GEMOLOGICAL ABSTRACTS

DONA M. DIRLAM, EDITOR

COLORED STONES AND ORGANIC MATERIALS

Baotite—A new gemstone in Baiyun Ebo, Inner Mongolia. Sun Weijun and Yang Ziyuen, *Abstracts of the 15th General Meeting of the International Mineralogical Association*, June 28–July 3, 1990, Beijing, China, pp. 688–689.

Baotite is a brownish black to black translucent mineral with a semi-metallic luster and a Mohs hardness of 6 that could potentially be used as a gem material. It is newly discovered from the Baiyun Ebo rare earth–iron ore deposit in Inner Mongolia. Its chemical composition is $Ba_4\{Ti,Nb,Fe\}_8O_{16}\{Si_4O_{12}\}$ Cl. A brief description of the occurrence of baotite is presented, although no information is included on its abundance. *JES*

Emeralds from Colombia (Part 2). G. Bosshart, *Journal of Gemmology*, Vol. 22, No. 7, 1991, pp. 409–425.

Part 2 of this trilogy on Colombian emeralds includes a review of crystal size and morphology, chemical composition, causes of color, physical and optical properties, and microscopic features. It is interesting to note that the author, contrary to one commonly held notion in Europe, acknowledges emeralds colored largely by vanadium. Colombian emeralds, with an average Cr:V ratio of 3:1, fall in the middle of the range of chromophore composition for emeralds in general. Iron content of Colombian emeralds is relatively low, and other possible chromophores are absent or insignificantly low. Optical absorption spectra, illustrated by unretouched spectrophotometer curves, are related to the chemical causes of color and to the renowned fine color of Colombian emeralds.

The discussion of microscopic features that concludes this article covers fluid inclusions, mineral inclusions, internal growth characteristics, and color zoning. Three pages of color photomicrographs illustrate the features discussed.

I found part 1 of Mr. Bosshart's three-part series to be commendable and readable, and I have not been disappointed by part 2. Moreover, the discussion in part 2 provides information on emeralds other than those of

This section is designed to provide as complete a record as practical of the recent literature on gems and gemology. Articles are selected for abstracting solely at the discretion of the section editor and her reviewers, and space limitations may require that we include only those articles that we feel will be of greatest interest to our readership.

Inquiries for reprints of articles abstracted must be addressed to the author or publisher of the original material.

The reviewer of each article is identified by his or her initials at the end of each abstract. Guest reviewers are identified by their full names. Opinions expressed in an abstract belong to the abstracter and in no way reflect the position of Gems & Gemology *or GIA.*

Colombia, making the article of even broader interest and gemological value. It was, however, mildly frustrating not to have the bibliography printed with the article in hand (an editor's note advises that the full bibliography was published with part 1). *CMS*

An examination of chrysoprase from Goiás, Brazil. R. C. Kammerling, J. I. Koivula, and E. Fritsch, *Australian Gemmologist*, Vol. 17, No. 8, 1990, pp. 313–315.

The authors studied specimens of chrysoprase that were reported to have originated in a galena mine near Niquelandia, Goiás, Brazil. The gemological properties were found to be consistent with those previously reported for chrysoprase chalcedony. X-ray fluorescence spectroscopy revealed that silicon and nickel were the only elements present in significant amounts. Comparison of these samples with Australian chrysoprase indicated that features are similar except for the intense absorption in the Australian material, which correlates with its more saturated color.

Although the authors have observed that chrysoprase is typically inert to U.V. radiation, the Brazilian material fluoresced a moderate greenish blue to long-wave U.V., with a weaker reaction to short-wave U.V. There was no phosphorescence to either wavelength. *Maha Smith*

Fossil mammoth ivory: A new choice for jewelers. R. Weldon, *Jewelers' Circular-Keystone*, Vol. 162, No. 8, August 1991, pp. 154–156.

Since the U.S. banned the import of elephant ivory in 1989, fossilized mammoth ivory has become a favored—and legal—alternative. The permafrosts of Alaska and the Soviet Union are sources for this ivory, which is thought to have lain preserved for 20,000 to 40,000 years.

This type of ivory has been used by the Athabascan Indians, Eskimos, and other Alaskans for thousands of years. According to Al Allen of Alaska Jade and Ivory Works, Soldotna, Alaska, 20,000 Indians currently make a living from fossilized ivory.

