsiders, as they are located in an area with severe travel restrictions. Mr. Lee provided the following report.

The emerald mines are located in the Mweza Range in southeastern Zimbabwe, within the Mberenga Communal Lands (formerly known as the Tribal Trust Lands). Throughout most of the emerald mines inspected by Mr. Lee, concentrations of emerald were frequently—but not exclusively—identified in pegmatite wall/serpentinite contact zones, most notably in the "nose" of such contact zones, which had been extensively folded and altered.

Emerald was first discovered in this region in May 1957. At the time of Mr. Lee's visit, 27 emerald mines were operating with the authorization of the Zimbabwe government, although most were rudimentary diggings that were being worked primarily with picks, shovels, and wheelbarrows.

One of the more sophisticated operations is the Machingwe mine (figure 3), an open-cast working that extends for approximately 2 km. Two bulldozers are used to move soil and rock, and to extend the pit workings. During the actual recovery of emeralds, the primary tools are picks and shovels, although there is some black powder blasting. Currently, the active open-pit emerald workings lie some 60 m below the surface. The area is protected by armed guards who are randomly situated throughout the mountainous bush that surrounds the mine.

The Lodge mine (figure 4), located approximately 30 km east of the famous Sandawana emerald mine, is also open cast. Although the Lodge mine has been in operation since 1981, almost all of the excavation and emerald-face working is still carried out with picks, shovels, and wheelbarrows.

Figure 3. This view from the edge of the main pit at the Machingwe mine, southeastern Zimbabwe, shows miners at work recovering emeralds. The pegmatite structure (white area) has been followed downward 60 m. Photo © Tom Lee and Michael Smith.

Unusual cat's-eye diopside. Efraim Katz of African Gem Cutters, Miami Beach, Florida, recently loaned the Gem News editors a very slightly oval single cabochon of unusual color that exhibited a strong chatoyant band across its dome. The stone was a very light grayish brownish green and appeared to be semitransparent when viewed face-up.

R.I. was determined to be approximately 1.67 by the spot method; because there were no polished flat surfaces, birefringence could not be determined. In the polariscope the stone exhibited a doubly refractive reaction that was difficult to resolve due to the presence of many doubly refractive inclusions. The stone was inert to both long- and short-wave U.V. radiation; no absorption features could be resolved with a hand-held spectroscope.

There are a number of gem species in the mid- to high-1.60s R.I. range that produce chatoyant varieties, including actinolite, diopside, enstatite, and kornerupine. Of these stones, however, all but actinolite are typically very dark brown to very dark green in color. We thus asked C. W. Fryer to perform X-ray diffraction analysis on the stone, which resulted in a match for diopside.

Figure 4. Miners at the Lodge mine, approximately 30 km east of the Sandawana mine in the Mweza Range, Zimbabwe, are housed in this compound. Photo © Tom Lee and Michael Smith.

Fine-quality chatoyant iolite. In the Spring 1990 Gem News column, we described a 23.65-ct cat's-eye iolite seen at the Tucson show this past February. Recently, GIA Instructor Yianni Melas assisted in obtaining another of these unusual stones for investigation.

The stone, loaned to us by Manu Nichani of Temple Trading Co., was purchased in southern India. The attractive 8.25-ct oval double cabochon measures 14.84 × 11.78 × 7.58 mm (figure 5). Semitransparent when viewed from above, it would be almost transparent were it not for a rough-ground base. In surface-incident light, it exhibits an exceptionally strong chatoyant band; this is even evident under diffused overhead fluorescent lighting. When examined face-up, it shows a light bluish gray body color on either side of the chatoyant band, while the periphery of the base appears a medium dark violet as a result of the strong pleochroism. A dichroscope was used to isolate the pleochroic colors which were identified as dark violet, light bluish gray, and light brownish yellow.

Magnification revealed the cause of chatoyancy to be minute, whitish fibers. Also noted were small, colorless, low-relief crystals. When the stone was examined with the polariscope, we noted that the chatoyant band appeared to bisect the 2V angle. All other gemological properties were consistent with those previously reported for this gem species.

Figure 5. Chatoyancy is unusual in iolite, especially as exhibited by this 8.25-ct cabochon. Photo by Robert Weldon.

