

GEM NEWS

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

DIAMONDS

Filled diamond update. The Summer 1989 *Gems & Gemology* article on filled diamonds stated that "there is no practical way to remove all of the filling material" from a treated stone. Following publication of the article, Mr. Isaac Landerer, one of the principals of the New York firm that performs diamond filling, Dialase, advised us that the filling material could, in fact, be completely removed. To support his claim he offered to supply a treated stone that we could examine and document both before and after the filling material was removed.

The stone subsequently provided was a 0.85-ct round brilliant. With magnification, a surface-reaching break in the stone exhibited a number of features characteristic of filled diamonds, including both orange and blue "flash effects" and gas bubbles trapped in the filling material (figure 1, left). EDXRF chemical analysis revealed the presence of lead in the filling. The diamond was then returned to Mr. Landerer for removal of the filling substance, reportedly by a deep-boiling technique in an undisclosed medium. When he sent the stone back, magnification revealed no visual indications of treatment in the previously filled break (figure 1, right). Furthermore, EDXRF analysis did not detect any lead where it had previously been noted. It thus appears that the so-called "Yehuda" filling treatment can be reversed, although we do not know the specific conditions of the removal process.

Diamond exploration in Pilbara, Australia. Perilya Mines and Canada-based Noranda, Inc., have arranged a joint venture to invest US\$570,000 for diamond exploration in the Pilbara area of Western Australia. The exploration is in its infancy, but researchers believe the earlier discovery of a 0.3-mm gem-quality diamond on the Nullagine project could lead to a major diamond source. (*Diamond Intelligence Briefs*, Vol. 5, No. 91-92)

Increased diamond output in Botswana. The Botswana Diamond Valuing Company plans to raise its diamond output by 12%, to 17 million carats, in 1990. To achieve this goal, the company will add 60 new diamond sorters to its existing work force of 280 sorters in Gabarone. Additionally, Debswana, the mining company co-owned by De Beers and Botswana, is funding construction of a

new recrusher plant in Jwaneng; the \$105 million plant is scheduled to begin operation in April 1990.

Botswana's output, in terms of value, is second only to that of the Soviet Union; Debswana accounts for approximately 55% of De Beers's total diamond output and about half of its profit. Despite these figures, diamonds are becoming increasingly difficult to recover from Botswana's three mines, and several companies—including De Beers—are exploring for new deposits. None of the many deposits discovered to date is considered commercially viable. (*Diamond Intelligence Briefs*, Vol. 5, No. 88)

Ghana may privatize mines. Sofremines, a French-based firm, is preparing a study on the rehabilitation and possible privatization of the Birim diamond field in southern Ghana. Production in Birim has dropped from 2.6 million carats in 1966 to 200,000 carats in 1988, as a result of unstable funding and outdated equipment. The new study reportedly emphasizes acquiring mobile equipment, which could be used in each sector for three to four years. Total reserves in the Birim field are estimated to be between 26 and 29 million carats. (*Diamond International*, October 1989)

Diamond cutting expands in Mauritius. The tiny Indian Ocean island of Mauritius, known for its stable social, political, and economic environment, is attracting growing interest from diamond manufacturers. Located 2,500 km from South Africa's coast, the island is home to three operating diamond plants, and a fourth is under construction. Currently, the island's diamond industry employs 1,550 workers.

The existing firms in Mauritius—L.S.P. Ltd., Belsdiam, and Universal Diamonds—all have their roots in Antwerp. The new plant is owned by India-based Pattel Ltd. In 1988, Mauritius accounted for just under US\$7 million in rough diamond imports from Belgium, a 130% increase over 1987. (*Diamond International*, October 1989)

Diamond exploration on the west coast of South Africa. John Gurney, chairman of the South Africa-based exploration company Benguela Concessions, says there is evidence that approximately 20 million carats of potentially gem-quality diamonds have accumulated off the west coast of South Africa. The diamonds have eroded from river deposits and been carried into the shallow waters of the Atlantic Ocean.

