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# GEMOLOGICAL ABSTRACTS

DONA M. DIRLAM, EDITOR

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## COLORED STONES AND ORGANIC MATERIALS

**The care and cleaning of gem materials.** M. Stather,  
*Australian Gemmologist*, Vol. 18, No. 2, 1992,  
pp. 34-38.

This article gives some general tips on cleaning gems. Included are dos and don'ts relating to the types of containers, detergents, and brushes to use; water temperature; and examination of items before, during, and after cleaning. Also addressed are "mechanical" cleaning methods—such as ultrasonic and steam cleaners—followed by sections on storing gems and precautions against wearing jewelry during sports activities. The final section explains how to clean ivory and bone.

The remainder of the report is a two-page table that succinctly addresses specific gem materials: chalcedony, quartz, beryl, coral, chrysoberyl, diamond, garnet, ivory, jade, jet, kunzite, lapis lazuli, malachite, opal, pearl, peridot, corundum, shell, spinel, tanzanite, tortoise shell, topaz, turquoise, tourmaline, and zircon. For each there is an entry on cleaning techniques, followed by comments relating to other durability concerns.

The brief report should prove informative to jewelers and gemologists. In many respects it serves as a useful follow-up to the *Gems & Gemology* article "Gemstone Durability: Design to Display" (D. Martin, Summer 1987, pp. 63-77). RCK

**The chemical properties of Colombian emeralds.** D. Schwarz,  
*Journal of Gemmology*, Vol. 23, No. 4, 1992, pp.  
225-233.

Quantitative chemical analysis was performed by microprobe on 90 samples of Colombian emeralds, 60 of known provenance. The discussion summarizes the data and compares the findings to previous work on emeralds from a variety of localities worldwide. Analyses of the data indicate how various elements substitute in the emerald structure. The findings essentially confirm previous research, but the data for samples of such precisely known provenance is a welcome addition to the literature on emeralds. Tables provide range and mean data for samples from each locality, and graphs illustrate the elemental correlations. Locality and geologic maps also accompany the text. CMS

**Chemical, X-ray and Mössbauer investigation of a turquoise from the Vathi area volcanic rocks, Macedonia, Greece.** S. Sklavounos, T. Ericsson, A. Filippidis, K. Michailidis, and C. Kougoulis, *Neues Jahrbuch für Mineralogie, Monatshefte*, No. 10, 1992, pp. 469-480.

Secondary turquoise occurs in a porphyritic trachyte-rhyodacite in the Vahti area of northern Greece, where it is found in veinlets and thin encrustations in cavities in volcanic rocks. In open spaces, it forms massive cryptocrystalline to fine granular structures. It has a "sky blue" color and a chemical formula of

$\text{Cu}_{0.96}\text{Mn}_{0.01}\text{Ba}_{0.01}\text{Al}_{5.86}\text{Fe}^{3+}_{0.13}\text{As}_{0.01}(\text{PO}_4)_4(\text{OH})_8 \cdot 5\text{H}_2\text{O}$ , with  $a = 7.52(\text{\AA})$ ,  $b = 10.24(\text{\AA})$ ,  $c = 7.70(\text{\AA})$ ,  $\alpha = 111^\circ 18'$ ,  $\beta = 115^\circ 07'$ ,  $\gamma = 69^\circ 19'$ . The Mössbauer spectrum at room temperature gave two doublets of nearly equal intensity, indicating that the  $\text{Fe}^{3+}$  is substituting for  $\text{Al}^{3+}$  in octahedral Al positions. The Cu cation influences the cell parameters  $c$  and  $\alpha$ , while the  $\text{Fe}^{3+}/(\text{Fe}^{3+} + \text{Cu})$  ratio affects the  $a$ -parameter. A simplified geologic map, two scanning electron micrographs, microprobe analyses, and a Mössbauer spectrum accompany the article.

R. A. Howe

*Editor's Note: It should be noted that there is no discussion regarding the gemological value of this material or its commercial availability.*

**Examination of an unusual alexandrite.** U. Henn and H. Bank, *Australian Gemmologist*, Vol. 18, No. 1, 1992, pp. 13–15.

An alexandrite examined by the authors exhibited a number of ambiguous properties. Refractive indices, birefringence, and U.V. luminescence were within the ranges for both natural and synthetic products, and the inclusions were equally inconclusive. Among the internal features were distinct growth zoning, air-filled fractures, fingerprint-like inclusions, and a single triangular platelet that could be platinum (typical of flux synthetics) or hematite or graphite (as found in some natural gem materials).

Further testing was therefore carried out using U.V.-visible, infrared, and Raman spectroscopy. The U.V.-visible spectrum was inconclusive, with features typical of both natural and flux synthetic alexandrite. Infrared spectroscopy proved diagnostic, revealing distinct vibrational bands attributable to  $\text{H}_2\text{O}$  and OH molecules in natural alexandrite. Raman spectroscopy further substantiated the identification by establishing the tabular black inclusion as hematite.