Depending on the minerals absorbed, fossilized ivory can occur in different colors: It has been found in dark blue, black, brown, and green, as well as in various shades of cream. Besides strength of color, the best way to distinguish between fossilized ivory and modern elephant ivory is from the engine-turn effect: The V-shaped crossing of lines in fossilized specimens forms acute angles of 90°, versus the angles of 120° or more seen in modern elephant ivory.

Other animal ivories and products exist such as walrus, narwhal, animal bone, horn, antlers, and chemically treated coral. For those uncomfortable about wearing ivory of any kind, doum palm, orozo nuts, and even plastic are available. *KBS*

Gemmology Study Club Lab Reports. G. Brown, S. M. B. Kelly, R. Beattie, and H. Bracewell, *Australian Gemmologist*, Vol. 17, No. 8, 1990, pp. 325–332.

This series of brief reports covers a number of interesting gem materials. First described is a 1.12-ct crystal fragment from central Queensland that consists of a ruby core surrounded by hexagonally banded grayish blue to bluish to purplish sapphire. Next covered is gem-quality stichtite, a rare, chromium-containing mineral from northwest Tasmania.

The next, and longest, of the entries covers a suite of jewelry set with emerald-cut stones that resemble "padparadscha" sapphires. According to the investigators, these stones were actually flame-fusion synthetic yellow sapphires "coated by a thin layer of surface diffused synthetic ruby." It is interesting to note that the owner of the jewelry had purchased it in Kashmir.

This is followed by an entry on two glass imitations, the first resembling aquamarine and the second composed of a photosensitive glass that changes from colorless to dark brown after a 15-second exposure to a 150-watt incandescent bulb.

Also covered are green beryls from Harry's Mine near Torrington, New South Wales (with a good description of their gemology and inclusions); an aventurescent quartz that reportedly originated from a site near Inverell, New South Wales, and resembles aventurescent feldspar; and pit glass from Sri Lanka. *RCK*

Editor's Note: Diffusion treatment actually diffuses a layer of color into the stone and is not a coating per se. However, recutting can remove the color.

Gemmological study on Eonyang amethyst from Korea. Won-Sa Kim, *Abstracts of the 15th General Meeting of the International Mineralogical Association*, June 28–July 3, 1990, Beijing, China, pp. 678–679.

Amethyst that occurs in geodes is found in the Eonyang Granite near the southern part of the Korean peninsula. The amethyst develops as an epitaxial overgrowth on earlier-formed smoky or colorless quartz. Fe, Mg, Ca, and Cu occur as trace elements in the amethyst in quantities up to 6 ppm. Various solid inclusions (hematite and perthite feldspar) and fluid inclusions (both liquid and gaseous) that occur in the amethyst were studied by several analytic methods to reveal the conditions of amethyst formation. *JES*

On the genesis of charoite rocks. N. V. Vladykin, *Abstracts of the 15th General Meeting of the International Mineralogical Association*, June 28–July 3, 1990, Beijing, China, pp. 689–690.

The geologic occurrence of this ornamental gem material in the Soviet Union appears to be unique. Charoite is found in the Murun massif, a large body of layered

ultrapotassic-alkali rocks that have been age dated at 120–160 million years. A number of unusual rock types are represented in this layered sequence, among which is charoite. These unusual rocks are thought to have crystallized from an ultrapotassic lamproite magma. Inferences are presented on the temperatures and other conditions of crystallization. *JES*

Mineral associations of corundum-bearing marbles and the problem of ruby genesis. S. I. Konovalenko, *Abstracts of the 15th General Meeting of the International Mineralogical Association*, June 28–July 3, 1990, Beijing, China, pp. 679–680.

Most high-quality rubies are found in primary and secondary deposits associated with corundum-bearing calcite marbles. Much of the world's production comes from a series of deposits that occur along the Alpine-Himalaya fold belt that stretches from Afghanistan and the Hindu Kush in the west along the Himalayas into portions of Southeast Asia. Experimental data and the presence of certain mineral inclusions (such as phlogopite, feldspar, etc.) suggest that rubies are formed during the metamorphism of carbonate rocks under high-grade conditions (epidote-amphibolite or amphibolite facies). Ruby formation also involves recrystallization during which structural defects and inclusions are often removed from the growing crystal. *JES*

Perestroika gems—natural & not. R. Weldon, *Jewelers' Circular-Keystone*, Vol. 162, No. 8, August 1991, pp. 142–145.