A 1970 survey estimated that there were about 3

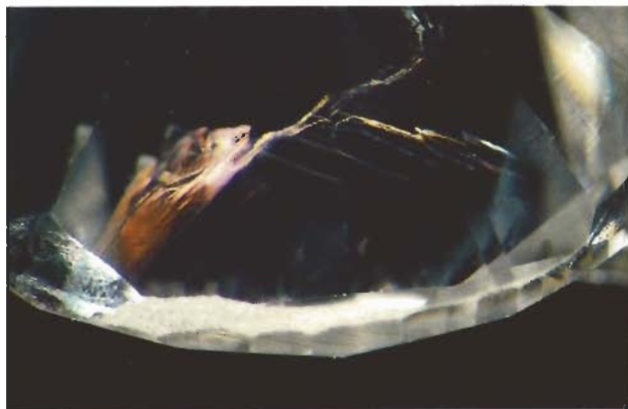


Figure 1. The "orange flash" effect (left) noted in a filled break is no longer apparent after removal of the filling material (right) from the diamond. Photomicrographs by John I. Koivula; magnified 15 $\times$.

billion carats of diamonds off the west coast of South Africa. Benguela Concessions has options on two concession areas off the coast. A small-scale diamond recovery operation near these two areas has extracted 44,000 ct from the ocean over the past 11 years. (*Diamond Intelligence Briefs*, Vol. 5, No. 91-92)

COLORED STONES

Burmese contract for new mining technology. Gold mines in Myanmar (Burma) have contracted with Min, Yugoslavia's Nis-based mining and metallurgical equipment company, to provide new mining equipment and technology needed to increase Burmese gold production. Experts speculate that this move by the Burmese could preface an opening of their gem resources. (*Mining Journal*, Sept. 15, 1989).

"Adularescent" chalcedony. Shane McClure of the GIA Gem Trade Laboratory in Santa Monica recently encountered some unusual chalcedony (figure 2). The material, marketed as "Mojave Blue" by its discoverers Bill Nicks and Mike Pirtle of Bakersfield, California, is recovered from a desert location near the town of Mojave, north of Los Angeles in the Mojave Desert.

The material has an appearance unlike anything we have previously seen in chalcedony. It ranges from semitransparent to translucent with a very light to medium grayish violet-blue body color. All the specimens we examined had a weak to distinct botryoidal structure. What is unusual about the material is a weak to quite distinct "adularescent" effect that in some instances mirrors the underlying spheroid structure. The effect was notably stronger than the sometimes hazy sheen seen in so-called chalcedony "moonstone." Microscopic examination revealed extremely fine, fibrous inclusions which might produce a scattering of light that could account for the apparent body color and phenomenon.

Star chrysoberyl from Sri Lanka. Chrysoberyl is known to occur in two popular phenomenal varieties, cat's-eyes and color-change alexandrites. Jay Rosenthal of Coral

Springs, Florida, allowed us to examine a most unusual star chrysoberyl (figure 3). The 1.54-ct stone, a translucent greenish yellow oval cabochon, exhibited a strong, four-rayed star centered on the dome. Magnification revealed that the asterism was due to the presence of densely packed, minute fibrous inclusions of unknown composition.

Update on hackmanite. The Summer 1989 Gem News column reported on a faceted hackmanite and illustrated the color alteration induced by exposure to long-wave ultraviolet radiation. Mrs. Willow Wight, editor of

Figure 2. This unusual "adularescent" chalcedony is from the Mojave Desert in California. Photo by Shane McClure.





Figure 3. This unusual 1.54-ct cabochon is a rare example of star chrysoberyl. Courtesy of J. Rosenthal; photo by Robert Weldon.

The Canadian Gemmologist, provided us with the following information regarding this stone and its discovery.

First, she reported that the weight of the stone is actually 3.23 ct. The rough was recovered by Gilles

Figure 5. Carved basalt as a gem material is being used in a variety of fashion items. Jewelry designed by Valerie San Giacomo and Michael Tope, Class Project Inc.; photo © Sky Hall.

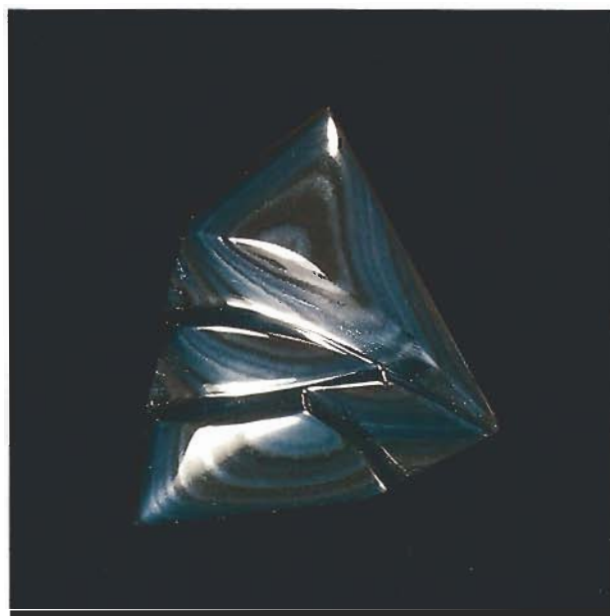


Figure 4. This carved psilomelane exhibits characteristic banding. Photo and carving by Bart Curren.

