

GEM NEWS

John I. Koivula, *Editor*

DIAMONDS

"Filled" diamonds. In recent months, there has been considerable discussion in the trade about the distribution of diamonds that have allegedly been filled to disguise cleavages and fractures, following a concept similar to that of oiling emeralds. Mr. Nubuo Horiuchi, of the Central Gem Laboratory in Japan, reported his observation in January 1987 of such a treatment, which diminishes the visibility of cleavages that reach the surface of some diamonds. According to Mr. Horiuchi's report, diamonds treated in this manner were discovered by the Central Gem Laboratory in lots imported from Israel. An unknown substance, possibly silicone, is being used both to give the cleavages a whitish appearance and to reduce diffuse reflections. This seems to improve the overall clarity appearance of these stones.

Since August of this year, all three locations (New York, Los Angeles, and Santa Monica) of the GIA Gem Trade Laboratory have encountered a number of imperfect diamonds that appear to have been treated by some sort of filling procedure. In September, the GIA Research Department acquired a 1.22-ct diamond (figure 1) that was reported by the dealer to have been treated in Israel to fill the fractures. Prior to its arrival at GIA, the stone had been boiled in concentrated sulfuric acid, which apparently removed some of the filling material near the surface. The result is a white, highly visible subsurface cruciform pattern across the table and crown of the stone that is probably a good representation of what the stone looked like before the filling treatment (figure 2). However, the stone also reveals a "rainbow" iridescence, not normally seen in diamonds, that appears to be the most distinctive characteristic of this treatment method (again, see figure 2).

The September 4, 1987, issue of the *Rapaport Diamond Report* states that such a treatment method was first developed by Mr. Zvi Yehuda of Israel. He purportedly introduces a "secret" ingredient into these heavily flawed stones at high pressure (50 atmospheres) and temperature (400°C). The *Rapaport Report* recommends that buyers use 20× magnification to look for small bubbles around the treated area in addition to looking for the "rainbow" iridescence mentioned above. On one of the stones that GIA has examined, a distinctive flow pattern was observed in the filled cleavages



Figure 1. This 1.22-ct heavily included diamond has apparently been "filled" to minimize the cracks and cleavages. Photo by Robert Weldon.

(figure 3), very different from the "feathery" appearance typical of (unfilled) diamond cleavages.

The GIA is currently subjecting a number of suspect diamonds to a series of sophisticated tests in an effort to identify conclusively the filling material as well as to confirm the presence of such a material in a specific stone.

De Beers—Botswana—and diamonds. De Beers Consolidated Mines Limited and De Beers Botswana Mining Company ("Debswana") have reached an agreement whereby De Beers will acquire from Debswana all of the rough diamond stockpiled during the period 1982–1985 (when the diamond industry was in recession). In exchange, Debswana will receive an undisclosed cash payment, 5.27% of the enlarged share capital of De Beers, and the right to nominate two directors to the boards of both De Beers and The Diamond Trading Company (Proprietary) Limited.

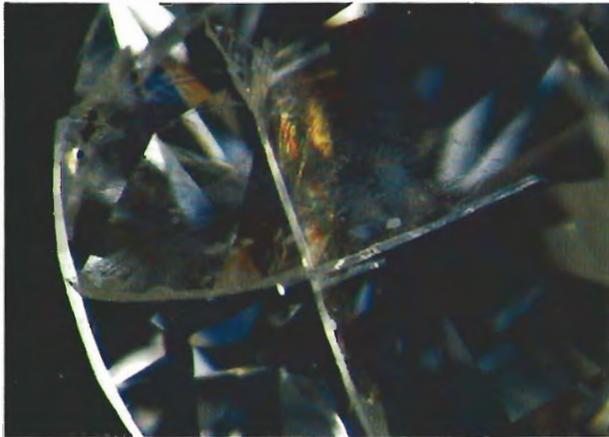


Figure 2. This white cross-like pattern on the diamond shown in figure 1 apparently was caused by removal of the filling near the surface during boiling out in an acid bath. The iridescence also seen here is characteristic of the treated portion of the cleavage system. Dark-field illumination, magnified 10×; photomicrograph by John I. Koivula.