RCK

**Gemmology Study Club lab reports.** G. Brown and S. M. B. Kelly, *Australian Gemmologist*, Vol. 18, No. 2, 1992, pp. 56–60.

The first of these seven brief lab reports describes a 2.60-ct faceted, medium-dark brownish red garnet, reportedly from Australia's Northern Territory. Gemological properties were determined as follows: S.G., 3.89; R.I., 1.75; optical character, singly refractive; diaphaneity, transparent; U.V. luminescence, inert to both long and short wave; and absorption spectrum, typical of almandine. Based on these properties and using criteria established by Stockton and Manson [*Gems & Gemology*, Winter 1985, pp. 205–218], the stone was identified as a pyrope-almandine garnet with no appreciable spessartine content.

Other reports cover two star spinels from Sri Lanka, one displaying four rays and the other six rays, and some yellow zircons. Additional entries describe a cameo with a black granular opaque base, to which was fused an allegedly laser-

carved head, possibly made of alkyd resin-bonded or imitation turquoise; a spherical cultured pearl with a much smaller round protuberance growing on its surface; and dendritic silica gems (single-crystal quartz, chalcedony, and opal). The final report describes two Egyptian faience scarabs (Mohs hardness, 5–6; specific gravity, 2.43 and 2.44; spot R.I., 1.49; inert to U.V. radiation, and no diagnostic absorption features).

Each entry is nicely illustrated with either color or black-and-white photographs.

RCK

**Notes from the laboratory—16.** K. Scarratt, *Journal of Gemmology*, Vol. 23, No. 4, 1992, pp. 215–224.

Items recently encountered in the Gemmological Association of Great Britain Gem Trade Laboratory (GAGB-GTL) include a large red spinel, a treated blue diamond, bleached-and-impregnated jadeite, and cast polyester resin simulants. The 149.92-ct red spinel exhibited typical properties for natural spinel and appears to have been recut from an ancient gem. In its original form, this spinel may have been larger than the "Black Prince's Ruby" in the British Crown Jewels. The treated blue diamond (0.40 ct) has an intense "zircon" blue color with yellow patches visible from some viewing angles. Optical and infrared spectroscopy confirmed that the stone is a treated type Ia diamond, and a concentration of blue color in the culet area indicates electron irradiation.

The laboratory's observations on several samples of "bleached" jade are described, including the unusually high luster that is a good first indication of this treatment. Standard gemological properties were typical for jadeite, and hot-point testing produced no "sweating" or other indication of impregnation. Infrared spectroscopy revealed features that conclusively identify the presence of an impregnating resin.

The final note reports on cast polyester resin simulants of tortoise shell, horn, ivory, bone, and jet that are being produced in the United Kingdom. The material is available in cylinders as large as 128 mm in diameter and 1.5 m long, in rectangular blocks as large as  $45 \times 75$  mm, and in sheet form. The material can be distinguished from its natural counterparts most readily by microscopy, as the resin shows none of the characteristic structures of the natural materials it imitates. Its R.I. and S.G. can be used as additional distinguishing properties.

All notes are well illustrated with color micro- and macro-photographs and, in some cases, with infrared spectra. A table of comparative properties also accompanies the note on polyester resin simulants.

An additional feature in this issue is "A Note from the Bahrain Laboratory," the first such to accompany "Notes from the Laboratory." This government-owned laboratory, operated with the assistance of GAGB-GTL, sent a report on an amber-bead necklace. This material is particularly popular in Bahrain for use in worry beads. S.G., hot-point, and

sectility tests all initially indicated that the beads were amber, but microscopy and immersion revealed that the beads were pale at the facet edges and the color appeared to be concentrated in the center of each facet. U.V. luminescence revealed a bright chalky bluish white fluorescence concentrated where the color was palest, i.e., at the facet edges. Additional microscopic examination revealed internal features indicating that the material had not been pressed. It was concluded that a surface color enhancement had been used, possibly as a by-product of a clarification process.

CMS

**Novel assembled opals from Mexico.** R. C. Kammerling and J. I. Koivula, *Australian Gemmologist*, Vol. 18, No. 1, 1992, pp. 19–21.

Opal is commonly seen in assembled stones primarily for two reasons. First, since natural opal often occurs in seams that are too thin for cutting into gems, composites are constructed to make use of these very thin layers of opal. Second, a thin layer of transparent opal can be glued to a black base to imitate highly prized black opal.

After detailing still more types of opal composites, the authors describe a new type of assembled opal, "Opal Encapsulado," reportedly from Mexico. Examination of two oval "Encapsulado" cabochons revealed that the majority of the assemblage consisted of a large transparent cap, below which is a thin slice of natural opal. A black granular substance covered the back of the opal slice. The base itself is composed of a transparent colorless material that appears similar in composition to the transparent dome.