The Soviet Union has long been known for its natural gem materials—among them Siberian diamonds, emeralds from the Ukraine, spinels from the Pamir Mountains, and demantoids from the Urals. Today, the Soviet Union is making inroads in the production of synthetic gems, including synthetic diamonds, synthetic malachite, flux synthetic spinel, "pearl" cubic zirconia, and hydrothermal quartz. This article gives a concise report on the past and present situation of the Soviet Union's production of natural and synthetic gems. It is a must-read for anyone interested in Soviet economics and how they affect the gem industry in the Soviet Union. The article is accompanied by nine photos of various USSR–produced gems. *KBS*

A rare baler shell pearl. G. Brown and S. M. B. Kelly, *Australian Gemmologist*, Vol. 17, No. 8, 1990, pp. 307–308.

Baler shells are large, spiral-shaped univalves found in the shallow waters off Australia's northern coasts, from Shark Bay in Western Australia to southeast Queensland. This nicely illustrated Gemmology Study Club Report describes the authors' examination of a rare, nonnacreous "pearl" that was recovered from a baler shell dredged off the coast from Noosa, some 100 km north of Brisbane, Queensland.

The authors preface their description of the "pearl" with a detailed description of the host shell, *Melo amphora*. The "pearl" itself weighs 68.97 ct, measures 22.8 mm × 20.6 mm, and is slightly pinkish orange, nonnacreous, and slightly pointed on one end. It displays a distinctive "flame" pattern similar to that seen on so-called conch "pearls." Magnification reveals that the smooth porcelaneous external surface is covered with a pattern of yellowish "flames" as well as small brown spots due to subsurface conchiolin accumulations. Gemological properties include an S.G. of 2.83, a spot R.I. of 1.67, no reaction to both long- and short-wave U.V. radiation, and no identifying absorption spectrum. An X-radiograph revealed a concentric structure similar to that of *Pinctada* pearls.

The authors conclude that this "calcareous concretion" is composed predominantly of aragonite. *RCK*

Research on the mineralogy of the calcium chrome-garnet of gem grade at a district in Tibet. Yongxian Liu, *Abstracts of the 15th General Meeting of the International Mineralogical Association*, June 28–July 3, 1990, Beijing, China, pp. 680–682.

Small crystals of transparent uvarovite garnet have been found at a locality in Tibet. The garnet occurs as part of a skarn deposit at the contact of metamorphosed carbonate sediments (marble) and igneous rocks that are part of the Mesozoic-age Gangdise-Liangqing Tanggula fold belt. Two generations of garnet can be recognized and differ slightly in occurrence and geochemistry. Chemical composition and other mineralogic data on this gem material are cited. *JES*

Two strongly pleochroic chatoyant gems. R. C. Kammerling and J. I. Koivula, *Journal of Gemmology*, Vol. 22, No. 7, 1991, pp. 395–398.

Gemstones that are both chatoyant and pleochroic are relatively uncommon. In this note, the authors describe samples of two such gems: two cat's-eye iolites (23.65 ct and 8.25 ct) and a 2.69-ct cat's-eye tanzanite. Gemological properties for the stones described are typical for their respective gem varieties, with the exception of their phenomenal features. In the iolites, the chatoyancy was found to be caused by minute, whitish-appearing parallel fibers. The tanzanite's chatoyancy was observed to be the result of parallel, whitish, light-reflecting channels. The authors note that, in both materials, cutting for the best optic effect resulted in poor face-up color, because the best pleochroic color was oriented to a different axis from that of the chatoyancy. This disparity between good color and chatoyancy, which is almost universal in pleochroic materials, is undoubtedly why more such stones are not cut. Six color photographs illustrate the note. *CMS*

DIAMONDS

The Lewis and Clark diamond. J. C. Zeitner, *Lapidary Journal*, Vol. 45, No. 5, August 1991, pp. 79–88.

This article provides some details of the July 1990 discovery of a light yellow, transparent, 14-ct diamond along a road near Craig, Montana, by local "rockhound" Darlene Dennis. The stone was first identified by a local faceter; the identification was then confirmed by the owner of the Yogo Sapphire mine. According to the article, an additional large (8 ct) stone was allegedly recovered in late 1990 by another Craig resident. The 14-ct diamond was sold for $80,000 to New York gallery-owner Alexander Acevedo. The article includes a color photo of the stone, a discussion of the possible source and future prospects for diamonds from this area, and an insert on diamonds from the Great Lakes region of the U.S. *WRV*

GEM LOCALITIES

Gemstone [sic] of Malawi: Ruby, sapphire, padparadscha, and fancy corundums. O. Grubessi, *Abstracts of the 15th General Meeting of the International Mineralogical Association*, June 28–July 3, 1990, Beijing, China, pp. 676–677.