With its three major mines—Jwaneng, Letlhakane, and Orapa—Debswana has become a major diamond producer (in terms of value) over the last decade. The combined diamond production of the Debswana mines and those already controlled by De Beers further strengthens the base of the Central Selling Organization. For its part, Debswana will obtain an investment in the diamond industry beyond its existing mines. The terms of this agreement are subject to approval by De Beers's current shareholders.

Large diamond auctioned. An unusually fine 64.83-ct pear-shaped brilliant-cut diamond was auctioned by Christie, Mason and Woods in New York on October 21, 1987. The diamond was graded D color and internally flawless, with very good polish and very good symmetry, by the GIA Gem Trade Laboratory in New York. It measures 34.10 × 22.32 × 14.79 mm. The stone does not thus far have a "name," and nothing has been released on its provenance. A photograph of this superb gem is reproduced here, in figure 4, with the kind permission of Mr. François Curiel, of Christie's, New York.

COLORED STONES

Iridescent andradite garnets. A very interesting and colorful free-form, somewhat oval, cabochon-cut gem (figure 5) was given to the GIA Research Department for examination because of its unusual appearance. The stone was originally loaned to Mrs. Lillian Meyer, departmental assistant at GIA, by Mrs. Bernice Rabb, who had purchased it in Hong Kong as a black opal. The



Figure 3. The inner surface of a filled cleavage plane in one of the diamonds examined at GIA shows the flowing rounded structures that appear to be typical of filling. Shadowed transmitted light, magnified 50×; photomicrograph by John I. Koivula.

Figure 4. This 64.83-ct D-internally flawless diamond was auctioned at Christie's, New York, in October 1987. Courtesy of Christie's, New York; photo © Tino Hammid.





Figure 5. The stone in this ring, originally purchased as a black opal, was determined to be iridescent andradite garnet from Mexico. Courtesy of Bernice Rabb; photo © Tino Hammid.

gem measures $17.17 \times 13.61 \times 7.80$ mm. It was not removed from the mounting for weighing, and an estimated weight could not be calculated because of the free-form shape.

The stone shows a most unusual play-of-color (figure 6) that at first glance gives it the appearance of an odd black opal. On more detailed examination, however, we found that the refractive index was over the limits of a standard gemological refractometer, and that the play-of-color seemed to be zoned or laminated in distinct planes and at angles suggesting a rhombic form for the original crystal. The material proved to be inert to ultraviolet radiation, and the hand-held spectroscope offered no additional information. On the basis of X-ray diffraction analysis, performed by C. W. Fryer, the stone was identified as andradite garnet.

At about the same time, a second, unmounted, polished free-form of the same iridescent andradite was sent to GIA Research by the New York office of the Gem Trade Laboratory for examination. This stone had been carefully cut to follow the natural rhombic dodecahedral faces of the original garnet. It weighs 44.59 ct and shows a mosaic iridescent pattern (figure 7) that is distinctly different from that shown by the mounted stone in figures 5 and 6.

Iridescent garnets have been reported in the geological literature before, but never as gems mounted in

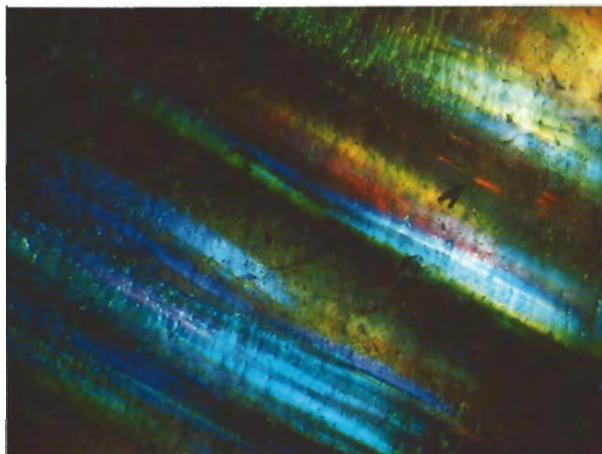


Figure 6. Bands of iridescent color are easily seen in the stone shown in figure 5. Oblique illumination, magnified $20\times$; photomicrograph by John I. Koivula.

