



GEMOLOGICAL ABSTRACTS

A. A. LEVINSON, EDITOR

REVIEW BOARD

Anne M. Blumer
Bloomington, Illinois

Jo Ellen Cole
*Gemological Institute of America
Carlsbad*

Maha DeMaggio
*GIA Gem Trade Laboratory
Carlsbad*

Professor R. A. Howie
*Royal Holloway
University of London, United Kingdom*

Mary L. Johnson
GIA Gem Trade Laboratory, Carlsbad

A. A. Levinson
*University of Calgary
Calgary, Alberta, Canada*

Elise B. Misirowski
Los Angeles, California

Jana E. Miyahira
*Gemological Institute of America
Carlsbad*

Himiko Naka
*GIA Gem Trade Laboratory
Carlsbad*

Carol M. Stockton
Alexandria, Virginia

Rolf Tatje
*Duisburg University
Duisburg, Germany*

COLORED STONES AND ORGANIC MATERIALS

Control of crystal phase switching and orientation by soluble mollusc-shell proteins. A. M. Belcher, X. H. Wu, R. J. Christensen, P. K. Hansma, G. D. Stucky, and D. E. Morse, *Nature*, Vol. 381, May 2, 1996, pp. 56–58.

The authors studied the growth of abalone (*Haliotis rufescens*) shell materials *in vitro*—that is, in laboratory dishes rather than within the animal (*in vivo*). Abalone shell consists of layers of calcite, aragonite (another crystalline form of calcium carbonate), and proteins. Typically, proteins integral to the carbonate layers comprise less than 2 wt.% of the shell material. There is an abrupt switching between calcite and aragonite deposition, and distinct “populations” of proteins are associated with calcite and aragonite layers. Multiple layers of aragonite form nacre.

Calcium carbonate grows from saturated aqueous solutions as dense, well-organized, and well-oriented calcite layers on a sheet of nucleating proteins, but it will also grow (though not as well) on glass. The authors extracted water- and acid-soluble proteins from calcite and aragonite layers of natural *H. rufescens* shells; when they introduced these proteins into the carbonate growth environment, the proteins that were associated with the aragonite layer caused aragonite growth on the calcite layers. Aragonite formation could be switched on and off by adding or depleting these soluble proteins. The authors conclude that these proteins alone are sufficient to cause aragonite formation, and neither magnesium nor temperature/pressure changes are required to form the aragonite layers. This research is useful for understanding the development of nacre in shell materials. MLJ

Effect of ligand metal charge transfer and intravalence charge transfer bands on the colour of grossular garnet. T. Lind and H. Bank, *Neues Jahrbuch für Mineralogie, Monatshefte*, Vol. 17, No. 1, March 1997, pp. 1–14.

Garnets of the ugrandite solid-solution series generally include brown to yellow to green colors; previous studies linked these colors to different properties of ions involved in the chemical composition. [Editor's note: “Ugrandite” is a group name for calcium garnets—*uvarovite*, *grossular*, and *andradite*.] The new grossular-andradites from Mali, however, all have a very similar bulk chemistry but still show a wide range of browns, yellows, and greens. The authors tried to find an explanation for this phenomenon by examining gem-quality grossular garnets from various Indian and African sources, including Mali. They looked at chemistry, absorption spectra, refractive indices, and density. On the basis of differences in absorption spectra, they distinguished three groups of garnets: (1) yellow and brown; (2) green to yellowish green with-

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 his reviewers, and space limitations may require that we include only those articles that we feel will be of greatest interest to our readership.

Requests 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 abstractor and in no way reflect the position of Gems & Gemology or GIA.

© 1997 Gemological Institute of America

out chromium and/or vanadium bands; and (3) green with chromium and/or vanadium bands. The main part of the article discusses the properties and charge-transfer behavior of the ions involved, and the resultant effect on garnet color. RT

Garnet—January birthstone. H. Bracewell, *Australian Gold Gem & Treasure*, Vol. 12, No. 1, January 1997, pp. 48–49.

Birthstones are valued for their lore as well as their gemological properties. January's birthstone, garnet, is a group of minerals that occur in almost every color except blue. The name *garnet* probably comes from the Latin term *granatum* for the many-seeded pomegranate, whose red seeds resemble some garnet crystals. Garnets have been used in jewelry since ancient Egyptian, Greek, and Roman times. Some fashioned stones are hollowed out on the reverse side in order to make them less dark. Among the metaphysical properties claimed for garnets are guidance in the dark, and use as an antidote to snake bites and food poisoning; they have also been thought to calm anger. They are associated with constancy in the [Victorian?] "language of gems." For more about garnets, see Ezekiel 54:12 in the *Old Testament*. MLJ

DIAMONDS

Archangel confirmation. *Mining Journal*, London, Vol. 328, No. 8430, May 23, 1997, p. 409.

Archangel Diamonds is still evaluating its Pipe 441 kimberlite in northern Russia. The pipe "has the potential to have" an aerial extent greater than 40 hectares. The estimated average grade of the crater facies is 0.37 ct/ton, and that of the diatreme facies is 1.38 ct/ton, to give an average grade for the pipe of 0.71 ct/ton. MLJ

Botswana: A year of landmarks. *Mining Journal*, London, Vol. 328, No. 8427, May 2, 1997, pp. 357–359.

Although many companies are exploring for diamonds in Botswana, all production there now comes from Debswana's three mines: Orapa, Letlhakane, and Jwaneng. In 1996, these mines produced 5.64, 0.90, and 11.17 million carats (Mct) of diamonds, respectively, with ore grades of 71.7, 28.9, and 140.0 carats per 100 tons of ore. The average diamond value was \$82 per carat. Plant capacity limits throughput at all three mines.

The Orapa (AK1) pipe was discovered in 1967 and began production in 1971. It has a surface area of 117 hectares; after 25 years of production, reserves are still calculated to last another 60 years. Botswana recently extended Debswana's lease to the year 2017. A second plant is expected to go on-line by the year 2000, adding 6 Mct to annual production; this would decrease the working lifetime of the open-pit mine to 32 years. However, the kimberlite pipe splits into two 20-hectare lobes at a depth of 210 m. These could be mined below 500 m by underground techniques, adding another 25 years to mine

life. The "ultimate configuration" of the Orapa pit is expected to be 500 m deep, 1.4 km wide, and 2.1 km long.

The two smaller pipes at Letlhakane, DK1 and DK2, about 40 km southeast of Orapa, started production in 1977. The Jwaneng kimberlite was buried under 50 m of Kalahari sand when it was found in 1973; sampling of termite mounds helped in its discovery. Production began in 1982; diamond yields increased 21% as a result of the "Fourth Stream" diamond recovery project, commissioned in 1995. Jwaneng is in the middle of a five-year initiative to reduce operating costs by 10%.