Gem finds in Inner Mongolia. Gem deposits have recently been discovered at 51 sites in the Inner Mongolia Autonomous Region of China. According to a report in the July 1990 issue of *Mining Magazine*, over the course of three years of prospecting a team of geologists found 42 types of gems, including agate, bloodstone, malachite, rock crystal, and topaz. The team also determined that the region contains 196 sites with gem deposits of commercial significance.

Opal with true chatoyancy. Dr. Byron C. Butler of World Gems/G.S.G. in Scottsdale, Arizona, provided the Gem News editors with a very unusual 0.76-ct cat's-eye opal for investigation. The opal, a translucent oval single cabochon, measures 7.33 × 5.47 × 3.31 mm and has a brownish yellow body color (figure 6). Unlike most so-called cat's-eye opals, which exhibit chatoyancy as a band of play-of-color when fashioned as triplets, this unassembled gem exhibits true chatoyancy. As in fine cat's-eye chrysoberyl, the "eye" is very sharp, and the stone also exhibits a strong "milk-and-honey" effect when the cabochon is illuminated from the side at a right angle to the chatoyant band.

The R.I., taken both on the well-polished base and by the spot method, was 1.45. When examined between crossed polars, the opal exhibited an anomalous blinking reaction in the form of a strain-induced snake-like band

Figure 6. This 0.76-ct opal exhibits unusually strong chatoyancy. Photo by Robert Weldon.

along the length of the dome. The stone fluoresced a weak red to both long- and short-wave U.V. radiation, and appeared a grayish bluish green through the Chelsea color filter. S.G. was determined by hydrostatic weighing to be approximately 2.08. Magnification revealed an extremely fine fibrous structure plus minute black inclusions.

The most unusual feature of this chatoyant opal was what appeared to be weak pleochroism in yellow and brownish orange that was noted with a calcite dichroscope. It is possible that this opal formed as a pseudomorph after a doubly refractive fibrous mineral such as goethite (which might also be responsible for the color) and that like-oriented remnants of the original material are responsible for both the strain and the apparent pleochroic reaction in this essentially amorphous material.

Star scapolite. The mineral series scapolite produces some interesting collector gems, including both purple and yellow stones that, because of similar gemological properties, may be confused with the quartz varieties amethyst and citrine, respectively. Also seen occasionally are different colors of chatoyant scapolite.

Efraim Katz of African Gem Cutters, Miami Beach, Florida, recently loaned the Gem News editors an interesting phenomenal scapolite for examination. This translucent, slightly brownish greenish gray oval double cabochon weighs 7.46 ct and measures 12.21 × 11.08 × 7.43 mm. The gemological properties were consistent for scapolite. Magnification revealed small black, reflective inclusions of what may be exsolution ilmenite; a few small plates of what may be mica were also noted.

What made this stone unusual was the presence of a strong reflective band across the long direction of the dome that was intersected by two much weaker but distinct additional bands (one of which was quite faint and difficult to photograph; figure 7). This would qualify the stone as a star scapolite, which is quite rare. Shortly after we examined this stone, GIA Collection Curator Loretta Loeb showed us a similar-appearing 2.82-ct asteriated scapolite that had recently been added to the GIA collection. Both of these stones are reported to have originated in Sri Lanka.

More activity at the sugilite mine. A recent mining industry report notes that Samancor has closed its Hotazel manganese mine near Kuruman, South Africa, because the reserves have been almost totally exhausted. To compensate, the company is increasing production at two nearby mines. One of these, the Wessels mine, is the only known source of the purple manganoan ornamental gem material, sugilite. This increased activity may lead to further sugilite discoveries. (*Mining Journal*, July 13, 1990, p. 25)

Figure 7. The intersecting reflective bands of this 7.46-ct scapolite qualify it for designation as a star stone. Photo by Robert Weldon.

Unusual carved tanzanite. As mined, tanzanite exhibits extremely strong pleochroism in blue, purple-violet, and greenish yellow, a combination that gives untreated material a rather unattractive face-up color with a strong brownish component. Fortunately, heat treatment removes the undesirable greenish yellow component, resulting in stones that, depending on orientation, exhibit fine blue to violet colors.

