Gems&Jewellery

January 2009 / Volume 18 / No. 1

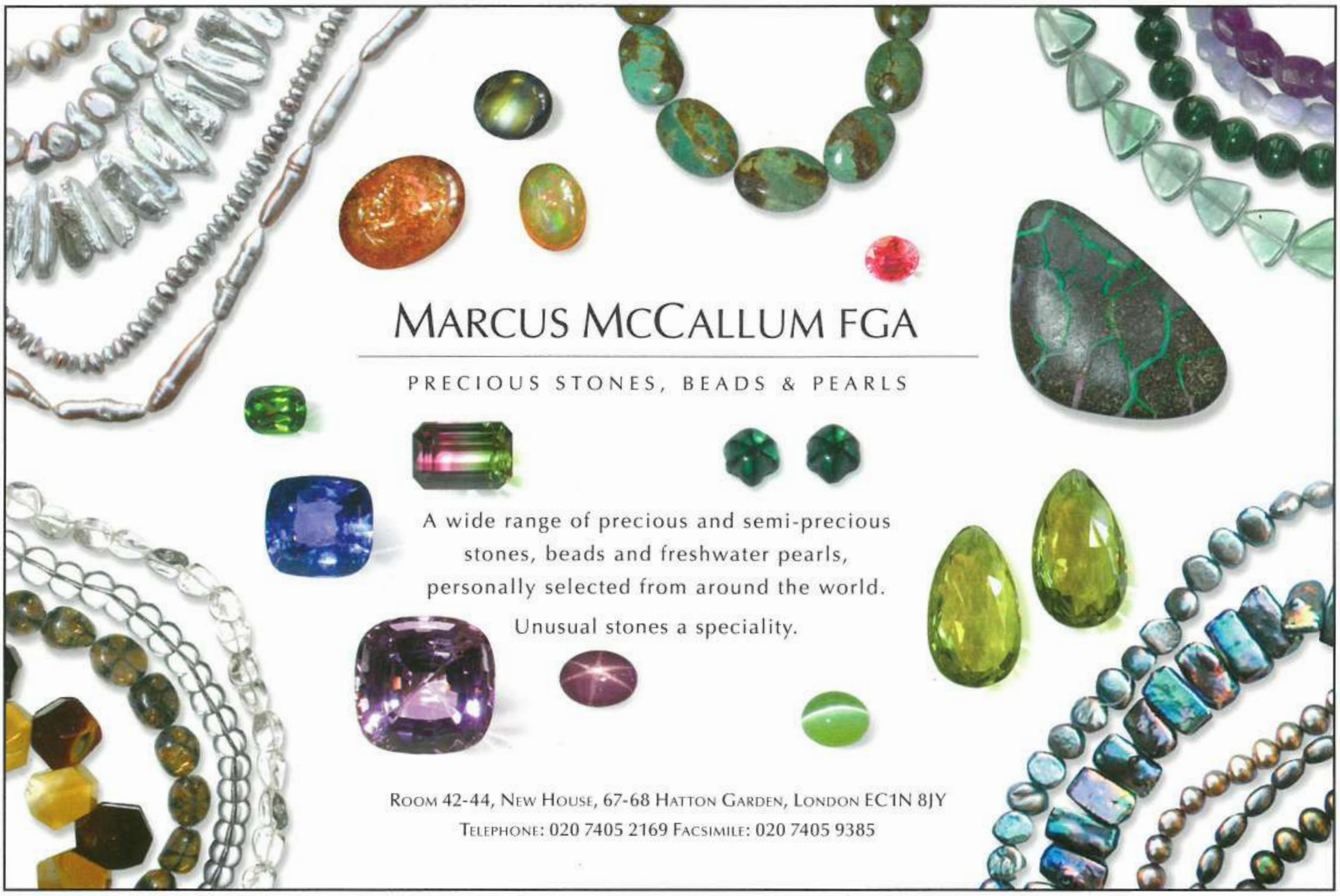
New findings on the French Blue

Conference Report 2008

Multi-phenomenal quartz

What exactly is jet?

The Gemmological Association of Great Britain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Editorial

Gems&Jewellery

January 09

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The year ahead

I guess it is just bad luck that gemmological education starts its second century in the year that the world goes into economic melt-down. The affects of the economic crunch are being seen right across the gem and jewellery trade, from mines being temporarily shut down, to diamond cutters put out of work, to well known retail names facing collapse. Auctions, labs and lapidaries, all are feeling the pinch.

So the first thing to be said, is good luck. Things will get better, but it could be tough for a time for many of you. The only advice we can offer is streamline your operation the best you can, prioritize, work very hard and don't compromise quality or standards. In this year, the 200th anniversary of Charles Darwin's birth, the fittest will survive. These are not the 'fittest' in the sense of those going to the gym more often, but in Darwin's sense of those best prepared and equipped to meet the challenges and changing environment around them.

At Gem-A it is too early to gauge how the year will pan out. Initial uptake for our education this year is good, but it is early days. Generally in a recession education does OK, because with a tighter job market, people seek better qualifications. Then, of course, with a weak UK pound our courses are now significantly less expensive for many of our potential students around the world. But this is a global rather than localized recession and our fate is linked with that of the countries from which our students and members hail. So we are warily optimistic. We are taking steps to keep to very tight expenditure budgets in 2009 and to prioritize our activities to those that have the best chance of keeping up our income stream. One of the largest expenditures has been the current up-dating of our courses. The Foundation Course is now complete, the Diploma well on its way, but the up-dating of the Diamond Diploma Course, originally planned for the second half of 2009 will now be postponed until 2010. Some of third phase of our web development will also be held back until at least the second half of this year. Also, until further notice, we will publish four issues of *Gems & Jewellery* each year, not five (as we have attempted in the past). There will be the same amount of articles, but in four rather than five issues to optimize postage and printing costs.

So, as the Irish comedian Dave Allen used to say, may your god go with you. A useful wish that applies to all, even those whose only god is money.

Jack Ogden
Chief Executive Officer

Cover Picture

Late eighteenth-century Portuguese silver aura set with amethyst, rock crystal, yellow topaz and white topaz with reflective coloured and colourless foil backings. Archdiocese of Évora Collection. Photo by fotografo@carlospombo.pt © Fundação Eugénio de Almeida, Évora. See Conference 2008, page 20.

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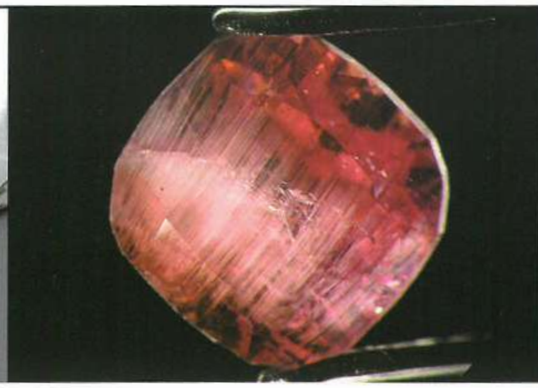
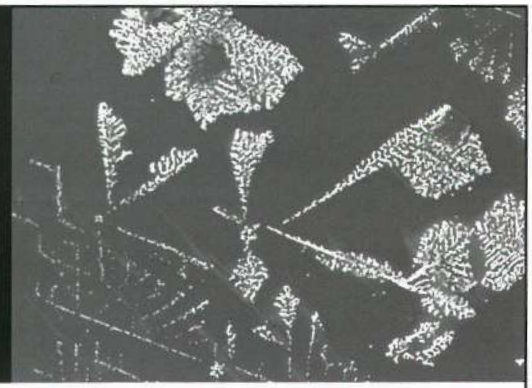

2009 EUROPEAN GEMMOLOGICAL SYMPOSIUM

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Keynote Speakers: ***Sir Gabi Tolkowsky and Martin Rapaport***

Further speakers include: ***Maggie Campbell Pedersen, Laurent Cartier, Jean-Pierre Chalain, Dr Eric Erel, Thomas Hainschwang, Vera Hammer, Prof. Dr Henry A. Hänni, Michael Hügi, Dr Michael S. Krzemnicki, Helen Molesworth, Andy Müller, Dr Daniel Nyfeler, Dr Jack Ogden, Vincent Pardieu and Roland Schlüssel***

Poster session: Details given at www.gemmologie.ch or email EGS.2009@gmail.com. Contributions welcome.

Additional events (participation optional):

- Welcome cocktail on the evening of Thursday 4 June and Symposium Dinner on Friday 5 June.
- A visit to the mineral collection of the Natural History Museum in Berne during the afternoon of Friday 5 June.
- An excursion to the famous crystal cave at Grimsel in the Swiss Alps on Sunday 7 June.

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To book: For details on the pricing, registration and how to book a hotel in Berne, please visit www.gemmologie.ch.

Gem-A Conference 2009

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The Hilton London Kensington

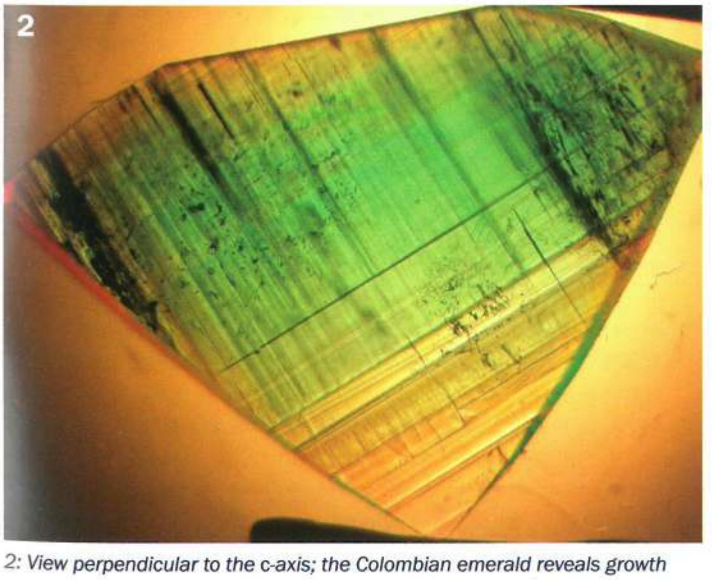
(See page 40)

Pencil it in ...

A rare 'Gota de aceite' Colombian emerald which had been treated

Dr Karl Schmetzer gives his observations of the stone before and after 'cleaning'

A few of the finest quality Colombian emeralds are designated in the gem trade with the name 'gota de aceite' (Spanish for 'drop of oil'). This name refers to the interior of such stones which have a 'roiled appearance which is reminiscent of honey or oil' (Ringsrud, 2008). The visual impression is caused by an interior texture of columnar growth structures with hexagonal forms, which are only rarely present in emerald crystals originating from the Muzo region in Colombia.



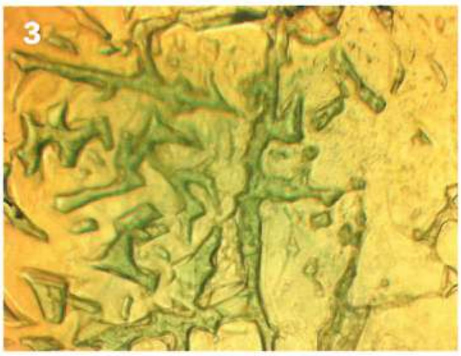
2: View perpendicular to the c-axis; the Colombian emerald reveals growth zoning associated with colour zoning parallel to the basal face as well as growth tubes and growth lines parallel to the c-axis. The c-axis runs diagonally from the lower right to the upper left. Immersion, 30×. (The yellow and orange comes from the light source and is not the colour of the stone.)

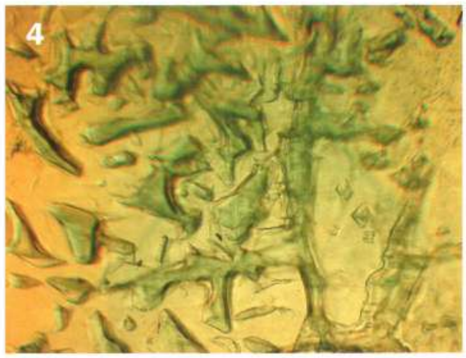
Unfortunately, even emeralds of this high quality may be treated in order to increase the intensity of the green coloration and improve their appearance. The stone described here is a faceted gemstone of 2.20 ct in weight (**1**) with gemmological properties such as SG and RI within the range usually observed for Colombian emeralds.

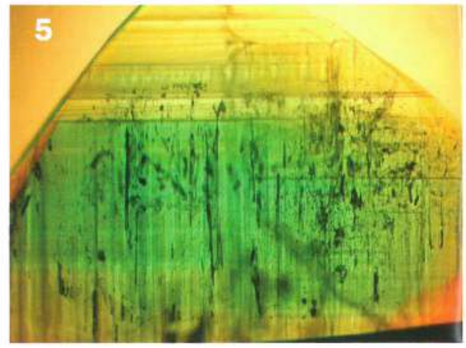
1: Faceted Colombian emerald with 'gota de aceite' growth structure, size 7.9 x 8.0 mm, 2.20 ct.

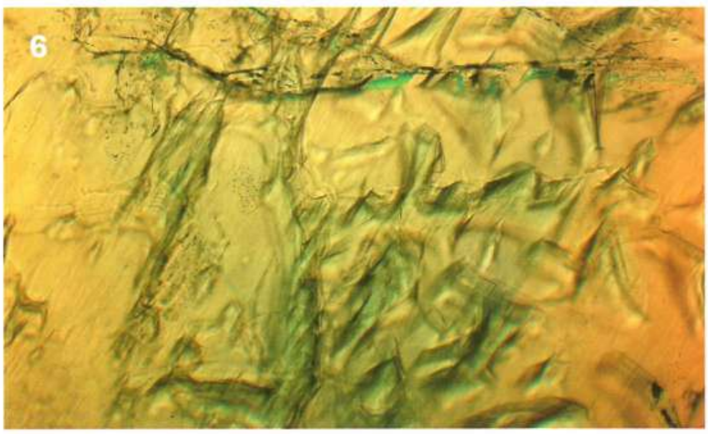
A magnified view of the stone using the immersion microscope is shown in **2** where, perpendicular to the c-axis, distinct growth layers parallel to the basal face of the original crystal (perpendicular to the c-axis) are visible; these are associated with colour zoning. Furthermore, growth channels and growth tubes or other growth lines parallel to c are also visible, and these are shown in cross-section in **3** and **4**. With an exact orientation of the emerald in the immersion microscope, it was apparent that the structure of this particular stone consists of several columnar crystals of emerald with an orientation parallel to the c-axis, which are partly intergrown or interconnected with each other and partly isolated. Some of the lines parallel to c shown in **2** reflect also the edges of the columns parallel to c. In some growth channels and in some cavities three-phase inclusions, a feature of Colombian emeralds, are present (**5**).

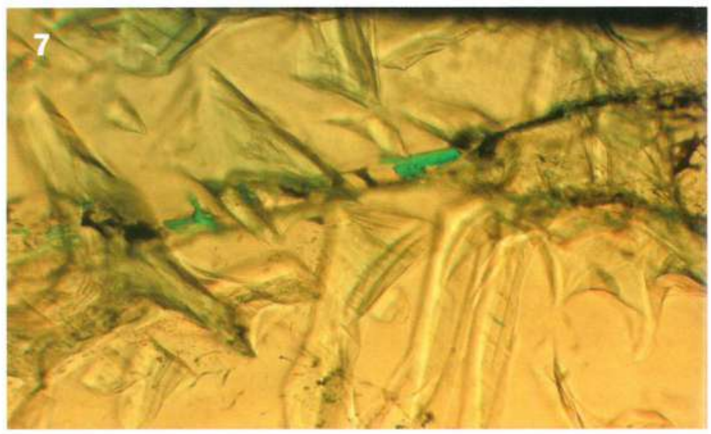
Gems and Minerals











3 and 4: The 'gota de aceite' structure of the emerald is clearly visible in a view parallel to the c-axis. This growth pattern consists of isolated or interconnected columns of darker green emerald within lighter green emerald matrix (which appears yellow because of the light source). Immersion, 50× and 70 ×.
5: In a view perpendicular to the c-axis, growth planes parallel to the basal face associated with colour zoning and growth lines or growth channels parallel to c are visible. Some channels contain two- and three-phase inclusions, typical for Colombian emeralds. The c-axis runs vertically. Immersion, 40×.
6 and 7: After cleaning, there was no sign of foreign green material in fractures close to the surface of the emerald, but deeper in the fractures it persisted and discrete areas of strong colour are visible. Immersion, 50x and 70×.

Within the main fractures in the emerald and in some of the growth channels parallel to the c-axis, thin films of a green substance were observed. The emerald showed the chromium-vanadium absorption spectrum typical of Colombian stones — the cause of their rich green colour — but these films of green material also contribute to the intensity of colour. Although colourless oils and resins are commonly applied to emeralds to increase their clarity, the use of foreign green material to intensify their colour is rarely reported.

Accompanied by the observations on the added green material, this emerald 'travelled' through several hands in the trade chain back to Colombia. After several weeks it then returned to Germany and was resubmitted for examination with the information that "the green oil has been removed now from the sample". Upon microscopic examination, the parts of the fractures close to the surface did appear somewhat cleaner now and to be free of the films of green material observed before. However, following the fractures deeper into the stone revealed that some thin films of a green foreign substance were still present at depth (**6** and **7**). So it is clear that this removal treatment was not completely successful, and the stone still had to be reported or described as 'treated'.