Diamondiferous kimberlites have been found at Martin's Drift, near Lerale, and at Falconbridge's Gope 25 pipe; De Beers is evaluating both deposits. Other companies looking for diamonds in Botswana include Auridiam, SouthernEra, Afriore, and Botswana Diamond Fields. MLJ

Brazilian lamproites. *Mining Magazine*, Vol. 177, No. 1, July 1997, p. 81.

The Contendas structure, in the states of Minas Gerais and Goiás, Brazil, is a large (130 hectare) crater that is a source of eluvial diamonds. Joint-venture partners KWG Resources and Spider Resources have found "numerous" lamproite indicator mineral grains—including pyrope garnet, eclogitic garnet, chrome diopside, ilmenite, and olivine—in lake sediments within the crater. There are plans to drill the crater in order to delineate the lamproite vents which caused it (and to determine their diamond contents). The partners are also working with the current *garimpeiro* operator mining the southern exposure of the structure, in order to evaluate the recovered eluvial diamonds in a systematic manner. MLJ

Diamanten aus China [Diamonds from China]. G. Steiner and M. Steiner, *Lapis*, Vol. 22, No. 11, November 1997, pp. 13–17, 86 [in German].

Diamond deposits were first found in China only a few decades ago, and literature on the topic is still scarce. This article begins with information from historic sources in which diamonds are mentioned, and then summarizes some data about diamond prospecting and production, drawing mainly from recent Chinese reports. Unfortunately, these sources, like their predecessors, offer relatively imprecise information.

The discussion of the geology of the Chinese diamond occurrences features a geologic map showing 14 deposits. All are kimberlite pipes and dikes, together with related secondary deposits, in the Sino-Korean, Yangtze, and Tarim cratons. The formation of the easternmost deposits of the Sino-Korean craton (Mengyin) are related to the Tanlu Fracture Zone, which stretches over 2,400 km from Shandong and Liaoning south to Jiangxi. The balance of the article describes the Mengyin diamond field, the composition of its kimberlites, and diamond production there. Color photos show the "Mengyin No. 1," a 119.01 ct octahedron found in 1996, and other diamonds, as well as representative countryside. The article

also includes a photo and geologic map of the open-pit Changma diamond mine. RT

Diamonds are for . . . smuggling. *Mining Journal*, London, Vol. 327, No. 8384, August 2, 1996, pp. 93–95.

Smuggling is a fact of life in the diamond industry, because of diamonds' high value-to-volume ratio. Smuggled rough diamonds usually come from artisanal workings and small-scale producers in countries that may be unable or unwilling to control or even monitor such production. Areas of origin include Zaire, Angola, Sierra Leone, Ghana, Central African Republic, South America, and Namibia (in decreasing order of smuggling on a carat-weight basis). Artisanal diamond production is usually considered "outside goods"—the approximately 20% of the market that is not channeled through De Beers's Central Selling Organization (CSO)—although the CSO may purchase such stones. An estimated 9.69 million carats of diamonds are smuggled annually (almost half of the total "outside goods"). The "outside goods" market is typically much more volatile than the CSO, and dealers may buy stones at higher-than-CSO prices (in a strong market) or not at all (in a weak one).

The buying-price formula for artisanal goods is calculated as the international price, minus expenses for buying, treating, and selling; minus taxes; and minus profit margins. Currency volatility and market volatility for the "outside goods" also play roles. If the difference between buying price and international price is very large, artisanal operators are tempted to bypass regular selling channels. A digger normally receives 50%–60% of the export value of his goods from an established field diamond broker. Traders operating on a barter basis, or those who undervalue the foreign currency (usually dollars) on which the diamonds' worth is based, can offer more money to diamond miners than legitimate channels. (Money launderers—offering above-market prices for available stones—can precipitate chaos in a local diamond market.) Smuggling costs are estimated at 4%–5% of the value of the goods, so export duties that exceed this amount encourage smuggling, as do bureaucratic inefficiency and corruption. Sometimes operators select better-quality goods for smuggling, and sell their lower-quality stones through an "official" operation.

The article estimates that about 50% of diamonds (by weight) in the "outside goods" pool have been smuggled. Although artisanal mining and smuggling will likely remain inseparable, artisanal mining does have its pluses. Diggers work small and low-grade deposits that would be uneconomical for most mining companies. Also, these operations provide income for people in rural regions, and—if taxed intelligently—provide foreign exchange and tax revenue for the producing country. MLJ

Diamonds from warm water. R. C. DeVries, *Nature*, Vol. 385, February 6, 1997, p. 485.

Natural diamonds are "remarkably free" of the metallic

inclusions so typical of synthetic diamonds, and most natural diamonds may have been formed by processes that require water (that is, hydrothermal processes). Silicate and sulfide mineral inclusions in natural diamonds give clues about how they form; still more evidence is available from liquid inclusions, especially from the poor-quality fibrous surface layers on "coated diamonds." These coatings suggest the presence of liquid carbon-hydrogen-oxygen (C-H-O) phases during diamond growth.

Additional evidence comes from chemical vapor deposition (CVD) of synthetic diamond coatings, where diamond can be deposited from C-H and C-H-O gases at 1000°C and low-deposition pressures. Even more evidence comes from the chemistry of the graphite-water system (if graphite is stable coexisting with water, diamond should be, too). Very small diamonds found in metamorphic rocks probably grew from C-H-O liquids.

Given all this evidence, the hydrothermal synthesis of diamond by Zhao et al. reported in *Nature* (abstracted in the Summer 1997 *Gems & Gemology*, p. 160) is plausible; however, a reliable method must be found to distinguish diamond seed crystals from new growth before this type of diamond synthesis can be confirmed. Zhao et al. imply a very slow growth rate: The Cullinan diamond, for instance, would require 30 million years to grow by their hydrothermal technique. MLJ

Diavik mine development at \$750 Million. *Diamond Intelligence Briefs*, Vol. 13, No. 247, July 30 1997, p. 1545.

A valuation of 4,217 carats of diamonds from a bulk sample at Diavik, in Canada's Northwest Territories, yielded \$60 per carat, with a grade of 2.8 ct/ton. Mining of the deposit [not to be confused with BHP-DiaMet's mine in the Northwest Territories] could begin in four years, and is estimated to cost \$600 million to \$750 million to develop. Two mining methods are being considered: construction of a ring dike around the property (cost: \$60–\$100 million), so that water could be pumped out and an open-pit mine developed; and underground mining.

