GEM NEWS

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

DIAMONDS

Scientists research material as hard as diamond. Using principles based on the calculated compressibility of a hypothetical solid composed of carbon and nitrogen, scientists at the Lawrence Berkeley Laboratory investigated the possibility of synthesizing new materials with a hardness comparable to diamond. Physicist Marvin Cohen and Berkeley graduate student Amy Liu used a combination of a simple empirical model and a quantum-mechanical "first principals" computer calculation to test their hypothesis. Experiments were performed on silicon-nitride, in which the silicon was substituted with carbon. Results found that a carbon-nitrogen compound would have a bulk modulus of 4.3 megabars, compared to the 4.4 megabars of a diamond. (A megabar is one million times atmospheric pressure at sea level.)

A material with a hardness comparable to diamond would be valued in industry for use in cutting tools and as a wear-resistant protective coating.

Malaysia diamond plant. According to the Bernama news agency, a new diamond-processing plant opened this past March at Ipoh, 190 km north of Kuala Lumpur in Malaysia. The plant, a joint venture between two Belgian companies (Schongut and Tache), is said to have an annual capacity of 900,000 processed diamonds, with a work force of 250.

Botswana beats target. Botswana produced 13 million carats of diamonds in the first three quarters of 1989, which betters the production target of 12.6 million carats, according to the minister of Finance Development Planning. The minister added that an $87 million crushing plant was scheduled for completion in April at Debswana's Jwaneng diamond mine near the city of Kanye, about 100 km southwest of Gaberone. He speculated that diamonds produced at Jwaneng in the future would be smaller and of lower value than those presently mined, although total carat output would remain at the current level. (*Mining Journal*, March 23, 1990)

Soviet-Singapore joint venture. Intraco of Singapore, a government-linked trading firm, announced plans for a joint trading venture with Almazjuvelirexport (Almaz), which is currently the exclusive producer and exporter of diamonds for the Soviet Union. The joint venture, which began operations in April 1990, is called Russalmaz Asia, and has started with an authorized capital of $500,000. Almaz would take a 50% stake, with the remainder divided equally between Intraco and Agrochem Investment of Singapore. The intention of the newly formed venture is to deal not only in diamonds, but also in colored stones, jewelry, precious metals, and industry-related equipment and machinery.

New area in Angola to be mined. A new area in and around Lucapa, in the province of Lunda-Norte, is a prospecting target for the Sociedade Portuguesa de Empreendimentos. SPE signed a two-year agreement that allows it to prospect the area, for which target production is 400,000 ct of diamond a year, according to SPE's chairman. At the end of the two-year contract, SPE and Endiama (Angola's national diamond enterprise) might consider a joint mining venture. (*Diamond International*, March/April 1990)

Argyle cutting school near Beijing. The Australian government has funded a school to train diamond cutters to boost the cutting of Australian rough in China and encourage competition with India in the manufacture of Australian goods. According to Beijing officials, the school, managed by Argyle Diamond Sales, was scheduled to begin operations in April. On staff are five Chinese training managers from the Pearl, Diamond, Gem and Jewelry Import and Export Corporation (CPDGJIEC). Students for the school—which hopes to train 850 cutters over the three-year duration of the project—will be recruited from CPDGJIEC factories in Beijing and the provinces. Argyle will supply the rough to be cut and polished; the finished stones will be returned to Argyle. (*Diamond International*, January/February 1990)

Kimberlite find in the U.S. The Upper Peninsula region of Michigan was targeted for drilling by Crystal Exploration, Inc., to determine the diamond potential of a kimberlite pipe found there. Out of 10 holes drilled in that area, seven intersected kimberlite.

Crystal Exploration has acquired the diamond exploration assets of Dow Chemical Co., which had been exploring for diamonds in Michigan for almost five years. During this time, they discovered six pipes, two of which require further processing to assess their potential. (*Mining Journal*, April 13, 1990)