Gustave P. Calderon

**Rauchmondsteine, eine neue Mondstein-Varietät (Smoky moonstones, a new variety of moonstone).**

H. Harder, *Zeitschrift der Deutschen Gemmologischen Gesellschaft*, Vol. 41, No. 2/3, 1992, pp. 69–84.

"Smoky moonstone" is proposed as a suitable varietal name for a feldspar from Sri Lanka that exhibits a strong blue adularescence against a smoky body color. The occurrence, like that of other moonstone deposits in Sri Lanka, is in a decomposed pegmatitic body in which fragments of partly decomposed feldspar crystals are imbedded in clay. The locality, discovered in 1990, is near the village of Imbulpe (or Imblupe, as given by the author), near Balangoda, Sabargumava Province, to the east of the famous gem capital of Ratnapura. Chemical analyses of numerous specimens from this and other moonstone deposits on the island show that those stones displaying white sheen are higher in potassium, while those of blue sheen contain more sodium. The smoky body color is attributed to a small iron content.

While the author claims this occurrence to be unique for smoky-body-color moonstone, this abstracter notes that similar smoky-hued moonstones, also displaying fine blue adularescence, have been mined from sanidine crystals found in the Black Range, Grant County, New Mexico.

They were reported as early as 1947 by V. C. Kelley and O. T. Branson (*Economic Geology*, Vol. 42, pp. 699–712), and briefly described in my book, *Gemstones of North America* (Van Nostrand Reinhold, New York, p. 74) in 1976. Aside from this, H. Harder's article is valuable for his accounts of typical moonstones from the classic locality at Metiyagoda and from other, recently developed deposits in Sri Lanka.

John Sinkankas

**Strong sales at Burma emporium, but high prices put off TGJTA team.** *Thailand Jewellery Review*, Vol. 5, No. 11, November 1992, pp. 34–35.

This summary of the 1992 mid-year Myanmar (Burma) Gems Emporium auction is based on information provided by a seven-member buying team of prominent gem dealers from Thailand. According to Thailand Gem and Jewelry Traders' Association (TGJTA) Honorary Advisor Thanan Maleesriprasert, the mission was concluded without a single purchase by the team because they felt the prices for rough gem material offered were unreasonably high. The dealers believe that the Burmese have abandoned any commitment to supply rough gemstones on a favorable basis to the Thais after having stockpiled material for several years without selling it through the traditional Jade, Pearl and Gemstones Emporium of the past. This is bad news for the Thai dealers, as they are finding it extremely difficult to obtain adequate rough supplies from their own country and other conventional sources such as Sri Lanka, India, and Australia.

More than 100 Thai entrepreneurs, some without connections to the Thai gem and jewelry industry, attended the event, most in the hope of meeting the appropriate Myanmar officials who could assist them with joint-venture projects in the gemstone sector and other commercial fields as well. It seems that most of the jade purchases, which accounted for the highest value of sales, were made by Taiwanese and Hong Kong Chinese, who outbid the Thai contingent. The article reports US\$6.37 million in sales of jade.

JEC

**Trade embargo on coral.** G. Brown, *Australian Gemmologist*, Vol. 18, No. 1, 1992, pp. 5–6.

In October 1991, the Wildlife Protection Authority of Australian National Parks and Wildlife issued a notice regulating the import and export of specific types of corals. This brief article includes the exact wording of Notice 13 and, importantly, provides an interpretation of the provisions. In this regard, the author points out a number of potential problems in enforcing the controls, as well as the potential impact on those dealing in corals. Further clarification is provided through a note from the editor and text from the Wildlife Protection Agency post-dating the initial issuance.

This report should be read by anyone, including tourists, who intends to purchase Australian corals or plans to bring corals into or out of Australia.

RCK

## DIAMONDS

**Diamonds for connoisseurs.** S. Stephenson, *Jewellery International*, No. 11, 1992, pp. 31–34, 37.

Only in the last decade has the buying public truly become acquainted with fancy-colored diamonds. This article reviews the reasons behind the new popularity now spurring sales, and how different dealers and manufacturers are developing marketing techniques for these stones. Once only within reach of the very wealthy, the greater availability of smaller, more affordable sizes has opened this market to the general retail consumer.

The author gives two reasons for this awareness. First, publicity surrounding the 1987 auction of a 0.95-ct red diamond for \$880,000, the highest price per carat ever paid for a colored diamond, helped create widespread popular interest in colored diamonds. Second, the marketing campaign for Argyle's champagne diamonds has created a new niche for colored diamonds, one that is more accepted by the average, price-conscious consumer.