The Diavik project is 60% owned by Rio Tinto, and Aber Resources has a 40% share. Aber has discovered 50 kimberlite pipes in the area, 12 with diamonds. The company is also exploring for diamonds in Greenland and at Victoria Island and Camsell Lake in the Northwest Territories. MLJ

Kelsey Lake's place in history. D. Clifford, *Mining Magazine*, Vol. 177, October 1997, pp. MNA 23, MNA 25–26, MNA 28.

The State Line kimberlite district, on the Colorado/Wyoming border, has about 30 kimberlites, almost all of which contain diamonds. However, only two of these pipes (KL-1 and KL-2), comprising Redaurum's Kelsey Lake deposit, are economic at present; these have already

gone into production. This deposit represents the first successful commercial kimberlite mine in the United States. [Editor's note: The diamond mine at Murfreesboro, Arkansas, was never economic, even though it operated over a period of many years in the early part of this century.]

The Kelsey Lake kimberlites were discovered in 1986–1987 after a diamond was found in a peridotite xenolith (a rock carried by igneous activity from deep within the earth). All the pipes in the state line district are about 390 million years old. The aerial extent of the two commercial pipes is greater than 9 hectares.

Assessing the economic potential of diamond deposits is expensive, and must be done early in the exploration cycle. At Kelsey Lake, gem-quality (rough) stones weighing 6.2 ct and 14.2 ct were recovered from the first 6,000 tons of ore processed. A resource of 16.9 million tons of ore to 100 m has been identified, and the weathered kimberlite in both pipes extends to even greater depths. Reserves are sufficient to support a 12-year mining operation.

The ore is processed simply and inexpensively in a plant that uses environment-friendly rotary pans for concentrating heavy materials and grease tables for the final separation of the diamonds. In 1996, 10,000 carats were recovered at a cost of less than US\$10/ton of ore. Redaurum has also secured the rights to process ore from the nearby Maxwell kimberlite, should it prove to be economic.

Diamond marketing is relatively unattractive to many mining companies in terms of "adding value to the product," since profit margins for finished goods are low and the diamond business is highly subjective. However, Redaurum has registered the trademarks "Kelsey Lake Diamonds" and "Colorado Diamonds," in order to develop a niche market. Fashioned stones have been sold for an average of \$173 per carat, and a 5.4 ct pear shape (illustrated on p. 54 of the Spring 1997 Gem Trade Lab Notes) sold for more than \$16,000 per carat. MLJ

Martapura diamonds. *Mining Journal, London*, Vol. 329, No. 8448, September 26, 1997, p. 252.

One hundred and three "gem and near-gem" diamonds weighing up to 1.63 ct have been recovered from the Upper Gravel Unit of the Martapura diamond project in southeast Kalimantan, Indonesia, by Indomin Resources. The stones were mostly "white to off-white" in color; no bort and no diamonds below "near-gem" quality were recovered. The amount of gravel from which these stones were recovered was not provided. Indomin has identified 8 million cubic meters of diamondiferous gravels in the Martapura area. MLJ

Moonstar's marine diamonds. J. Chadwick, *Mining Magazine*, Vol. 177, July 1997, pp. 42, 45–47.

This article describes marine diamond mining aboard the *Moonstar*, a ship owned by Benguela Concessions and

Moonstone Diamonds. Benguela has the rights to several marine mining concessions off the northwest coast of South Africa, where diamonds that were transported by rivers from their original kimberlites are found along submerged benches (former beaches). The *Moonstar* will be used first to mine trenches in concessions off Wreck Point and Port Nolloth.

The ship, built in Scotland in 1966 and formerly known as the *Aberthaw Fisher*, was refurbished and refitted as a diamond mining vessel (her tonnage is not specified). Onboard are:

- Two 510 mm airlift mining heads (vacuum-cleaner-like machines); the first removes overburden, and the second pumps the slurried diamond ore up to the vessel.
- A series of multi-stage vibration screens (which separate gravel from clay, returning the latter to the water).
- Surge bins (to break up large clumps of ore still glued together by clay).
- A scrubber mill, a 50-ton-per-hour dense-media separation plant, and X-ray separation equipment.

The plant design has been customized to survive the corrosive marine environment and to deal with seashells in the gravels, which interfere with recovery. The vessel has helicopter support and a crew of 70, including 45 mining personnel.

In four days of tests, 35 diamonds (totaling 18.79 ct) were recovered. The *Moonstar* is expected to recover about 65,000 carats of diamonds (with an average value of \$200 per carat) annually. The stones found to date average 0.32 ct; it is anticipated that the largest would be about 8 ct. MLJ

NSW diamond find. *Mining Magazine*, Vol. 177, No. 2, August 1997, pp. 144–145.

Fifteen "gem-quality" diamonds (total weight 3 ct) have been found during trial mining at the Round Top prospect, in the Copeton Dam region of New South Wales, Australia. The mining company, Cluff Resources Pacific, also recovered 200 diamonds in May 1997 from the nearby Lucky Streak prospect. The Copeton–Mount Ross area was a major source of diamonds in the late 19th century, when an estimated 0.5 million carats were recovered. MLJ

Platinova diamond. *Mining Journal, London*, Vol. 329, No. 8441, August 8, 1997, p. 116.

Platinova A/S has found a 1 point (0.01 ct) diamond in a 27.6 kg sample from kimberlite boulders on the shore of an unspecified lake near the coast of central west Greenland. "Abundant" diamond indicator minerals are found in till samples taken in the direction of ice movement from the lake. Platinova has also found kimberlite boulders and dikes in the lake's vicinity. MLJ

Results. *Mining Journal*, London, Vol. 329, No. 8448, September 26, 1997, p. 263.

Rex Diamond Mining recovered 8,635 carats of diamonds (from 41,800 tons of ore) from the Ardo and Bellsbank mines in South Africa during the year ending June 30, 1997. The average value of these stones was US\$256 per carat. Flooding at the mines limited production. *MLJ*

Russian environmental agreement. *Mining Journal*, London, Vol. 328, No. 8417, February 21, 1997, pp. 149–150.

The republic of Sakha (Yakutia) has signed an agreement with the World Wide Fund for Nature, which will allocate US\$350,000 to protect Arctic lakes and forests. Mining for diamonds and other commodities in the past has caused serious leaks of toxic chemicals into the Vilyu River. *MLJ*

Stresses generated by inhomogeneous distributions of inclusions in diamonds. T. R. Anthony and Y. Meng, *Diamond and Related Materials*, Vol. 6, No. 1, January 1997, pp. 120–129.