This abstract presents a brief summary of gemological data on various gem corundums from the Landanai region of Malawi. Chemical composition data (microprobe) along with optical properties and features seen by microscope examination are described for ruby and a range of colors of sapphire. The author notes that, except for green corundum, R.I. and S.G. increase with iron enrichment and decreasing aluminum. Considerable data are provided in this brief note. *JES*

INSTRUMENTS AND TECHNIQUES

The microscopic determination of structural properties for the characterization of optical uniaxial natural and synthetic gemstones. Part 2: Examples for the applicability of structural features for the distinction of natural emerald from flux-grown and hydrothermally-grown synthetic emerald. L. Kiefert and K. Schmetzer, *Journal of Gemmology*, Vol. 22, No. 7, 1991, pp. 427–438.

Using the techniques described in part 1 of this three-part series, the authors pursue their research into the distinction between natural and synthetic emeralds. The authors found that natural emeralds from metamorphic deposits usually do not have growth structures that can be used diagnostically. However, emeralds from deposits with lower temperatures of formation, including those from Colombia and Nigeria, reveal internal growth structures that are useful. These appear as striations parallel to the dominant growth planes. A variety of flux-grown and hydrothermally grown synthetic emeralds were also examined and revealed certain differences in growth features from those of natural emeralds. Flux-grown synthetic emeralds, for example, were never observed to exhibit structure parallel to the pyramidal faces *u*, *p*, and *s*, while such structural features were observed in both Colombian and Nigerian samples. Also commonly noted in flux-grown synthetics is the zoning of residual flux parallel to dominant growth planes, a feature not found in natural emeralds.

Hydrothermally grown synthetic emeralds revealed one dominant set of growth structures parallel to the orientation of the seed plate, forming an angle with the c-axis of 22°–40°—a characteristic never found in natural emeralds. Accompanying the growth striations in hydrothermal synthetics are distinct color zoning and subgrain boundaries.

The authors conclude that the structural characteristics they observed in natural and synthetic emeralds cannot be used alone to determine the origin of a sample. However, they do constitute a valuable source of information that, in conjunction with other features, can decisively identify natural or synthetic origin. Thirty photomicrographs clearly illustrate the features discussed in the text. *CMS*

Presidium® DiaMeter—System Berger. T. Linton and G. Brown, *Australian Gemmologist*, Vol. 17, No. 8, 1990, pp. 301–303.

This Instrument Evaluation Committee report covers both the DiaMeter®—System Berger and Presidium's Electronic Gemstone Gauge. The former is a specialized slide rule calculator used to estimate the weight of round brilliant–cut diamonds, calculate weight loss in recutting round brilliants, distinguish brilliant-cut diamonds from simulants of higher specific gravity, and identify poorly proportioned diamonds. The Gemstone Gauge is an electronic measuring device that resembles the conventional analog Leveridge gauge but uses instead a digital LCD read-out.

The investigators used the two instruments to measure and then estimate the weights of 10 well-made round brilliants, ranging from 0.05 ct to 1.4 ct. The electronic gauge was found to be easy to use and accurate to within 0.01 mm, while the DiaMeter® proved to be, on average, within 1% of the exact weights of the stones (compared to their actual weights as determined on an electronic balance). The DiaMeter® also proved to be successful in detecting deviations from "ideal make" in 10 other round brilliants of moderate to poor make. No indication was given of what criteria were used for "ideal make."

The investigators conclude that these two instruments used together will speed weight and girdle diameter estimations, although accuracy is limited by how much the make of the stones varies from "ideal" proportions. *RCK*

Presidium® Diamond MiniMate℠. T. Linton and G. Brown, *Australian Gemmologist*, Vol. 17, No. 8, 1990, pp. 318–320.

After reviewing the working principle behind this and similar instruments, the authors of this Instrument Evaluation Committee Report describe in detail the components and use of the Presidium® Diamond MiniMate℠.

On the basis of their evaluation, Messrs. Linton and Brown found the instrument to distinguish accurately both mounted and unmounted diamonds (either gem or industrial quality) from an extensive range of simulants. They also identify a number of critical precautions that must be observed when using the instrument. *RCK*

JEWELRY MANUFACTURING ARTS

The composition and structure of a Byzantine torc [sic]. M. Hockey, *Jewellery Studies*, Vol. 3, 1989, pp. 33–39.