Reference

Ringsrud, R. (2008). Gota de aceite: nomenclature for the finest Colombian emeralds. *Gems & Gemology*, **44**(3), 242-5

The Author

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What exactly is 'jet'?

Maggie Campbell Pedersen asks whether there is a need to re-define what we mean by 'jet'

Jet is generally accepted as being a black, fossilized material that can be carved. If you ask gemmologists to define jet, they will invariably describe only the jet that comes from Whitby, England – and to some purists only the material from Whitby is 'true jet'. Our books describe Whitby jet in some detail and give only brief mention to the existence of other jets. Indeed, there seems to be no definitive answer to the question: "What exactly is jet?"

Two frog carvings illustrating the high lustre of Whitby jet (left) as opposed to that of New Mexican jet (right). Photo © Maggie Campbell Pedersen.

It has long been known that jet occurred in many localities in Europe, notably Whitby and the Asturias Province in Spain. Further jet deposits occur in many places including parts of the United States, and nowadays we find on the market quantities of jet from Siberia, China and Mongolia.

Yet none of these 'other jets' have quite the same characteristics as the Whitby material.

Even the Spanish jet – usually regarded as being almost on a par with Whitby jet – has a slightly different composition containing more sulphur than Whitby jet, which may account for its slight tendency to crack if subjected to sudden changes of temperature.

Jet is a form of coal. Whitby jet is a very specialized form, as it is derived from the wood of one species of tree only, thought to be related to today's monkey puzzle tree *(Araucaria araucana)*. Other jets are derived from mixtures of plant types and parts (leaves, wood, pollen, spores and resins) which degrade at different rates. The result is that most polished jets display a slightly irregular structure, while Whitby jet appears homogeneous. This can usually be seen by the naked eye, but becomes more obvious under magnification. And with a more homogeneous structure comes a higher lustre.

Further, the ages of the materials vary greatly, with some Chinese material being a mere 30 million years old, as opposed to Whitby jet which is about 180 million years old. The jet from Eastern Siberia has been labelled sapropelic coal (see 'Siberian sapropelic coal. A unique type of workable jet' by S. Glushnev, *The Journal of Gemmology*, Vol. 24 no. 5, 1995) which is a form of cannel coal – a bituminous or sub-bituminous coal – and older than the Chinese material.

Should we differentiate between the different types, cannel coal, jet and so forth? It can be exceedingly difficult to do so without using laboratory tests. Today the origins are of more importance to geologists and archaeologists than to the jewellery trade, which already calls it all jet. The differentiation should perhaps be made according to the quality of the material – its durability and high polish. And this would automatically leave Whitby jet at the top of the list.

However, this leaves us with a small problem. We have long believed that only 'true jet' will give a brown streak when tested. In fact many of the coals that we are using for decorative purposes today give brown streaks, including cannel coal. And, conversely, other materials now being called jet can give a black streak.

Is it perhaps time to reconsider the terminology and specifications used for jet in the jewellery and gemmology fields?

An extended, illustrated version of this article appears in Organic Gems, the online information centre devoted to organic gem materials, at www.maggiecp.com.

Golden labradorite

Designer Joanna Angelett dug deep for the ideal stone

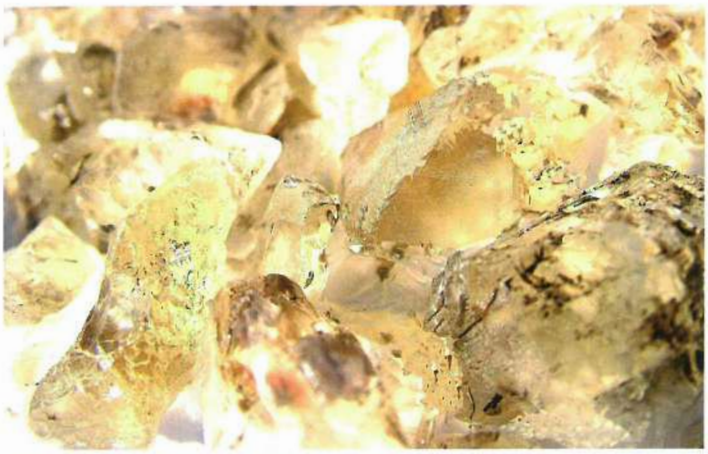
The gold, silver, enamel, diamond and golden labradorite 'Cup of David'. Photo © Joanna Angelett.

As golden labradorite becomes a popular gem material, turning up more and more in jewellery sold by internet and TV selling channels, it is interesting to look back on a unique use of the gem in the mid-1990s by top Australian designer, Joanna Angelett, and her determined quest to find this then elusive stone.

Gem-set jewellery and objects can be discussed and admired from many different points of view. A fine example is the gold, silver, enamel, diamond and golden labradorite 'Cup of David' designed and made by Joanna Angelett for the international competition 'Jerusalem 3000' in 1996. Media coverage of this award-winning piece variously focused on the technology, the design, and the meaning and symbolism, but the transparent, golden gem material ingeniously used to cover the small enamelled inserts received little comment. In fact there is an interesting story to them.

When pondering over her design, Joanna realized that she required a transparent gem, simply cut to overlay the enamel rather than to impart sparkle. But what type of gem? The requirements were clear – it should be natural, absolutely transparent with excellent clarity, have a subtle golden hue and, trickier, be an Australian stone, because the Cup would represent Australia in the competition. Australian citrine was rejected because its colour was too intense and would detract from the colour of the underlying enamels. Australian yellow beryl was another possibility, but none seemed to have been available commercially for many years. There seemed no answer until she glanced through an old issue of the Australian magazine *Gold, Gem and Treasure* and saw an article about Australian golden labradorite written by Edward Knevett of Glen Innes, New South Wales. A photo in the article displayed the transparent, light golden stone – she had found the gem she wanted. But the bad news in the article was that the Australian gem was not then available commercially; she would have to go to New South Wales and dig it up herself.

Labradorite is a member of the plagioclase feldspar mineral group and is perhaps best known for the extraordinary iridescence or play-of-colour in some of the darker material; this is caused by interference of light reflected from its very fine lamellar structure. This stone was first discovered on Paul's Island near the town of Nain in Labrador, Canada, in the eighteenth century, hence its name. Occurrences are recorded in the Hogarth Range, New South Wales, the source of the stones referred to in this article, and in Queensland. Labradorite is triclinic with perfect cleavage and distinct lamellar



The rough golden labradorite from Hogarth Range, New South Wales. Photo © Joanna Angelett.

Two of the enamelled inserts with golden labradorite covers above. Photo © Joanna Angelett.

Two of the enamelled inserts, a floral design (left) and King David with the Golden Harp (right), complete with golden labradorite covers mounted in the cup. Photo © Joanna Angelett.

Designer and maker of the Cup of David, Joanna Angelett, explaining the jewellery techniques used to Director of the Jerusalem Museum, Mrs Borovski, in the Exhibition and Convention Center in Jerusalem. Photo © Joanna Angelett.

twinning is common, features that could make cutting and setting tricky. However, the hardness is about 6–6.5 on the Mohs' scale, on the soft side for jewellery but perfectly serviceable for its intended use to overlay enamels. The refractive index of the golden labradorite is reported to be 1.565–1.572.

A few weeks after reading about Australian labradorite, Joanna was camping amid eucalyptus trees and, under the watchful eyes of kangaroos, koalas, parrots and snakes, "discovering one after another pieces of labradorite of wonderful sunlight colour from pliable, dry soil". There was no lack of the gems – but she was finding none large enough to be cut to form the seven enamel overlays. Despite the excitement of the gem hunt adventure, she was increasingly coming to the conclusion that the gems she sought would not be found. But finally one morning, while distracted by an iguana, her small shovel hit a stone with a familiar 'ring' and she looked down to see a piece of clear, golden labradorite some 6.5 cm long. Subsequently a sufficiently large selection of good quality golden labradorite of ample size was found, the largest being some 8 x 4 cm. She also retrieved many samples of more milky labradorite.

Back in Sydney, the pieces of golden labradorite were examined, pre-formed and then cut. The material took a fine polish. The elaborate lidded cup, incorporating elaborate filigree as well as the seven enamelled motifs, was created, measuring 20 cm in height and weighing 1053 grams. The diamonds set in it were also of Australian origin: they too came from New South Wales. The cup was chosen by the international judges to be one of only 29 entries out of 360 submitted from 14 countries for the Jerusalem 3000 Exhibition and Catalogue.

Jack Ogden

Designer Joanna Angelett is now based in London. Learn more about her work at www.angelettgallery.com

The Bear Facts

Bear Williams has some crushing news on peridotite and gets some unexpected results from a group of amblygonites

Going green

A recent report informs us that plans are afoot to 'grind up' peridotite.

Peridotite is a major component of the Earth's mantle beneath the crust and lithosphere. Fresh peridotite may be brought through the Earth's crust as a magmatic igneous rock and consists primarily of the mineral olivine, although it may include other mafic minerals such as pyroxene, amphibole and mica. Once at the surface, peridotites weather into members of the serpentine group of minerals, such as chrysotile.

Many of these peridotites contain important gem materials such as peridot, garnet and diamond, which formed at depth within the mantle. It seems peridotite has a "voracious appetite for [eating] carbon dioxide". In the *Economist* magazine (21 November 2008) it states: "Geologists have long known that when peridotite is exposed to the air it can react quickly with carbon dioxide to form carbonates like limestone or marble." Regarding this process, they are looking into the idea of "grinding up the peridotite" to further increase its ability "to soak up emissions" such as carbon dioxide waste from power stations. It is principally the alteration of the olivine in these rocks by water and carbon dioxide that 'fixes' the carbon.

Faceted peridots.

As one of the more attractive varieties of olivine, peridot would like to present itself as your personal representative in the effort to thwart increasing greenhouse gases. Show you're green by wearing your own peridot – no need to crush it up for maximum effect.

Amblygonite

Recently submitted to the Stone Group Lab was a series of attractive, pastel-coloured stones thought to be amblygonites. The stones had good clarity and attractive colours ranging from a pastel lemony yellow to a light greenish blue, much like an unheated aquamarine. Some colours fell in between, neither quite yellow nor green. The sizes ranged from 0.76 to 1.96 ct. RIs varied slightly within the group (1.614-1.640), with notably strong birefringence.

The amblygonites are a lithium-aluminium phosphate group of minerals with variation between hydroxyl and fluorine. Raman comparisons gave a best match to montebrasite, an isomorphous hydroxyl member of the amblygonite series. Amblygonite and montebrasite have been found ranging from colourless, yellow, pinkish, tan, green, blue and lilac. Pale yellow is most common. While montebrasite can grow in rather large, clean crystals, typical colours are yellow to colourless.

Unexpected was the reaction under the Chelsea colour filter of a distinct pale pink in the blue to greenish colours. Chromium is unlikely in these pegmatitic gems, as iron and manganese are the more common transition elements in the amblygonites. When all stones were exposed to intense daylight for 24 hours no colour change was observed, but upon heating, the blue colour component faded, leaving a very pale golden colour. After heating, the pink Chelsea colour filter reaction was no longer observed. It is increasingly known that gamma (cobalt-60) irradiation is being applied to this material and this is the presumed cause of these blue to greenish colours.

With a hardness of 5.5 to 6 and brittle, it would wear a bit like a fire opal; however this material has perfect basal cleavage and should not be bounced about.

The country of origin is uncertain although Brazil is the most likely

The group of stones (a) as they were when they were received and (b) three of the stones after heating. The oval stone at the top shows marked fading after heating.

source today. A golden to olive green fluorescence under long-wave ultraviolet excitation was observed. Other amblygonites can show pale blue, weak orange, bright green and tan fluorescent colours. Jewellers should be cautious in exposing these stones to intense heat or hard wear.

About the Author

Bear Williams is Lab Director at Stone Group Labs, Missouri, USA. Contact: bear@stonegrouplabs.com

Hands-on Gemmology

'Multiphenomenal' quartz from India

Gagan Choudhary and **Meenu Brijesh Vyas** examine a stone displaying both chatoyancy and asterism

Recently, the Gem Testing Laboratory of Jaipur, India, encountered a yellow-green quartz (1) which displayed a strong chatoyant band as well as 'ten-rayed' asterism making this quartz specimen highly unusual. Asteriated quartz commonly originates from Sri Lanka, but this specimen was reportedly from the Kangayam-Karur belt in the state of Tamilnadu, India.

The stone was an oval cabochon weighing 12.08 ct and measuring 15.72 × 11.83 × 9.65 mm. The owner expected it to be chrysoberyl since it came from the chrysoberyl mines at Olappalyam in the Kangayam-Karur belt in Tamilnadu.

Chatoyancy and asterism are optical effects commonly encountered in the quartz group of gemstones. As is well known, 'chatoyancy' is produced by the reflection of light from one set of parallel needle-like inclusions while 'asterism' is caused by reflections from multiple sets of parallel inclusions and is best seen in cabochons or spheres. In quartz, six-rayed asterism is produced by inclusions lying in the basal plane perpendicular to the c-axis or optic axis, while chatoyancy-producing inclusions lie in the planes parallel to this axis. Most quartz asterism shows six rays, but multi-rayed asterisms have also been reported in greenish-yellow varieties in the past originating from Sri Lanka (see, e.g., Schmetzer and Glas, 2003; Kiefert, 2003).

1. This 12.08 ct yellow green quartz from the Kangayam-Karur belt in Tamilnadu, India, displays a strong chatoyant band. Photo by G. Choudhary.

Methods used

The standard gemmological tests performed included refractive index (RI) measurement using a GemLED refractometer and specific gravity (SG) measurement using the hydrostatic method with a Mettler Toledo CB 1503 electronic balance. Exposure to standard long-wave (366 nm) and short-wave (254 nm) UV radiation were used to document fluorescence reactions. The spectrum was observed using a desk-model GIA Prism 1000 spectroscope. We examined the internal features of the samples with a binocular gemmological microscope and fibre-optic light.

Infrared spectra in the 6000–400 cm^{-1} range at resolution of 4 cm^{-1} and 50 scans were recorded using a Nicolet Avatar 360 Fourier-transform infrared (FTIR) spectrometer at room temperature with a transmission accessory.

Qualitative EDXRF analysis was performed using PANalytical Minipal 2 instrument using two different conditions. Elements with low atomic number (e.g. Si) were measured at 4 kV tube voltage and 0.850 mA tube current. Transition or heavier elements were measured at 15 kV tube voltage and 0.016 mA tube current.

Results and discussion

Visual Characteristics

The stone has a vitreous lustre and a bright medium yellow-green body colour with a distinct chatoyant band visible at its centre (**1**); this appearance is very similar to that seen in chrysoberyl cat's-eyes, the identity that was expected by the owner of this specimen. However, on rotating the specimen under fibre optic light we noted a ten-rayed star on a side of the dome (**2**). The intersection point of this star was inclined at approximately 45° to the chatoyant band. On further rotation of the stone and viewing in a direction perpendicular to this chatoyant band, i.e. along the girdle, two wavy rays were seen (**3**), which intersected each other at a slight angle. At one particular angle, chatoyancy and asterism could be seen together, confirming that they are separate phenomena (**4**). In many previously documented stones, the chatoyancy displayed was merely one of the rays of a star that was more intense and appeared similar to a 'cat's-eye' (e.g. Johnson and Koivula, 1999). The asterism in this specimen was only visible in reflected light and not in transmitted light, i.e. it displayed 'epiasterism'.

*2. On turning the stone 45° from its position in **1**, pronounced asterism with ten intersecting rays is visible, making this quartz specimen highly unusual. Note one of the stronger and sharper rays.*
3. When viewed from the girdle, i.e. the direction perpendicular to the chatoyant band, two wavy rays intersecting at a low angle are visible.
4. In one viewing direction, both the 'chatoyancy' and 'asterism' are visible demonstrating the presence of both rather than just an uneven star.
Photos: 2 and 4 by M.B. Vyas; 3 by G. Choudhary.

Gemmological properties

The results of the gemmological tests are listed in Table I and indicate that the stone is quartz.

Microscopic observations

Examination of the specimen with a microscope using fibre optic illumination revealed the presence of long needles in various orientations. Initially, the needles appeared to be random; however, with careful observation, various sets of needles could be distinguished. One set of needles in one direction was relatively denser (**5**) compared to the others, but this was not the cause of the main chatoyant band, since these needles were inclined to the chatoyant band as well as to the c-axis. In addition, one set of needles intersected at nearly 90° (**6a**) and another set appeared to intersect at approximately 60/120° (**6b**); the latter arrangement of inclusions is commonly present in quartz and corundum. The needles varied in appearance between white, brown and iridescent, and since chemical analysis using EDXRF was inconclusive, further (mineral) identification would require Raman analysis.