Inhomogeneous (nonuniform) distributions of inclusions in diamonds can generate long-range strains, with maximum magnitudes approaching the crushing strength of the diamond. These strains can either strengthen or weaken the diamond. The stresses generated by inclusions are proportional to the average size of the inclusions and to their concentration. If the diameter of a central inclusion cluster is greater than 20% of the diameter of the diamond, the inclusion cluster may “significantly” weaken the diamond crystal. *MLJ*

Tracing diamonds looted by Nazis. C. Even-Zohar, *Mazal U'Bracha*, Vol. 13, No. 82, September 1996, pp. 21, 22, 24.

Documents produced by “Operation Safehaven,” a U.S. intelligence effort that immediately followed World War II, were recently declassified by the U.S. National Archives. These documents show that the Nazis were probably extremely successful in obtaining diamonds (and \$2.5 billion of gold, at today's prices) from conquered countries. On the basis of 1940–1942 documents specific to Antwerp, Nazis may have looted diamonds worth millions of dollars. Diamonds that were not needed directly for the war effort may have been sold through Switzerland and Spain.

Rough taken from Belgium in 1940 alone exceeded 340,000 carats, worth \$10.5 million at 1940 prices. The combined total of stolen rough and polished goods probably exceeded \$25 million, an astonishing amount considering that CSO sales for 1940 were £6.1 million (about \$25 million).

These documents—which name specific German officials, diamond dealers, and buyers—also indicate that separate bureaus were responsible for polished goods and rough stones. It remains to be seen if renewed efforts to

trace these items will succeed more than 50 years after their theft. *AAL*

A wake-up call—diamond mining from the ocean. B. Dunnington, *The Diamond Registry Bulletin*, Vol. 29, No. 2, February 1997, p. 5.

Namibian Minerals Corporation, or Namco, is among the companies mining diamonds from beneath the waters off the Namibian coast. Namco has concessions from the Namibian government to dredge off of Luderitz Bay. (De Beers has the close-in concession at the mouth of the Orange River.) In 1996, Namco's two mining ships recovered 456,000 carats from the seafloor. Using a special dredging technology, they separate diamonds from the alluvial host material at the seafloor, so only the diamonds come to the surface; this minimizes disturbance to the environment. *MLJ*

GEM LOCALITIES

Areas of greatest interest. *Queensland Government Mining Journal*, Vol. 97, No. 1132, March 1996, p. 14.

Some areas of greatest interest for field gem collectors (“fossickers”) in Queensland, Australia, have been listed as Designated Fossicking Land, Fossicking Areas, or General Permission areas. This article lists highlights of the recent laws, which govern the conduct of field collectors at these sites. Gem materials that can be “fossicked” include: sapphires (several areas in the Anakie region, especially near Rubyvale, Sapphire, and Willows Gemfields); boulder opal (Yowah, Cunnamulla, Duck Creek, Sheep Station Creek, Quilpie, Opalton, and Winton); aquamarine (O'Briens Creek, Mount Surprise); topaz (the aquamarine localities, plus Swipers Gully in the Passchendaele State Forest); zircon (the sapphire localities); peridot (Chudleigh Park); and quartz varieties (amethyst at Kuridala, “amethystine quartz” at Castle Mountain, smoky quartz at Swipers Gulch, agate at Agate Creek and Forsayth, and petrified wood at Chinchilla). *MLJ*

Bernstein der Lausitz [Amber from the Lausitz Region]. W. Sauer, *Der Aufschluss*, Vol. 48, No. 1, 1997, pp. 43–51 [in German].

During the ice ages, glaciers spread Baltic amber across the north German lowlands. This amber has become a popular by-product of open-pit lignite mining in the Lausitz region of Eastern Saxony. Because it is a by-product, amber production increases when lignite production is increased. Amber mainly occurs in the Tertiary and Quaternary sediments adjacent to the lignite. The article also contains information on the history of amber production in this area, amber's local use in jewelry, and the different types of amber (succinite and glessite) recovered. Color photos show several samples. *RT*

Black pearls of French Polynesia. D. Doubilet, *National Geographic*, Vol. 191, No. 6, June 1997, pp. 30–37.

The lagoons in the Tuamotu Archipelago are famous for the black-lipped pearl oyster, *Pinctada margaritifera*, a source of black pearls. The author visited Robert Wan, whose company—Tahiti Perles—produced more than half of the million cultured pearls exported from French Polynesia in 1996.

The pearl oysters in French Polynesia spawn naturally in these lagoons (unlike Japanese Akoya oysters, which are conceived by combination of sperm and egg cells in a hatchery). These oysters require 75°F (about 24°C) unpolluted waters. The larvae attach themselves to plastic garlands, where they grow into oysters. After six months, they are transferred to hanging baskets. They remain in the lagoon for another two years, when they are collected for pearl culturing. A small piece of mantle tissue and a nucleus (a bead carved from an American freshwater mussel) are surgically introduced into each oyster, and the oyster is returned to the lagoon. The mantle tissue will form a sac in which the nacre that will cover the shell nucleus is generated. The oysters are harvested for pearls three years later.

French Polynesia had “pearl” fisheries at the turn of the century, but the main product was mother-of-pearl for inlay and buttons; pearls were very rare. In addition to Mr. Wan’s large operation, about 500 other pearl farms operate throughout Polynesia. Different localities have some product variation; for instance, pearls with green overtones are grown in the cooler waters of the Gambier Islands. MLJ

Boulder opal—going, going . . . *Queensland Government Mining Journal*, Vol. 97, No. 1134, May 1996, p. 16.

The discovery of opal in Queensland, Australia, was first recorded in 1872, from sites at Listowel Downs, Adavale, and near Springsure. The Cragg mine, in the northern Queensland Mayneside area, was the first to be staked, in 1888. In the 1890s, commercial production began in opal fields at Kynuna (or Kymuna), Opalton, Kyabra, Ah, Koroit (or Korbit), and Hungerford. From 1900 until 1957, the Hayricks Mine in Quilpie was the most important producer of opal in Queensland. Many mines were developed from the 1960s to 1988, as opal increased in popularity and because of the growth of gemstone investment activities.

The Queensland Boulder Opal Association was formed in 1992 to promote these opals, and the first international boulder opal auction/sale was held in May 1993. Three such auctions were held in 1996 in Winton, Queensland. For the auctions, the opals are classified as boulder black, boulder crystal, boulder light, boulder matrix, and “ah nuts” (or Yowah nuts).

The Queensland fields extend about 1,000 km north to south (from Kynuna to the New South Wales border) and over 300 km west from the centers at Longreach, Blackall, and Charleville. Other opal fields include Toom-

pine, Kyabra-Eromanga, Bulgroo, Yaraka, Jundah, and Davenport-Palparara. MLJ

Chrysoprase from Warrawanda, Western Australia. T. Nagase, M. Akizuki, M. Onoda, and M. Sato, *Neues Jahrbuch für Mineralogie, Monatshefte*, Vol. 17, No. 7, July 1997, pp. 289–300.