In 1984, the British Museum received an early Byzantine gold torque that had passed through several collections and had been restored many times. At the time the museum received the neckpiece, both the original work and the restored areas were deteriorating badly. This article describes the original methods and materials used in making the torque, and documents the museum's restoration process in great detail.

The torque, which is estimated to date from the sixth or seventh century A.D., is made of gold foil over a magnetite, sand, and glue filler; the whole length is threaded with a copper core wire attached to lion's-head finials. The core wire itself had swollen from corrosion and was missing in places, and repairs to it had broken; gold foil had flaked off the body and filler had been lost.

To restore the torque, sheathed copper dowling was soft-soldered to the remaining core wire; the missing filler was replaced with polyester resin, which also provided a base to which the gold foil was attached with adhesive. Areas missing the original gold were infilled with an easily removable adhesive-resin mixture and covered with gold leaf or gold-powder color.

The author provides details of the composition of the various components, and of experiments she performed to determine the exact method of the torque's assembly. She also describes the means of shaping, soldering, and burnishing its parts; it is readily apparent that the methods of manufacture were extremely sophisticated for their day. *LES*

From Oroide to Platinageld: Imitation jewellery in the late nineteenth century. J. Rudoe, *Jewellery Studies*, Vol. 3, 1989, pp. 49–71.

In an exhaustive study, the author discusses the enormously popular costume jewelry of the late 1800s. The first part of the article deals with the many alloys used to imitate gold and silver, as reported in the trade press of that period. The second part discusses the jewelry made by the firm N. C. Reading & Co., a major Birmingham, England, manufacturer, whose ledgers and sample boards from the period provided the author with documentary evidence.

The fanciful trade names used by 19th-century manufacturers make fascinating reading. Various combinations of copper, aluminum, and zinc create "Abyssinian Gold," "Oroide," "Orissus Gold," "Afghanistan Gold," and "Crazy Gold." This last prompted one writer to remark that perhaps the market would soon be subjected to "deranged electro-plate, delirious rolled plate, and slightly gone German silver."

In her discussion of N. C. Reading & Co., the author covers the trademarked alloys used by the company, as well as their registered designs, and offers many insights into the techniques of mass-manufacture in the late 1800s. For example, watch-chain swivels for pocket watches were hand assembled from die-struck parts in a process that required 36 steps.

It is interesting that the company, which specialized in chain, hired only women to make its chains. Several of these women survived, eyesight intact, into the mid-20th century. It would have been extraordinary to have had their views on working conditions and the like. *LES*

The golden age of designer jewelry. S. Menkes, *Connoisseur*, Vol. 220, No. 942, July 1990, pp. 48–53.

Jewelry produced during the 1940s and '50s has a distinctive look that has been repopularized in the last several years. This article briefly describes the influences that brought about the design style and, with broad strokes, paints a vivid picture of several important designers, their jewels, and the women who wore them (notably, the Duchess of Windsor). Among the designers mentioned are Cartier, Van Cleef and Arpels, Schlumberger, Verdura, Belperron, and Boivin. The article concludes with a list of the major dealers in jewelry of this period worldwide. Photos of jewels appear throughout the article. *EBM*

Medieval and Renaissance jewelry flowers at Christie's. R. Shor, *Jewelers' Circular-Keystone*, Vol. 161, No. 5, Heritage Section, May 1990, pp. 148–150.

JCK's senior editor gives a concise report on the December 1989 sale in London of British artist Phyllis Bray Phillips' important collection of Medieval and Renaissance jewelry. Although this is not a catalog of the 80 pieces offered at auction, several pieces are described and the characteristics that made them particularly significant are pointed out. The author also provides the hammer prices on those jewels he has singled out for discussion, and mentions the final offer ($108,000) on the only item that did not meet its reserve bid: a 14th-century rock crystal triptych of superior workmanship and rarity. Seven color photos augment the text. *EBM*

Metall in Bewegung (Metal in motion). R. Ludwig, *Art Aurea*, No. 2, 1991, pp. 55–60.

Jewelry designer Birgit Laken has long been active in Holland's artistic avant-garde. Drawing her inspiration from the Haarlem shore, 18 km west of Amsterdam, she uses the ancient technique of mokumé gane to recreate the textures of the sea in gold, silver, and other metals.