Because virtually all of the tanzanite used in jewelry has been heated, many jewelers are unfamiliar with the appearance of the untreated material. Recently, Bart Curren of Glyptic Illusions brought to our attention a fine 10.19-ct tanzanite that he had carved and then heat treated, documenting the color both before (figure 8, left) and after (figure 8, right) the treatment process. Note in the two photos how the unusual cutting style helps emphasize the pleochroism. With both distinct purplish and yellowish brown colors showing, the untreated stone superficially resembles some amethyst-citrine quartz.

Cat's-eye tanzanite. Because of the rarity of cat's-eye tanzanite, it came as a pleasant surprise when Peter and Bobbi Flusser, of Overland Gems in Los Angeles, showed us the 2.69-ct stone pictured in figure 9. This semitransparent, high-domed oval cabochon with a slightly convex base exhibits an attractive medium dark grayish violet-blue color and a sharp chatoyant band when examined from above. Magnification revealed the cause of the chatoyancy to be numerous parallel whitish channels running perpendicular to the "eye"; spike-shaped two-phase inclusions were also noted.

The gemological properties determined for this stone were consistent with those reported in the literature for tanzanite. With respect to the pleochroism, it was

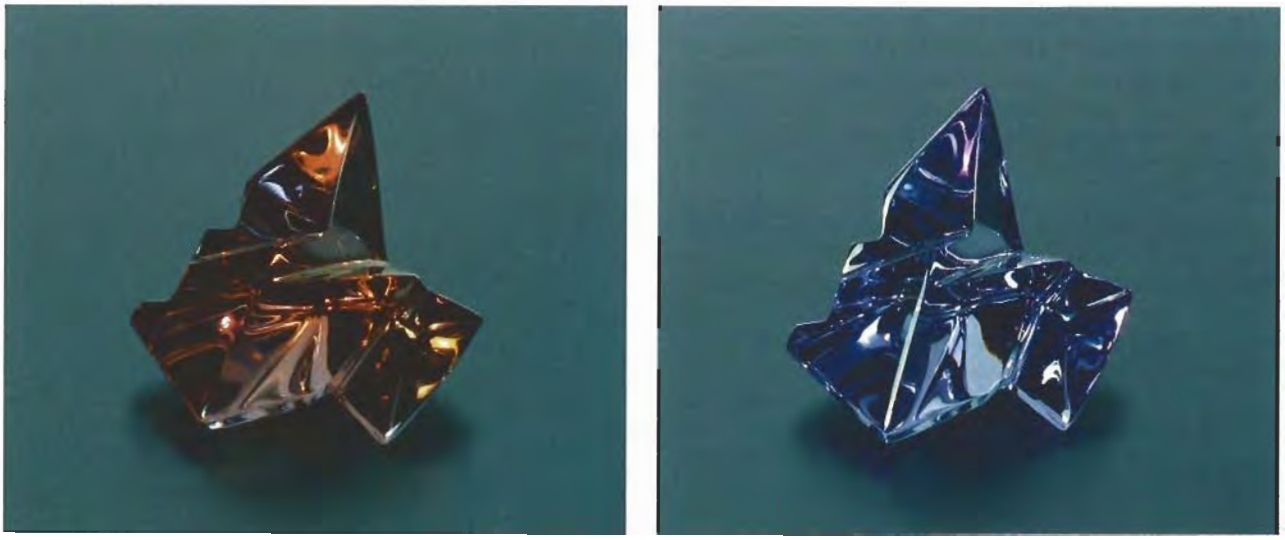
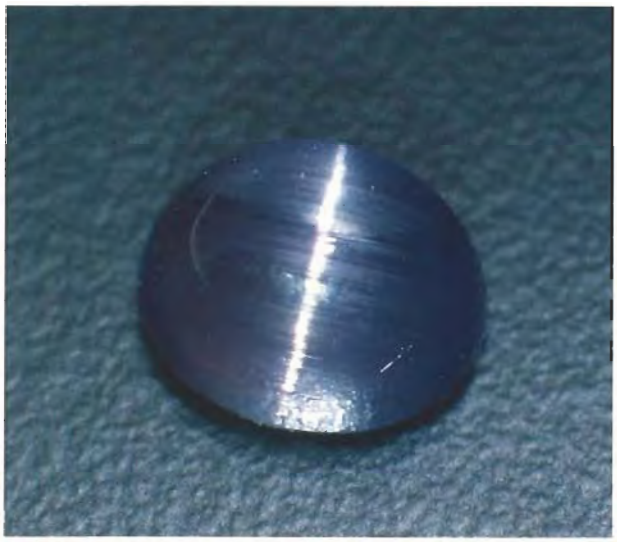