Stephenson reviews the current supply and demand for colored diamonds, and concludes that the potential for future growth is dependent on consumer awareness, economic conditions, and supply. A sidebar explains how deformities or impurities cause color in diamonds. Seven color photographs illustrate the article. *JEC*

**Evaluation of brilliancy in relation to various combinations of the main facets angles (in Japanese).** M. Kato, *Journal of the Gemmological Society of Japan*, Vol. 16, No. 1–2, 1991, pp. 15–23.

Because the accurate measurement of diamond pavilion proportions is very time consuming with the Leveridge gauge, micrometer, or ProportionScope, pavilion proportions are generally measured by visual observation. The GIA diamond-grading course teaches the table-reflection method to estimate pavilion depth. Kato maintains that the GIA method is not only too crude to estimate proportion properly, but it is also principally incorrect, because it ignores important factors like the effect of the crown main facet angle and the table percentage. He suggests that accurate measurement is particularly important for stones above 0.5 ct, F color, or VVS<sub>2</sub> clarity.

Kato further describes the analysis of dispersion and volume, showing that the grading of brilliancy can be improved. He has proposed the use of "F-values" to evaluate brilliancy. F-values are calculated and diagrammatically presented in relation to various combinations of main facet angles of pavilion  $\alpha$  and crown  $\beta$ . Kato maintains that the F-cut (crown angle 36° and pavilion angle 40.75°) described in a previous paper (*Journal of the Gemmological Society of Japan*, Vol. 9, No. 3, 1982) yields the highest brilliancy and is truly an ideal cut, as compared to the Tolkowsky cut (crown angle 34.30° and pavilion angle 40.45°).

Masao Miki

## Examination of artificial coloring of diamonds (in Japanese).

I. Umeda, *Journal of the Gemmological Society of Japan*, Vol. 15, No. 1–4, 1990, pp. 3–11.

Gem diamonds have been artificially colored at the Jewelry Laboratory UMEDA in Japan. They used primarily type Ia cut stones, but also rough diamonds and type Ib synthetic diamonds.

Standard irradiation in a nuclear reactor (neutron irradiation) produced a desaturated green body color in the diamonds. This coloration is caused by extensive damage to the crystal lattice of diamond, which occurs when high-powered neutrons collide with carbon atoms. Color alterations from green to brown were observed with annealing (in an electric furnace), which heals some damage in the crystal structure, thus stabilizing the body color. The radioactivity of the diamonds treated in this manner decreased to a safe level within a few months after treatment.

Colorless diamonds were altered to blue and bluish green by bombardment with 10-MeV electrons in a linear accelerator (electron bombardment). This color change is caused by the collision of high-powered electrons and carbon atoms, which creates some voids in the diamond's crystal lattice. Annealing modifies conditions within the crystal lattice by exchanging carbon atoms and voids within the unit cell of the diamond. The temperature of annealing determines the degree of modification within the crystal system, yielding reproducible colors that vary from lemon yellow to golden yellow.

It is not feasible to alter the color of diamonds by conventional cobalt-60 gamma-ray equipment, because diamonds are nearly transparent to gamma rays.

A dual-beam spectrophotometer was used to record the spectra of the sample diamonds before and after treatment (irradiation and annealing) at room temperature. However, low-temperature spectroscopy—not performed for this study—is needed to determine differences between treated and natural-color stones. *Takashi Hiraga*

**Famous diamonds of the world XLVII.** I. Balfour, *Indiaqua Annual* 1991, No. 55, p. 255.

This brief article is an update on one of the most notable diamond discoveries, the Centenary diamond. In 1988, the Premier mine produced a 599-ct rough diamond, coincidentally in time to commemorate De Beers's 100-year history. Mr. Balfour also notes the timely appearance of other large stones that have marked historic events.

The delicate task of fashioning this rough was assigned to Gabi Tolkowsky. The finished product, a combination heart and shield shape, is reportedly flawless. Weighing 273 ct, it is the third largest fashioned diamond "of the finest color."

Juli L. Cook

**Russia to De Beers: 'We want more control'.** R. Shor, *Jewelers' Circular-Keystone*, Vol. 164, No. 1, January 1993, pp. 50–60.

Things are heating up between Russia and De Beers. Russia is not only the world's most prolific diamond producer by value, but it also claims to have huge stockpiles of rough diamonds buried in the Kremlin vaults—possibly as much as \$3 billion worth. In addition, Russia is planning to open two more mines that could double production. Now, the Russians want to have more control over the diamonds they produce, but too much autonomy could put the world diamond market in jeopardy of collapsing.