Mokumé was first developed in the late 17th century by Japanese armourers who used heat and pressure to weld several layers of metal into exceptionally resilient swords for the samurai. This labor-intensive process has only been used in the West since the 1970s.

The swirling patterns of mokumé are ideally suited to Birgit Laken's artistic vision. Stark and impressionistic, her jewelry echoes the 17th-century work of painter Frans Hals, but has the timelessness and energy of the ocean itself, as can be seen in the five illustrations. This article is printed in both German and English. *LES*

More than elegant, ravishing, and chic—Schlumberger. A. F. Collins, *Connoisseur*, Vol. 220, No. 942, July 1990, pp. 54–55 and 105.

Jewelry design underwent a transformation in the 1940s from the tailored, two-dimensional geometrics of the Art Deco period to the vigorous, three-dimensional shapes derived from nature that characterized one aspect of the "Retro" style. French designer Jean Schlumberger was at the forefront of this evolution, and his vibrant, distinctive jewels were trend setters among the international *haute monde*. In the mid-1950s, he was invited to join Tiffany & Co. as one of their designers. This proved to be a successful collaboration that continues to benefit Tiffany to the present day. Although Schlumberger died in 1987, Tiffany still produces jewels based on his "elaborate, chimerical designs."

The article traces Schlumberger's career, touching on the factors that influenced his creative genius and mentioning many of his associates, particularly his partner Nicolas Bongard. Colorful descriptions for several pieces of his fantastical jewelry are presented in the text, making up for the paucity of illustrations. *EBM*

Neillo [sic] jewellery in major renaissance. *Bangkok Gems & Jewellery*, Vol. 3, No. 12, July 1990, pp. 34–41.

Niello is a decorative technique for silver and, infrequently, gold, wherein the metal is engraved with a design and the indented areas are filled with a black alloy to produce a contrast with the polished metal. This article discusses a recent revival of interest in Thai-produced niello items and expresses the concern that this craft is dying out. The text mentions the oldest nielloware company in Thailand, Thai Nakon R.O.P., and Simon Callai, an Italian artist who makes niello jewelry for Rose Tattoo Jewelry in Thailand; articles that describe their work immediately follow this one in the issue. Historically, niellowork in Thailand is speculated to have come from Persia, although "its origin has yet to be found with definitive accuracy." The technique of producing niello is described in equally vague terms, with "skill, patience, and precision" as qualities to be emphasized. Two examples of Thai nielloware illustrate this article, and niello items produced by Thai Nakon and by Callai are shown in the two articles that follow. *EBM*

Schönheit ist eine Geschichte (Beauty is a story). G. Staal, *Art Aurea*, No. 2, 1991, pp. 72–77.

Stories come in many forms and can be told through many media. The "Beauty Is a Story" exhibition in Belgium last spring showcased the work of 13 American and European artists who use jewelry to tell their stories.

With such diverse materials as gold, pearls, gem crystals, bits of fabric, and tea leaves, these jewelers take us through their private landscapes. Sometimes obscure, sometimes eloquent, this jewelry is deeply personal: a meditation on the artists rather than the design.

Although it is difficult to imagine that anyone but the designer would wear some of these pieces, several of which are illustrated, it is fascinating to see the conventions of jewelry design being challenged. This article is printed in both German and English. *LES*

JEWELRY METALS

A comparison of recent analyses of British Late Bronze Age goldwork with Irish parallels. D. R. Hook and S. P. Needham, *Jewellery Studies*, Vol. 3, 1989, pp. 15–24.

In trying to determine whether Britain had a goldworking tradition separate from that of Ireland in the Late Bronze Age, the authors compared stylistic details with the chemical compositions of 31 British bracelets of the period.

To determine the composition of these historic artifacts, the authors used X-ray fluorescence (XRF) testing because it is nondestructive. The XRF results were confirmed by data from hydrostatic weighing. This allowed the authors to correct for depletion gilding caused by the years of burial to which the bracelets had been subjected. Data for this correction were obtained by electron microscopy of one bracelet that had broken in antiquity. Calculated S.G.'s based on the corrected XRF results seemed close to the measured S.G.'s, but, unfortunately, no statistical analysis is presented.