Figure 8. The unusual cutting style of this 10.19-ct tanzanite emphasizes the stone's pleochroism both before (left) and after (right) heat treatment. Carving and photos by Bart Curren, Glyptic Illusions.

interesting to note that a deeper color was observed when the stone was viewed down the sides in both the long and the narrow directions. It appears that, as is the case with cat's-eye alexandrite, orienting the stone to center the chatoyant band across the dome of the cabochon results in less than the best face-up color. No doubt, reflections off the chatoyancy-producing channels also contributed to a slight washing out of the color when the stone was viewed from above.

Figure 9. This 2.69-ct cabochon is a fine example of the very rare cat's-eye variety of tanzanite. Photo by Robert Weldon.



ENHANCEMENTS

Faceted gems with Aqua Aura enhancement. In the Winter 1988 Gem News column we reported on "Aqua Aura" quartz, single crystals and crystal clusters of colorless quartz that had a thin film of gold applied to their external surfaces. These treated specimens displayed both the blue to greenish blue transmission color of the gold as well as a superficial thin-film iridescence. A more detailed report subsequently appeared in the April 1989 issue of the *Journal of Gemmology.*

According to an article in the September 1989 issue of *Rock & Gem,* the process was developed by Bill McKnight and Tom Stecher of Vision Industries, Lynnwood, Washington. The application of this treatment to faceted gems is now taking place on a commercial basis. The Gem News editors obtained two fashioned hexagonal prisms of Aqua Aura–treated quartz (one of which is shown in figure 10) in fall 1989, and shortly thereafter encountered Aqua Aura–treated faceted topaz set in silver pendants. The vendor of the treated topaz, TransGem Corp. of West Bend, Wisconsin, was contacted for further information. In response, Johnathan J. Parentice of TransGem informed us that they planned to begin marketing this material nationwide soon, and that some 10,000 ct were submitted for enhancement in December 1989. Mr. Parentice also kindly provided us with several samples for examination.

The 11 treated faceted topazes supplied by TransGem (two of which are shown in figure 10) ranged from 0.71 ct to 2.25 ct. They varied in color from medium light to medium dark blue to greenish blue; all of the stones showed a very uniform color face-up. They exhibited an overlying weak to moderately strong iridescence that was most noticeable on the larger stones. R.I., birefrin-

gence, optic character, and S.G. were consistent with topaz. Also as is typical for topaz, the specimens were all inert to both long- and short-wave U.V. radiation, appeared brownish green to green through the Chelsea color filter, and showed no absorption features when examined with a desk-model spectroscope. Unlike topaz, however, no pleochroism was noted in any of the stones when they were examined with a dichroscope.

A 0.70-ct pear-shaped brilliant-cut treated quartz supplied by TransGem and the two faceted quartz "prisms" mentioned above were similarly tested. Their R.I., birefringence, optic character, and S.G. were consistent with those reported in the literature for quartz, while their reactions to U.V. radiation, appearance through the Chelsea filter, spectroscopic features, and appearance through the dichroscope were essentially the same as noted above for the treated topaz.

Magnification proved key to identifying the Aqua Aura enhancement (figure 11). When examined with diffused, direct transmitted light, all of the treated specimens—both topaz and quartz—exhibited one or more of the following features: (1) diffused, dark outlining of some facet junctions; (2) white-appearing facet junctions where either the treatment did not "take" or where it had been abraded away; (3) a combination of fine, white-appearing facet junctions immediately bordered on either side by slightly dark blue outlining; (4) irregular, minute, random, white-appearing abrasions on facet junctions and/or surface pits and scratches on facet surfaces; and (5) irregular blue coloration on some facets (some facets exhibited areas of no color). One of the pear-shaped topazes exhibited an exceptionally heavy deposit of the coating near its point. When examined with magnification in surface-reflected light, the iridescence became very noticeable on all specimens and the surface irregularities were easy to detect.