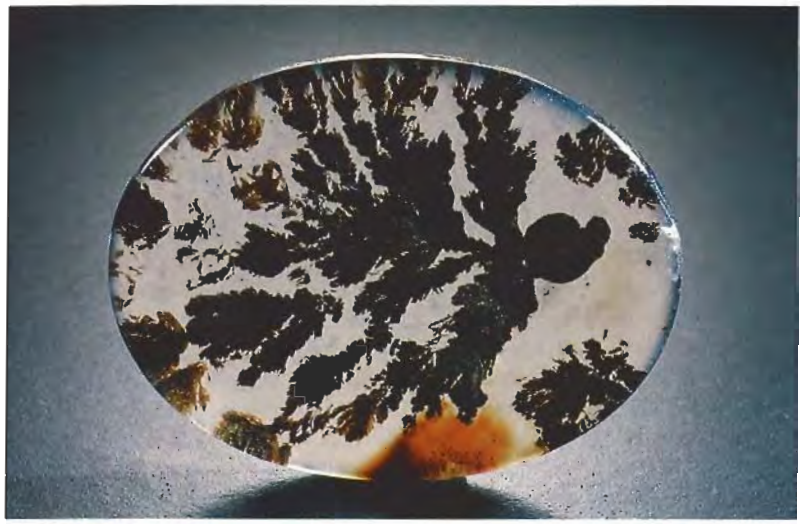


Figure 1. This 39.00 × 30.45 × 6.42 "plume" agate is actually an assembled stone. Photo by Robert Weldon.

Diamond-cutting industry in Sri Lanka. Switzerland and Sri Lanka are setting up a joint venture in the Katunayake area of Sri Lanka to cut and polish diamonds and colored stones. The project is expected to employ about 150 people. Sri Lanka had three approved diamond-cutting units in 1986, and now has 13, most of which are joint ventures with Belgian, Israeli, and Japanese interests. The Sri Lankan government has offered outside investors incentives such as duty-free import of machinery and accessories and tax exemptions on export profits.

Future industry proposals include the establishment of an exclusive diamond zone within the Katunayake Free Trade Zone as well as the establishment of a special Diamond Guild. (*Mining Journal*, April 27, 1990)

Tanzania intensifies mineral search. Apparently because of radical reductions in the production of gold and diamonds (the latter is reportedly only 50% of what it was in the mid-1970s), the Tanzanian government has intensified its search for mineral deposits. The Mwadui diamond mine is expected to be exhausted in approximately nine years. (*Diamond Intelligence Briefs*, May 8, 1990)

Prospecting in Botswana. The firm Molopo Australia is currently exploring for diamonds in Botswana in a large tract to the south and southwest of Debswana's Jwaneng diamond mine. The firm reports "significant advances" in its evaluation of one of the kimberlite pipes discovered in the prospect area. Molopo will carry out aeromagnetic surveys in parts of the concession as well as continue to evaluate the economic potential of already-discovered kimberlite pipes. (*Diamond Intelligence Briefs*, May 8, 1990)

COLORED STONES

Assembled "plume" agate. From time to time, we see gem materials that have been treated to fabricate, alter, or induce inclusions. We have seen transparent quartz crystals with man-made "three-phase" inclusions, topaz with stained etch channels that were heat treated to alter the color of the iron-based staining, and agates with dendritic inclusions produced through electrically stimulated chemical precipitation.

Recently, Pieter Bennett, a student at GIA in Santa Monica, donated an interesting assembled stone to the Institute. The stone, a very low-domed oval cabochon (figure 1), had been purchased at the February Tucson Show, where it was represented to be "natural" dendritic agate. The 61.39-ct specimen is essentially colorless and almost transparent where inclusions are not present. It exhibits an attractive "plume"-type pattern of dark reddish to greenish brown dendrites. One small, irregular area is a dark yellowish brown color with wavy, agate-like banding.

When examined from the side, the assembled nature of the piece becomes obvious: The top consists of a transparent, colorless, convex cap joined to a flat, light gray, semitransparent to translucent base. With magnification, the cap appears inclusion-free. Between the cap and the base is a fairly thick (approximately 0.5 mm), transparent, colorless layer that contains many minute spherical gas bubbles. Using a straight pin and very little pressure, we easily scratched and indented this layer, which we believe to consist of an epoxy or similar synthetic resin. Irregular drops of this material were found on the cap near the separation plane, and the entire base—which showed several scratches—was coated with it. In addition to the dendritic inclusions mentioned above, the approximately 1.2-mm-thick base section contained some irregular, wispy, milky-white areas, some of which showed typical "botryoidal" or "fortification agate" structure.