The emerging strategy is that De Beers will keep control of Russia's production but will pay more and control less. Russia would like to leave distribution of the largest part of the rough to De Beers, while increasing and diversifying its production of polished goods. Leonid B. Gourevitch, one of Russia's top parliamentary officials, thinks it is time for Russia to assert itself. Gourevitch doesn't want a split from De Beers or a change in the contract, but he says "Russia must work with De Beers to maintain order in the diamond market." De Beers's concerns regarding Russia's demands include: (1) the possibility that the best rough will go to local polishers and De Beers will get only the least desirable stones; (2) the inefficiency of Russia's polishing facilities, which will be difficult to modernize; and (3) future ventures between Russia and other firms that might promote illegal sales of Russian rough in the various diamond markets.

This in-depth article covers many aspects of the Russia-De Beers contract, future deals, the Russian market, and the key players involved in what many may see as the deal of the century. The article includes a detailed flow chart showing the various channels of distribution.

KBS

## GEM LOCALITIES

**A deposit of greenstone, Shan State, Myanmar.** T. Hlaing, *Australian Gemmologist*, Vol. 18, No. 2, 1992, p. 42.

A gem material known locally as "greenstone" is recovered both from a fresh outcrop and as water-worn pieces in the Langkho district in southern Shan State, Myanmar.

Four specimens were examined at Taunggyi Degree College, Myanmar, to characterize the material. Microscopic examination revealed that the material consists of masses and radiating aggregates of green-to-yellow long, prismatic fibrous crystals imbedded in a fine- to medium-grained limestone. X-ray diffraction analysis determined the presence of calcite and tremolite in four samples, with quartz and/or diopside in three of these, and confirmed the amphibole content of this nephritic material. In accord with the variable composition, S.G. values ranged from 2.88 to 3.10.

This gem material is marketed in both Yangon and Mandalay. It reportedly first became popular some 20 years ago and is experiencing renewed popularity today.

RCK

**Gems around Australia:** 7. H. Bracewell, *Australian Gemmologist*, Vol. 18, No. 2, 1992, pp. 38–39.

Continuing her narrative tour of Australia's gem-producing areas, the author begins this seventh episode with a visit to the area of Mount Goldsworthy in Western Australia. This site is known for its "tiger-iron," an ornamental gem material consisting of bands of predominantly golden silicified crocidolite set in black and red jaspilites. This latter material is described as alternating layers of fine-grained chalcedony or sediments impregnated with black hematite and silica.

The next stop was Marble Bar, the name itself a misnomer as the formation consists not of a calcium carbonate but, rather, of a fine-grained jasper. The local council has set aside an area where samples of this banded, deeply colored material can be collected.

On the outskirts of Marble Bar, the author visited the Comet gold mine, which has been in operation since 1938 and is also a tourist attraction. Sixty kilometers to the south, in the Lionel area, chlorite is mined and then marketed under the name "Pilbara Jade." Chrysotile and serpentine are also found in the Lionel area.

RCK

**The Mintabie opalfield.** I. J. Townsend, *Australian Gemmologist*, Vol. 18, No. 1, 1992, pp. 7–12.

This article, adapted from an earlier report by the author published by the South Australian Department of Mines and Energy, provides a good overview of what has become a significant source of gem-quality opal. Discovered in the 1920s, the Mintabie opal field has been exploited in earnest only since 1976. It is located in the far north of South Australia, approximately 1000 km northwest of Adelaide and 290 km from the famous Coober Pedy opal-mining center.

The opal occurs in a medium- to coarse-grained kaolinitic, fluvatile sandstone. Opal-bearing levels are found from the surface down to a depth of at least 25 m. Drilling is used both in grid prospecting and in sinking vertical shafts for underground mining, while bulldozers are used extensively in the open-cut mining of amalgamated claims. With either method, miners resort to simple hand tools whenever precious opal is encountered.

A great range of precious opal types is recovered at Mintabie, including black, crystal, semi-black, and white pinfire, comparing favorably with the best of these from other Australian localities. Although some Mintabie opal has a tendency to crack, this trait is believed to be confined to material recovered from below the water table.

The article also contains some general information on the formation, composition, and structure of Australian opal; production figures for Mintabie; and pricing data for the various opal types. It is nicely illustrated and is a welcome addition to the literature on Australian opal.

RCK

## INSTRUMENTS AND TECHNIQUES

**Determination of the age and origin of emeralds using rubidium-strontium analysis.** Ph. Vidal, B. Lasnier, and J-

P. Poirot, *Journal of Gemmology*, Vol. 23, No. 4, 1992, pp. 198–200.

Age dating can be used to determine the natural or synthetic origin of emeralds and, in some cases, their locality of origin. The authors describe their study of the use of rubidium-strontium geochronology for this purpose. They found that reliable dating could not be obtained for all samples, but that isotopic ratios provided sufficient information to group the samples into three clusters: emeralds from Precambrian rock localities (Brazil, Madagascar, Zambia), emeralds from young rocks (Colombia, Pakistan, Afghanistan), and synthetic emeralds (Lennix and Gilson). A major problem with the technique, for gemological applications, is that it requires the destructive analysis of a few milligrams of powdered material, which cannot always be sacrificed from a cut gemstone. The authors conclude with suggestions for further research and improvements in analytic methodology. CMS

**Robotic opal-cutting: An Australian solution to an old problem.** A. Cody and G. Brown, *Australian Gemmologist*, Vol. 18, No. 2, 1992, pp. 40–41.