These inclusions lie in five different directions and are the cause of the ten-rayed asterism in the quartz. One of the rays was more prominent than the others; this was due to the denser orientation of parallel needles in one of the directions. Since none of the sets of needles was oriented perpendicular to the main chatoyant band, its cause was still unsolved. However, using a strong fibre optic light, fine 'flaky' inclusions could be resolved (**7**) under the microscope at high power. These flaky inclusions are densely packed and so fine as to

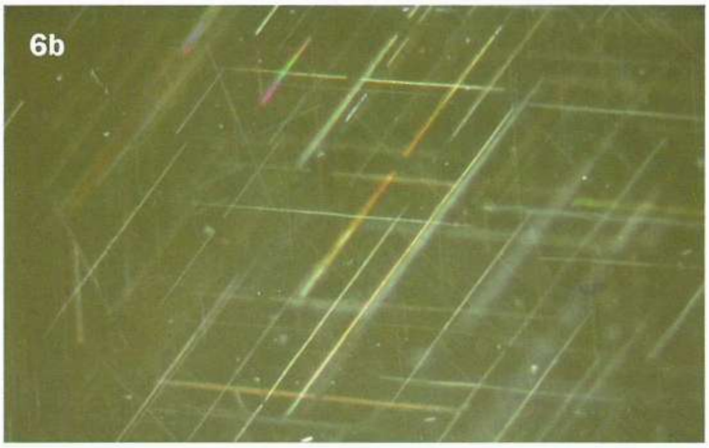
Table I: Gemmological properties of yellow-green quartz.

Property	Description
Weight	12.08 ct
Colour	Yellow green
Optic character	Anisotropic; bull's-eye optic figure
Refractive index (spot)	1.540
Specific gravity	2.64
UV fluorescence	Inert to both LW and SW
Internal features	Various sets of needles; in total five directions of parallel inclusions – giving rise to ten-rayed star • one directional (stronger) • intersecting almost at 90° • intersecting almost at 60/120° Fine flaky inclusions in one direction, giving rise to cat's-eye effect
Absorption spectrum	None
FTIR analysis	Absorption band from 3000–3700 cm^{-1} with peaks at 3592, 3539, 3480, 3435, 3380, 3310 and 3200 cm^{-1}

*5. This dense array of needles is oriented in only one direction and gives rise to the stronger ray seen in **2**. Photomicrograph by M.B. Vyas, magnified 60x.*

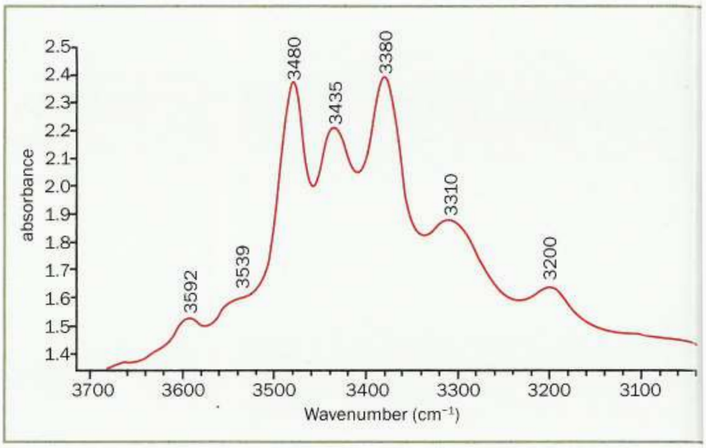
Hands-on Gemmology

'Multiphenomenal' quartz from India



6. Two different sets of intersecting needles were observed. One set comprised two-directional needles which intersected each other at an angle of nearly 90° (6a) while in another set the needles appeared to be intersecting at approximately 60/120 (6b). Also note the iridescent and brownish appearance of these needles. Photomicrographs by M.B. Vyas (a) and G. Choudhary (b); magnified (a) 60x and (b) 80x.

7. Fine flaky inclusions oriented in one direction along the c-axis and perpendicular to the chatoyant band were responsible for the cat's-eye effect in this specimen. Photomicrograph by G. Choudhary, magnified 80x.



8. Infrared spectrum of yellow-green quartz in the region 3000–3700 cm^{-1} shows peaks that are consistent with natural quartz.

cause some milkiness; they are oriented parallel to the c-axis and are responsible for the main chatoyant band. Similar inclusions have also been reported by Kiefert (2003).

Infrared spectra

FTIR spectra recorded in the region 6000–400 cm^{-1} display complete absorption of wavelengths up to 2200 cm^{-1} and a broad absorption band from 3000–3700 cm^{-1} containing many peaks. These lie around 3592, 3539, 3480, 3435, 3380, 3310 and 3200 cm^{-1} (**8**) and are consistent with those found in natural quartz (Kiefert, 2003).

Conclusion

The specimen reported here is unusual in containing both 'chatoyancy' and 'asterism' and the authors have not found any reports of a similar combination in recent literature.

In addition, a ten-rayed asterism in a gem variety with a trigonal or hexagonal symmetry is in itself very unusual.

Acknowledgement

The authors are grateful to Mr A. Sibiraja for sharing the information about the origin of stone and loaning it for further study.

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About the Authors

Gagan Choudhary FGA and Meenu Brijesh Vyas FGA are Assistant Directors of the Gem Testing Laboratory since 2001 and 2003 respectively. Both are currently involved in educational, testing and research activities of the institute.

Ian Mercer retires

Ian F. Mercer BSc FGA, Gem-A Director or Education, announced his retirement at the beginning of 2009.

Ian joined the Association in 1990 at the time of the merger between the Association and the Gem Testing Laboratory. He was awarded the Diploma in Gemmology with Distinction in 1968 and later graduated from Birkbeck College London with a BSc in geology.

Prior to joining the Association, Ian was a senior scientific officer at the Geological Museum in South Kensington, later to become part of the Natural History Museum.

Ian not only strengthened the existing correspondence courses in gemmology but also established allied teaching centres to augment them. He travelled extensively, particularly in the Far East, to establish teaching and examination centres worldwide. Ian contributed to the compilation of a formal Gem Diamond course leading to the Gem Diamond Diploma examinations and established on-site teaching of the courses at the Association's headquarters, expanding the programme of short courses and workshops.

Ian initiated negotiations with the Qualifications and Curriculum Authority (QCA) to establish Gem-A as an awarding body for the study of gemmology, maintaining and strengthening the international reputation of our qualifications.

In his role as Director of Education Ian brought his enthusiasm for the subject to a new generation of gemmologists, and his many years of dedicated service are very much appreciated by the Association.

We wish Ian all the best for his retirement.

Peter G. Read FGA DGA – 1927–2009

Peter Read demonstrating the Brewster angle meter.

It is with great sadness that we announce the death of Peter Read on 15 January after a long illness.

Peter was an Assistant Editor on *The Journal of Gemmology* and had been a Gem-A correspondence course tutor for 25 years, retiring from the post in 2007 at the age of 80.

Peter became aware of gemmology as a science when he was Technical Manager of a development department in De Beers Central Selling Organization. After reading Basil Anderson's book *Gem Testing*, he decided it would benefit his department's work if he became qualified as a gemmologist, and to this end he enrolled in the evening classes held at the Cass Institute in Aldgate East. In 1975, after two years of study, he was awarded the Diploma in Gemmology and the following year the Gem Diamond Diploma.

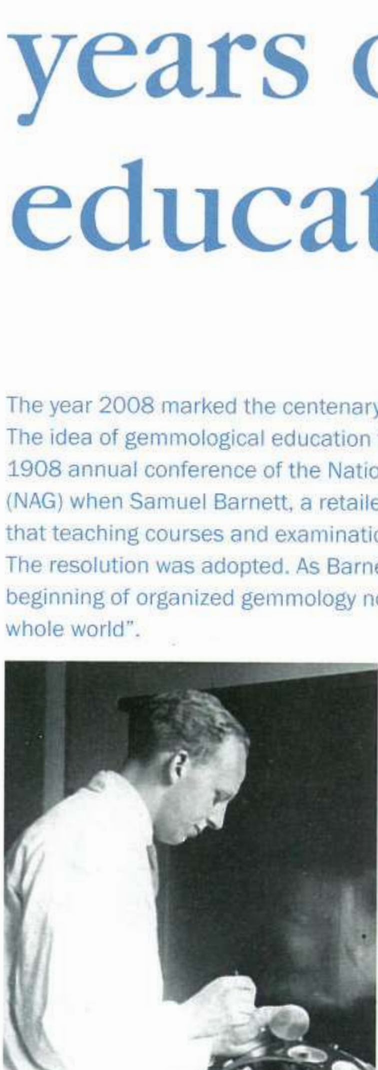
In 1977 he gave his first talk to the Association entitled 'Automation in the sorting and sizing of rough diamonds'. The talk was the first of many given by Peter, mainly covering the design and use of gem identification instruments, some of which were developed by Peter for the Rayner Optical Company. Two projects which had the distinction of being world firsts for Peter were his GEMDATA, a computer-aided programme for gem identification, and his Brewster-angle meter which was developed for Gem-A. In 1978 Peter ran the first of a ten-year series of weekend residential courses in gemmology at West Dean College, Chichester, which included hands-on preparation courses for students taking Gem-A's diploma examination.

In 1980 he was elected to the Gem-A Council, and two years later was appointed as a correspondence course tutor.

Peter is survived by his wife Joan and a step son and daughter.

The first hundred years of gemmological education

The year 2008 marked the centenary of gemmological education. The idea of gemmological education for the trade originated at the 1908 annual conference of the National Association of Goldsmiths (NAG) when Samuel Barnett, a retailer from Peterborough, proposed that teaching courses and examinations in gemmology be organized. The resolution was adopted. As Barnett later said, this was "the beginning of organized gemmology not only in this country but in the whole world".



Basil Anderson in the Gem Testing Laboratory in 1929.

Following the 1908 resolution, an educational committee was formed which arranged a series of lectures and, soon after, the first evening courses in gemmology.

The first examinations in gemmology were held in 1913 and in recent issues of *Gems & Jewellery* we gave the questions for the first Diploma examination and the Theory Section syllabus. Now we shall look back at the other major milestones that led to the high level of gemmological education that is available today.

In 1925 the world's first gem testing laboratory was established in London in response to the new challenge of identifying Mikimoto cultured pearls. The director was Basil W. Anderson. In the following year Bristow Tully, the first director of examinations, was granted a patent for his table model refractometer for jewellers which was made by Rayners.

In 1931 the NAG's Education Committee became The Gemmological Association, a distinct branch of the NAG. This enabled all gemmology exam graduates to become eligible for election to Fellowship status. In the same year *The Gemmologist* was launched as the official publication.

The original type of Chelsea colour filter with leather case and the 1934 advertisement, and this popular filter as it is today.

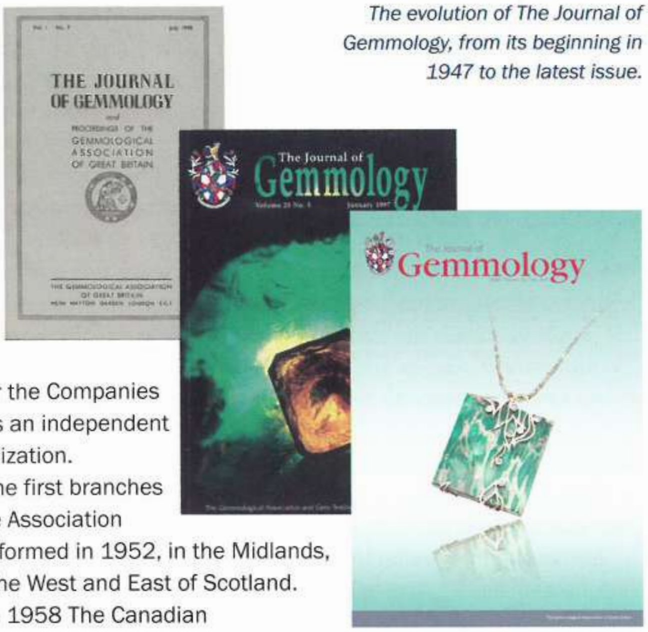
The year 1934 saw the development of the Chelsea colour filter by Basil Anderson and C.J. Payne. It was so named because the Chelsea Polytechnic gemmology students found the filter so useful.

In 1935, after a disagreement with the publisher of *The Gemmologist*, *Gemmological News* was launched as the Gemmological Association's official journal, which became *The Journal of Gemmology* in 1945, the year in which the Gemmological Association Research Diploma was established. In the following year the Gemmological Association of Australia was formed and became an associate of the Gemmological Association.

The Association's title was changed to The Gemmological Association of Great Britain in 1938, and in 1947 it was incorporated

A gemmology class in the 1940s.

Centenary



The evolution of The Journal of Gemmology, from its beginning in 1947 to the latest issue.

under the Companies Act as an independent organization.

The first branches of the Association were formed in 1952, in the Midlands, and the West and East of Scotland.

In 1958 The Canadian Gemmological Association was established and became an affiliate of The Gemmological Association of Great Britain the following year. By this time the Diploma examination was being held in centres throughout the world.

An examination in gem diamonds for Fellows of the Association (FGAs) was introduced in 1963 after the first courses had been conducted in Birmingham. This was followed in 1967 by a class in London run by Eric Bruton.

In 1965 the Association established Gemmological Instruments Ltd, a wholly-owned subsidiary, created to supply the needs of members and students for gem testing instruments, books and relevant gem materials.

A Grant of Arms was received by the Association in 1967.

In 1974 the Accredited Gemologists Association (AGA) was established by Antonio (Tony) Bonanno as alumnae of the Gemmological Association of Great Britain. Tony had been awarded the Diploma in Gemmology with Distinction in 1955.

In 1981 both the Gem and Mineral Society of Zimbabwe (formerly the Rhodesian Gem and Mineral Society) and the Gemmological Association of Hong Kong became affiliated to the Association, followed by the Gemmological Association of South Africa and the Singapore Gemologist Society in 1985.

After 65 years of collaboration, The Gemmological Association of Great Britain and The Gem Testing Laboratory of Great Britain merged to become The Gemmological Association and Gem Testing Laboratory of Great Britain (GAGTL) in 1990. In the same year the Gem Diamond Diploma course and examination were established.

Gem & Jewellery News was introduced in 1991, a joint publication of The Gemmological Association and the Society of Jewellery Historians. The title changed to *Gems & Jewellery* in 2005, and has been published by the Association alone since the beginning of 2008.

Class of 2008. Students at a Gem-A ATC.

In 1995 the Association, together with the major gemmological associations in other European countries, founded the Federation for European Education in Gemmology (FEEG).

GAGTL was rebranded as Gem-A in 2001. By this time, Gem-A was operating more than 30 allied teaching centres and over 50 exam centres around the world, with exam papers in eight languages.

In 2007 Gem-A, by then a UK registered charity, changed its company name to The Gemmological Association of Great Britain.

The centenary was celebrated in 2008 by the launching of the new gemmology course, a redesigned website, the hosting of the European Gemmological Symposium, and a new look for both *Gems & Jewellery* and *The Journal of Gemmology*.

Pages from the new Foundation in Gemmology course notes.

Origins

When is a Paraíba not a Paraíba? **Harry Levy** looks at the meaning and use of origins

The continuing dispute over the name Paraíba tourmaline, when it can and when it cannot be used, has caused both interest and confusion in the gem trade. This beautiful intense blue-green tourmaline was first recovered in the Paraíba region of Brazil. But before discussing the details of this gem, we should review how place names associated with particular gems (their origins) have developed in trade over the last few centuries.

What do we mean when we use the term 'origin' of a gemstone? Simply stated it means the place where the stone was found. But this simple statement of location may hide a more complex geological origin. The stone may have been mined from solid rock in that particular location, or it may have been found in the gravels of a river bed. The latter are known as alluvial stones, and they may have travelled many miles from their hard-rock source. In the process of transport, stones from different geological sources can be mixed – another complicating factor.

Sometimes rubies from marble in Burma may have very similar characteristics (including colour) to those from marble in Nepal or Vietnam.

There is no magic formula to determine the origin of a stone; there are no machines (yet) to do this. The best solution of course is to have a track record of the stone from the mine to its cutting and polishing – its provenance. A database can then be built up by recording the characteristics of as many stones as possible from a known location. This means colour, how the colour is dispersed within the stone, the types of inclusions, details of their composition, and other features.

In the early days the finest gemstones were found in only a few locations. For example rubies came from Burma, emeralds came from Colombia. Over time, prospectors began to find good rubies in Siam and good emeralds in Zambia.

For most traders the first indicator of a stone's origin is its colour. For example, sapphires found in Australia are usually a dark inky blue or a strong royal blue, while those found in Sri Lanka are paler. When dealing with the cheaper and the medium-valued ranges of gems, this attribution of origin by colour was good enough for traders because its commercial impact was not too great.

Two cushion-cut paraíba-type tourmalines from Mozambique, 7.30 ct and 13.78 ct. Photo © G.F. Williams & Co.

Problems arose, however, in the upper echelons of the market when the traditional mines could not produce enough to satisfy the demand, and miners and dealers started offering stones from other sources. One important example is the rubies which came from Burma and had a recognized colour. As demand for Burma rubies spread, poorer qualities came on to the market and although some more beautiful stones came from Siam, there was a resistance in the market to buy them. They were regarded as not being 'real' rubies, because their colour was different from traditional (Burma) rubies. I am not going into the gemmological discussions as to what defines a ruby, but the resistance to buy meant re-education for both consumer and dealer.