A spot R.I. taken on the apex of the cap revealed a reading of 1.51; the 1.56 flat-facet reading taken on the base was believed to represent the thick coating rather than the underlying material. No birefringence or pleochroism was noted, and no absorption features could be detected with a desk-model prism spectroscope unit. When examined face-up in the polariscope, the stone exhibited an aggregate reaction; when examined through the side, parallel to the separation plane, the cap gave a singly refractive reaction, while the base gave an aggregate reaction. Using hardness points, we determined that the cap had a Mohs hardness of approximately 5 1/2.

Viewed face-up, the piece was inert to long-wave U.V. radiation and fluoresced a moderate chalky yellow to short-wave U.V. When the piece was examined parallel to the girdle plane, however, the epoxy-like layer fluoresced

a bright bluish white – and both the base and cap were inert – to long-wave U.V.; to short-wave U.V., the cap fluoresced a strong chalky yellow, the epoxy-like layer fluoresced a moderate chalky bluish white, and the base was inert. Interestingly, when the stone was viewed through its base while exposed to short-wave U.V. radiation, the yellow fluorescence of the cap was masked.

On the basis of these test results, we determined that the specimen was a glass and dendritic ("plume") agate doublet, the two components being joined by a colorless cement layer. One might ask why anyone would go to the trouble of producing such an assembled stone. Dr. Emmanuel Fritsch, of the GIA Research Department, suggested that only in a relatively thin section might the agate base exhibit the desired "plume" effect; the assemblage allowed this effect to be seen in a larger (and perhaps more durable) stone.

Apatite "from Paraíba" and apatite purchased as emerald. Among the colors seen in the Paraíba tourmaline that has recently emerged from Brazil is a saturated bluish green similar in appearance to what some in the trade call "light emerald." Also seen at the February Tucson Show were parcels of greenish blue to bluish green apatite that reportedly came from Madagascar; at least one exhibitor was offering apatite in this color range as "Paraíba apatite," while another was selling virtually identical material labeled simply "Paraíba." To our knowledge, no apatite comes from Paraíba.

Interestingly, about a month after the Tucson Show, we received International Colored Gemstone Association (ICA) Laboratory Alert No. 35, "Bluish Green Apatite Rough as Emerald." The report, which originated with Yehuda Yacar of the Gemological Institute for Precious Stones and Diamonds Ltd. in Ramat-Gan, Israel, documented the gemological properties of a 230-gram parcel of bluish green apatite that was purchased in Kenya as emerald and was said to have come from Madagascar.

Brazilian chrysoprase. Chrysoprase is one of the more popular gem varieties of chalcedony. The best known locality for this yellowish green material is Australia, and it is often given the misnomer "Queensland jade."

Recently, Douglas M. Henrique of Huntington Park, California, showed us some rough specimens of an attractive light yellowish green material that he described as Brazilian chrysoprase. According to Afranio Moreira, of Brasil Comercio de Pedras Preciosas, in Governador Valadares, the material is found in a galena mine near Niquelandia, in the Brazilian state of Goiás. According to Mr. Moreira, only 30% of the material recovered is green, with the rest white.

We subsequently had two oval single cabochons and a preform cut from one of the pieces of rough (donated by Mr. Moreira) and subjected these to testing to confirm the identity. One of the cabochons, together with a piece

Figure 2. Chrysoprase, like this 11.18-ct cabochon and accompanying rough, is being mined in Goiás, Brazil. Photo by Robert Weldon.

of strongly color zoned rough, is shown in figure 2. The pieces are all light, slightly yellowish green and semitranslucent. A refractive index of 1.539 was obtained from the flat, well-polished base of one specimen, and thin sections of the cabochons gave aggregate reactions in the polariscope. When viewed through a Chelsea color filter, the stones appeared grayish green. Specific gravity (taken with heavy liquids) was approximately 2.64. Magnification revealed yellowish, possibly limonitic, staining in some surface-reaching fractures.

X-ray fluorescence spectrometry, performed by Dr. Emmanuel Fritsch, demonstrated the presence of both silicon and nickel in a test sample. Meredith Mercer, also of the GIA Research Department, compared the U.V.–visible absorption spectrum of this material to that of a reference sample of Australian chrysoprase from the GIA collection and found the features of the two to be essentially identical. This testing confirmed the identity of the material as chrysoprase chalcedony.

One interesting feature noted during the gemological investigation was the reaction to ultraviolet radiation of this Brazilian material: It fluoresced a moderate greenish blue to long-wave, and a weaker greenish blue to short-wave, U.V., and did not phosphoresce to either wavelength. Chrysoprase from other localities is typically inert to both wavelengths.