Although Australia is the major source of rough opal, relatively high labor costs result in much of the smaller rough being exported for cutting. To address this issue, an Australian opal dealer and CSIRO's Division of Manufacturing Technology have developed robotic opal-cutting equipment.

Before opal rough is processed with this equipment, it is first examined by an experienced opal cutter, who then uses hand grinding to remove any matrix, expose play-of-color on what will be the top of the stone, and prepare a flat base. This preform next goes to the robot's data-entry cell/dopping station, where another experienced cutter makes decisions as to the shape and dimensions of the finished piece, assisted by computer-generated graphics. At this station, the stone is also automatically dopped, the dop stick is bar coded, and the cutting parameters are programmed into the system. Next, the stone goes to the computer-controlled, automated grinding cell, where it is identified by the bar code and then cut to the programmed proportions. After they have been cut, the stones are tumble polished in large batches.

The system appears to be quite efficient for processing caliber-sized opals and is capable of producing approximately 480 stones in an eight-hour day. RCK

**Simple advanced refractometer technique: Determining optic sign.** A. Hodgkinson, *Canadian Gemmologist*, Vol. 13, No. 4, 1992, pp. 114–117.

This article reiterates the usefulness of determining several optical characteristics at once while taking R.I. readings with the refractometer. While most gemologists are used to measuring refractive index and birefringence, too many forget that optic character and sign can also be determined from the refractometer at the same time. Although the first

logical choice of instruments might seem to be the spectroscope, the author feels that in many cases determination of optic character and sign are more diagnostic.

Mr. Hodgkinson has developed a way to determine optic character and sign even when a mounted stone is not optimally oriented, especially with notoriously difficult separations such as differentiating scapolite from quartz. A relatively simple but detailed test using Polaroid sunglasses is described thoroughly in the text and with diagrams. JEC

## JEWELRY HISTORY

**Hollywood jewels.** B. Paris, *Art & Antiques*, Vol. 9, No. 8, August 1992, pp. 44–50.

Paris's article begins with a detailed history of La Peregrina—a 203.84-grain pearl now set as a pendant to a Cartier pearl, diamond, and ruby necklace—the focus of an exhibit of the jewels of Hollywood held in Los Angeles in December of 1992. Coinciding with the 1992 release of a book documenting movie jewelry, the Academy of Motion Picture Arts and Sciences sponsored an exquisite display in Los Angeles. The exhibit featured some 21 pieces designed by Cartier, Tiffany, Harry Winston, Paul Flato, and Van Cleef and Arpels that had appeared in films.

The highly visible, wealthy celebrities of Hollywood became the fashionable American royalty, setting trends with their distinctive styles. Recognized as the queen of this court for her status as a celebrity, and a connoisseur of remarkable jewelry, is Elizabeth Taylor. Several pieces in her collection are recognized for their royal associations and outstanding quality: the Peregrina pearl, the Krupp diamond, the Taylor-Burton diamond, and a heart-shaped yellow diamond. Highlights in this article include some fascinating stories that appear to have been taken from the new book, *Hollywood Jewels* (Abrams), by Penny Proddow, Debra Healy, and Marion Fasel. Most illustrations in this article are of actresses wearing the jewelry and are from this book. AGP

**Round wire in the early Middle Ages.** N. Whitfield, *Jewellery Studies*, Vol. 4, 1990, pp. 13–28.

Although various studies have been made of the techniques used in antiquity for the manufacture of round wire, only limited attention has been paid to the Early Middle Ages (roughly fifth to 10th centuries A.D.). First presented as a lecture to the Society of Antique Jewellery Historians' 10th Anniversary Conference, this paper presents the results of a detailed study of jewelry from this period. The jewelry studied is in collections at the British Museum, the Victoria and Albert Museum, the Royal Museum of Scotland, and the National Museum of Ireland. The study focuses on 0.15–0.6 mm gold and silver wire that was formed by hammering, block twisting, strip twisting, strip drawing, folding, wire drawing, casting, and/or smoothing.

The author describes these methods of manufacture, the probable tools used, and the marks that are indicative of



each technique. In some cases, to prove that marks found could be linked to a specific technique, the author experimentally made wire using the technique in question. Fifteen valuable black-and-white photos illustrate the marks described. Some of the photos depict wire made by the author.