All such rubies were saleable, but the price of, say, a Siam ruby was still much less than a similar sized Burma ruby, even if the Burma stone was dull and heavily included. Many dealers who wanted a better price for their Siam rubies brought pressure on their representatives who ran organizations such as CIBJO, to help them. Eventually, CIBJO recommended that stones could not be sold using origin as a selling tool and their guidelines banned the use of origins. Thus one could no longer sell a 'Burma ruby' or a 'Kashmir sapphire'. For national authorities to accept such a restrictive ruling, it was argued that determining the origin was not always accurate and thus could not be safely used to make a sale.

Around the Trade

An amusing incident happened at one of the CIBJO meetings I attended in the early '80s. The origin rule was being debated and after re-affirmation that we could no longer refer to our rubies as Burma or Siam, the proposer of the motion then distributed a list of gemstones that had been recently stolen. The stones were marked as Burma ruby, Ceylon sapphire, Colombian emerald and so on. Every stone had a country of origin! When this practice was questioned, it became plain that the origin was being used to describe the appearance of a stone and not the actual country of origin. Thus was born the notion of 'type'. The trade could not communicate colour of a gem without a notion of 'type'; when we are asked, as stone dealers, for a sapphire, one of the questions we ask is: what type of sapphire is required? So we still talk about Kashmir sapphires and so on.

However, this state of affairs could not be sustained for the more expensive gemstones where a buyer wants to know where the object of his considerable investment is truly from. There is still the perception that a fine Burma ruby is worth far more than a similar ruby from another origin, and those trading such stones, dealers and auction houses, still insist on stating an origin.

When such stones are sold, an independent certification is needed and these are supplied by laboratories. It is amazing for this top range of stones that only a few laboratories, and within them only a few testers, are considered to offer reliable opinions. Another CIBJO story I remember is that in the early '90s when gemstone origins were again being debated, the original motion was amended by adding that it was forbidden to state the origin on an invoice or a certificate. There was an immediate threat of resignation from the CIBJO-recognized laboratories present on the basis that an important part of their work was producing certificates giving the origin of the stones. A compromise was reached when it was agreed that origins could be given as an added note on the certificate, a practice which I think is still adhered to.

Origins are also demanded by authorities in the diamond world. In the early stages of establishing the Kimberley Process, the sale of rough diamonds from certain countries was banned or heavily controlled. The legislators wanted a 'gemmological origin' certificate, but when it was pointed out that many of the diamonds in question were alluvial and thus had an uncertain origin, they agreed to have a 'provenance origin' certificate.

Coming right up to date, there are import restrictions on Burmese gems in Europe, USA, Australia and Canada. In the UK, the EU legislation came into force on 10 March 2008 which forbids the import of, among other Burmese products, "Articles of natural or cultured pearls, precious or semi-precious stones (natural, synthetic or reconstructed)".* There are similar bans now in place in Canada and Australia. In the US, there has been a ban against imports of rough gem materials from Burma since 2003. In September 2008 new US legislation came into effect which extended the ban to imports of Burmese jade and rubies that have been cut or polished in third countries.**

An example of the green paraíba-type tourmalines currently on the market. 2.33 ct. Photo © G.F. Williams & Co.

Returning to the origin (sorry for the pun) of this article concerning a distinctive coloured tourmaline from the Paraíba region of Brazil. These stones had a distinctive colour (due to copper) and were marketed at a very high price for tourmalines. In the past, the finest tourmalines had been sold for a few hundred dollars per carat, but these new stones were trading for several thousand dollars per carat. Tourmalines of similar appearance were later found in mines near Paraíba and sold as 'Paraíba'. And then, very similar tourmalines were found in Africa. Traders were immediately faced with the question of how they should be designated. The distinctive coloration was again due to copper; stones were submitted to laboratories and they declared that they could not easily determine their source as Brazil or Africa in a laboratory. So there was a temptation to sell them as Paraíba tourmalines. Prices began to drop, as there were now many more such stones available from Africa. This caused a reaction from those who had true Paraíba tourmalines and we now have a multi-million dollar legal dispute between these dealers and those who sell stone of similar appearance from Africa.

There has been a prolonged debate on the Gem-A's MailTalk on this issue. The matter could be resolved if the word 'type' were introduced. If we sell types, then 'Paraíba tourmaline' would become 'paraíba tourmaline'. The word Paraíba would change from a noun to an adjective. However, those who sell stones mined in Paraíba want to market their stones as Paraíba tourmaline, knowing that they will again be able to charge huge prices, while those selling similar stones from Africa do not want to go down this route, since their stones cannot readily be distinguished from the ones mined in Paraíba.

So, in spite of the periodic trade attempts to ban the use of 'origins' when selling stones, they are still a potent factor to those dealing in the finest stones. In these cases, having a 'desirable' origin can mean a difference of many thousands of dollars and it is difficult to control the usage of words. Perhaps we can better understand this problem if we consider that an 'origin' now resembles a brand name, and the issue in the future will be who has the ultimate authority to control use of the brand name.

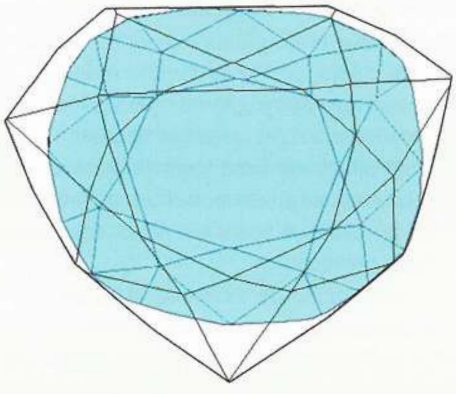
* For the full EU, and thus UK, regulations see: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2007:308:0001:0080:EN:PDF.

** For the US 2008 legislation see http://www.govtrack.us/congress/billtext.xpd?bill=h110-3890

Gem and Jewellery History

The Hope and The French Blue

Computerized reconstruction of the Blue Diamond. The colour and scintilation were simulated by combining various scanning laser technologies as well as CAD software and optical linear spectroscopy, based on the Hope Diamond. © Farges / MNHN by permission of the Smithsonian Institution, Washington.



Top: Lead model of the Blue Diamond discovered in the MNHN, Paris. Dimensions: 30.4 x 25.5 x 12.9 mm.

Below: A diagram of the Hope Diamond in blue (Smithsonian Institution, Washington) in the French Blue (MNHN, Paris) showing the recutting. © Farges/MNHN.

The spectacular blue Hope diamond, presented to the Smithsonian in Washington in 1958 by jeweller Harry Winston, was long assumed to have been recut from the blue diamond looted from King Louis XVI in Paris in 1792. This identification was strongly supported by CAD-based research by Jeffrey Post at the Smithsonian in 2005, but has now been confirmed by the discovery by François Farge, the chief mineralogist at the Paris Museum of Natural History, of a lead casting of a diamond with the label "Replica of a blue diamond belonging to Monsieur Hoppe of London."

This lead replica exactly matches illustrations of the lost 69-carat diamond original. "It is more than a hypothesis," said Mr Farge. "We have carried out analyses by scanner and laser, which have been validated by experts in gemmology."

Lead casts of diamonds were made for practical as well as record purposes. Those of large rough diamonds helped to plan their cutting, as discussed in *Gems & Jewellery*, December 2005, *pages 78 and 79*. There is a nineteenth-century statement that "In the British Museum there is a model in lead of the Pigot diamond before it was

Gem and Jewellery History

cut, and also of the various cuttings by which it was reduced to its ultimate form." Some new notes about the famous Pigot diamond, once the largest diamond in Britain, will be published in the next issue of *Gems & Jewellery*.

Most accounts of the origin of the Hope, formerly the French Blue, trace it back to the traveller and gem-dealer Jean-Baptiste Tavernier who sold it to Louis XIV. What is not widely known is that this diamond and Tavernier's illustrations were known in Europe before his book *Six Voyages* was first published in two volumes in Paris in 1676. *Philosophical Transactions*, on 27 April 1674, published 'A Note about some Unusual Diamonds' which says: "There came to our hands, some while since, a Representation of a considerable number of excellent Diamonds, sold by one Monsieur Tavernier to his King, after his last return from the East-Indies, whither he had made his Voyages by Land. Amongst these diamonds there are described three of a very unusual colour; one weighing 112 $^{3}/_{16}$ Carats, of very fine Violet-colour, and two of a Rose-pale colour; all three of an Adamantine hardness, and upon that account esteemed Diamond."

There is an even earlier and hitherto unpublished reference to this illustration in a letter written in the surviving correspondence between two diamond-dealing brothers, John and Nathaniel Cholmley.* In a letter from John in London to Nathaniel in India in December 1670, John refers to Tavernier and enclosed "the prints of the great Dyamonds hee brought with him the last time from India". In a letter to Nathaniel the previous December, 1669, John had said that "The king of France bought all [the diamonds] that Taverneer bought last year, rough, for 300,000 crowns and has them sett." Tavernier had only arrived back in Paris after his final trip east in December 1668 – within three months he had sold the diamonds, including the famous blue, to Louis XIV.

The Hope Diamond removed from its setting. With permission of the Smithsonian Institution, Washington.

The blue, in its rough form, weighed 112 $^{3}/_{16}$ carats (just over 115 metric carats). As cut and set in the French crown jewels it weighed 69 carats. The Hope now weighs 45.52 carats, but it had seemingly been slightly 'improved' by Harry Winston when the girdle was faceted to brighten the gem.

Jack Ogden

* The unpublished *Letter Book* of John Cholmley preserved in the North Yorkshire County Record Office.

Conference 2008

From the foundations of gemmology to practical gemmology in the modern world

The Gem-A Centenary Conference and 2nd Annual European Gemmological Symposium was held at the Hilton London Kensington over two days, including a dinner dance, followed by additional events including the Annual Graduation and Awards Ceremony. Also included were book signings by two of the conference speakers, John Koivula and Al Gilbertson.

The Foundations of Gemmology

The papers on Day One, Saturday 25 October, were grouped under the general heading 'The Foundations of Gemmology' and dealt with the history of gemmology and gem use.

After a brief welcome to the Conference, participants were introduced to 'Gems in eighteenth-century jewellery' by **Rui Galopim de Carvalho FGA DGA**. Rui's study focused on the new gem discoveries in eighteenth-century Brazil explaining how the history of jewellery is intimately attached to the history of the use of gems. He illustrated his talk with many fine photographs of gem-set jewellery and *objets d'art,* demonstrating his intimate knowledge of, and love for, the treasures in Portuguese churches, museums and other collections.

***Gems in eighteenth-century jewellery:** orange-red imperial topaz crystals were found in the region of today's Ouro Preto in Minas Gerais by the early 1750s. Photo Erica and Harold Van Pelt for* Brazil: Paradise of Gemstones *by J.R. Sauer.*

Rui explained that prior to the sixteenth century a limited number of gem varieties were exported into Europe. Those that did arrive came along the inland trade routes, including sapphires from Ceylon (Sri Lanka), garnets and amethysts from India, and pearls from the Gulf. One of the few significant gem materials of local origin was bright red Mediterranean coral and freshwater natural pearls from central Europe. In the sixteenth and seventeenth centuries direct sea routes were opened up between Europe and the Indian Ocean and beyond in one direction, and South America in the other, introducing greater quantity and wider variety of gem materials. The discovery of the new gem occurrences in Brazil during the eighteenth century brought diamond, imperial and colourless topaz, amethyst and chrysoberyl to Europe, changing the nature of European jewellery and allowing a far greater use of colourful gems. The foiling of gems was common and coloured foils were often used, perhaps in part to allow uniformity of colour.

The increased availability of diamonds from Brazil after about 1730 also helped accelerate the development of diamond cutting. In the context of diamond cutting, Rui raised the question of the 'Lisbon Cut' diamonds, with a divided triple-cut bezel, that are referred to in the literature, but actual examples have not hitherto been identified. However, Rui had now spotted one example in a gold tobacco box set with diamonds and emeralds, made in 1756 and now in the Royal Palace of Ajuda. Foils behind rock crystals, topaz and goshenite simulating diamonds were often painted with a small central black dot in the culet to optimize the illusion of a diamond appearance. These colourless gems were not used as fake diamonds but rather a low-cost substitute of diamonds; therefore they were cut and set in similar designs.

Following Rui's presentation, **Sandra M. Brauns FGA** spoke about 'The Crown Jewels of Sweden'. Sandra passed her Gemmology Diploma examination in Hong Kong in 1975 and has been a Gem-A tutor since 1978. She currently works in the Jewellery Department of Bukowski's Auction House, Stockholm. Sandra talked about her researches on the seventeenth-century Swedish crowns, their history,

Recent Events

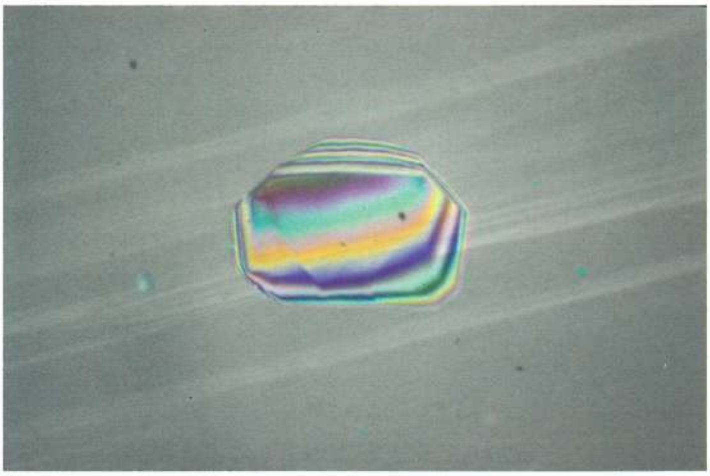
The Crown Jewels of Sweden: *Crown of King Erik XIV, Stockholm 1561. The Royal Court, Sweden. Photo Alexis Daflos*

the identification of the gems set within them and the symbolism of the sceptres and orbs. Her talk was illustrated by photographs of many of the splendid crown jewels and of painted portraits of the royalty concerned.

The Swedish Crown Jewels are kept in the Royal Treasury at the Royal Palace. Among these treasures are the crown and the orb and sceptre of King Erik XIV (ruled 1560–68) who was supposedly poisoned with arsenic. Sandra explained that King Erik was an unsuccessful suitor to Queen Elizabeth I of England to whom he sent several portraits of himself. Erik's elaborate gem-set and enamelled crown was made in Stockholm in 1561, but by a Flemish goldsmith. King Oscar II of Sweden and Norway (ruled Sweden 1872 until 1907) was the last Swedish king to be crowned. Sandra also discussed some of the more recent jewels owned by Swedish Royalty.

Next **John I. Koivula FGA GG CG**, Chief Gemologist of the GIA in Carlsbad, California, and well-known author of *The Microworld of Diamonds* and, with the late Dr E. Gübelin, *The Photoatlas of Inclusions in Gemstones, Volumes 1, 2 and 3*, explained something of the history of his specialist subject. In 'Inclusions in gemmology: a history interwoven', he told participants about the early observations of mineral and fluid inclusions in gem materials and how, over the centuries, these became better understood, helped by advances in gemmological microscopy. He referred to the early mentions of inclusions in gemstones, including those made by Kautilya, the Indian economist and royal advisor, and his contemporary, the Greek naturalist Theophrastus, both around 300 BC, by the Roman writer Pliny the Elder some three and a half centuries later, and then by the Medieval Islamic authorities.

John then moved to the great period of European scientific advances in the seventeenth and eighteenth centuries. Thomas Nicols, the English naturalist who wrote *Lapidary or, The History of Pretious Stones* (1652) explained how "Glass imitations of sapphire are distinguished because they are usually full of little bubbles and stones [inclusions]". At about this same period Robert Boyle wrote his *An Essay about the Origine and Virtues of Gems* (1672) and mentioned the "hairs of a lovely reddish colour" he had observed in pale amethyst. Once into the eighteenth century, scientific interest in gem inclusions increased and such eminent scientists as Sir Humphry Davy and Sir David Brewster began to consider the genesis and composition of gem inclusions, including multi-phase inclusions. By the mid nineteenth century detailed illustrations of inclusions were being published, including drawings by Dr Isaac Lea, an English naturalist, the German geologist and petrographer Ferdinand Zirkel, and, particularly noteworthy, the fine illustrations by the German mineralogist Dr Reinhard Blum in his now extremely rare *Einschlüsse von Mineralien* published in Düsseldorf in 1854. Drawings of inclusions continued to be the norm, for example those published by George Frederick Kunz in the USA and by Noel Heaton, a British geologist and gemmologist.



Inclusions in gemmology — a history interwoven: *Without polarized light an inclusion of quartz in quartz is invisible (top) because the inclusion and its host have identical optical properties. But because their optical orientation is different, in polarized light the inclusion stands out in vivid colours against the background of the host. Field of view is approximately 5 mm horizontally. Photomicrograph by John I. Koivula.*

Recent Events

Conference 2008

The use of photomicrography to capture gem inclusions was a twentieth-century development and one spearheaded by the Swiss gemmologist and jeweller, Dr Edward J. Gübelin. As John Koivula noted: "The impact that Dr Gübelin had on the science of gemmology is almost immeasurable." After a series of articles on inclusions, his book *Inclusions as a means of Gemstone Identification* was published by the GIA in 1953.