No systematic compositional differences were found to correlate with the stylistic differences seen between the two sets of bracelets. This article is of interest particularly for its combination of two testing methods. *Meredith E. Mercer*

SYNTHETICS AND SIMULANTS

ESR spectrum of Australian synthetic Biron emerald. D. R. Hutton and G. J. Troup, *Australian Gemmologist*, Vol. 17, No. 8, 1990, pp. 299–301.

This report, originally presented at the Australian Bicentennial Physics Conference in 1989, describes the use of electron spin resonance (ESR) spectra in the examination of various types of emeralds.

First described is the use of this method to determine the iron content of emeralds. Examination of a "known hydrothermal emerald" revealed an appreciable iron content. Similar examination of a "New Chatham" synthetic emerald revealed little iron present, while the ESR spectra of a Biron synthetic emerald also showed little iron present.

The ESR spectra can also be interpreted to provide information on the perfection of an emerald's lattice. Based on ESR spectra, the authors deduce that the Biron synthetic emerald has an extremely well-ordered lattice that approaches, if not reaches, laser quality. *RCK*

Imitation chicken-blood stone. G. Brown, S. M. B. Kelly, C. Sutherland, and P. Callaway, *Australian Gemmologist*, Vol. 17, No. 8, 1990, pp. 311–313.

Following a description of the appearance and gemological properties of chicken-blood stone, a natural ornamental material from China, the authors describe a rather convincing imitation that is being sold to unwary tourists in China and Hong Kong.

A representative sample of this imitation is then discussed. A polished seal blank, measuring 4 × 4 × 11.5 cm, was sawed in half, revealing a central core of opaque, dark gray talc-like material and a 1-cm-thick cap of a similar material at one end (where the seal would be carved). All surfaces except the cap were coated with a layer 2–5 mm thick of translucent, yellow-brown plastic that contains red streaks of imitation cinnabar. The streaky texture of the underlying talc-like material was visible through the translucent coating, adding to the realism of the deception.

The core material was cool to the touch with a soapy feel, had a Mohs hardness of 1–2, a spot R.I. about 1.55, and peeled readily to yield a fibrous peeling. The coating was warm to the touch and had a waxy feel, a Mohs hardness of 1–2, a spot R.I. about 1.57 to 1.58, bubble inclusions, and peeled readily to yield a "clean" peeling. The imitation cinnabar streaks fluoresced bright red to long-wave U.V.

The authors conclude that the imitation was produced by coating a steatite core with a layer of thermosetting epoxoid resin that had been included with streaks of imitation cinnabar. *RCK*

Russian flux-grown synthetic spinel. G. Brown, S. M. B. Kelly, and R. Sneyd, *Australian Gemmologist*, Vol. 17, No. 8, 1990, pp. 315–317.

The authors begin with a review of the gemological properties already reported in the literature for Russian flux-grown synthetic red spinel, and proceed to describe their investigation of a 14.69-ct octahedral crystal of this material.

The gemological properties of this flux-grown synthetic are virtually identical to those previously reported. Magnification revealed a number of diagnostic features, which are well illustrated with 10 photographs in the report, among them: (1) etch trigons on octahedral faces; (2) dissolution microlamellation along octahedral edges and polycentric development of octahedral faces; (3) clusters of small, colorless to light pink, spinel octahedra attached to external crystal faces of the host crystal; (4) irregular, rounded masses of opaque, dark-colored flux; (5) highly reflective flat triangular platinum "flakes" (some partly resorbed); (6) curving internal fractures; and (7) a single flattened triangular inclusion decorated by tufted dendrites.

The authors conclude that if no inclusions were present this material could not be identified as synthetic by conventional gemological testing. *RCK*

TREATMENTS

Anomalous behaviour of certain geuda corundums during heat treatment. S. I. Perera, A. S. Pannila, and R. N. Ediriweera, *Journal of Gemmology*, Vol. 22, No. 7, 1991, pp. 405–407.

Heat treatment of the "ottu" variety of geuda sapphire (i.e., light blue or colorless with dark blue patches) has resulted in the production of a nontransparent white coating on much of the material. In an attempt to discover why some "ottu" sapphires heat well and others do not, the authors performed chemical analyses on some 50 samples of treated material. They found that stones of good blue final color contain Fe of 0.03%–0.15% and Ti below 0.03%, with few other trace elements present. Material that clarified but resulted in only pale color contained both Fe and Ti in the range 0.03%–0.15%, with a few additional trace elements present. The "dead milk" coating of the third group of stones proved to have significantly more Fe (0.15%–0.3%) and Ti (more than 0.3%), with Ti always greater than Fe, as well as significantly more trace elements – including vanadium – present. The chemical composition of the blue areas in the treated stones of this third group were found to be similar to that of stones in the first and second groups, except for the presence of vanadium. The authors conclude that the presence of additional minor impurities, including vanadium, may prevent the formation of the Fe-Ti pairs necessary for the production of blue color. *CMS*

Radioactive and radiation treated gemstones. C. E. Ashbaugh, III, *Radioactivity and Radiochemistry*, Vol. 2, No. 1, 1991, pp. 42–57.