Whitfield concludes that hammering was in widespread use for making thick wires; the most common way of making finer wires appears to have been block twisting. Examples of strip twisting have thus far been found only on Merovingian jewelry of the late fifth and sixth centuries. Although drawing wire through a draw plate was known in Eastern Europe in the fifth and sixth centuries, there are no authentic examples in Western European jewelry until the eighth century.

Altogether, this report gives fascinating insight into early gold and silversmithing capabilities. *EBM*

## JEWELRY MANUFACTURING ARTS

**Tweaks and leaps.** C. Edelstein, *Jewellery International*, No. 12, 1992/1993, pp. 61–65.

This article, which includes 10 superb color photographs, reviews recent fashion trends in jewelry. Although the global recession persists, jewelry design continues to grow and change. Designers tend to extremes—either remaining conservative and sticking with established styles, or boldly leaping into new areas of artistic expansion, using new materials and methods of fabrication. Thematic jewelry seems to be a growing trend, with equestrian, nautical, celestial, and natural motifs being the most popular.

Because clothing and jewelry fashion tend to go hand in hand, multi-layered necklaces with fringes of chain are complementing the revival of “hippie” fashions. Enamelled neon colors—hot pink, lime green, and sea blue—are in great demand for the second season, especially in “color-blocked” patterns on tubular bangle bracelets, domed rings, and fat hoop earrings. Gold granules, knots, bands, and squiggles are added for accents. Black-and-white enamel combinations are also a favorite, as is the use of inlaid opaque stones. Intarsia is slowly catching on.

Color and unusual cuts are the most important trends in gemstones themselves. The greater availability of tanzanite, tsavorite, tourmaline, and colored sapphire affords a host of new color combinations. As consumers become familiar with these unusual stones, they are expected to increase in popularity. More customers are also being introduced to fantasy cuts. The works of Bernd Munsteiner, Bart Curren, Steve Walters, and Michael Dyber have helped promote this with one-of-a-kind designs.

Emphasis on color is also showing up in mixed-metal jewelry, with the cool white of platinum accenting yellow, green, or pink gold.

The strongest sellers of late have been hoop earrings with dangling charms and stackable rings, both part of the “convertible” jewelry trend. These rings and hoops are metamorphosed by different designers into their own signature styles and mass-marketed very successfully. This

kind of “convertible” jewelry has proved very popular lately, as consumers like the idea of getting multiple looks from a single purchase. *JEC*

## JEWELRY RETAILING

**Bulgari's new age.** V. Becker, *Jewellery International*, No. 13, 1993, pp. 29–30.

Ms. Becker briefly discusses the jewelry firm Bulgari's influence on the development of the current Italian style of bold, sophisticated gold jewelry. The roots of this style can be found in the late 1960s and early 1970s, when Bulgari saw a need for versatile day jewelry for the modern woman executive. Taking their inspiration from their rich cultural heritage, brothers Nicola and Paolo Bulgari based their jewelry designs on classical Roman and opulent Italian Renaissance motifs. The now-familiar style of a bezel-set, ancient coin suspended from a heavy gold chain brought Bulgari international fame. The use of bezel-set cabochon-cut stones in a strong mix of colors, and the combination of gold and stainless steel, were other innovations introduced by Bulgari that have become signature elements for jewelry of the last decade.

The 1990s are heralding a new trend toward individuality and social consciousness. In an effort to move with the time, Bulgari has launched a new line of jewelry—called “Naturalia”—based on stylized fish, birds, and animals. The author hints at future changes in jewelry styles without elaborating further. Three examples of Bulgari's distinctive jewels are shown in color photographs. *EBM*

## SYNTHETICS AND SIMULANTS

**Fiber-eye: A Gemmology Study Club report.** G. Brown and S. M. B. Kelly, *Australian Gemmologist*, Vol. 18, No. 2, 1992, p. 52–53.

Fiber-eye is the trade name for a laboratory-grown material consisting of fused, cubic-packed glass optical fibers. Like the hexagonally arrayed Cathay-stone, one type of Fiber-eye consists of parallel fibers. When fashioned into properly oriented cabochons, it displays strong chatoyancy. A second type of Fiber-eye, however, is composed of twisted bundles of fibers; such material displays a zigzag “lightning bolt” chatoyancy.

Gemmological testing was conducted on both white and dark brown specimens. Magnification revealed the cubic symmetry of the optical fibers in both types; in the brown material, the color appeared to be caused by a brown substance surrounding bundles of colorless glass fibers. Gemmological properties determined were as follows: Mohs hardness, 5.5 to 6; fracture, splintery; tenacity, very brittle; S.G., white type—4.23, brown type—3.55; optic character, singly refractive; spot R.I., over the limits (estimated at 1.86 using a reflectivity meter); diaphaneity, transparent parallel to—and opaque perpendicular to—length of fibers; U.V. luminescence—long wave, white type greenish yellow and brown type inert—short wave, white type pale green and

brown type brownish green; absorption spectrum, no diagnostic features.