Major jade deposits in Japan. Commercial mining of jade is very limited in Japan, although large deposits of good-quality jadeite exist. In addition to the green variety, blue, purple, black, and white jadeite has been found.

Deposits in Kotaki, near Itoigawa and Oomi in Niigata prefecture, are under snow six months of the year, and even in the warmer months strong river currents and

Figure 3. This "cat's-eye" opal triplet measures 7.78 × 9.85 × 4.80 mm. Photo by Robert Weldon.

landslides make it difficult to get men and equipment into the area. Following the rainy season, however, jadeite pebbles of good color and quality are found on the banks of the Kotaki and Himekawa rivers, in Niigata prefecture, and on the seashore at Asahi, in nearby Toyama prefecture. A deposit of fine jadeite was recently discovered in Hashidate, close to Itoigawa, but the snow, rough terrain, and dangerous insects make commercial mining possible only in September.

In Ooya, in Hyogo prefecture, good-quality white jadeite with splashes of bright green has been discovered, but the deposits are protected. Deposits recently discovered in Kanto and Gunma are yet to be mined. Other jadeite deposits in Japan are: Kamuikotan in Hokkaido; the northern mountain area of Nagano prefecture; Wakasa in Tottori prefecture; Oosa in Okayama prefecture; and Nagasaki and Shikoku. (*Jewellery News Asia*, March 1990)

Attractive chatoyant assembled opal. Opal is an essentially noncrystalline, amorphous form of silica that consists of regularly arranged spherical particles which diffract white light into colors of the spectrum.

Some opal, notably material from Idaho, exhibits a play-of-color in the form of a chatoyant band, an effect that has been attributed to planar faults in the stacking of the silica spheres. This chatoyancy can be enhanced by gluing a colorless cabochon cap, which acts as a condensing lens, over the opal; the cap also increases durability. Another piece of material, such as chalcedony, may be glued to the base, thus producing a "cat's-eye opal triplet."

Recently Lorri Dee Rascoe, a staff gemologist in the GIA Gem Trade Laboratory, showed the editors a very attractive opal triplet measuring 7.78 × 9.85 × 4.80 mm. The assembled stone was noteworthy for the strength of its play-of-color chatoyant band (figure 3).

Peridot mining update. Suzanne Kinkade, of Arizona Gems & Crystals, provided the Gem News editors with an update on peridot mining at the San Carlos Apache Indian Reservation in Arizona. According to Ms. Kinkade, monthly production at this important locality is presently about 600 kg of cabochon- and tumbling-quality material and 12–15 kg of facetable rough. Approximately 95% of the latter consists of pieces smaller than 5 ct. Typically, mining is carried out from October

Figure 4. Amethyst scepters such as this 10-cm-long crystal were found recently in the Inyo National Forest, California. Photo by Robert Weldon.

to March, since the heat is unbearable during much of the rest of the year and many of the potential miners are often occupied as firefighters.

California quartz update. In the Winter 1988 Gem News section, we reported on the recovery of good-quality smoky quartz crystals in the Inyo National Forest, Inyo County, California. Continued exploration by Michael and Cora Anderson has led to the discovery of amethyst crystals as long as 4 in. (10 cm) in this area. Some of these crystals show very fine scepter form, as seen in figure 4.

Most of the crystals found thus far can be described as specimen quality, while a few have transparent areas suitable for faceting. The extent of the deposit is not known at the present time.

Unusual pseudomorph. Some of the most unusual unfashioned specimens of gem minerals are silica pseudomorphs after various organic materials. Included among these are petrified wood and silicified coral, as well as opalized wood, shells, and even lizards.

Recently, an unusually fine fossilized cryptocrystalline quartz pine cone (figure 5) that dates back to the Jurassic period was brought to our attention by David Humphrey. The pine cone, *Aura Caria Mirabilis*, was reportedly found in the Cerro Cuadrado Petrified Forest, in Patagonia, Argentina. It measures 55 mm high and 53 mm in diameter, and weighs approximately 125 grams.

Figure 5. This 55-mm-high fossilized pine cone was discovered in Patagonia, Argentina. Courtesy of David Humphrey, Pacific Palisades, CA. Photo by Robert Weldon.