The final part of John's presentation dealt with the tools of the trade – the introduction of dark field microscope illumination in gemmology by Robert Shipley Jr in the 1940s and John's introduction of fibre optic illumination to gemmology in the early 1980s. As John pointed out, experimentation with lighting was of paramount importance; an inclusion invisible with 'normal' dark- or bright-field illumination may be revealed in all its glory by oblique illumination from a fibre optic light source. Nowadays, UV light sources were increasingly being used in inclusion studies and Raman spectroscopy was opening up hitherto unimagined opportunities for the characterization of gem inclusions.

During the Conference John Koivula signed copies of *The Photoatlas of Inclusions in Gemstones, Volume 3,* which had arrived from the publisher just a matter of hours before the conference opened.

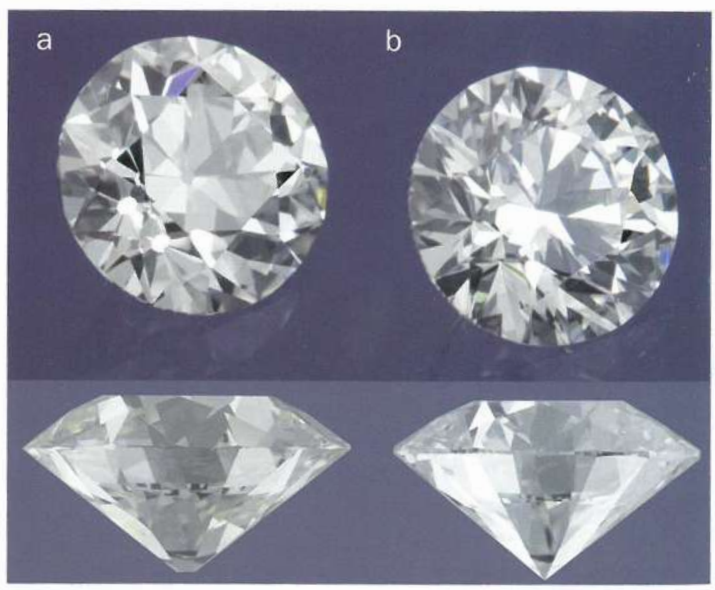
Al Gilbertson GG of GIA, California, had become interested in the development of the modern brilliant cut diamond and diamond cut evaluation since the late 1970s. He started conducting his own cut evaluation research in 1995 and became part of AGS's Cut Task Force until joining GIA's cut research team in 2000. In his presentation 'Changes in the perception of perfection', he explained about the evolution of the standard round brilliant, tracing its history and explaining the appearance issues that contributed to its popularity. Al used animations of ray tracings through various old and more recent cuts to demonstrate how light return was affected. He began with the earliest use of diamonds in jewellery in their rough form prior to the introduction of cutting, and then explained how cutting developed, retaining a balance between brilliance and weight retention. The brilliant cut lived up to its name in the candle-lit drawing rooms and ballrooms of the eighteenth and early nineteenth centuries, but by the second half of the nineteenth century cutters were seeking ways to maximize brilliance, especially with the new forms of lighting then coming into use. Of major importance here was the American diamond cutter, Henry D. Morse of Boston. Morse had commented: "Shopping for diamonds by the carat is like buying a racehorse by the pound," and complained that the Dutch, then the main cutters, worked by the piece, sacrificing excellence for speed of work and beauty for weight. Work by Morse and then other American cutters soon brought American cut diamonds to the fore with cuts stones of proportions that pre-empted Marcel Tolkowsky's publication of his 'ideal' form in his *Diamond Design: a Study of Reflection and Refraction of Light in a Diamond* (1919). Diamond cutting continued to evolve through the twentieth century, influenced by the introduction of mechanical and, later, laser sawing, new types of lighting, computerized ray tracing and laser scanning of rough to optimize yield.

During the conference Al Gilbertson signed copies of his recently published *American Cut – The First 100 Years.*

The focus then turned to one of the founding fathers of modern gemmology when **Yvonne J. Markowitz**, the Rita J. Kaplan and Susan B. Kaplan Curator of Jewelry at the Museum of Fine Arts, Boston, talked about 'American gemstones: George Frederick Kunz and Tiffany & Co.'

George Frederick Kunz was born in 1856. At the age of 10 he was intrigued by a mineral display he saw and decided then to begin his own collection. By his mid-teens Kunz was a serious collector, in correspondence and making exchanges with other collectors, and forming and selling collections. In 1875 he assisted the American Museum of Natural History and so impressed the curators that

Changes in the perception of perfection. *(Below) Top and side view of a 58-facet brilliant-cut diamond from the 1800s. (Right) The top and side views of (a) a 1919 Tolkowsky brilliant (with short lower halves, larger culet and knife edged girdle) and (b) a modern brilliant with Tolkowsky's general proportions. Photos © GIA.*



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American gemstones — George Frederick Kunz and Tiffany & Co. *George Frederick Kunz. Photo courtesy of the Tiffany archives.*

he was asked to arrange for the transportation and display of the museum's minerals and fossils at the 1876 Philadelphia Centennial Exhibition.

Kunz then began to sell gems to Charles Tiffany of Tiffany & Co. New York, and in 1879 was invited to join Tiffany's as gem specialist. Kunz's expertise with American gem materials was further developed when he was appointed special agent to the US Geological Survey 1883, a position beneficial to him and to Tiffany and Co. Kunz began to travel extensively finding fine gems and minerals that were then displayed by Tiffany in their New York store and at international exhibitions, such as the superb collection shown at the Paris Exposition of 1889 later sold intact to J.P. Morgan who donated it to the American Museum of Natural History. In the 1880s Kunz also began his prolific writing career, his books being both major academic studies and subtle advertisements for Tiffany. He also identified and named several new mineral specimens, including morganite (after J.P. Morgan), moissanite (named after his friend and colleague Henri Moissan), californite (also called 'California jade' or 'American jade', a form of vesuvianite) and, of course, the pink variety of spodumene — kunzite. Kunz died in 1932 from a stroke, survived by his daughter Ruby and his second wife Opal.

The history of gemmology was then traced back to its more ancient roots when **Dr Jack Ogden FGA**, Gem-A, London, took participants on a voyage through '7000 years of gemmology'. The English term 'gemmology' did not appear until the early nineteenth century and its earliest use appears to be by John Pinkerton in his book *Petralogy* published in 1811. However, the subject itself long pre-dates his involvement — one of the earliest encouragements for young people to study gemstones being found in the Karma Sutra, an Indian text of the second century AD, better known for the encouragement of other skills.

Gemstones had been admired, worn and traded from very early times, but for millennia gem knowledge was limited to that required to buy, trade and sell gems profitably and fairly. Gems were mainly judged on colour and distinguishing between gems of similar colour was only important when there was a significant difference in value. Indeed this pragmatic approach to gemmology survived in some cases in quite recent times — for example the nineteenth-century German gemmologist Max Bauer said that there was little need to distinguish a pale ruby from a pink topaz because there was little monetary difference between them.

7000 Years of Gemmology. *The nineteenth century saw the availability of new and affordable gem equipment, such as the dicroscope. The invention of this instrument is usually attributed to the Viennese mineralogist Wilhelm Haidinger in 1844 (his drawing shown), but a similar instrument had been described by Brooke in 1829.*

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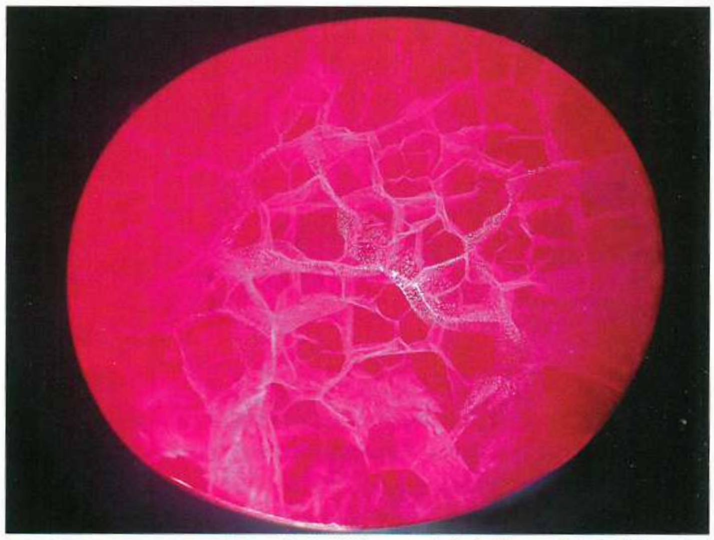
By the fourth century BC, transparent gemstones were coming into use, abrasives harder than sand were available, and writers such as Theophrastus and Pliny were beginning to consider gems and their properties. However, the major advances came in medieval Islamic times when scholars began to discuss such things as the laws of refraction, dispersion and specific gravity. For example, Al-Biruni listed the specific gravity of several gems with remarkable accuracy. Further east, Indian scholars were also considering scientific aspects of gemmology, and increasing European contact with the Arab world spurred a corresponding rebirth of scientific interest. The worldwide political changes in the fifteenth and sixteenth centuries, including the Arab conquest of northern India, the European discovery of America, and the European discovery of the sea route to the Indian Ocean and the east, brought a huge growth in the assimilation, absorption and dissemination of global knowledge, and the flowering of the sciences in seventeenth-century Europe included interest in gems. Sir Isaac Newton described refraction and double refraction and Sir Francis Bacon wished that microscopes could be developed that would allow examination of the 'irregularities of gems'.

Those buying and selling gems were still reliant on their own and the trade's experience, and there is little evidence that they concerned themselves much with the science. However, the improvement and availability of equipment, and new gems and imitations entering the market, meant that the gem and jewellery trades ignored the science at their peril. By the late nineteenth century books on gemmology aimed at the trade were being published and courses being proposed. Then, in 1908 the National Association of Goldsmiths (the British trade association for retail jewellers) decided to establish a Gemmological Committee to develop gemmological courses and qualifications. The Gemmological Committee eventually matured into the Gemmological Association (Gem-A) and the qualification became the Gemmological Diploma, the graduates of which have been eligible for election to Fellowship of the Gemmological Association — FGA — since 1931.

The first day of the conference was followed by a dinner and dance, also held at the Hilton London Kensington (see page 30).



Don't despair: your gemmological skills are not going to waste. Just keep them polished. *'Gemmological oddities' included (top) doublets with natural green sapphire crowns and blue flame-fusion synthetic sapphire pavilions and (below) a flame fusion synthetic ruby, quench crackled and flux healed. Presence of curved striae obscured flux-healed fractures. Photo by Duncan Parker.*

Practical Gemmology in the Modern World

The topic for Day Two of the conference, Sunday 26 October, was 'Practical Gemmology in the Modern World' with a particular focus on observation and the practical use of gemmological instruments.

This focus was precisely addressed by **Duncan Parker FGA FCGmA** in his presentation 'Don't despair: Your gemmological skills are not going to waste. Just keep them polished'. Duncan is a gemmologist and jewellery valuer at Harold Weinstein Gemmological Laboratory in Toronto, Canada, and has been President of the Canadian Gemmological Association for the last ten of the Association's fifty years. He explained how the gemmological skills and techniques possessed by a gemmology graduate, coupled with basic gemmological equipment, could help to identify gems and their treatments within the limited financial and time constraints of 'real-world' gemmology. Duncan pointed out how gemmologists might despair when they see and hear about the advanced expensive equipment now routinely used by laboratories, but he assured participants that a huge amount could still be done by the gemmologist using what is sometimes termed 'classical gemmology'. The vital ingredients were keeping knowledge and practical skills up-to-date through the journals, attending gem shows, conferences and seminars, and handling and examining as many stones as possible. It was also very important to be aware of the limitations of one's knowledge. Gemmologists and valuers were being confronted by an ever increasing variety of gems and gem treatments; in particular internet and TV selling channels were popularizing hitherto rarely seen gems and, in some cases, offering poor quality examples to meet price points. Examples include 'alexandrites' with little if any discernible colour change. The oddities encountered and identified by Duncan included doublets with natural green sapphire crowns and blue flame-fusion synthetic sapphire pavilions and flame-

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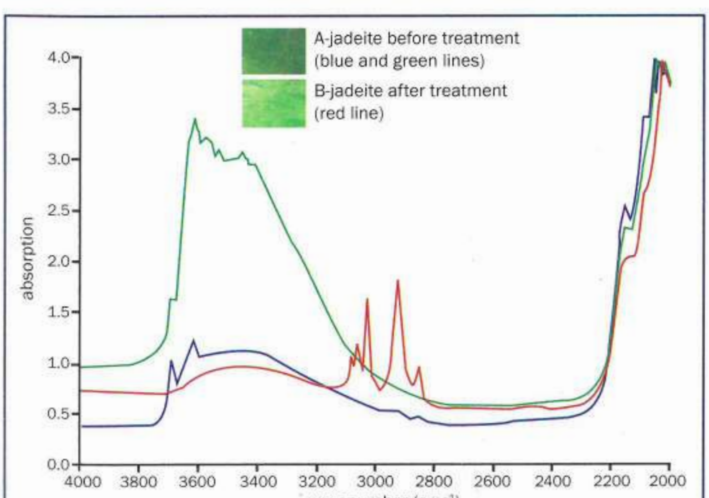
fusion synthetic ruby that had been quench crackled to emulate the internal features of a natural ruby. Jewellery that might have fooled the unwary valuer included a ring set with a 6.23 ct diamond next to a synthetic spinel triplet and a 'vintage' gold-mounted sapphire ring where the sapphires were diffusion treated. Duncan also talked about the glass-filled rubies that are becoming so common on the market, illustrating several examples with their internal and surface characteristics. He then moved on to coloured diamonds, now very popular, and showed examples of natural pink diamonds and their far less expensive emulators, coated diamonds. These latter could need sharp eyes and experience to detect. Other diamond surprises included what appeared to be a magnificent large diamond in an enclosed mount, but which actually was a wafer-thin diamond crown over a stamped metal foil imitating the pavilion. The appearance was highly deceptive. Duncan also mentioned a CZ of yellowish tinge that worryingly showed a perfect 'cape' diamond spectrum – a feature that needs further research. After a brief discussion of synthetic diamonds and some other current challenges, including dyed cultured pearls and synthetic forsterite imitating tanzanite, Duncan reiterated the need for good gemmological skills, and stressed that basic gemmological equipment still sufficed for much of the day-to-day needs of the valuer.

Dr Michael S. Krzemnicki FGA then helped bridge the gap between basic and advanced gemmological equipment when he spoke about 'Getting mobile: Portable instruments for gemmologists now and in the future'. Dr Krzemnicki has been working as a gemmologist and tutor at the SSEF Swiss Gemmological Institute since 1998, and was appointed Director of Education in 2002. He is currently the Deputy Director of SSEF and lectures internationally, as well as publishing papers on gemstone deposits, new gemstones and analytical techniques in all major gemmological journals.

He explained that new technology was allowing the production of small-scale and mobile equipment for gemmologists at relatively low cost. Examples included portable UV-Vis, infrared and Raman spectroscopy. Gemmologists were mainly concerned with the identification of gems, whether they are natural or synthetic, treated or not, and questions of origin. For this work the standard portable equipment included such familiar items as the loupe, the spectroscope, the refractometer, various colour filters, UV lamps and, of course, a small carat balance. At the other end of the scale are more advanced laboratory techniques, such as laser induced breakdown spectroscopy (LIBS), first developed by the SSEF for beryllium detection in corundum. However, the trend now is for smaller equipment as a result of new technological developments and the ever-increasing miniaturization of electronic components, mainly as a result of research for space exploration and military uses. A good example of this reduction in the size of components is the rapidly expanding use of LED light sources. Recent years have seen the development of portable, almost pocket size, UV-Vis-NIR spectrometers which can be used for many gemmological purposes. Michael described their use in origin determinations, such as distinguishing between rubies from Mogok, Burma, and the similarly coloured stones of Winza, Tanzania; distinguishing between sapphires and emeralds of different origins; and separating

Getting mobile: Portable instruments for gemmologists now and in the future.

FTIR analysis of untreated A-jadeite (weak bands at approximately 2850 and 2950 cm⁻¹ are due to contamination by finger fat when handling) and the same material after bleaching and treatment with colourless polymer (B-jadeite). The graph was produced by a portable FTIR spectrometer (left). © M.S. Krzemnicki, SSEF Swiss Gemmological Institute.



A finest quality Imperial jade (A-jade) bead necklace, typical of jade tested by the SSEF. © SSEF Swiss Gemmological Institute.

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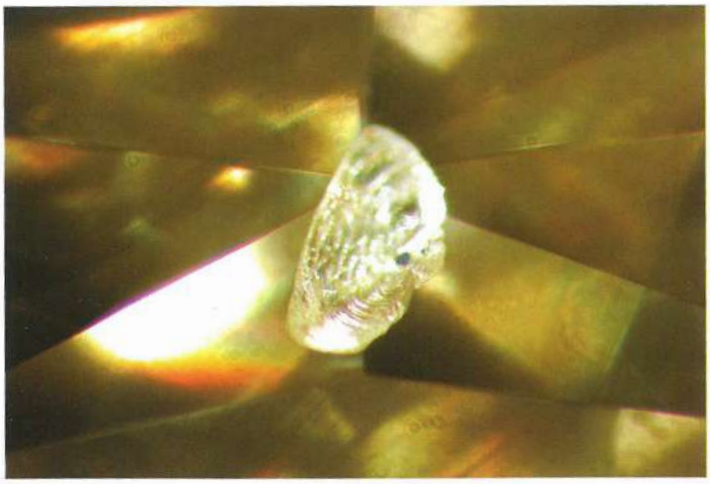
Paraíba tourmalines from the copper and manganese-bearing elbaite tourmalines from Mozambique. Another recent acquisition by SSEF was a portable FTIR spectrometer which was used, for example, to distinguish between A-jadeite and B-jadeite. The next few years will see an increasing range of miniature versions of what are now large, laboratory pieces of equipment. For example, space exploration is prompting the development of hand-sized versions of bulky mass-spectrometry equipment. There are also now portable Raman spectrometers and a range of new technologies on the horizon for gemmologists, including atomic force microscopy, laser assisted microwave plasma spectroscopy and laser induced atomic fluorescence.