The report includes some speculation as to how this material is produced, and is illustrated with both black-and-white and color photos. RCK

**Synthesis of gem-quality diopside by the floating zone method, using natural chromian diopside (in Japanese).**

Y. Naito, *Journal of the Gemmological Society of Japan*, Vol. 15, No. 1-4, 1990, pp. 29-36.

Kamisano, Yamanashi Prefecture, in Japan is rich in non-gem-quality green diopside. The author used this opaque material as nutrient and seed in the synthesis of gem-quality diopside by the traveling solvent, floating zone method, with an infrared-convergent-image furnace in a nitrogen atmosphere. Nutrient rods (1.5 cm in length and 0.5 cm in diameter) were prepared by hydrostatically pressing the powders of natural samples. Transparent, emerald-green, single-crystal boules of diopside were successfully synthesized. The conditions of growth and microscopic features of the resulting products are also described. The author states that synthesis had never before been attempted using natural diopside. Masao Miki

## TREATMENTS

**Diffusion-treated synthetic star detected.** *Jewellery News Asia*, No. 97, September 1992, p. 184.

The Hong Kong Gems Laboratory has identified a gem that it describes as a Verneuil synthetic ruby with a diffusion-treated star. The depth of the star was less than 1 mm, according to the laboratory director, Ou-Yang Chiu Mei. While the stone looked natural, the star did not move as expected. The director also pointed out that the rays on this star were not as sharply delineated as Linde synthetic stars. Experiments at the University of Hong Kong showed a slight difference in chemical composition between the top of the stone and areas near the base. Also, curved striae were detected on the base using an electron microscope. It is believed that the star was produced by coating the stone surface with titanium oxide and then heating the stone to 1700°C. JEM

**Identification of a dyed black cultured pearl (in Japanese).** E.

Ito, *Journal of the Gemmological Society of Japan*, Vol. 16, No. 1-2, 1991, pp. 50-51.

The Pearl Science Laboratory of Japan tested a black pearl, sold as a "Ryukyu black pearl," for color origin. The greenish black body color with pinkish overtones resembled that of the natural black pearl known as Ryukyu, which is found only in black-lip mollusks (*Pinctada margaritifera*). However, Ryukyu pearls usually look bluish black under a strong light source; this pearl appeared reddish purple. Further testing with a spectroscope failed to show the absorp-

tion lines at 400, 500, and 700 nm that are typical of Ryukyu pearls. Examination with a microscope revealed dye concentrations in small surface cracks. A destructive test revealed dye concentrations within the coarse parts of the nacre.

Takashi Hiraga

**Identification of fissure-treated gemstones.** H. A. Hänni, *Journal of Gemmology*, Vol. 23, No. 4, 1992, pp. 201-205.

Dr. Hänni's review of fissure-treated gemstones brings together the diverse literature on this topic from the past decade and summarizes the nature, appearance, and identification of gemstones subjected to this general category of treatment. The article begins with a brief explanation of why fissure treatment works and how it is performed. Dr. Hänni focuses on the oil and epoxy-resin treatment of emerald and the glass-infilling of corundum. He provides a summary of identification features and methods, including bubbles or dendrite-like patterns, ultraviolet fluorescence, soaking in solvents, color flashes, microscopy, infrared spectroscopy, and the like. Color photomicrographs and infrared spectra illustrate the distinguishing characteristics noted. The article concludes with a brief discussion of disclosure practices. Dr. Hänni recommends that all fracture treatments be dealt with in the same way, including general disclosure to the final consumer. CMS

## MISCELLANEOUS

**Gemstone photography: Capturing the beauty.** R. Weldon, *Jewelers' Circular-Keystone*, Vol. 163, No. 10, October 1992, pp. 70-72.

Mr. Weldon begins part two of his series on gemstone photography by describing a basic photography studio for gems and jewelry. He then focuses on backgrounds and props, tips on positioning the gemstone, and how to prevent the accumulation of dust. The author concludes with lighting methods, including suggestions on light diffusers and the strategic positioning of lights. Overall, this article, combined with the first (on film), gives a working knowledge of gemstone photography. It is illustrated with 10 color photographs. KBS

**Symmetrical polyhedra for gemstones.** J. Lurie, *Journal of Gemmology*, Vol. 23, No. 4, 1992, pp. 207-214.

This in-depth article about symmetrical polyhedra will be of interest primarily to crystallographers, lapidaries, and geometers. Its stated aim is to inspire gem cutters to explore faceted "spheres" as alternate designs. The various classes of symmetric polyhedra are described in considerable detail, accompanied by excellent drawings and tables of faceting angles for each of the major forms. Some fascinating and unusual patterns emerge. CMS



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