Haineault from a pocket in the back wall of the Poudrette Quarry at Mont Saint-Hilaire, Quebec, about 20 mi. (32 km) south of Montreal, in the late summer of 1988. Apparently, it is not unusual to find opaque, whitish hackmanite at this locality, with the material appearing "magenta" when first uncovered but fading on exposure to sunlight. The stone illustrated in the Gem News column was faceted from one of two large, transparent broken crystals found. These crystals cut approximately 40 stones in all, the largest weighing 15.33 ct. The same pocket that yielded the hackmanite also produced pectolite and villiaumite specimens. Among the other unusual minerals collected from the Mont Saint-Hilaire locality are catapleite, serandite, and light blue willemite.

Psilomelane and basalt: novel black carving materials.

Recently a number of black gem materials such as hematite and dyed chalcedony have seen a resurgence in popularity in the form of carved stones in geometric and free-form shapes. In response to this demand for black gems, Bart Curren of Glyptic Illusions, Topanga, California, began carving some materials not generally thought of as having gem application. One of these, psilomelane, is an oxide primarily of manganese with lesser amounts of barium and sometimes sodium and potassium together with some water. It is usually found in botryoidal or stalagmitic form and has a Mohs hardness in the range of $5\frac{1}{2}$ – $6\frac{1}{2}$. Because of its mode of formation it often exhibits attractive banding, as can be seen in figure 4.

Even more unusual as jewelry items were carvings made from basalt, a fine-grained igneous rock (figure 5). Examination of a thin section of the carving material

revealed the presence of some glass, in addition to plagioclase feldspar, augite, and olivine. This is the first time to our knowledge that basalt has been carved for use as an ornamental gem material.

Quench-crackled, dyed-green quartz. From time to time throughout history, rock crystal quartz has been quench crackled and dyed to imitate such gems as ruby and emerald. Timothy D. Schuler of Schuler Gemological Services, Palm Harbor, Florida, recently informed us that quartz that had been quench crackled and dyed green was being marketed in his area, mounted in 14K yellow gold ear studs, as "green amethyst." According to Mr. Schuler, customers were not being told that the material had been treated.

Huge, doubly terminated sapphire crystal. Mr. E. Gamini Zoysa, of the State Gem Corporation in Sri Lanka, reports the recent discovery of an extremely large, doubly terminated sapphire crystal (figure 6). Found in Rakwana, the crystal weighs approximately 40.3 kg and measures 25 × 50 cm (10 × 20 in.). According to Mr. Zoysa, the crystal contains some good "gemmy" blue areas, as well as some areas that appear milky and may respond favorably to heat treatment.

Sapphires found in Burundi. Geologist and gem miner Campbell Bridges reports the discovery of a very large new deposit of sapphire in Burundi, near the border with Rwanda. The deposit is said to be of volcanic origin. The material recovered thus far includes stones of good color as well as some described as "geuda-type" which Mr. Bridges feels will probably heat treat favorably.

Mining ventures are reactivated in Southeast Asia. After years of war and economic hardship, Vietnam is gradually implementing new policies to check inflation and encourage international investments. The government's move to pull out of Cambodia and demobilize hundreds of thousands of troops is expected to bring the country global recognition, most importantly from the United States. As a result, mining operations are beginning to reopen, particularly in the areas of metals and petroleum. Currently, small-scale operators are producing an estimated 1,000 kg per year of gold. Similarly, minor operators are reportedly finding considerable quantities of "world class" rubies and sapphires in Ha Tuyen province. The Vietnamese government will work with Thai interests in a joint venture to market these gems.

Experts say that the joint venture with the Thais is one example of the Vietnamese government's willingness to open up to foreign investments and modernize their industrial sector. Furthermore, their receptiveness to joint ventures could lead to greater mining development in this country.