Figure 7. A different, mosaic, pattern was observed in the second iridescent andradite examined. Oblique illumination, magnified $10\times$; photomicrograph by John I. Koivula.



jewelry. A 1943 report (E. Ingerson and J.D. Barksdale, "Iridescent garnet from the Adelaide Mining District, Nevada," *American Mineralogist*, Vol. 28, pp. 303–312) describes such material from Nevada. Mr. Bart Curren, owner of Glyptic Illusions, Topanga, California, made a field trip to the locality described by Ingerson and Barksdale, but with little success. Although he found a quantity of iridescent garnets, the pieces were all very small and the iridescence appeared different in its structural aspects from the two stones we had examined. Thus, the Nevada locality was ruled out as the source for these much larger gems.

Subsequently, however, we met two gem and mineral dealers from Mexico who had several large polished free-form iridescent andradite garnets for sale. The color



Figure 8. These two cat's-eye quartzes (the larger stone weighs 61.25 ct) are reportedly from a new locality near Belo Horizonte, Brazil. Courtesy of Hrach Chekijian; photo by Robert Weldon.

patterns of these stones were almost identical to those displayed by the two stones we had seen previously. From these dealers, we learned that the iridescent andradites are a by-product from a calcite mine located about 145 km northeast of Hermocillo, Sonora, Mexico.

Plasticized emeralds. Mr. Nubuo Horiuchi (of the Central Gem Laboratory in Japan) also reports that a number of plastic-treated emeralds have been observed over the last three years in Japan. As with oiling, the treatment only works if the fractures reach the surface of the stone. With this treatment, it appears that the fractures are first cleaned and then impregnated with an as-yet-unknown type of liquid plastic, which is then presumably hardened by exposure to light or ultraviolet radiation. This treatment appears to be much more durable than oiling, but it is nonetheless still a treatment. According to Mr. Horiuchi, it is difficult to distinguish between the plastic treatment and oiling.

Editor's note: Oiled stones have a tendency to "sweat" their oil when exposed to even slight temperature increases (e.g., during examination with a gemological microscope). A stone that had been plastic impregnated would not show this reaction. Perhaps there may also be a characteristic fluorescence. For extremely valuable suspect gems, infrared spectrometry should be definitive. The Gem News editor would greatly appreciate the opportunity to examine one or more of these plasticized stones for a more detailed discussion in an upcoming issue of *Gems & Gemology*.

Kunzite from Sri Lanka. Mr. Gordon Bleck, a miner and dealer in Sri Lankan gem materials, reports that the pink variety of spodumene, kunzite, has been found in an area east of Ratnapura at Okkampitiya. The material is described as medium to dark pink in color. There appears to be a good quantity of gem-quality material.

The approximately 10-cm (4 in.) crystal examined by the Gem News editor was somewhat etched, similar to the material from San Diego County, California, and contained complex three-phase inclusions typical of pegmatitic spodumene. To our knowledge, this is the first time that kunzite has been reported from Sri Lanka.

"Rainbow moonstones" are labradorite. Dr. Henry Hänni, of the Mineralogical and Petrographic Institute of the University of Basel, Switzerland, has found through his research into feldspar mineralogy that the so-called "rainbow moonstones" coming from India are not true moonstone alkali feldspars, but rather are labradorite feldspars. Microprobe analysis provided the identification.

These labradorite feldspars get their phenomenal color effects by diffraction from lamellar growth, in the same way that the Finnish spectrolite-labradorites do, and not from exsolution of albite in orthoclase—as is the case with true adularescent moonstones. However, because they lack the ilmenite inclusions that give most labradorites a dark grayish background body color, these feldspars appear white to almost colorless, and thus the misidentification.

Phenomenal quartz from Brazil. Mr. John Bradshaw, curator of the Harvard Museum's gemstone collection, sent Gem News a selection of translucent to semi-transparent orangy brown cat's-eye quartzes that have been coming out of a locality near Belo Horizonte, Minas Gerais, Brazil. The gem-quality stones examined thus far range in weight from 24.58 to 61.25 ct; they are the property of Mr. Hrach Chekijian. Some of the stones show weak stars with one very strong ray producing the chatoyancy, while others show only one strong chatoyant ray. One of each type of stone is shown in figure 8. We do not know how much of this material is

available, but the stones appear to have excellent jewelry potential.

Included quartz from Mexico. Rock crystal quartz containing inclusions of marcasite, with minor amounts of pyrite, chalcopyrite, silver, and gold, is being produced at the Solaverna mine in Zacatecas, Mexico. The material is so densely filled with marcasite and the other inclusions that it appears almost black and, for all practical purposes, is opaque. The material is being cut into beads and sold under the trade name Solavernite.