The next speaker's topic focused on an important, but often neglected, aspect of a gemmologists' and valuers' work – 'Damage to cut gemstones'. In this presentation, **Professor Henry Hänni FGA**, director of the SSEF Swiss Gemmological Institute and professor for gemmology at Basel University, discussed the factors that damage gem materials, such as mechanical resistance, chemical resistance thermal stability and the stability of colour. He explained how to analyse damage to help identify the moment at which damage to the gem material has happened — something that can be vital in insurance and other disputes.

The factors that influence a gem's stability and thus make it prone to damage include mechanical resistance (the various manifestations of 'hardness', toughness, brittleness, fracture, cleavage and parting), thermal stability, chemical resistance and stability of colour. Henry illustrated various examples of damage to diamonds including damage caused during the cutting and setting of diamonds, damage caused during use such as worn facet edges, abrasion due to rubbing against neighbouring diamonds and even diamond surfaces abraded during sandblasting in jewellery finishing operations. Even more marked were similar types of damage on other gems, such as the sapphires and garnets illustrated by Henry, especially when worn or set so that they came in contact with diamonds. An interesting form of naturally-caused damage with time was the expansion of uranium-containing zircon inclusions and uraninite inclusions in sapphires — if such inclusions were near the surface, such expansion could lead to fractures. In some cases existing damage can be hidden or disguised and only becomes noticeable later in the life of the jewellery, such as the example of a wax-filled fracture in a star ruby. The trend towards repairing jewellery with the gems in place also provides opportunities for damage. For example, diamonds in jewellery being repaired are protected from burning by coating them with a borax compo©©©und — however the same compound would attack rubies, sapphires and some other gems. Henry showed illustrations of significant attack to rubies in jewellery as a result of using a borax compound — and burned surface to diamonds when borax had not been used. Soldering can also cause heat stress and even fracture to some set stones. A particularly intriguing instance was a large fancy yellow pear-shaped diamond with a grading report describing it as flawless, but with a 1 mm black mark in the stone, at the base of a small fracture. The most likely cause is the impact of laser soldering during repair to a prong. Other examples of damage discussed by Henry included the removal of the polymer consolidant in B-Jade in an ultrasonic cleaner and serious etching to peridot from acid cleaning of jewellery in workshops as, for example, after soldering.



Damage to cut gemstones. *The origin of a crater-like pit in a diamond is explained as a consequence of a laser shot mistakenly directed into the stone when the setting was repaired. The laser energy transformed a small volume of diamond into graphite, and the increase of volume blasted a portion of the stone away and created the damage on the gem. The stepped chip measures approximately 1.0 x 0.5 x 0.3 mm. The graphitized central area is about 0.07 mm across. Photo © Henry A.Hänni, SSEF.*

A good example of the treatment challenges facing modern gemmologists was **Dr Ulrich Henn's** 'Colour-enhanced quartzes and their identification. New results on green, yellow-green and violet-blue quartzes from Brazil'. Dr Ulrich Henn, mineralogist and gemmologist, is the General Manager of the German Gemmological Association and head of the German Gemmological Training Centre in Idar-Oberstein. He is the author of several books and more than 250 publications covering all fields of gemmology.

Ulrich started by reminding participants of the structure of quartz and the defects within it. The defects included general ones — vacancy, substitution and interstitial — and special defects in chemical bonding and electron density. There are two types of quartz — 'wet' quartz which contains water and is of hydrothermal origin and 'dry' quartz which is of pegmatitic origin. Iron-containing amethyst heated at about 400–500 °C will either turn to green-coloured 'prasiolite' (also called 'greened quartz' or sometimes, more controversially, 'green amethyst') or to a yellow to orange colour. With further treatment by gamma irradiation and heat, prasiolite changes to a violet-blue colour. This blue quartz is marketed under the names of 'blueberry quartz' and sometimes Safirita.

The prasiolite was only one of the green quartzes that might be encountered by a gemmologist; the others were natural green quartz, gamma-irradiated green quartz and synthetic green quartz. The gamma-irradiated green quartz was irradiated colourless 'wet' quartz

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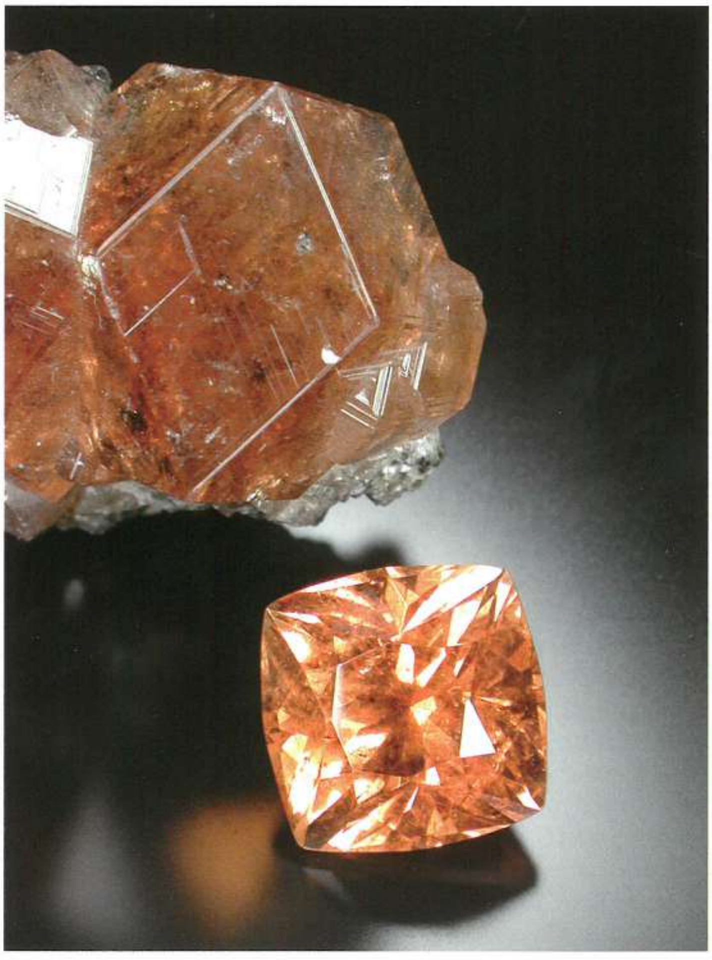
Colour-enhanced quartzes and their identification. New results on green, yellow-green and violet-blue quartzes from Brazil. *(From the top):*
Faceted treated blue-violet quartz, prasiolite and lemon-quartz.
Treated rough quartz from Brazil: three irradiated smoky-quartz samples and one lemon-quartz after irradiation and heat-treatment.
Tumbled lemon-quartz from Brazil.
Photos by U. Henn.

Under the Chelsea colour filter with incandescent light, gamma-irradiated green quartz appears red, the heated 'greened quartz' appears green.

When colourless 'dry' quartz contains some aluminium, gamma irradiation will turn it smoky and subsequent heating will convert this to a lemon yellow ('lemon quartz'). Natural yellow quartz (citrine) and lemon quartz are pleochroic, while 'citrine' produced by the heat treatment of amethyst is not.

The mechanisms for most of these various colour changes were explained by Ulrich, although the cause of the development of the violet-blue colour is still not fully understood.

Participants were then introduced to exploration aspect of gemmology by **Bradley S. Wilson FCGmA BSc MSc** when he talked about 'Coloured gemstone discoveries and developments in Canada'. Brad is vice president and Fellow (FCGmA) of the Canadian Gemmological Association, and an accomplished gemstone faceter. He currently operates 'Alpine Gems', a gem cutting shop and consulting business in Kingston, Ontario, which is the Canadian office of Coast to Coast Rare Stones International, a coloured gemstone company specializing in rare, soft and collector gems. Brad's presentation took his audience on a tour of some of the recently discovered and often very remote localities for coloured gemstones in Canada. He illustrated examples of the gemstones found to date and talked about their geology, quality and cutting. Examples included sapphires and lapis lazuli from Baffin Island, emeralds from Ontario, aquamarine from British Columbia, and demantoid, hessonite and tsavorite garnets from Quebec. As well as describing the surveying and exploration procedures, Brad talked about the day-to-day realities of field work in remote but often majestic terrain. Naturally, Brad's life threatening encounter with a polar bear on a recent trip was



Coloured gemstone discoveries and developments in Canada. *Hessonite garnet from Quebec. Photo © Bradley Wilson.*

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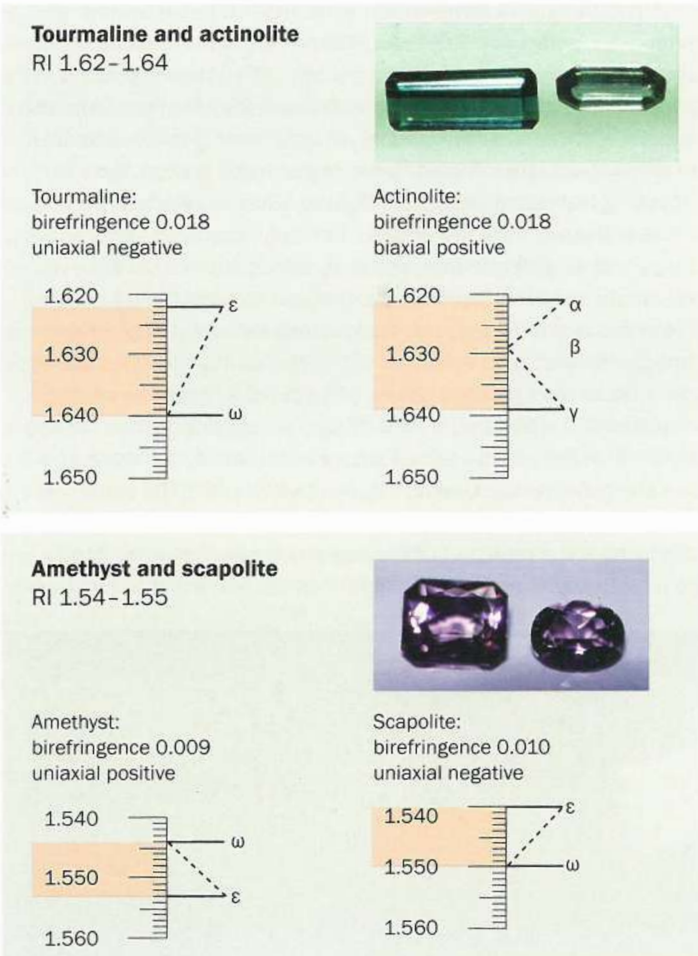

Pushing the refractometer. *Examples of gemstones of similar appearance with overlapping RIs that may be distinguished by their shadow edge behaviour; green tourmaline and actinolite (top) and amethyst and scapolite (below). Photos © Alan Hodgkinson.*

mentioned during question time. This fateful incident has been doing the rounds on the internet, for here suffice it to say that we were very lucky indeed to have a live and intact Brad as a conference speaker.

Alan Hodgkinson FGA, President of the Scottish Branch of Gem-A, has spent some fifty years in the jewellery industry, focusing on gemstones and gemmology and is well known worldwide for his lectures explaining how to get the best out of basic gemmological equipment, such as the spectroscope and refractometer. The latter was the subject of his talk at the conference, entitled 'Pushing the refractometer'.

Alan began by stressing the importance of having an accurately calibrated refractometer. Ideally a set of calibration standards should be used, but, at a minimum, a sample of quartz will quickly show if the 1.544 reading is correct. It is also best to aim for getting readings to three decimal places. To identify a gem four observations are required, highest RI, lowest RI, birefringence and shadow behaviour. The movement of the shadow edge is useful because it will distinguish between the four types of birefringent behaviour. For example, amethyst and scapolite have similar RIs and birefringence, but amethyst is uniaxial positive, scapolite uniaxial negative, and are thus separable by the movement of their shadow edges on the refractometer when the stones are rotated. Tourmaline (uniaxial negative) and actinolite (biaxial positive), which might be confused, may similarly be distinguished by shadow edge behaviour. Other examples Alan provided were the distinction between aquamarine and maxixe beryls. After explaining good refractometer 'method' and some of the challenges caused by 'locked' or 'restricted' rays, Alan explained how top lighting the refractometer can often provide useful readings, especially for very small stones, even when these are not obtainable using conventional lighting methods. Top lighting could be used with monochromatic, polarized or with white light, the latter having the benefit of also allowing observation of dichroism.

Full descriptions of getting the most out of the refractometer and other gemmological techniques will be found in Alan's long-awaited book on *Gem Testing Techniques* due to be published in 2009.

Participants were able to learn more about practical refractometer use in a special workshop on the Monday following the conference. This practical session entitled 'A new approach to the teaching and the use of the refractometer', was presented by Darko B. Sturman, Curator Emeritus of the Royal Ontario Museum, and Conference speaker Duncan Parker.

The final paper of the Conference brought together several of the Conference themes when **Dr Emmanuel Fritsch** talked about 'Gemmology, a new science anchored in fundamentals'. Dr Fritsch is a professor of physics at the University of Nantes in western France, where he teaches an advanced gemmology degree, the DUG. He worked for nearly ten years at the GIA, lastly as manager of GIA Research from 1992 to 1995. His research is conducted at the Institut des Matériaux Jean Rouxel (IMN) and he specializes in advanced techniques applied to gemmology, coloured diamonds,

Gemmology, a new science anchored in fundamentals. *The set-up at the Institut des Matériaux Jean Rouxel in Nantes, France, uses excitation at the femtosecond scale for nanosecond luminescence spectroscopy. This truly high tech, expensive equipment is at the moment purely of academic interest for gemmologists, but could become useful in the future to separate natural from treated gems for example, if no simpler approach works. Photo by J.-C. Ricquier.*

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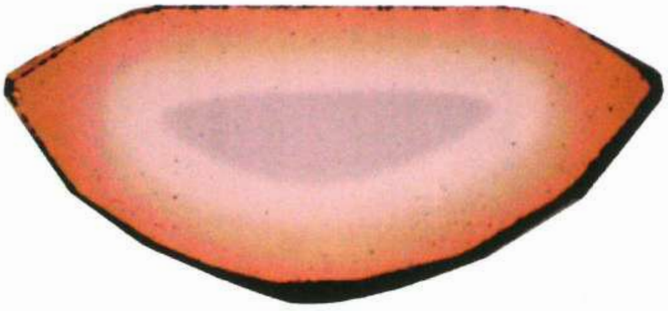
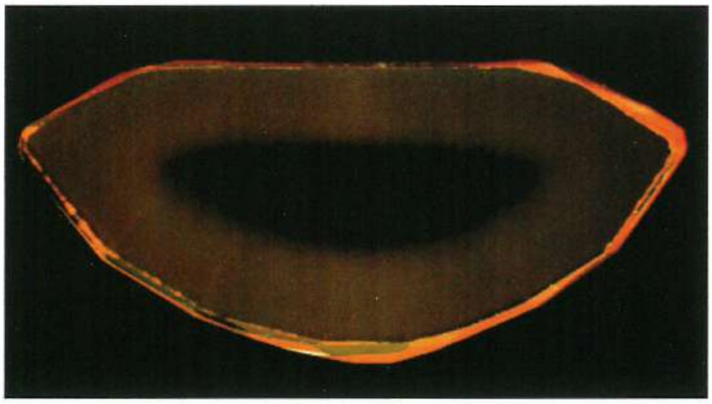

Classical gemmology was somewhat swept under the rug during the big beryllium diffusion of corundum controversy. Still, in favourable cases, classical gemmology can help. This is illustrated by a colour-zoned slice of Be-diffused pink sapphire, with a classical orange rim. The rim luminesces a strong orange, the pink core is inert, and such different behaviour can be seen with the naked eye in some stones. Photos courtesy GemTechLab, Geneva.

the origin of colour and luminescence, treated and synthetic gems, opals, pearls and twinned crystals. Emmanuel discussed the evolution of gemmology from a trade practice to a science in its own right, considering both 'high tech' gemmological instruments and the use of practical observation. Emmanuel began by explaining that gemmology had progressed from a trade practice to a science within the last few generations and some were enthusiastic about this evolution, others were scared. He also pointed out that now gemmology was accepted as a science, it should be treated like one, with better scientific training for gemmologists, better adherence to scientific methods and correct use of terminology – including abandonment of some old 'trade' terminology which is scientifically wrong or inappropriate, such as the term 'graining' applied to diamond. The variety and complexity (and cost) of the scientific techniques that can be applied to gemmology are limitless. As an example Emmanuel mentioned looking at the kinetics of luminescence phenomenon at the nanosecond scale, using femtosecond excitation (illustrated opposite). The results are potentially exciting, but as Emmanuel said, it is a whole new type of physics applied to gemmology. At the other end of the scale was the increasing availability of hi-tech methods, such as relatively low-cost Raman spectroscopy, to those who were not fully trained to use them or interpret the results. Recent examples of such misunderstandings were given – such as the recent announcement of the supposed discovery of 'synthetic tourmaline' on the market. Despite all the new technology, observation supported by some simple tools and a good binocular microscope will remain the most useful and often the only necessary step. Indeed, too great a reliance on 'push-button' technology may lead to the loss of knowledge and experience built up by hands-on observation. Emmanuel pointed out some of the results possible with basic gemmological equipment and explained what can be done with some traditional but less used methods, including fluorescence and the thermal conductivity meter. For example yellow corundum was far more conductive than yellow beryl, chrysoberyl, tourmaline or zircon; red garnet more conductive than red spinels. Orange long-wave luminescence can help identify Be-diffused corundum, in particular in iron-rich sapphires or in the case of colour zonation (illustrated above). Magnetism can also separate garnet (magnetic) from red spinel (non-magnetic) and, for example, peridot (magnetic) from sinhalite (non-magnetic). In conclusion Emmanuel said that we must not replace classical gemmology with high tech, but rather build on the existing knowledge.