The authors used optical and transmission electron microscopy, Fourier-transform infrared spectroscopy, and electron microprobe analysis to determine the origin of color in chrysoprase from Warrawanda, about 80 km (50 miles) southwest of Newman, Western Australia. Inclusions of kerolite, a talc-like mineral with a nickel content of about 10 wt.% NiO, were found to be the color source. The Ni is believed to come from the strongly weathered silicified serpentinite in which the chrysoprase veins and nodules occur. The Ni-bearing kerolite mainly occurs as fillings in the interstices between the quartz grains and as inclusions in quartz crystals. RT

Exploration and prospecting interest on the increase in Wyoming. W. D. Hausel, *International California Mining Journal*, Vol. 65, No. 11, July 1996, pp. 5, 6, 8.

Several Wyoming regions are being prospected for diamonds and other gem materials. Along the northern flank of the Seminoe Mountains of central Wyoming, kimberlitic indicator minerals (pyrope garnets) have been found in a dry gold placer. In addition, several diamondiferous kimberlites have been located in the State Line diamond district of southeastern Wyoming: More than 120,000 diamonds [carat weight unspecified] have been produced so far, and some of the pyrope garnet and chrome diopside in the area also show gem potential.

“Hundreds” of kimberlite-indicator-mineral anomalies have been found in anthills, stream sediments, and Tertiary conglomerates in the Green River basin. Guardian Resources has reportedly discovered 10 kimberlite breccia pipes in the area, one diamondiferous. A few small diamonds have been reported from a coal bed in the Powder River Basin in northeast Wyoming, and kimberlite indicator minerals were reportedly recovered from stream sediments in the Bighorn Mountains in the early 1980s. MLJ

Flammenachat aus Brasilien—Zur Entstehung ungewöhnlicher Chalcedon-Quarz-Geoden aus dem Paraná-Becken, Rio Grande do Sul, Brasilien [Flame agate—on the formation of unusual chalcedony-quartz geodes from Paraná Basin, Rio Grande do Sul, Brazil]. R. Rykart, *Lapis*, Vol. 22, No. 5, May 1997, pp. 27–31 [in German].

The author describes the appearance, mineral composition, and formation of flame agate, snake agate, and irregularly formed chalcedony specimens that occur in sandstones of the Tupanciretá formation, in Soledade, Paraná Basin, Rio Grande do Sul, Brazil. The chalcedony geodes, called flame agate, measure 3–12 cm in diameter. The

cavities in which they occur are surrounded by characteristic bulges of colored chalcedony and typically contain small quartz crystals (rarely amethyst) and sometimes goethite, calcite, and zeolites. The geodes originated from "steam bubbles" that formed in layers of wet sandstones that were repeatedly covered by basaltic lava flows during the Jurassic era. Snake agate, small chalcedony disks 3–5 cm in diameter, and irregularly shaped chalcedony formations are assumed to originate from gelatinous polysilicic acid that precipitated in fissures in the host rock.

Dr. Peter R. Buerki

Green to envy. A. Wenk, *Modern Jeweler*, Vol. 96, No. 10, October 1997, pp. 33–34, 36, 38.

Since its discovery in the mid-19th century in Russia's Ural Mountains, the demantoid variety of andradite garnet has been touted by Tiffany and flaunted by Fabergé, its fiery green brilliance making it the best of the breed. Despite its beauty, however, demantoid's rarity has been its most important claim to fame. Since 1915, the Russian deposits have produced relatively few stones above one carat. In addition, limited production over the past 80 years has caused this brilliant green garnet to be of more interest to collectors than to jewelers.

A new deposit in Namibia has given hope that demantoid will be available in significant quantity and good quality for the first time, although it is doubtful that demantoid will ever be plentiful. The deposit is located in a large savanna, surrounded by mountains in the central area of the Precambrian Damara Orogen belt in central Namibia. At its best, Namibian demantoid is bright green and usually eye clean. Rough from the new deposit has thus far produced cut stones up to 9.89 ct, a size close to the record 10.40 ct demantoid from Russia in the Smithsonian Institution. The new demantoid from Namibia does not have the "horse-tail" chrysotile inclusions characteristic of the Russian material. In fact, demantoid is one of the few gems that is made more valuable by its internal features, as horse-tail inclusions prove Russian origin.

MD

Neues Vorkommen von Demantoid in Namibia [New occurrence of demantoid in Namibia]. T. Lind, U. Henn, A. Henn, and H. Bank. *Gemmologie: Zeitschrift der Deutschen Gemmologischen Gesellschaft*, Vol. 46, No. 3, 1997, pp. 153–159 [in German].

This is the first detailed technical study on the potentially important new demantoid deposit in central Namibia. Following a historical review of demantoid and a description of the geology of the Namibian deposit, the authors report the physical-chemical properties of the Namibian material.

The Namibian demantoid has a density of 3.81–3.85 gm/cm³. The refractive index was over the limits of the refractometer. Chemical analyses show a composition that is essentially pure andradite with very low concen-

trations of chromium, ranging between 0.02 and 0.13 wt.% Cr₂O₃. The visible-range absorption spectra show bands for Fe³⁺ and Cr³⁺. Distinct growth zoning is seen with the microscope, as are unidentified ore-like (opaque) inclusions. "Horse-tail" chrysotile inclusions, so characteristic of the Russian demantoids, were not seen in the Namibian material.

AAL

On the topaz trail. P. O'Brien, *Australian Gold Gem & Treasure*, Vol. 12, No. 4, April 1997, pp. 26–30.

The Innot Hot Springs topaz locality is about halfway between Atherton and Mt. Surprise in North Queensland, Australia. The topaz comes from dumps left over from a rich tin deposit discovered in the late 1800s. Topaz, quartz, aquamarine, and sometimes sapphires were by-products of alluvial tin (cassiterite) workings in Australia; the tin miners had no interest in these gangue minerals and left them behind, much to the delight of modern-day fossickers.

Collecting is done by dry-sieving. The topaz is unmistakable: "It literally pops out of the ground, clear, shiny, and definite." The author unearthed several "marble size and bigger" topaz crystals in about four hours. Most of this material was clear with "perfect" crystal forms; blue specimens were uncommon. About 30 years ago an 18 kg piece of topaz was found at Innot Hot Springs. Permission is required to enter the topaz digging area.

MLJ

Sapphire agreement. *Mining Journal*, London, Vol. 326, No. 8416, February 14, 1997, p. 136.