Those specimens that tended to be more greenish blue—especially those displaying fairly prominent iridescence—could be visually mistaken for some heat-treated zircon. R.I., birefringence, and S.G. readings would quickly help identify the gem materials as topaz or quartz, respectively. While there is no natural blue single-crystal quartz with which the Aqua Aura–treated quartz could be confused, it does bear a resemblance to some cobalt-doped blue synthetic quartz. In this instance magnification, as well as Chelsea-filter reaction and absorption spectrum, would make the separation. The "Aqua Aura" topaz might easily be mistaken initially for the irradiated blue topaz that is so prevalent in today's gem market; in fact, Mr. Parentice did report that TransGem's product was being marketed as an alternative. In all cases, however, the superficial iridescence is a strong indicator and magnification would quickly reveal the Aqua Aura treatment.

A final point relates to the durability of this surface enhancement. Both quartz and topaz specimens were exposed to the electrically heated tip of a thermal reaction tester; this produced no noticeable effect on the treatment layer. Furthermore, a number 6 Mohs hardness point failed to scratch an "Aqua Aura" faceted quartz and a number 7 Mohs hardness point had no apparent effect on one of the treated topazes. Testing of a treated stone with dilute hydrochloric acid also had no noticeable effect. It would thus appear that this enhancement is fairly durable. Note, however, that because this is a surface treatment, it would be partially or completely removed during recutting or repolishing.

Figure 10. These two faceted topazes (the oval weighs 2.15 ct) and faceted hexagonal prism of quartz (18.18 ct) have both been treated by the Aqua Aura method. Photo by Robert Weldon.

New opal enhancement. Former GIA student Eunice Um showed the Gem News editors two tumble-polished opals she had purchased in Mexico. The essentially

Figure 11. As is evident in this topaz, the darker color outlining of some pavilion facet junctions and the irregular facet coloration are typical of Aqua Aura–treated stones. Photomicrograph by John I. Koivula; magnified 5×.

colorless, transparent stones exhibited play-of-color. One side of each, however, had been unevenly coated with a translucent, very dark brown, plastic-like material that gave the body color a somewhat dark appearance and accented the play-of-color when the stones were viewed from the uncoated side. When they were viewed from the coated side, even at low magnification (figure 12), gas bubbles could be seen in the coating. With magnification, it was also evident that the coating could be easily indented with a needle probe.

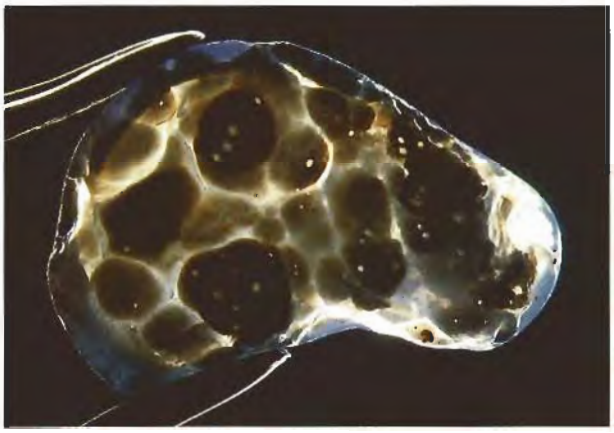


Figure 12. This 10.3-mm-long opal, purchased in Mexico, had been coated on one side with a dark, plastic-like material. Photomicrograph by John I. Koivula.

"Plastic"-coated sugar-treated opal. A number of treatments have been used on otherwise unusable opal from various localities to produce a dark background, thereby reducing light scattering and bringing out play-of-color.

Recently John Fuhrbach, a gemologist from Amarillo, Texas, sent us an unusual 16.58-ct opal (figure 13) for examination. The essentially opaque, low-domed oval cabochon had a uniform black body color and displayed a fairly strong, evenly distributed pinfire play-of-color that was predominantly green with minor amounts of yellow and orange.

The opal displayed some rather interesting gemological properties. Spot R.I. readings on the dome gave values of 1.45, but the base produced values of 1.56 to 1.57. When exposed to long-wave U.V. radiation, the dome fluoresced a very strong yellow-green whereas the base fluoresced a very strong chalky blue-white. The short-wave U.V. reactions were similar but somewhat weaker, and there was no phosphorescence to either wavelength. Microhardness tests on both the dome and the base showed that the stone could be easily indented with the point of a straight pin. Hydrostatic weighings produced an S.G. value of 1.91.