This well-illustrated report appears in a journal whose audience is primarily scientists and engineers who deal with radioactivity and its measurement. Mr. Ashbaugh first discusses naturally radioactive gems such as zircon and ekanite and then describes gems that are irradiated in the laboratory, e.g., tourmaline, diamond, and topaz. This portion of the article is enhanced by an up-to-date table on radiation-induced color alterations in various gem materials and the color centers responsible for the colors so produced.

The report also includes a discussion of the radioactive nuclides encountered in gems and the mechanisms by which they are produced. Finally, there is a small treatise on how to calculate radiation exposure from radioactive gemstones over various periods of time.

Well documented with 58 references, this report is recommended for those interested in irradiated gemstones and radiation doses from various radionuclides. *RCK*

Two types of historical traps: On "Diamond Softening" and the "Antiquity of Emerald Oiling." K. Nassau, *Journal of Gemmology*, Vol. 22, No. 7, 1991, pp. 399–403.

The author opens this article by pointing out that readers of ancient gem "recipes" should watch out for two "traps": either outright scoffing of seemingly outrageous statements, or ready acceptance of reasonable-sounding statements. Dr. Nassau describes two examples of these problems. The process of "diamond softening" described by Pliny proved, through new translations of original texts and reference to older texts from which Pliny derived information, to refer neither to diamond nor to softening for the purpose of easier cutting. The misunderstood process, in fact, referred to the quench-crackling of quartz in preparation for dyeing.

The example provided for the second "trap" involves emerald oiling. Pliny has often been cited to prove the antiquity—and, thus, venerability—of this treatment. However, closer examination and retranslation of Pliny's original descriptions revealed that the oiling he described was that of either turquoise or poor-grade malachite. In fact, further investigation by the author revealed no clear reference to emerald oiling before 1962, when it appeared in Liddicoat's *Handbook of Gem Identification* described as a "longstanding" process. *CMS*

MISCELLANEOUS

Frederick H. Pough. J. Sinkankas, *Lapidary Journal*, Vol. 45, No. 4, 1991, pp. 18–24.

This article provides a detailed and interesting account of Dr. Pough's career. After receiving his M.S. in geology at the University of St. Louis in 1930, he subsequently studied at the University of Heidelberg before receiving his doctorate in mineralogy from Harvard University. Dr. Pough then acquired a position at the American Museum in New York, where he became Curator of Mineralogy and Physical Geology in 1943. After retiring from that position in 1952, he worked for a short time at the Santa Barbara Natural History Museum before leaving to become an independent consultant. During his long career, he has authored and co-authored numerous articles and books on mineralogy, vulcanology, altering the color of minerals with irradiation, and pearls. In 1990, Dr. Pough was awarded the Carnegie Mineralogical Award. Also included in the article is a one-page compilation of highlights of the rare mineralogy books in Dr. Pough's collection. Four other fascinating articles concerning the life of Fred Pough are included in this issue. Now in his 80s, Fred Pough continues to be actively involved in the gem and mineral community. *RT*

Old books, old maps, and the gem connoisseur. W. J. Sersen, *JewelSiam*, Vol. 1, No. 5, 1990, pp. 102–105.

For the gem connoisseur, Sersen provides a brief overview of important literature and where to find it. He discusses three rare (late 19th to early 20th century) books: *Ivory and the Elephant* by G. F. Kunz, *Mani-Mala* by S. M. Tagore, and *Precious Stones and Gems* by E. W. Streeter. Also of value are early British colonial government publications that contain maps and photographs. One such publication was the *Burma Gazetteer*, which focused on different areas in Burma and sometimes detailed that area's gem deposits and mining techniques. Two editions of the *Gazetteer* detail the Ruby Mines District and the Myitkyina District. British Ceylon also published gem-related documents. As for how and where to find these treasures, Sersen points to specific libraries, sellers that specialize in rare and out-of-print books, and book publishers. *RT*