Montana sapphire producer Gem River Corporation entered into an agreement with Landstrom's Original Black Hills Gold Creations™, in which Landstrom will purchase between \$1 million and \$3 million in cut and polished sapphire over one year, beginning February 12th, 1997. For the first six months of that period, Landstrom was not to sell or market any of these sapphires. The agreement set prices for various colors, styles, sizes, and quality grades of sapphires, which were to average \$55 per carat. Most stones were projected to be under 1 ct in weight. The stones were to be marketed as "Gem River Sapphires" and "Montana Sapphires" (both terms trademarked).

Gem River has identified proven reserves of 4 million carats. However, the company owns freehold over "substantial" ground around the deposits and was confident that adequate ore reserves could be proved to sustain mining.

MLJ

Gem River resumption. *Mining Journal*, London, Vol. 329, No. 8437, July 11, 1997, p. 27.

Gem River Corporation has resumed mining for sapphires at Lower Dry Cottonwood Creek in Montana for the 1997 season. Gem River produced 975,000 carats in 1996, and 1.5 million carats are anticipated in 1997.

MLJ

Surface geochemical techniques in gemstone exploration at the Rockland Ruby mine, Mangare area, SE Kenya. A. G. Levitski and D. H. R. Sims, *Journal of Geochemical Exploration*, Vol. 59, No. 2, June 1997, pp. 87–98.

Mineral and gem deposits that are covered by soils, alluvium, glacial deposits, or any other material are among the most difficult to discover. Geologists typically use indirect methods to find these buried deposits. The techniques vary, depending on the specific geologic situation (e.g., type of overburden or the mineral being sought).

This article describes exploration techniques used to find corundum mineralization in the Mangare area of southeast Kenya. The Rockland (John Saul) Ruby mine was the specific study site. This type of corundum mineralization is found in pegmatitic material adjacent to ultramafic bodies within gneiss. The area is covered by 1–3 m of overburden consisting of soils, gravels, and secondary calcareous material.

Bulk samples of the overburden were chemically analyzed. Also used was a special *in situ* selective chemical leach called “MDI” (Method of Diffusion Extraction). Both methods yielded unambiguous anomalies for nickel, cobalt, and chromium over the known extent of the ultramafic body; however, the MDI anomaly defined the ultramafic body more precisely.

Because a spatial and genetic relationship exists between the corundum mineralization, the pegmatitic material, and the ultramafic body, a two-step exploration sequence is recommended: (1) soil sampling and analysis on a 100 × 50 m grid to delineate the ultramafic areas; followed by (2) MDI measurements of a finer (50 × 25 m) grid over the ultramafic body to, one hopes, delineate individual corundum-bearing pegmatites. AAL

INSTRUMENTS AND TECHNIQUES

Raman spectra of various types of tourmaline. B. Gasharova, B. Mihailova, and L. Konstantinov, *European Journal of Mineralogy*, Vol. 9, 1997, pp. 935–940.

The authors characterized 25 natural tourmalines of known origin and chemical composition by polarized Raman spectroscopy in the spectral range 150–1550 cm^{-1} . They used a Raman microspectrometer (a Microdil-28) with an intensified diode-array detector in back-scattering geometry and argon laser excitation. Raman bands of the buergerite-schorl series are centered at about 230 and 670 cm^{-1} ; in addition, the spectra are characterized by a single peak at $238 \pm 2 \text{ cm}^{-1}$ and three resolved peaks at 635 ± 3 , 674 ± 3 , and $697 \pm 3 \text{ cm}^{-1}$. Elbaite tourmalines have a sharp peak at $224 \pm 2 \text{ cm}^{-1}$ and two well-separated peaks, one at $638 \pm 3 \text{ cm}^{-1}$ and the other above 707 cm^{-1} . The dravite-buergerite-uvite series is characterized by two peaks at 215 ± 3 and $237 \pm 3 \text{ cm}^{-1}$, with a smooth spectral band centered at about 670 cm^{-1} .

Dr. Peter R. Buerki

JEWELRY HISTORY

Capturing the image of antique jewelry. R. Weldon, *Jeweler's Circular-Keystone*, Heritage section, Vol. 168, No. 6, June 1997, pp. 210–215.

Photographing gems and jewelry is surprisingly difficult, as anyone who has tried it will agree. Robert Weldon, a Graduate Gemologist and a writer for the jewelry trade press, is also an excellent gem and jewelry photographer. In this article, he generously shares his photographic knowledge, giving not only the basics but also insight into photographic pitfalls and tricks to avoid them.

The article is divided into eight sections: tools for the job, other considerations (e.g., set-ups and f-stops), choosing the piece, choosing the background, lighting, photographing shiny metal, photographing gems, and documenting the piece. There is also a table, “Matching Film to Light,” in which specific film types are recommended and their idiosyncrasies listed.

The article is well illustrated with the author's photographs. In several cases, the same piece is shown under different lighting conditions, or with different backgrounds, to demonstrate points in the text. Mr. Weldon's writing style is engaging, and the article makes this exacting artform sound deceptively easy. EBM

Dates to remember. C. Romero, *Jeweler's Circular-Keystone*, Heritage section, Vol. 168, No. 2, February 1997, pp. 160–167.

In the estate jewelry business, questions always arise when a period piece is being dated. Knowing when a specific clasp was invented or when certain synthetic gems were put on the market can help pinpoint a piece's age. For this article, Christie Romero has compiled important dates for inventions and discoveries relevant to jewelry history. The data come from her book, *Warman's Jewelry* (Chilton Co., Radnor, PA, 1995), which presents the material chronologically. In the article, however, she arranges it in five categories: metals and metalworking techniques, inventions and patents, gemstone cutting and setting techniques, natural and synthetic gemstone discoveries, and other synthetic jewelry material. Caveats about what can be concluded from the information provided, together with a strong bibliography, frame the text, which is *packed* with useful facts. Included among the many items listed in the article are: patent dates for white gold, spherical cultured pearls, and the screw-backed earring, along with dates for the discovery of demantoid garnet, the flux-grown synthetic ruby process, and the development of Bakelite plastic. Ms. Romero has done a tremendous amount of work here, and she deserves the full respect and gratitude of jewelry dealers, researchers, and historians alike. EBM

The jewelry of John Paul Cooper. N. N. Kuzmanovic, *Jewelry: Journal of the American Society of Jewelry Historians*, Vol. 1, 1996–1997, pp. 41–51.