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Conference dinner and events

Delegates relax: (1) Brian Jackson with Charlotte and Alan Hodgkinson; (2) Rui Galopim de Carvalho and Donna Hawrelko; (3) John Koivula and Emmanuel Fritsch; (4) Helen O'Neill and Duncan Parker; (5) Chandra Horn, Ran An and Helena Sa; (6) Rui Galopim de Carvalho and Alan Jobbins.
Photos (1) © Wight Quintin; (2–6) Gem-A.

After the first full day of lectures, both delegates and speakers were able to relax and socialize at the informal dinner/dance held at the Hilton London Kensington. Following dinner, dancing went on until after midnight, with many continuing to socialize into the small hours. Amazingly, everyone seemed to be present and alert for the presentations on Sunday morning.

Several events and workshops were held on the days following the Conference. On Monday and Tuesday, 27 and 28 October, there was a private viewing of the William and Judith Bollinger Jewellery Gallery at the Victoria and Albert Museum with an introduction by Richard Edgcumbe, and a guided tour of the Crown Jewels housed in the Tower of London with David Thomas MVO, Crown Jeweller from 1991 to July 2007. The Graduation Ceremony was held on the Monday evening, a report of which is given opposite.

In addition two workshops were held, one on a new approach to the use of the refractometer with Darko Sturman and Duncan Parker, and the second on precious metal clay with Helen O'Neill. The final event was a Gem Discovery Club Specialist Evening when Antionette Matlins demonstrated the value of small, simple gem testing tools.

Graduation Ceremony

Gem-A graduates from around the world gathered at the magnificent Goldsmiths' Hall in the City of London on Monday 27 October 2008 to receive their diplomas and awards. We were delighted that all the 2008 prize winners were able to attend.

Professor Alan Collins, Chairman of the Gem-A Council, presided and Gem-A President Professor Andy Rankin presented the awards and gave the address (see below).

To mark the celebration of One Hundred Years of Gemmological Education, Fellows and Diamond members who had been unable to attend the Graduation Ceremony in the year in which they qualified were invited to come along to the 2008 ceremony for the formal presentation of their diplomas. Those who were able to join us were Edward D.J. Forshaw FGA (1982), Reading, Berkshire; Irene Haralabopoulos DGA (2005), Athens, Greece; Kathryn Anne Kinev FGA (1990), Atlanta, Georgia, USA; Keecha Narayanamurthy FGA (1971), Kuala Lumpur, Malaysia; Duncan Parker FGA (1990), Toronto, Ontario, Canada; David John Sayer FGA DGA (1977 and 1981), Wells, Somerset; Joanna Thomson FGA DGA (1993 and 1994), Peebles, Tweeddale; Gaynor Jane Turner DGA (1993), Edinburgh; Stephen Jeffrey Turner FGA DGA (1993), Edinburgh; Veronica Wetten FGA (1983 with Distinction), Hounslow, Middlesex; and D. Willow Wight FGA (1970 with Distinction), Ottawa, Ontario, Canada.

Michael O'Donoghue and Terry Davidson who had retired from the Council during 2008 were presented with certificates honouring their contribution to the work of the Association.

The ceremony was followed by a reception for graduates and guests.

Professor Andy Rankin's address

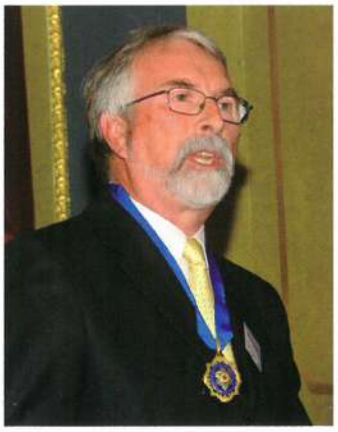
"I am a geologist and chemist by training but like you, I have also been smitten by the beauty and wonder of gem materials. Over the past ten years I have been trying to find out how nature can form such wondrous objects.

"Gemmology is a dynamic and increasingly scientific discipline, and we never stop learning. Someone once told me that the true test of a gemmologist was whether they had the words polymorphs and pseudomorphs in their spell checkers.

"You can be justifiably proud of your achievements which are being celebrated here today. Your Gem-A qualifications are recognized throughout the world as the gold standard in training and education of a professional gemmologist for the gem and jewellery industry. So, now begins the next stage in your careers.

"Our pathways through life take many twists and turns. When we start out on a journey we inevitably meet obstacles as well as opportunities. These pathways have a habit of meandering as in my case. Many of you will find work in your chosen field, UK or abroad. A number will find employment in related fields

Yet others may decide to continue their training and education. Whatever you do, I wish you every success for the future."



Professor Andy Rankin giving the address at Goldsmtihs' Hall. Photo courtesy of Photoshot.

Andy then went on to reminisce about his own path from Chemistry to Applied Mineralogy and onto Applied Geology and Gemmology.

"There were three main influences in my chosen career as a scientist and mineralogist. The first influence, when I was a young boy, was a fabulous display of mineral and gems in the front of the old Geological Museum (now part of the Natural History Museum). Then, as a young PhD student working on fluid inclusions in the 1970s, I discovered H.C. Sorby, a Sheffield-based scientist, who in 1857 presented and published a monumental paper on the use of fluid and melt inclusions in determining the origin of rocks, minerals and gemstones. His ideas were ridiculed at the time. But he went on to become one of the most famous scientists of his generation and was the founding father of the science of petrology (amongst many other areas such as metallurgy and metamorphic geology). Then during my time as a lecturer at Imperial College I discovered the science fiction writer, H. G. Wells, who studied geology as a subsidiary subject at Imperial College in the late 1800s (way before my time!). He wrote in his memoirs about the magnificence, wonder and beauty of looking at minerals and rock sections under the microscope ('therein lies a key to our understanding of the evolution of our planet').

"The key messages from all of these influences were: 1) the beauty and wonder of nature, even in the most dull looking rocks once you get inside them; 2) no objects are so small, such as submicroscopic inclusions in minerals, as to be unworthy of our most serious scientific endeavours; and 3) have faith in your scientific beliefs if conventional wisdom opposes them but the facts support them."

Andy concluded by congratulating the graduates and wishing them every success for the future.

Roman to Renaissance

A collection of rings dating from AD 300 to 1600

A collection of rings representing the highpoints in the history of the ring from the Late Antique period to the end of the Renaissance, is to be exhibited in London in Spring 2009. The collection compiled by Sandra Hindman, Professor Emerita of Art History at Northwestern University, Chicago, and owner of LES ENLUMINURES, a gallery in Paris and Chicago, comprises fine examples of rings from the Merovingian, Byzantine, Medieval and Renaissance periods including marriage rings, seal rings, stirrup rings, tart mould rings, iconographic rings, merchant rings and gemstone rings.

One of the oldest rings in the collection is an early Christian Roman gold marriage ring, *circa* 500, of a type that was popular in the Roman Empire and Byzantium from around the fourth to the seventh century. Included in a group of rings associated with the Huns, nomadic tribes that moved from the steppes of Central Asia into Eastern Europe in the fourth century, is a gold cloisonné ring in the form of a rhomboid set with garnets. Among the Byzantine rings is an eleventh-century gold ring with Christ Pantocrator ('all sovereign') in relief set in a blue, cloisonné-enamelled Greek cross. The Greek inscription engraved around the gold band which translates as 'Receive the suppliant before you, despite his sinfulness'. This puzzling inscription is otherwise only known from a sixth-century ivory consular diptych associated with Emperor Justinian in the British Museum.

Gothic examples include a magnificent gold stirrup ring set with a cabochon sapphire and engraved with the initials E and N on each side (**1**). Known as a bishop's ring, it is English or possibly French, *circa* 1200. Another fine Gothic ring is a thirteenth-century gold signet ring from France or Italy (**2**). The perimeter of the oval bezel is engraved in Lombardic letters in Latin with the New Testament text 'John is his name' and the centre is set with a classical intaglio of a Roman in profile carved in a deep red carnelian.

1

2

3

1. Stirrup ring, England, or possibly France, c. 1200. Gold and sapphire.
2. Gothic signet ring, France or Italy, thirteeth century. Gold and carnelian.
3. Renaissance cusped ring, Northern Europe, fifteenth century. Gold and hessonite garnet.
All photographs © Les Enluminures.

Renaissance rings include a fifteenth-century Northern European gold cusped ring which widens at the shoulders to a large octagonal bezel set with a polished orange hessonite garnet held in place by gold prongs (**3**). Such cusped rings mark the start of an era increasingly interested in showing off precious stones and their popularity is evident in the many paintings that feature them.

Catalogue

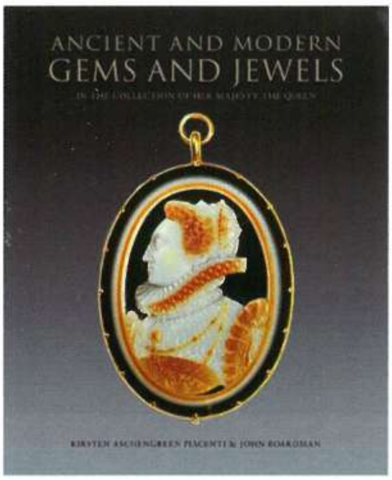
The exhibition will be complemented by a catalogue entitled *Toward an Art History of Medieval Rings*. It contains contributions by Sandra Hindman, art historian Ilaria Fatone and conservator Angélique Laurent-Di Mantova, with an introduction by jewellery historian Diana Scarisbrick.
ISBN 978 1 903470 64 0. www.paul-holbertson.net. £25.00.

The Roman to Renaissance exhibition will be staged by the Paris gallery LES ENLUMINURES at the eminent London dealer Wartski, 14 Grafton Street, London W1, from Tuesday 12 to Friday 22 May 2009.

Book Shelf

Book Review

Ancient and Modern Gems and Jewels in the Collection of Her Majesty the Queen



Kirsten Aschengreen Piacenti and John Boardman, with contributions from Beatriz Chadour-Sampson and Martin Henig. Royal Collection Publications, London, 2008 (ISBN 978 1 902163 47 5) £95.

This book is a catalogue of the historic gems and jewels in the Royal Collection, as distinct from both the Crown Jewels and the jewellery in The Queen's personal collection. It is described as the first comprehensive study of these objects, namely 24 ancient intaglios and cameos, one medieval intaglio, 253 post-renaissance intaglios and cameos, 19 jewels – from sixteenth to late nineteenth century – 27 insignia, including 12 Orders of the Garter and a sixteenth-century Order of Malta; and five 'Objects of Virtue' including a gem-set silver gilt tankard. Among the ancient gems is an important cameo of the Roman Emperor Claudius (AD 43–5) (Cat. 1) which once belonged to Charles I (**1**). Other royals who helped grow the collection include Henry, Prince of Wales (1594–1612), Queen Caroline (1683–1737), consort of George II, George III (1738–1820) and George IV (1762–1830). The concept for the catalogue dates back to the late 1960s and it is good indeed to see it finally published in such a magnificent form. This is a glorious-looking book, with scholarship of the highest order supported by excellent photography.

Sadly the price of the book will put it out of reach for many general readers and, perhaps more sadly, for too many scholars and students. The good news is the collection is also online at www.royalcollection.org.uk/microsites/gemsandjewels/ where there is abbreviated text, but excellent photos that can be enlarged to life-size. For many of those who can afford hard copy, the connection with The Queen may well be its greatest marketing strength.

It has always amused me that many Jewellery historians tend to be swept up into some sort of rapturous state when the objects they discuss have royal association. So a relevant question to pose is – would this collection be important if it were not for its royal connection? The answer is yes and no. As a collection of engraved gems and jewels it is good, but not truly exceptional. Even the Director of the Royal Collection, Sir Hugh Roberts, notes in his Foreword that "Compared to the great European princely collections ... the Royal Collection's holdings of cameos, intaglios and jewels may appear somewhat patchy." What does make the collection – and thus this volume – so valuable are the known provenances in so many cases. We know many of the gem engravers and jewellers, as well as the royal and non-royal hands, through which the objects have passed.

It is this aspect of provenance that brings me to what I see as a shortcoming, not of the authors and co-authors, but in grasping

1

Cameo portrait of the Emperor Claudius. Sardonyx in copper-gilt mount. Roman, AD 43–5. 21.3 × 16.0 cm. Royal Collection © 2009, Her Majesty Queen Elizabeth II.

Book Shelf

an opportunity. Here is a large series of mounted gemstones, in mounts that are often of known date and origin, and some wonderful jewelled objects, but there is no detailed study of these. The mounts are very briefly described in the entries and a whole Appendix titled 'Mounts' had my heart beating, until I realized that it was a brief three paragraphs and a proposed numbered typology (which may be of limited value unless it was drawn up using a much wider sample of gems than just the present collection). The mounts and jewels deserved far more study. One might expect mount types to reflect the materials, so how does the material of the gem or the proximity of enamel influence choice of mount? The reddish copper-containing gold alloys so typical for later eighteenth- and early nineteenth-century intaglio and cameo mounts might be expected to cause brittleness problems, unless these alloys were carefully controlled – so what are they? This was a perfect opportunity to study the composition of the metal and enamel components, and overall assembly, of dated and provenanced objects and thus to make a major contribution to the field. But I am not really surprised at this lack of technical concern, not after the inexcusable omission of any detailed technical study of the metalwork and enamel when the Crown Jewels were studied and published in 1998, and at a selling price that was an anathema to scholarly accessibility.*

The engraved gems are identified gemmologically; they are mostly members of the quartz family and we can assume these are accurate as Alan Jobbins provided the identifications. The identifications include some suggestions for localities for the gems set in the jewels and around the engraved gems, such as 'Colombian emerald', 'Burmese rubies', a few 'Indian emeralds' and even a 'Russian garnet'. However, we do get the feeling that gem identification was not high in the list of priorities for the collection. For example, the lack of opportunity to use anything other than very basic equipment is suggested by a description of 'pseudo-emerald' (Cat. 96). Also, since the majority of the engraved stones are members of the quartz family, the brief explanation as to the use of the terms 'agate', 'onyx' and 'sardonyx' in 'Notes for the Reader' will not be sufficient to avoid confusion when the reader also encounters 'carnelian', 'chalcedony', 'nicolo', 'sard' and 'flint' in the catalogue. Not all the engraved gems are cryptocrystalline quartz varieties, although most are. We also find almandine garnet (Cat. 46), lapis lazuli (Cat. 92 and 163), hessonite garnet (Cat. 160), black marble on white feldspar (Cat. 166), shell on slate (Cat. 209), rock crystal (Cat. 268), amethyst (Cat. 273), garnet (Cat. 269) and citrine (Cat. 275 and 276). Some comparative data on the use of these materials for dated gems in other collections would have been valuable.

With the mounts and jewels, there is greater variety of gems, but more background for the reader would have been useful. For example the beautiful gold, enamel and gem-set 'Darnley or Lennox Jewel' (Cat. 280) made in the later sixteenth century, possibly in Scotland, is set with 'Burmese rubies', 'Indian emerald' and the largest central gem is described as a 'cobalt-blue glass' (**2**). This deserved some comment. Cobalt-coloured blue glass was indeed known from antiquity and the Renaissance, but its presence here raises the question as to whether some other rare 'sapphires' in Renaissance jewellery might also really be glass. Sapphires, other than the paler Ceylon stones, are very uncommon in European jewellery before the later nineteenth century, when the Kashmir deposits were exposed by an landslide. Might the reader not be surprised that the centre stone of such a fine object is glass and wish to have an explanation?

2

The Darnley or Lennox Jewel. Gold, enamel, Burmese rubies, Indian emeralds, cobalt-blue glass. Scottish, c. 1571–8. 6.6 × 5.2 cm. Royal Collection © 2009, Her Majesty Queen Elizabeth II.

The large engraved ruby in the Stuart Coronation Ring (Cat. 289) certainly deserves more study. It would be interesting to know what indicates that this ruby is "probably one half of a medieval bead that has been cut away and polished to remove the drill hole". Rubies are extremely rare in European jewellery before the trade routes to the East were opened up in the late Medieval Period.