Rubies from Vietnam? Dr. Henry A. Hänni, of the Swiss Foundation for the Research of Gemstones (SSEF), provided the Gem News editors with some very interesting information relating to rubies that he believes to be from a new source in Southeast Asia. On a recent visit to Thailand, Dr. Hänni heard about rubies supposedly coming from either Vietnam or Cambodia; he also noted that Richard Hughes, editor of *Gemmological Digest*, had mentioned rubies from Vietnam in the most recent issue of that journal. While in Chanthaburi, Thailand, Dr. Hänni had an opportunity to see a large number of rubies (figure 6) that were reportedly from this new locality in Vietnam and to purchase samples for preliminary investigation.

Figure 6. This ruby rough is reportedly from a new locality in Vietnam. Photo courtesy of Dr. Henry Hänni, SSEF.

Dr. Hänni believes, based on his study of the inclusions and on trace-element analyses, that the deposit from which these rubies came is similar to the ruby deposits of Burma, Hunza (Pakistan), and Jegdalik (Afghanistan); he postulates that the rubies are derived from a marble occurrence. Samples he examined contained phlogopite mica and intersecting twin lamellae, and had a "certain milkiness." Almost all of the individual stones were waterworn, rolled pebbles, although some exhibited fresh crystal faces and had a tabular habit (figure 7). Dr. Hänni feels that if these stones were heat treated, they might be indistinguishable—except by trace-element analysis—from similar-appearing material from East Africa or Burma.

The largest specimen examined weighed approximately 20 grams (100 ct); like many of the stones, it was not transparent but was believed to be suitable for heat

Figure 7. Note the tabular habit of this ruby crystal, which was reportedly mined in Vietnam. Photo courtesy of Dr. Henry Hänni, SSEF.

treatment. With magnification, Dr. Hänni observed healing fissures as well as "dense patterns of intersecting narrow twin lamellae" in this stone.

Rock-like material with play-of-color. At a Santa Monica gem show, one of the Gem News editors recently examined an interesting semitranslucent gem material, fashioned *en cabochon*, that ranged from gray to yellow-brown in body color and exhibited a speckled play-of-color (figure 8). Magnification revealed transparent colorless grains surrounded, and cemented together, by what appeared to be a whitish opal exhibiting diffraction colors. Some specimens exhibited a range of spectral colors, while others showed only green.

According to the vendor, Ajith K. Senanayake of Sri Gems, Baton Rouge, Louisiana, the material is recovered from swampy areas within a 30- to 40-mi. (48–64 km) radius of the city of Lafayette, Louisiana. It is found in association with what Mr. Senanayake describes as a "sandstone-like" rock. Slabs as large as 1 m across have been recovered.

Figure 8. These 3- to 5-ct cabochons of a rock-like material from Louisiana display a speckled play-of-color. Photo by Robert Weldon.

The GIA Gem Trade Laboratory has examined similar material in the past, and found it to be a rock composed primarily of quartz sand grains, opal, and pyrite, with the opal being the cementing agent.

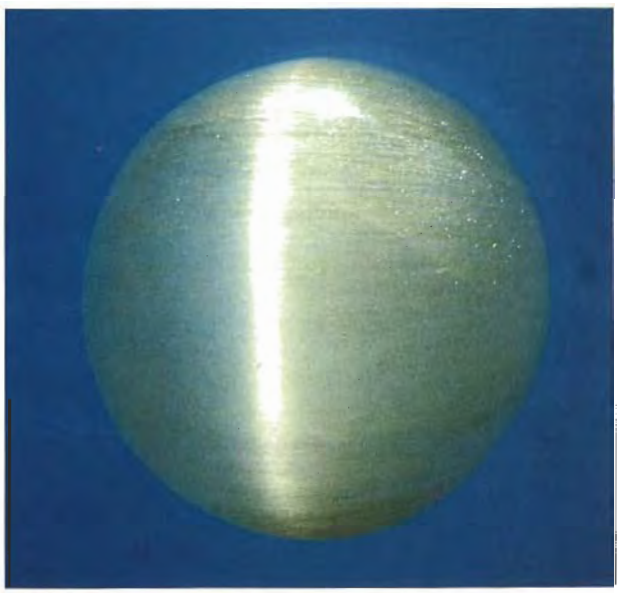
Cat's-eye topaz. Recently, Charles Carmona of Guild Laboratories, Inc., Los Angeles, showed us an interesting, very light yellowish brown, almost round double cabochon that he had identified as topaz. The 3.53-ct stone (8.63 × 8.36 × 5.01 mm) was translucent and exhibited a very strong chatoyant band (figure 9), which was apparent even under the diffused illumination of overhead fluorescent lighting.