John Paul Cooper, a notable jeweler of England's Arts and

Crafts movement, was active between the late 1890s and 1933. Cooper began work in 1889 as an architect but segued into the decorative arts after encouragement from Henry Wilson, his boss at the firm. During the 1890s, Cooper made boxes and other decorative objects; his work with shagreen (shark skin) became a popular product of the firm's studio branch. His move into metalwork and jewelry coincided with the opening of his own studio in 1897. Cooper's jewelry is typical of the Arts and Crafts style—hand-fabricated gold and silver set with pearls and cabochon-cut gemstones (predominantly amethyst, moonstone, chrysoprase, and aquamarine). His motifs are mostly stylized florals, often incorporating the mystical or mythological. The author categorizes Cooper's jewelry into four periods with subtle stylistic differences:

- The Birmingham period (1902–1906)—characterized by chased (a form of metalwork) figures and scenes with a mythological theme.
- The Hunton period (1907–1910)—more opulent and colorful than the Birmingham period and using more gems; the metal is also more elaborately worked.
- The first Betsom's Hill period (1911–1919)—more elegant and refined.
- The second Betsom's Hill period (1920–1933)—simplified, cool, and detached.

Using Cooper's jewelry stockbook as a reference, the author chronicles his development as a jeweler and quotes from Cooper's personal journal to show how his interest in spirituality and mysticism influenced his work. Although the chances of finding Cooper's pieces on the open market today are slim, it is important to chronicle his work. Without being too biographical, the article is a scholarly overview of the jewelry made by this little-known artist. *EBM*

Margaret Craver: A foremost 20th century jeweler and educator. J. Falino and Y. Markowitz, *Jewelry: Journal of the American Society of Jewelry Historians*, Vol. 1, 1996–1997, pp. 8–23.

For the inaugural issue of the American Society of Jewelry Historians' journal in its new format, authors Falino and Markowitz give us a tidy introduction to the work of artist-jeweler Margaret Craver. Ms. Craver is a respected metalsmith and jeweler whose work is part of permanent collections at 11 major U.S. museums, including the Smithsonian Institution, where her tools, hallmarks, notes, and correspondence are now in the Archives of American Art.

Ms. Craver's jewelry style is strong and clean. She primarily used hand-forged silver, often incorporating enamel or gems that she cut herself (chiefly turquoise and varieties of quartz). In the 1950s, she became fascinated with *en resille*, a style of enameling used in France during the 16th and 17th centuries. This technique, of floating enameled foils in an enamel ground, had been lost, and Margaret Craver experimented for several years to recre-

ate it. Her success is evident in pieces made during the 1960s and 1970s that were shown in major art exhibitions nationwide and have since become part of various museum and private collections.

Ms. Craver also dedicated much time to teaching. As a volunteer at a Chicago hospital in 1944, she developed a rehabilitative metalsmithing program for disabled World War II veterans. This program brought her to the attention of the Worshipful Company of Goldsmiths in London, the Rhode Island School of Design, and the Rochester Institute of Technology, for whom she organized workshops and conferences that she also participated in. She filled the years between 1950 and her retirement in 1988 with exhibitions, lectures, and time devoted to her jewelry work.

This well-documented article is augmented by 14 illustrations. The authors also have thoughtfully provided Ms. Craver's hallmarks (one for 1934–43 and a second for 1944–88), a chronology of her professional life, and a list of museums that house her pieces. *EBM*

Splendor in the glass. E. C. Fisher, *Jeweler's Circular-Keystone*, Heritage section, Vol. 168, No. 6, June 1997, pp. 204–208.

The popularity of costume jewelry today has prompted a need for information about its historical background and development. This article focuses on glass made in Bohemia for use as gem substitutes in jewelry.

Bohemia, in central Europe, became Czechoslovakia after World War I. In 1993, it split into two independent states, the Czech Republic and Slovakia. This region has long produced glass for jewelry use. Ms. Fisher neatly capsulizes four centuries of this craft—from the mid-16th century to the present—sketching in the highlights of its evolution from cottage industry to mass production and international renown. Included in the highlights is the well-known name Swarovski, as Daniel Swarovski introduced machine technology to the manufacture of rhinestones in the late 1800s. Wars and economic depressions have increased the demand for costume jewelry. During the 20th century, it grew enormously in both acceptance and market value.

In addition to describing the development of Czech glassmaking, the author also touches on jewelry design and manufacture in the region. Typically made in brass filigree, the work was originally all done by hand, but the cost effectiveness of machine-stamped mounts soon revolutionized the industry. Ms. Fisher's article gives insight into, and instills respect for, Bohemian jewelry. Nine photographs handsomely illustrate the text, and a bibliography provides sources for more information about this interesting topic. *EBM*

The Stuart Jewel: A new acquisition for the National Museums of Scotland. B. Jackson and S. Honeyman, *Journal of Gemmology*, Vol. 25, No. 6, April 1997, pp. 428–430.

The National Museums of Scotland recently acquired a

rare example of 17th century Scottish jewelry with a well-documented history of ownership. The unusual piece is an enameled "trembler" gold hat ornament, set with rubies that are apparently of Burmese origin. The enameled flower (a Stuart rose?) attaches to its stem with a spring that permits the top to move; hence, the name "trembler." Information about the piece's creator is being sought. CMS

JEWELRY RETAILING

The Israeli public owns \$11.7 billion of jewelry. *Mazal U'Bracha*, Vol. 13, No. 83, October 1996, pp. 78, 80, 81, 83.

One independent organization, Gemolab, appraises 80% of Israel's jewelry. Gemolab experts estimate that Israelis own \$11.7 billion of jewelry, or about \$4,186 for every Israeli woman. Jewelry constitutes "10–12% of the belongings" of an average household, so the need for independent appraisers is high in Israel. Retail-store-based appraisers often have conflict-of-interest problems.

The main objective of home-insurance appraisals is to determine fair replacement value. This is a relatively straightforward process for unmounted stones. Gemolab appraisers use prices from the Rapaport list and the Israel Diamond Exchange; mark-ups and VAT (Value Added Tax) are also added.

Appraising set diamonds is far more complex because of difficulties in determining color, clarity, and weight; precise evaluations are usually impossible. Even more difficult is appraising the setting. The profit margin of the retail source must be factored in, as must the reputation of the designer and the store from which the jewelry was purchased. Designer reputation might be considered highly subjective, however, so Gemolab bases their appraisals on the local market and on local prices, enabling consistency and objectivity.

The Israeli appraisal market has two unusual aspects. First, the term "replacement value" means being able to buy the same or a similar object in the "same store again" (which is something that insurance companies elsewhere in the world might not accept). Second, appraisal value differs from place to place in Israel (similar to how an insurance policy costs more in a high-risk neighborhood). AAL

Sri Lanka deregulates to raise exports. M. A. Prost, *Colored Stone*, Vol. 10, No. 6, November–December 1997, pp. 10, 12.