Elsewhere in the region, Laos and Cambodia have asked the Thai Gems & Jewellery Traders' Association to



Figure 6. This 40.3-kg doubly terminated corundum crystal from Sri Lanka dwarfs the pocket calculator used as a size reference. Photo courtesy of E. Gamini Zoysa.

consider investing in gem-mining operations in their countries. Already, Laotian companies have established joint ventures with the Thais, including one operation that is producing sapphires. Several other joint operations are expected to begin, and at least four of those include Australian interests. (*Mining Journal*, September 15, 1989; *Mining Magazine*, September 1989; *Journal of Gem Industry*, June 1989)

Large faceted Pamir spinel. A number of reports have appeared in the literature recently about pink spinels coming from the Pamir Mountains in the Soviet Central Asian republic of Tadjikistan (see Gem Trade Lab Notes, Spring 1989, pp. 39–40, and *Zeitschrift der Deutschen Gemmologischen Gesellschaft*, August 1989, pp. 85–88). Recently a 146.43-ct intense reddish pink brilliant was cut from a deformed crystal by Justina Wright of Fallbrook, California. Mrs. Wright acquired the crystal from Marius Van Dyk. The rough also yielded a 30.03-ct free-form.

Sri Lanka update. Gordon Bleck recently returned from Sri Lanka with news of conditions that may adversely affect the supply of gems from that country. He reports that from January to mid-April of 1989 there was severe drought and, in most mining areas, inadequate water to wash the gem gravels. Then, in June, the nation experienced the worst flooding in 15 years, which stopped mining in the central southern district for approximately one month. A significant increase in terrorist activity in June also led to decreased mining in outlying areas because miners were afraid to venture to the more remote mines.



Figure 7. This 3.55-ct zircon from Sri Lanka lacks the secondary brownish component often seen in green stones of this species. Courtesy of G. Bleck; photo by Robert Weldon.

Mr. Bleck also confirmed that approximately two years ago emeralds were discovered at Hambantota, on the southeastern coast of Sri Lanka, in a former rice paddy. The emeralds are found under a layer of sandy soil about 2 ft. (72 cm) below the surface, not far from the sea. Reportedly about 2 kg of material has been recovered to date, but most of this is not gem quality. The largest stone faceted thus far weighs approximately 0.5 ct. The color of the one crystal we examined was very saturated.

In addition, Mr. Bleck reports examining a number of unusual stones during his last trip, including a 3+-ct light brown faceted monazite. The stone reportedly came from the Trincomalee area in the northern part of the island. He also showed us a 40.91-ct piece of gem rough that could not be identified by gemologists who examined it in Sri Lanka. The stone, which was recovered from a pit mine near Eheliyagoda, exhibited dark blue and near-colorless areas. EDXRF spectroscopy, performed by GIA's Dr. Emmanuel Fritsch, identified the stone as cassiterite. However, we found no reference to either Sri Lanka as a source of cassiterite or its occurrence in blue in the current editions of Webster's *Gems* and Liddicoat's *Handbook of Gem Identification*.

A new find of attractive green zircons was also reportedly made this past year, although the exact locality has not been disclosed. The more than 20 stones we examined were primarily medium dark in tone and of fairly high saturation, lacking the secondary brownish component generally seen in green zircons (figure 7). They were also highly radioactive, registering about 60 times the level of background radiation.

Another stone examined was an 8.77-ct triangular brilliant-cut hessonite garnet which had an excep-

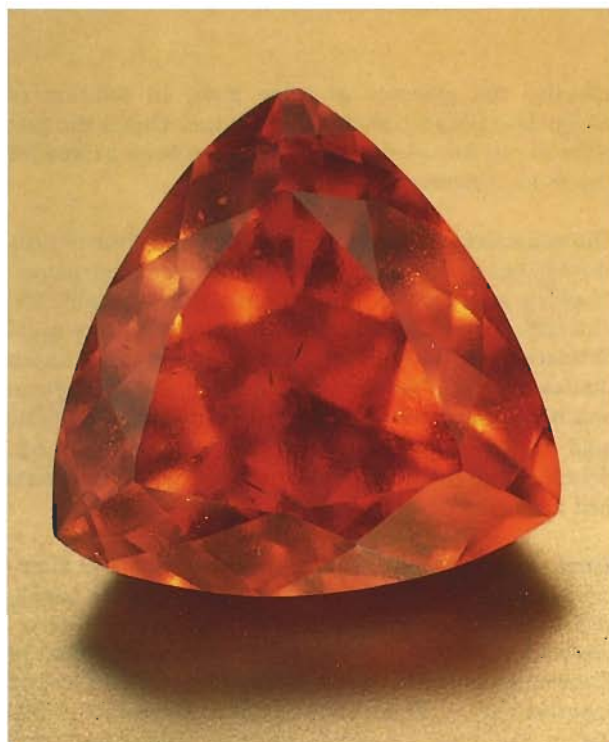


Figure 8. The color in this 8.77-ct hessonite is unusually saturated. Courtesy of G. Bleck; photo by Robert Weldon.

tionally saturated orange color as well as a strong eye-visible "heat-wave" effect (figure 8), which is typical of hessonite garnets from this classic source.