Magnification revealed a dense pattern of very fine, parallel etch ribbons that were stained with a light yellow material (possibly limonite). When the stone was examined in transmitted light down the length of the ribbons, a transmission effect similar to that seen with the mineral ulexite (sometimes sold as "TV stone" because of the fiber-optic effect it exhibits) was noted. Secondary partially healed fractures in fingerprint patterns were also noted.

This is the first example of cat's-eye topaz that either of the Gem News editors has seen.

The discovery of the Paraíba tourmaline mine. The introduction of the "electric" blue and green tourmalines known as "Paraíba" to the colored stone market was one of the more notable industry events of recent years. Heitor Barbosa, who claims to have first discov-

Figure 9. This 3.53-ct cat's-eye topaz exhibits strong chatoyancy. Photo by Robert Weldon.



ered the Paraíba tourmalines, provided the following report on the history and development of this mine.

The sole source of the material, Mina da Batalha a Nova Era (Mine of the Battle of the New Era) is located in the state of Paraíba, Brazil, south of the mountain range Serra da Borborema on the north flank of Serra da Frade. It is 4.5 km northeast of Salgadinho, near the village of São Jose da Batalha. The mine is operated by COGASBRA, Cooperativa de Garimpeiros de São Jose da Batalha, municipality of Salgadinho, registered by the National Department of Minerals, DNPM, alvara no. 7.432, on March 13, 1990. Because the ongoing dispute over mining rights could become violent, the mine is not open to outsiders at the present time.

Barbosa, who previously had mined green tourmaline from the Golconda mine in Minas Gerais, was traveling through northeast Brazil's rugged *sertão* outback region in 1982 when he met Jose Pereira of Patos, Paraíba, an old *garimpeiro* who dealt in industrial "black mineral"—tantalite-columbite—which is found almost exclusively in pegmatites. When Barbosa examined some samples of the black mineral, he noticed tiny grains of a material resembling colored sugar that no one had identified but he suspected was a gem material. Barbosa then decided to explore for gem prospects with Pereira as his guide. They searched the mine dumps and tailings of the region's tiny, industrial pegmatites, exploited for tantalite, beryl; mica, phosphate, and quartz, among other minerals. In 1983, while investigating the tailings of a small manganotantalite pit at the base of a hill, Barbosa spotted colorful fragments and began to dig.

Over the course of two and a half years, with a crew of 10 to 16 men, Barbosa laboriously dug two shafts up to 50 m deep, the second with 15-m galleries at several levels. The slow and cumbersome process involved two-kilo sledge hammers, chisels, pry bars, shovels, picks, and dynamite. The shafts followed vertical pegmatite dikes, with narrow (1.8 × 0.6 m) galleries carved where they intersected a horizontal finger of the dike. (Tourmaline is usually found here in pencil-thick veinlets enveloped in white kaolin clay.) Debris was moved back out of the galleries by shoveling across the length of the shaft and into a rubber bucket, which was then hauled to the top of the shaft by a hand-turned winch.

During 1985–87, Barbosa relates, miners encountered several varieties of tourmaline, ranging from bright "lettuce" green to blue green, near-emerald color, and drab green stones with indicolite tips large enough for faceting. In August 1988, at a depth of 50 m, Barbosa found five different types of blue tourmaline, including the "electric" blue stone he calls "Heitorita" (figures 10 and 11). He tells how he had to "bring [the beautiful tourmaline] out again and again to look at it. . . . After five and a half years, this was not just a good surprise but a present beyond imagination." In late 1988, the first examples of Paraíba blue tourmaline found their way into the Brazilian markets.

Figure 10. Heitor Dimas Barbosa holds some of the exciting tourmalines that he has mined from the Batalha a Nova Era mine, in Paraíba, Brazil.

Since the emergence of significant amounts of this fine material, a second claim has been made on exploration rights in the general vicinity. However, Barbosa has already been granted these rights for the area where the tourmaline was found, and he expects the Federal Department of Minerals to grant the mining lease to the COGASBRA mining cooperative, of which he is president, shortly. Currently, COGASBRA is working five different shafts with 14 miners, although Barbosa feels that a greater capacity—up to 25 pits—is feasible.