Responding to competitive market pressures, Sri Lanka last June lowered taxes and tariffs to help small and medium-size cutting and manufacturing companies increase productivity. The new policies allow manufacturers to import rough stones duty-free, paying only a 4.5% security levy that is refunded if the stones are reexported within six months. More important to manufacturers is that any company can trade gems locally and pay only

the security levy. The government is also offering a 100% tax exemption on imports of goods, such as machinery, to companies that export 50% of their production. To further assist the industry, the National Gem and Jewellery Authority, which regulates the jewelry industry in Sri Lanka, has allocated \$4.2 million to develop heat-treatment facilities for milky corundum mined in Sri Lanka. All these measures are designed to help Sri Lankan industries compete internationally. According to the Sri Lanka Gem & Jewellery Exchange, the liberalization of import and export regulations—which began two years ago—has already had a positive effect on the industry. The export value of cut and polished gems reportedly increased from \$13.64 million in 1996 to \$18.79 million by the end of July 1997.

Although manufacturers are optimistic, they remain concerned about other restrictions, including the time-consuming paperwork in which goods are officially documented, valued, and cleared through the Gem Authority in Colombo. That process normally takes two days and is seen as the major remaining obstacle. MD

PRECIOUS METALS

Metal boulders. A. Maslowski, *International California Mining Journal*, Vol. 66, No. 3, November 1996, pp. 15–19.

Among the metallic elements found worldwide as minerals are gold, silver, platinum, copper, and iron (or iron-nickel alloy). The largest gold nuggets usually are too valuable to preserve. Many have been found in Australia: One that contained more than three tons of gold was found in New South Wales in 1872. Native silver is found—sometimes as veins—in underground mines, but it reacts with air, water, and many elements far too rapidly to form significant placer nuggets. The largest platinum nugget in the Smithsonian Institution weighs 536.7 grams, and came from Chocó, Colombia; both Russia and Colombia are possible sources of still larger nuggets. Some masses of native copper have weighed more than 100 tons. One nickel-iron meteorite, Ahnighito, weighs about 31 metric tons. Found in Greenland, it now resides in New York's American Museum of Natural History. This article mentions several other sizable nuggets, including a glacier-transported 104.4 gram platinum nugget found in 1880 in Plattsburgh, New York. MLJ

X-ray assays offer a non-destructive complement to traditional fire assays. F. Reilley, *American Jewelry Manufacturer*, Vol. 42, No. 7, July 1997, pp. 48–50.

A fast, accurate, and nondestructive way to determine metal purity is briefly described. X-ray assay will not replace fire assay techniques, but it complements them well. It could be helpful in jewelry manufacturing and in quality control of incoming goods, for example. In X-ray assay, analysis of the electromagnetic spectrum determines the test sample's elemental compositions by weight percentage. Accuracy depends on the accuracy of

the reference standards used, the length of time the standard is measured, the similarity of the standard to the unknown sample, and the shape and size of the item being tested. This article is worth at least a quick read because it describes an assay technique that could be widely used in different areas of the jewelry industry.

JM

TREATMENTS

How to identify fillings in emeralds using Raman spectroscopy. H. A. Hänni, L. Kiefert, and J.-P. Chalain, *Jewellery News Asia*, No. 145, September 1996, pp. 154, 156.

Using a Renishaw Raman laser spectrometer-microscope system, researchers at the SSEF Swiss Gemmological Institute have successfully detected various organic materials used to fill emeralds. Such analyses are fast, nondestructive, and require no special sample preparation. According to the SSEF, the important features for these fillers are observed in the Raman spectra between 2800 cm^{-1} and 3100 cm^{-1} , with another region showing diagnostic peaks between 1200 cm^{-1} and 1700 cm^{-1} . The most important individual peaks in these regions, which are absent or extremely weak in natural resins or oils, are found at 3069 cm^{-1} , 3008 cm^{-1} , 1606 cm^{-1} , and 1250 cm^{-1} . However, the age of the organic fillers can affect Raman spectra. The spectra of older fillers may have an additional "hump" because of fluorescence in the region between 2800 cm^{-1} and 3100 cm^{-1} . This can mask characteristic peaks in this region and make the identification of an older filling very difficult—if not impossible—using this region alone. Fortunately, the region between 1200 cm^{-1} and 1700 cm^{-1} is not diminished by this fluorescence effect.

John I. Koivula

Treated jadeite doublets confuse market. *Jewellery News Asia*, No. 156, August 1997, p. 38.

Ou-Yang Chiu Mei, of the Hong Kong Institute of Gemmology and President of Hong Kong Gems Lab, describes an assemblage (doublet) that is composed of a thin layer of jadeite over an epoxy resin. The material, sometimes called "egg crust jadeite" or "thin layer jadeite," is 10% jadeite and 90% epoxy resin. Dark jadeite with poor translucency is usually used. When this jadeite

is cut into very thin layers and combined with the resin, material with enhanced transparency results. The infrared spectra of this assemblage are similar to those of B-jade. However, requests to call it "A-jade" or "B-jade" on laboratory certificates have been refused.

JM

MISCELLANEOUS

A gem of an exhibition. M. Kernan, *Smithsonian*, Vol. 28, No. 6, September 1997, pp. 57–63.

The Janet Annenberg Hooker Hall of Geology, Gems and Minerals at the Smithsonian Institution, Washington, DC, opened in September 1997. In addition to the famous Hope Diamond, the 20,000-square-foot (6,096 m^2) hall features 40 of the best-known cut-stone creations in the world. Among the most ravishing is a diadem, Napoleon's wedding present to Empress Marie-Louise. This piece, which currently contains more than a thousand diamonds and 79 turquoise cabochons, originally held emeralds—instead of turquoise—which were removed by Van Cleef & Arpels and sold in the 1950s. Also on display are the Napoleon diamond necklace, given to Empress Marie-Louise on the birth of their son; the Hooker Starburst diamonds and Hooker emerald; the Star of Asia; the Marie Antoinette diamond earrings; the DeYoung red-and-pink diamonds; a 23,000 ct topaz; the 38 ct Chalk emerald; the 423 ct Logan Sapphire; and the 127 ct Portuguese diamond.

The Minerals and Gems Gallery has interactive displays and videos that explain many properties of gems and minerals. A 1,600-square-foot (488 m^2) "mine" contains zinc, copper, lead, and some gem minerals. Real ore veins and crystal pockets are set into rock-like walls, painted to resemble a working mine. The Rocks Gallery exhibition tells how rocks are formed and altered by wind, water, gravity, and powerful forces below the earth's crust. Granites, basalts and limestones, glacially striated rocks, and large garnets are displayed. The Plate Tectonics Gallery features video presentations that demonstrate how the movement of enormous plates cause most of the planet's geologic activities. A cutaway of an active volcano shows the mechanics of the heat from the earth's interior bursting to the surface and creating islands. The Moon, Meteorites, and Solar System Gallery includes a 4.5 billion-year-old meteorite.

MD