Paraíba tourmaline update. In the Fall 1989 Gem News column, we described some unusual tourmalines from Paraíba, Brazil. These were notable for their color, ranging from bluish green to violetish blue. Since that time, we have seen additional material from this locality that is light to medium in tone and yellowish green or violet in hue.

Recently, Dr. Emmanuel Fritsch, Meredith Mercer, and Mike Moon of the GIA Research Department had an opportunity to analyze a range of Paraíba tourmalines using EDXRF and UV-visible absorption spectroscopy. They found that the tourmalines contain manganese and copper as possible coloring agents, along with traces of iron. The absorption spectra in the visible range of green to blue tourmalines from Paraíba are characterized by a broad band with an apparent absorption maximum at about 700 nm. This band could be related to either Fe^{2+} or Cu^{2+} ; oriented quantitative absorption measurements are necessary to ascertain its exact origin. Less intense features attributed to Mn^{3+} (the main coloring agent of rubellite) have been recognized in some of the samples as well. The Paraíba tourmalines are therefore unique for their unusually high copper content and their possible coloration by Cu^{2+} , which has not previously been encountered as a coloring agent in tourmalines.



Figure 9. A thin dark blue color zone on the base of this multi-colored tourmaline cabochon causes it to appear quite different in reflected (left) and transmitted (right) light. Stone courtesy of Crystal Kingdom, Venice, CA; photos by Robert Weldon.

Unusual multi-colored tourmaline. GIA librarian Robert Weldon recently brought an unusual tourmaline cabochon to our attention. The 48.72-ct bullet-shaped stone reportedly came from somewhere in the vicinity of the Turkish-Iranian border in western Asia. The tourmaline showed a striking difference in appearance when illuminated with reflected versus transmitted light (figure 9). In reflected light, it exhibited a small area of pink at the tip, below which most of the stone appeared slightly bluish green, with a very thin layer at the base that was almost black. When intense transmitted light was directed through the base, however, the majority of the stone took on a pleasing deep blue color, with some of the pink still visible in the tip. In transmitted light, the very dark blue color of the thin basal layer projected into the remainder of the stone.

SYNTHETICS AND SIMULANTS

Synthetic corundum "crystals." Dr. Henry Hänni and Mr. George Bosshart, of the Swiss Foundation for the Research of Gemstones, recently issued an ICA Laboratory Alert on two samples of synthetic corundum that were sold as waterworn rough (figure 10). The larger of the two weighed 56.04 ct, measured approximately

Figure 10. These two apparently waterworn corundum crystals, 56.04 and 21.80 ct, are actually flame-fusion synthetic sapphires. Photo courtesy of the Swiss Foundation for the Research of Gemstones (SSEF).





Figure 11. Reportedly manufactured in the Soviet Union, this 17.19-ct synthetic spinel crystal was flux grown. Photo by Robert Weldon.

53.50 × 12.47 × 7.82 mm, and had a slight color change, appearing purple in daylight and purplish red in incandescent light. Its most interesting feature was its morphology. It was described in the alert as having "a slender barrel shape and irregularly spaced steps on the finely frosted surface," resembling a natural, waterworn bi-pyramidal purple sapphire crystal. Inclusions could not be detected, even under immersion; its identification as a synthetic sapphire was based on a combination of the optic axis direction (approximately 30° off the long axis), size, color, and trace-element content.

The smaller "crystal" weighed 21.80 ct, measured approximately 24.64 × 11.98 × 7.74 mm, and was medium blue in color. It had the appearance of "a

Figure 13. These fantasy cuts were fashioned from a new man-made material with a garnet-like structure called "Oolongolite." Photo courtesy of Dominique Robert.



Figure 12. These dark reddish brown inclusions were the only gemological evidence of the flux growth of the synthetic spinel crystal shown in figure 11. Photomicrograph by John I. Koivula; magnified 35×.

broken and waterworn [blue sapphire] pebble, showing one residual pseudo-crystal face with an irregular step-like relief." Concentric color banding, trace-element analysis, and fluorescence to short-wave U.V. radiation supported the identification of a flame-fusion synthetic sapphire.