Magnification revealed two key features. First, we noted the typical "peppery," speckled appearance that is associated with sugar-treated opal from Australia. Second, the entire cabochon was seen to be coated with a transparent, colorless material. This coating was significantly thicker on the base than on the dome, and gas bubbles were noted in the thicker base coating. A small scraping taken from the coating on the base was tested with a thermal reaction tester ("hot point"), producing an acrid odor reminiscent of that noted with some plastics.

We concluded that the stone was a sugar-treated opal that had subsequently been coated with a plastic-like substance. The uncharacteristically high R.I. reading on the base was attributed to the thick coating of the plastic-like material on that side; the different U.V. fluorescence reactions of the dome and the base were believed to be due to the variation in thickness of the "plastic" layers; while the unusually low S.G. was attributed at least in part to the significant "plastic" component, with the porosity of the starting material possibly a contributing factor.

SYNTHETICS AND SIMULANTS

Knischka synthetic ruby update. Professor P. O. Knischka of Steyr, Austria, reports that he has produced synthetic ruby crystals over 5 cm in length that have yielded faceted stones as large as 67 ct. Material is being marketed in the form of faceted stones in sizes ranging to over 11 ct, as preforms that may exceed 25 ct, and as rough "macro-clusters," "plates," and "micro-clusters." The fashioned materials are marketed in three qualities based on the extent of inclusions and in colors described

Figure 13. Both sugar treatment and coating with a plastic-like substance were used to enhance this 16.58-ct opal. Photo by Robert Weldon.

Figure 14. This half-crystal of Knischka synthetic ruby weighs 40.65 ct. Photo by Robert Weldon.

by Professor Knischka as "light, medium, [and] dark in Burmese pink tone or Thai purple tone."

Recently, Dr. Edward J. Gübelin provided us with a large half-crystal of Knischka synthetic ruby. The crystal, which had been sawn down its length and the cut surface polished, weighs 40.65 ct and measures 39.66 mm long × 17.90 mm in largest diameter (figure 14). It is dark purplish red, exhibits accordian-like deep growth steps perpendicular to and along the length of the crystal, and contains the glassy two-phase inclusions and platinum platelets previously noted in this material (see E. Gübelin, "New synthetic rubies made by Professor P. O. Knischka," *Gems & Gemology*, Vol. 18, No. 3, pp. 165–168).

Fluorite imitating emerald. A number of ICA Laboratory Alerts and reports in the gemological literature have appeared over the past few years concerning imitation emeralds fabricated out of natural as well as man-made materials. Earlier this year, the ICA released a Laboratory Alert Update that describes yet another type of "crafted" specimen.

Submitted by Jean-Paul Poirot of the well-known Paris laboratory, it describes what at first appeared to be an emerald crystal in matrix. The specimen, which originated in Madagascar, was found to consist of a green fluorite crystal that had been attached with a mica-laden glue to a block of tourmaliniferous rock. One end of the crystal had been given a roughly hexagonal shape, and cleavages gave the impression of growth lines.

Mr. Poirot cautions that the spectrum of green fluorite is somewhat similar to that of emerald and that such stones also appear red through the Chelsea color filter. The fluorite fluoresced a strong violet-blue to long-wave U.V. radiation, while the glue around its base fluoresced a strong yellowish white. The identification of the crystal was confirmed by X-ray diffraction analysis.

Imitation jade carving. On a visit to the jade market in Kowloon, Hong Kong, this past January, one of the editors (RCK) obtained a carved sphere that was represented (not surprisingly) as jade (figure 15). Testing of this attractive ornamental object at GIA Santa Monica revealed that it was quite interesting gemologically.

The sphere weighs 186.7 grams (933.5 ct) and ranges from 52.0 to 53.3 mm in diameter. It is opaque except in thin edges, where it is semitranslucent. Although it is predominantly a mottled dark reddish brown grading to medium yellowish brown, approximately 40% of the surface area is a strongly mottled medium yellow-green to vivid, dark yellowish green.