Tourmaline doublets. Some of the most interesting assembled stones—and potentially the most difficult to identify—are those that are composed partially or completely of the natural gem species being imitated. For example, beryl triplets, composed of two sections of natural beryl joined by a green cement, will give refractive index and birefringence readings consistent with emerald.

ICA Laboratory Alert No. 33, written by Drs. Hermann Bank and Ulrich Henn of the Deutsche Stiftung Edelsteinforschung, Idar-Oberstein, reports on tourmaline doublets. One basic type exhibits a cat's-eye effect, made by cementing a transparent crown to a

Figure 11. The "electric" blue color that appears to be unique to the Paraíba find can be seen here in this 1-cm tourmaline fragment on quartz from the Batalha a Nova Era mine. Specimen courtesy of Nature's Geometry; photo by Robert Weldon.

Figure 12. These two bicolored tourmalines were identified as assembled stones. Photo courtesy of H. Bank and U. Henn, Deutsche Stiftung Edelsteinforschung, Idar-Oberstein, Germany.

fibrous pavilion; the other is a bicolored transparent stone, with the two color components cemented together (figure 12). In either case, the component pieces may or may not be from the same crystal. As the authors note, both types can be identified with magnification, as the cement layer is easily visible.

"Treasure" postage stamp. While reading the article "Emerald and Gold Treasures of the Spanish Galleon *Nuestra Señora de Atocha*" (*Gems & Gemology*, Winter 1989), Nawal Kishore Tatiwala of Bansal Jewellers Gem Identification Laboratory in Jaipur, India, was reminded of a postage stamp in his gems and jewelry stamp collection (figure 13).

The stamp, issued by the Bermuda government in 1969, shows a gold cross that appears to be set with cabochon emeralds in a style very similar to that of the emerald-set cross described in the *G&G* article and pictured on the cover of that issue. The stamp carries the

Figure 13. The emerald-set gold cross pictured on this Bermuda postage stamp is strikingly similar to the cross that appeared on the cover of the Winter 1989 Gems & Gemology. *Stamp courtesy of Nawal Kishore Tatiwala; photo by Robert Weldon.*

legend "1594 TREASURE FROM THE SEA" and a value of "4d." According to Mr. Tatiwala, four stamps of different values were issued.

SYNTHETICS AND SIMULANTS

Plastic cameo imitations. The Spring 1989 Gem News column reported on two plastic cameo imitations, one resembling a shell cameo and the other mimicking a Wedgwood piece.

At the most recent Tucson Show, the Gem News editors saw a new type of plastic imitation cameo that was quite large and resembled those cut from the reddish brown and white helmet shells. These imitations are particularly effective in that they appear to have been molded in a manner that produces an irregular concave back, similar to that seen on large natural shell cameos (figure 14).

Figure 14. These two plastic imitation shell cameos, which measure 70 × 56 mm, had been molded to imitate the irregular concave backs seen on some natural shell cameos. Photo by Robert Weldon.

Imitation emeralds from southern Africa. Jim Lewis of Kaiser Gems, Los Angeles, has provided more information on imitation emerald crystals similar to those described by Dr. Henry A. Hänni in the Spring 1989 Gem News section.

On a buying trip to Zambia in May and June of 1989, Messrs. Lewis and Caesar Habib (co-owner of Kaiser Gems) were shown what appeared to be a large emerald crystal by a local man not involved in the gemstone industry. In Malawi, they were shown a similar-appearing specimen. In Los Angeles some months later, Kaiser Gems was visited by the man from Zambia who brought with him the original specimen plus another similar "crystal." These were examined with magnification and immediately determined to be composite imitations. Mr. Lewis subsequently loaned them to GIA for examination.

The two "crystals" have a distorted hexagonal habit (figure 15). The larger weighs 63.35 ct and measures 31.96 × 17.60 × 16.37 mm; the smaller weighs 26.96 ct and measures 28.30 × 15.49 × 12.05 mm. They are both medium dark green with rather rough surfaces that are partially coated with a light orangy brown limonitic staining and tiny flakes of mica. The smaller one has an area of distinctly lighter color and lower transparency. Some relatively clean, smooth surface areas on both reveal highly transparent interiors; neither of the specimens has a termination.