Another interesting gem presence is the little cabochon opals – described as 'Hungarian opals' – in a late sixteenth-century pendant (Cat. 283). Opals are not now known for their survival rate, although there are other surviving sixteenth- and seventeenth-century examples – including what appear to be black opals in the early seventeenth-century 'Grenville Jewel' in the British Museum. Hungary is presumed to be the only old source, so are Hungarian opals less susceptible to dehydration and self-destruction than their Australian cousins?

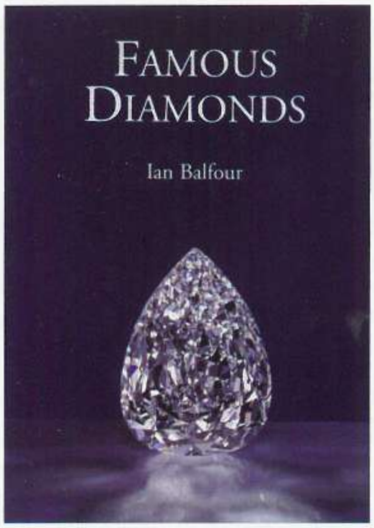
It would have been useful to have had more gemmological and technical information, but we shouldn't end this review on a negative note. The book is a major contribution and the authors, those who provided additional advice and the Royal Collection are to be congratulated on this achievement. The price is high, but the parallel presentation of the whole collection on the web makes it accessible to all.

Jack Ogden

*C. Blair, S. Bury, A. Grimwade, R.R. Harding, E.A. Jobbins, D. King, R.W. Lightbown and K. Scarratt. *The Crown Jewels: the History of the Coronation Regalia in the Jewel House of the Tower of London.* London 1998. Volume I: The History and Volume II: The Catalogue ISBN 0-11-701359-5

New titles from Gem-A

Famous Diamonds (5th edition) by Ian Balfour



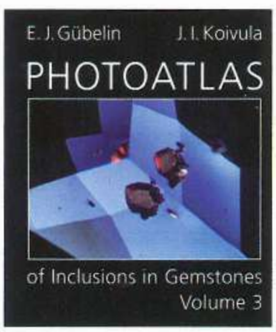
Each famous diamond has an individual history and many are connected with the lives of emperors and conquerors, great kings and queens, with statesmen and soldiers, and the rich and famous. In this revised and updated edition, Ian Balfour tells the fascinating stories, full of mystery, intrigue and romance, of more than 80 famous diamonds, each one lavishly illustrated. Included are the Eureka, the first African diamond to have gained authenticity; the Centenary that took over a year to cut and polish; and the Cullinan, the largest uncut diamond ever found; and the Hollyw+ood romantic Taylor-Burton.

Since the publication of the last edition in 1997, new information about some of the older, historic diamonds has come to light which has necessitated slight changes to the text and in one case, the Sancy diamond, a complete rewrite. The stories of several diamonds have been added which did not appear in the previous edition, as well as a fascinating account by Asscher's Manufactory in Amsterdam dated 1908 of the cutting of the Cullinan.

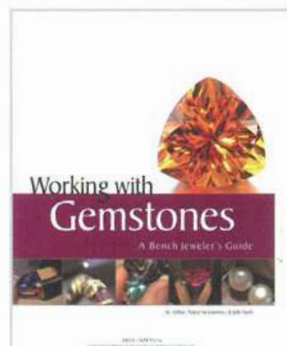
The fifth edition of Famous Diamonds was launched in London with a champagne reception at Asprey, New Bond Street, on 18 November 2008.

£50.00 plus postage and packing

Photoatlas of Inclusions in Gemstones Volume 3
E.J. Gübelin and J.I. Koivula
£210.00

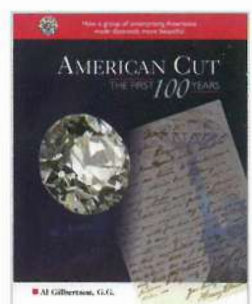


Working with Gemstones. A Bench Jeweler's Guide
Arthur A. Skuratowicz and Julie Nash
£19.95



Phenomenal Gems
Fred and Charlotte Ward
£10.95

American cut The first 100 years
Al Gilbertson GG
£24.00



Prices quoted are exclusive of postage and packing

To place an order or for further information contact:

The Gemmological Association of Great Britain

27 Greville Street, London EC1N 8TN, UK

t: +44 (0)20 7404 3334 f: +44 (0)20 7404 8843 e: shop@gem-a.com

What the Dickens ....

Does a diamond ring prove Charles Dickens had a love child?

A ring is to be sold at auction which, it is claimed, was given to Charles Dickens by poet Alfred Lord Tennyson. The ring, set with a 0.90 ct diamond, is inscribed 'Alfred Tennyson to Charles Dickens 1854'.

According to documentation including letters, wills and newspaper articles to be included in the sale, Dickens gifted the ring to his son Alfred D'Orsay Tennyson Dickens (1845-1912) who emigrated to Australia apparently in debt. In 1890 he sold the ring to a Hector Charles Bulwer Lytton Dickens (1854-1932) who had always claimed to be Charles Dickens' illegitimate child through a relationship with his sister-in-law and housekeeper Georgina Hogarth.

Georgina Hogarth joined the household of Charles Dickens and his wife Catherine (Georgina's sister) in 1842 as housekeeper and companion. In 1858 following 'some domestic trouble' Charles and his wife Catherine separated, but Georgina remained in the family home and continued to run the household until Charles' death in 1870. It was widely believed that actress Ellen Ternan was Dickens' mistress during his marriage, but is was rumoured that he also had a relationship with Georgina Hogarth which was strongly denied by Dickens at the time. Both Ellen and Georgina were at Dickens' bedside when he died.

One of the documents being auctioned with the ring is a list written by Hector Charles Bulwer Lytton Dickens dated 1924 in which he refers to a "large diamond ring belonging to my father bought by me from my brother A.T. Dickens in Melbourne in 1890". He goes on to point out that the date inscribed in the ring is the year of his birth and later in the list refers to an item as being "... the property of my mother G.H."

The single stone diamond ring claimed to have been given to Charles Dickens. Photo © Nigel Ward Company.

The Auctioneers, Nigel Ward & Co., believe that the documentation strongly indicates that Hector Charles Bulwer Lytton Dickens was in fact the love child of Charles Dickens, and the owners claim that the ring was passed down from the illegitimate son. However, Florian Schweizer, Curator of the Charles Dickens Museum in London, has said that he can see no historical foundation in the claim. In *The invisible woman: a biography of Nelly Ternan and Charles Dickens*, the author Claire Tomalin claims that 'Hector Dickens' was probably an Australian conman called Charly Peters who used the then current rumours of Dickens' infidelities to trick people out of money.

The ring and documentation are being auctioned by Nigel Ward & Co. at their Pontrilas, Herefordshire, salerooms on 21 February.

Auction Houses

Listed below is a selection of British-based auction houses specializing in jewellery. Visit their websites for details of forthcoming sales.

Bonhams	**www.bonhams.com**
London, Knightsbridge	t020 7393 3900
London, New Bond Street	t020 7447 7447
Edinburgh	t0131 225 2266
Los Angeles	+1 323 850-7500
New York	+1 212 644 9001
San Francisco	+1 415 861-7500

Lyon & Turnbull	**www.lyonandturnbull.com**
Edinburgh	0131 557 8844
Glasgow	0141 333 1992
London	020 7930 9115

Christie's	**www.christies.com**
London, South Kensington	020 7930 6074)
London, King Street	020 7839 9060
Amsterdam	+31 (0)20 575 5255
Dubai	+971 (0)4 425 5629
Geneva	+41 (0)22 319 1766
Hong Kong	+852 2521 5396
Milan	+39 02 303 2831
Beverly Hills	+1 310 385 2600
New York	+1 212 636 2000

Sotheby's	**www.sothebys.com**
London, New Bond Street	020 7293 5000
Geneva	+41 (0)22 908 4800
Milan	+39 02 295 00201
New York	+1 212 606-7000
Hong Kong	+852 2524 8121

Fellows & Sons	**www.fellows.co.uk**
Birmingham	0121 212 2131

Woolley & Wallis	**www.woolleyandwallis.co.uk**
Salisbury, Wiltshire	01722 424500

Gemmology or gemology?

The different spellings are not just one more example of the differences between spelling in Britain and the United States – two countries divided by a common language, as George Bernard Shaw is supposed to have said. Many in Britain once championed 'gemology' with one 'm'. An insight comes from the letters in Gem-A's archives relating to the syllabus for our original gemmology courses (see *Gems & Jewellery*, October 2008, pages 24 and 25). In the initial correspondence almost a hundred years ago about the course, 'gemology' was spelled just like that – with one 'm'. However, the spelling of the word was being discussed in the British trade journals at the time and there were many who preferred 'gemmology' with two 'm's and this finally won the day. In a letter of 12 June 1912 Herbert Smith, the curator of mineralogy at the British Museum of Natural History and one of Gem-A's founding fathers, a supporter of the one 'm' option capitulated, but added: "There can be no question that 'Gemmology' is the etymologically correct way of spelling the word; at the same time there can be little less question that the word looks better with one 'm'."

Grain of Truth

Books, websites and other media continue to state the 'fact' that pearls form when a grain of sand enters the oyster. Why? Gemmologists have long since ceased to believe this is the usual cause, although it may well occur from time to time.

Two centuries ago, the usual statement in books was a generality to the effect that pearls were formed when "a grain of sand or some other body ... has irritated the animal". The situation in 1862 was explained by George Henry Lewes in his *Studies in Animal Life* (first published in instalments in *Cornhill Magazine* in 1860): "Naturalists are at present divided into two camps, fighting vigorously for victory. The one side maintains that the origin of a pearl is this – an egg of the oyster has escaped and strayed under the mantle; or the egg of a parasite has been deposited there; this egg forms the nucleus, round which the nacre forms, and thus we have the pearl. The other side maintains with great positiveness that anything will form a nucleus, a grain of sand, no less than the egg of a parasite. 'Tis a pretty quarrel, which we may leave them to settle. Some aver that grains of sand are more numerous than anything else; but Möbius says that of forty-four sea pearls, and fifteen fresh-water pearls, examined by him, not one contained a grain of sand; and Filippi, who has extensively investigated this subject, denies that a grain of sand ever forms the nucleus of a true pearl. Both Filippi and Küchenmeister declare that a parasite gets into the mussel or oyster, and its presence there stimulates an active secretion of nacre."

What happened to the escaped oyster egg theory? To a non marine biologist it sounds plausible, after all oysters are supposed to produce millions of young out of which only a dozen or so survive.

De Lamerie and the chimney-sweep's boy

Paul de Lamerie (1688–1751) is a name known to, and revered by, all those with an interest in historic English silver. This Hugenot gold- and silversmith had moved to London in 1691 and opened a shop in 1712. He is best remembered for his Rococo silver work produced from the 1730s onwards, but he is also remembered by those with an interest in the history of law. A court case involving de Lamerie is still cited in cases concerned with whether the finder of something becomes its owner. The case, in 1722, revolves around a piece of jewellery set with a diamond found by a boy working for a chimney sweep. The lad took it to de Lamerie's shop to find out what it was. De Lamerie's apprentice "under pretence of weighing it, took out the stones" and then told de Lamerie that the mount was worth "three halfpence" which de Lamerie then offered to the boy. The boy refused, demanded the piece back, received just the "socket without the stones", and the rest is legal history.

The argument that as finder rather than owner the boy had no rights to the jewel, was rejected by the judge. Although the boy, as finder, did not acquire absolute ownership, he had a better claim than anyone else apart from the true owner who had lost the piece. Thus it was his until the owner came forward to claim it. The Court also ruled that de Lamerie was answerable for his apprentice's actions. Furthermore, as the gem was by that time no longer available, several members of the trade were asked what the value would be of the best jewel that would fit the mount. The boy would be paid this sum in compensation unless de Lamerie could produce the gem "and shew it not to be of the finest water".

Chemistry lesson

The lucky and apparently rather precocious chimney sweep's boy who found the diamond-set jewel was some 70 years too early to recognize that the diamond he had found and the soot he encountered every day were chemically similar. However, once it was understood that diamond was indeed carbon, the possibility of synthesizing diamond from carbon began to intrigue scientists. An observer writing in *The Telegraph* in 1865 noted that the scientist says that diamonds "are nothing but carbon, and that some day, out of black-lead or coke, or common charcoal at six-pence a basket, he will make such glittering trash to any amount". The writer then added: "Beauty wisely turns away from the horrid sage [scientist], and continues to dote upon diamonds ... How much does it matter, after all, what they are made of? For, if it comes to it, the lovely wearer herself is composed, as these disagreeable people tell us, of a lot of ugly chemicals, which never yet prevented a heart from breaking for her sake."

Jack Ogden

Events and Meetings

Gem-A Branch Events

Midlands Branch

Contact: **Paul Phillips**
02476 758940
email: pp.bscfgadga@ntlworld.com

Friday meetings will be held at the Earth Sciences Building, University of Birmingham, Edgbaston.

Friday 27 February 2009
The Cheapside Hoard
JAMES GOSLING

Sunday 15 March 2009
PRACTICAL TRAINING DAY
Identification of gemstones mounted in jewellery
Venue: Barnt Green, Worcs.

Friday 27 March 2009
An Exploration into the World of Pearls
GWYN GREEN

Friday 24 April 2009
Cometh the Day, Cometh the Jewel
DAVID CALLAGHAN

Sunday 21 June 2009
Summer Luncheon Party

Scottish Branch

Contact: Catriona McInnes
0131 667 2199
e-mail:
scotgem@blueyonder.co.uk
website: www.scotgem.demon.co.uk

Meetings are held at the British Geological Survey, Edinburgh, unless otherwise stated.

Wednesday 25 March 2009
Scottish pearl evening at CAIRNCROSS OF PERTH

Friday 1 to Monday 4 May
SCOTTISH GEMMOLOGICAL CONFERENCE
See page 9 for details.

South West Branch

Contact: Richard Slater
07810 097408
email: richards@fellows.co.uk

Meetings held at Bath Royal Literary and Scientific Institution, 16-18 Queen Square, Bath.

Sunday 15 March 2009
24 Hours from Tucson
CLAIRE MITCHELL

Sunday 19 April 2009
Upon Reflection and **Cometh the Day, Cometh the Jewel**
Two talks by **DAVID CALLAGHAN**

Gem-A Annual General Meeting followed by a presentation by
RUI GALOPIM DE CARVALHO FGA DGA
Monday 22 June 2009
The National Liberal Club, Whitehall Place, London SW1 2HE

Gem-A Conference 2009

Saturday and Sunday 17 and 18 October — The Hilton London Kensington

Day One **The Lore and the Profits**
Insights into the business of gems, from mines to market.

Dinner/dance at the Hilton London Kensington

Day Two **Showing Colour**
To celebrate 75 years since the introduction of the Chelsea Colour Filter, presentations will look at colour in gems, its causes and effects.

Gem-A Graduation Ceremony

Monday 19 October — Goldsmiths' Hall, London EC2

Put the dates in your diary. Further details will be given in the next issue of *Gems & Jewellery.*

Gem-A Workshops

As the world's longest established gem educator, The Gemmological Association of Great Britain is the leading provider of the most up-to-date and comprehensive knowledge regarding gemstones and retail staff training. With highly qualified tutors, fully-equipped classrooms and a wide variety of teaching stones for students to examine, we provide all of the essentials for top-quality training. Our workshops are held from 10:00 am to 4:30 pm each day (unless otherwise stated) at our headquarters near Hatton Garden, one of London's finest jewellery quarters.

Diamond Buying Guide

If you are in the market to buy a diamond, we can help you. Whether it is the perfect ring for that special someone or a considered purchase for yourself, improving your knowledge about diamonds is essential for making the right purchase. Or maybe you just wish to improve your sales knowledge. Whether you are buying or selling, we will provide you with the practical information about the 4Cs: carat weight, clarity, colour and cut, which will enable you to make informed choices and give great diamond sales advice.

Dates: Monday 20 April and Tuesday 20 October 2009
Price: £80.00 + VAT*, Gem-A students £50.00 + VAT

Introduction to Practical Gemmology

If you are new to the world of gemmology, or just want a fun hands-on day of learning how to test gemstones using the correct equipment, come along for an exciting day of gemstone testing. We will teach you the basic principles required for identification and will demonstrate how to use the equipment. You will then be able to try gem-testing yourself under the guidance of an experienced tutor, and will discover an exciting new world.

Dates: Monday 23 March and Tuesday 13 October 2009
Price: £80.00 + VAT*, Gem-A students £50.00 + VAT

*Quote the special promotional code WKS09 when booking to receive £5 off the price of your workshop.

Other upcoming workshops include:

Allure of Gems: Monday 9 March and Tuesday 29 September 2009

Three Day Advanced Diamond Grading: Wednesday, Thursday and Friday 22–24 April 2009

Bead Stringing for Jewellery: Wednesday 6 May 2009

Advanced Bead Stringing for Jewellery: Thursday 7 May 2009

For the latest information on Gem-A workshops and short courses go to
www.gem-a.com/education/short-courses-and-workshops.aspx
or contact us at information@gem-a.com or +44 (0) 20 7404 3334
if you would like to learn more about our workshops, or to book a place.