New ruby locality in Afghanistan. Mr. Gary Bowersox, president of Gem Industries, Inc., in Honolulu, Hawaii, reports that a new find of gem-quality ruby has been discovered in Afghanistan, northeast of Kabul. This mine is unrelated to the deposit near Sorobi, known as the Jegdalek mine, that was reported by Mr. Bowersox in his article "A Status Report on Gemstones from Afghanistan," which appeared in the Winter 1985 issue of *Gems & Gemology*.

Heat-treated pink sapphires. Mr. Gordon Bleck also has informed us that many Sri Lankan pink sapphires are heat treated in Sri Lanka to improve their color by driving off any blue overtones that may be present. The heating is done in air in an open fire. The temperature reached during this type of heat treatment may be as high as 1100°C.

New locality for topaz. In the July 1987 issue of *Mineral News*, Lanny R. Ream reported on a major new find of

topaz in the northeastern United States. The deposit is said to be in the state of New Hampshire, but more accurate locality information was not available. The specimens from this new source are reputed to be of top quality.

Treated cat's-eye zircons. Although chatoyant zircons are not particularly common, they have been reported in the literature from time to time. They are known to occur in a variety of colors, such as green, brown, and pale yellow. Mr. Gordon Bleck informs us that some of these "cat's-eye" zircons have in fact been treated to create a false eye. To fabricate chatoyancy in zircon, Mr. Bleck reports, "feldspar is melted onto the back of the zircon" cabochon. However, "the backs of the cabochons must be left somewhat rough in order for the treatment to work." Mr. Bleck uses a simple test to detect these false cat's-eyes. He rubs an emery board across the back of the cabochon in question; if the stone has been treated, the cat's-eye will disappear. With a microscope, it is also possible sometimes to see small natural pits and scratches that have been filled in by the melt.

Acknowledgments: In addition to those individuals mentioned specifically in the Gem News text, the editor would like to thank Dr. Emmanuel Fritsch, Mr. C. W. Fryer, Ms. Patricia Gray, Mr. Robert E. Kane, Dr. James E. Shigley, and Ms. Carol M. Stockton for supplying useful information for this column.

ANNOUNCEMENTS

The Tucson Gem and Mineral Show will be held February 11–14, 1988, at the Tucson Community Center. The featured species for the show is beryl. For more information, contact the Tucson Gem and Mineral Society, P.O. Box 42543, Tucson, AZ 85733.

The American Gem Trade Association (AGTA) will again be in Tucson, February 6–11, at the Doubletree Hotel. Along with their usual seminars and trade shows, AGTA will announce the winners of the Spectrum Award (a jewelry contest aimed at the effective use of colored stones) during that time. The deadline for entries for the Spectrum Award is November 4, 1987; for information, contact the AGTA headquarters at the World Trade Center #181, P.O. Box 581043, Dallas, TX 75258, (214)

742-4367. AGTA is also offering special travel rates; call (800) 972-1163. The GLDA show will be at the Holiday Inn Broadway, February 6–14; for information call (602) 742-5455.

The Gemological Institute of America will have various lectures and seminars at the Holiday Inn Broadway, February 6–11. For information, call (800) 421-7250, ext. 227, or write GIA, 1660 Stewart St., Santa Monica, CA 90404. The American Gem Society (AGS) will also present seminars and other activities at the Viscount Suite Hotel, February 3–8. Contact AGS at 5901 West Third St., Los Angeles, CA 90036, (213) 936-4367.

Numerous other shows will be held at various locations around Tucson (e.g., the Holiday Inn/Holidome, the Sheraton Pueblo Inn, the

Tucson Pima County Fairgrounds, the Desert Inn, and the Americana Hotel) during the same period.

The Asian Institute of Gemological Sciences, Bangkok, Thailand, announces the publication of its quarterly newsletter *Gemological Digest*. Written in English, *Gemological Digest* will feature articles on a variety of subjects, including gemology, jewelry, and important issues that affect the trade. The first issue, available now, contains articles on the disclosure of treatments and the pink sapphire vs. ruby controversy. *Gemological Digest* is free to all members of the trade. For more information, contact the Asian Institute of Gemological Sciences, 987 Silom Road, Rama Jewelry Building, 4th Floor, Bangkok 10500, Thailand.