The larger piece had one relatively smooth surface that allowed determination of refractive index readings of approximately 1.54–1.55, although the condition of the surface did not allow for an accurate birefringence. The smaller "crystal" had a smooth, partially polished face which gave R.I. readings of 1.545–1.553 and a birefringence of 0.008; a flat surface on the lighter green area gave a vague R.I. reading of 1.57. Both "crystals" gave doubly refractive reactions in the polariscope and appeared grayish green through the Chelsea color filter. Both showed a strong, chalky, slightly greenish white reaction to long-wave U.V. radiation in some areas, with a similar but distinctly weaker reaction to short-wave U.V. There was no phosphorescence to either wavelength. When the specimens were examined with a DISCAN diffraction-grating spectroscope unit, a dark absorption band at 662–689 nm was observed; this is similar to the main absorption feature noted in jadeite and some other gem materials that have been dyed green, including quench-crackled quartz.

Magnification revealed the true nature of the deception. Both specimens consisted of fairly thick green seams holding together irregular fragments of a transparent colorless material, the individual fragments exhibit-

Figure 15. These two imitation emerald crystals, the larger weighing 63.35 ct, are composed primarily of quartz fragments held together by a green binding agent. Photo by Robert Weldon.

Figure 16. The 10-mm beads in this necklace resemble rhodochrosite but were determined to be dyed massive calcite. Photo by Robert Weldon.

ing parallel striations that were randomly oriented from one fragment to another. The green binding material contained numerous gas bubbles and was easily indented with a needle probe; the mica flakes appeared to be glued onto the surfaces of the specimens. Doubling could be seen through the smoothest face of the smaller specimen.

On the basis of this examination, the editors concluded that these imitation emerald "crystals" were composed primarily of quartz fragments that were held together with a green epoxy resin or other plastic. The lighter green area on the smaller crystal is believed to be a piece of low-quality natural emerald. These two specimens appear to be quite similar to the two imitation emerald crystals from southern Africa described by Dr. Hänni in his earlier report.

Imitation rhodochrosite beads. Massive calcite has been dyed various colors and used to imitate a wide variety of other ornamental gem materials such as jade ("Mexican jade"), lapis lazuli, and coral. GIA instructor Mary Fitzgerald recently showed the Gem News editors a continuous strand of approximately 10-mm beads that at first glance resembled rhodochrosite. The beads, which she purchased in Mexico, have an overall pinkish body color; many of them showed prominent banding ranging from very light pink to slightly orange-red (figure 16). With routine gemological testing, the beads were found to be massive banded calcite ("onyx marble"). Magnification showed obvious dye concentrations in surface-reaching fractures and around the drill holes, while vigorous rubbing produced a pink discoloration on an acetone-dipped cotton swap.

ANNOUNCEMENTS

Tiffany & Co. has donated a large kunzite necklace to the Smithsonian Institution's National Museum of Natural History. The necklace, which features a 396.30-ct kunzite on a necklace of South Sea baroque pearls, was designed by Paloma Picasso in 1986. It appeared on the cover of the Summer 1987 issue of *Gems & Gemology*. The donation coincided with the opening of a branch store of Tiffany & Co. in Tysons Corner, Virginia.

The National Museum of Natural History also recently received a donation from the Independent Jewelers Organization of a 120-lb. (54.5-kg) specimen of transparent smoky citrine consisting of two pencil-like, six-sided crystals that are joined at the base. The longer section is 26 in. tall and 7 in. in diameter. Both crystals are so transparent that it is possible to read newsprint through them. The specimen was found at a mine in Minas Gerais.

The Cleveland Museum of Natural History has announced the opening of its new 7,000 square-foot exhibition gallery with an inaugural exhibit from its permanent collection of gems, jewelry, and precious metals. The show, titled GemFire, will run from April 7, 1990, to February 17, 1991. On display are over 2,000 gems, minerals, and metals, including fancy-colored diamonds, black opals from Australia, a 122.08-ct kunzite, and a 22.18-ct emerald from the Muzo mine in Colombia. Also in the hall will be several educational exhibits on geology, the lapidary arts, and mining.

Erratum: The Gem News entry regarding the Pamir spinel in the Winter 1989 issue of *Gems & Gemology* should have called the stone a cushion cut. It was faceted by Justina Wright of Fallbrook, California, but is owned by Marius Van Dyk.