Although we could not obtain a refractometer reading because of the condition of the surface (see below), we did detect a birefringence blink, which indicates a material

Figure 15. Sold as "jade" in Hong Kong, this carved sphere was determined to be a selectively dyed rock consisting of calcite and lesser amounts of serpentine. Photo by Robert Weldon.

of high birefringence. When examined through a Chelsea color filter, the greenish areas appeared grayish green while the brown areas looked red-brown. All areas were inert to both long- and short-wave U.V. radiation, and there was no phosphorescence. Testing on an inconspicuous area revealed a Mohs hardness of approximately 3.

Magnification revealed a very mottled texture with some areas that were near-colorless to white in both brownish and greenish portions. Brown color concentrations were noted in surface-reaching fractures in the brownish areas, while both brown and green color concentrations were seen in green areas; small chipped spots in the brownish areas showed a lighter brown color and had a granular texture. Many of the incised areas contained concentrations of an off-white to yellowish material that readily melted when touched with a thermal reaction tester.

Chemical tests were also performed in inconspicuous spots. Both the brown and the green areas effervesced to a small drop of dilute hydrochloric acid. Rubbing of brown areas with an acetone-dipped cotton swab produced a strong red-brown discoloration, while similar testing in green areas showed a less obvious but still definite green discoloration.

X-ray diffraction analyses of scrapings from both the green and the brown areas were performed by C. W. Fryer. Material taken from the brown area produced a strong pattern for calcite; the X-ray diffraction pattern for the green area showed strong lines corresponding to calcite plus slightly weaker lines that matched a general pattern for serpentine.

On the basis of the above, the editors identified the sphere as a rock consisting of calcite and lesser amounts of serpentine that had been selectively dyed, the whole piece having been wax or paraffin coated. It is possible that before treatment the areas containing serpentine had a light green color which led to the selective dyeing of these portions with a green coloring agent to intensify the effect.

ANNOUNCEMENTS

The Tucson Gem and Mineral Show will be held February 13–17, 1991, at the Tucson Convention Center. The featured mineral for the show is azurite. For more information, contact the Tucson Gem and Mineral Society, P.O. Box 42543, Tucson, AZ 85733.

The American Gem Trade Association will be in Tucson February 9–14 at the Convention Center. They will announce the winners of the Spectrum Awards (a jewelry contest aimed at the effective use of colored stones) at that time. For information, contact the AGTA headquarters at the World Trade Center #181, P.O. Box 581043, Dallas, TX 75258, (214) 742-4367; for reservations, call (800) 972-1162.

The Gemological Institute of America will present various lectures and seminars in Tucson, February 9–14, at the Convention Center. For information, call (800) 421-7250, ext. 227, or write GIA, P.O. Box 2110, Santa Monica, CA 90406.

The Gemological Institute of America is sponsoring the International Gemological Symposium June 20–24, 1991. Experts will be speaking on such diverse topics as colored stone and diamond sources, gem identification, antique and period jewelry, synthetics and simulants, diamond market perspectives, jewelry for the 20th century and beyond, global economics, marketing and merchandising challenges, and pearls. On Sunday, key figures will address some of the most important—and controversial—issues in the industry, including new technologies in gem identification, quality analysis of colored stones, and current concerns in jewelry evaluation and appraisals. Poster sessions, a noncommercial marketplace of new ideas, will also be held on Sunday. Each day also has its share of social events, where attendees can meet each other and the speakers and panelists, including a grand finale at the Los Angeles County Museum of Natural History. For more information, contact GIA at (800) 421-7250, ext. 211, or write to GIA at P.O. Box 2110, Attn: Symposium Office/Resource Development, Santa Monica, CA 90406.

The Israel Precious Stones and Diamond Exchange Ltd. has announced new telephone and facimile numbers as of June 3, 1990. These are (972-3) 5751177-83 and (972-3) 5752547, respectively.

The State Gem Corporation of Sri Lanka has announced that, effective August 1, 1990, the export of "geuda" rough will be open to dealers from all countries who obtain registration with the Manager, State Gem Corporation, Geuda Trading Centre, Ratnapura. Procedural details can be obtained on written request to the manager. In the past, only dealers from Thailand were eligible for permits to export geuda.

Also from the State Gem Corporation comes an announcement of the establishment of a Gem & Jewellery Exchange in Colombo. The exchange will provide rooms that may be rented by foreign buyers and service facilities so that it may serve as a "One Stop Export Shop."