Neither the steps on the larger "crystal" nor the step-like elevations and depressions on the smaller one were parallel, and both appeared to have been produced by a grinding wheel; the translucent, frosted surfaces displayed by both specimens were believed to be the result of tumbling or sanding. These two synthetic sapphires, fashioned to imitate natural crystals, had been purchased recently in Sri Lanka.

Flux synthetic spinel. The Gem News editors recently examined a 17.19-ct synthetic red spinel octahedron (figure 11) that was brought to our attention by gemologist Bill Vance, who obtained it from a Soviet citizen. Although sold to Mr. Vance as a hydrothermal product, gemological investigation combined with infrared spectrometry and EDXRF analysis proved it to be a flux-grown synthetic. All of the basic gemological properties were virtually identical to those of similarly colored natural spinel, with the exception of flux-like inclusions in one area of the crystal (figure 12). A stone cut from unincluded areas of such a crystal would not be identifiable by standard gemological tests.

A 13.14-ct synthetic red spinel crystal with very similar properties was recently described by Professor Hermann Bank and Dr. Ulrich Henn of the German Foundation for Gemstone Research, Idar-Oberstein, in ICA Lab Alert No. 26, "Flux-Grown Synthetic Red Spinel from USSR."

New man-made crystal. GIA's Dr. Emmanuel Fritsch reports that an apparently new man-made crystal with a garnet-like structure is now commercially available.

The material is produced and marketed by Dominique Robert of Lausanne, Switzerland, in a variety of cuts including "fantasy"-type carved gems (figure 13), under the trade name "Oolongolite." It comes in colorless, dark blue, medium blue, medium green, dark bluish green, and "lilac" hues. Gemological properties reported by the

manufacturer are as follows: R.I. of 1.93 to 2.00, singly refractive, S.G. of 6.7 to 7.0, and Mohs hardness of 7 $\frac{1}{2}$ –8.

Acknowledgments: The editors would like to thank Jennifer Rowland for her help in preparing this column.

ANNOUNCEMENTS

The Art of Van Cleef & Arpels makes its debut at the Los Angeles County Museum of Art on April 7, 1990. The exhibition features the historical creations of the famed jewelry company and will highlight brooches, bracelets, necklaces, earrings, vanity and powder boxes, watches, evening bags, and special commissions dating from the 1920s through the 1950s. After the exhibit leaves Los Angeles on June 17, the display travels to the National Museum of Natural History, Smithsonian Institution (July 12–October 30), and the Honolulu Academy of the Arts (January 16–February 24, 1991).

John Sinkankas's book *Gem Cutting*, originally published by D. Van Nostrand Co. in 1955 and now in its third edition, was chosen by the Mir Publishing House of Moscow for translation into Russian, under the title *Handbook for Working Precious and Ornamental Stones*. Mir published 70,000 copies in 1989. *Gem Cutting* is the first lapidary book to be translated into Russian and reflects the desire of the Soviet government to encourage local artisans to take advantage of the many gem deposits that occur throughout the Soviet Union.

The Aurora Gem Collection, one of the largest collections of "fancy" colored diamonds ever to be shown in public, is again on display at the American Museum of Natural History in New York City. The collection now consists of 244 diamonds with a combined weight of approximately 221 ct. Many different col-

ors are represented, as are a variety of cuts and localities.

The 8th Hong Kong Jewelry & Watch Fair will be held at the Hong Kong Convention & Exhibition Centre September 17–20, 1990. At the 1989 fair, more than 1,500 companies from 30 countries were represented, and more than 25,000 buyers from 60 countries attended. The Hong Kong Fair will also give out eight awards to showcase the latest jewelry designs based on beauty, originality, wearability, adaptation to fashion trends, and craftsmanship. For more information on the fair or how to enter the competition, contact Headway

Trade Fairs, Ltd., 9/F Sing-Ho Finance Building, 168 Gloucester Road, Hong Kong. Telephone: 5-8335121; fax: 5-8345164.

Jewellex '90, the second Korea International Jewelry & Watch Fair, will be held September 20–24, 1990, at the Korea Exhibition Center in Seoul. The fair features the newest designs in jewelry and the latest models of clocks, watches, manufacturing equipment and accessories. For more information, contact the Korea Exhibition Center, 159, Samsung-dong, Kangnam-ku, Seoul, 135-731 Korea. Telephone: (02) 551-5213; fax: (02) 555-7414 or 551-1313.

The ruby petals in this peony clip, created by Van Cleef & Arpels in 1936, illustrate the "invisible setting" for which the company is noted; the stem and leaves are made of diamonds.

