

# Gems & Jewellery

Winter 2010 / Volume 19 / No. 4



Conference  
report

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Composite  
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Gems&amp;Jewellery

Winter  
10

Contents



3

Gem-A Conference



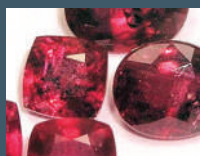
20

Organics



24

Gem-A Calendar



26

Around the Trade

Gems and Minerals 28

Hands-on Gemmology 34

Book Shelf 37

Journal Files 38

Gem-A News and Views 40

Letters to the Editor 44

Museum News 46

Stone Scoop 48

## Eighty shared years

An old association like ours has many milestones to be celebrated. Since our 2008 centenary you have heard a bit about Gem-A history: the Gemmological Committee was established in 1908 by the National Association of Goldsmiths of Great Britain and Ireland (NAG) to develop gemmological education and examinations for the UK jewellery trade, leading to the first Diploma in Gemmology being awarded in 1913. In 1931 the Gemmological Association of Great Britain was established to take over the work of the Committee and to provide an association for graduates of the gemmological diploma. Graduates who paid the annual subscription would be Fellows of the Association (FGAs). The idea of a 'gemmological association' was first formally proposed in April 1931 and on the 24 September 1931 both the FGA status and Gem-A as we know it today were born. Therefore 2011 is the eightieth anniversary of the use of the FGA status.

We are not alone in having something to celebrate in 2011. One of our graduates in 1929 who "acquitted themselves in practical work in such a way as to show that they may be expected not to be misled by any stone which may come their way" was the American Robert Shipley. In February 1931 Shipley established what was to become the Gemological Institute of America – the GIA. He was undoubtedly inspired to set up the American organization by his UK gemmology education, but the intriguing question is whether his new organization influenced us to create a more formal association here. The formation of the UK association had come after several years' discussions regarding autonomy and financing, but the final prompt may have come from the American example.

In any case, at the beginning of 1932, the then Secretary of the Gemmological Association of Great Britain reported that he had received considerable interest in the Association from Robert Shipley FGA in America, and so the Board of the Association "agreed that a letter of greeting and good wishes" be sent to what they referred to as the recently formed 'Gemological Society of America'.

In this, their eightieth year, we repeat those good wishes to the GIA and hope that the next 80 years of our two organizations will continue the tradition of collaboration, productive competition and mutual respect.

**Jack Ogden**  
Chief Executive Officer

### Cover Picture

Late seventeenth to early eighteenth century Mughal style True Cross with a cruet set in nephrite jade. In the cross the gold applications are set with ruby cabochons. Museu Nacional de Soares dos Reis, Porto @ DDF-IMC. See Conference 2010, Portuguese Treasures, page 4.



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# Conference 2010

## Gemmology and the Gem Market: Micro and Macro

The 2010 Gem-A Conference held at the Hilton London Kensington on Sunday 7 November looked at gems from both gemmological and marketing perspectives, and in detail as well as giving the wider picture. Jack Ogden summarizes presentations made by the international panel of speakers.



From left: Andrew Cody, Rui Galopim de Carvalho, Christopher P. Smith, Michael Hügi, Michael Krzemnicki, Maggie Campbell Pedersen and Richard Drucker.

After coffee and registration Jack Ogden, Gem-A Chief Executive, welcomed all those present and thanked the sponsors and supporter, Marcus McCallum, T H March and Apsara Gems, for their generosity.

### Opal and the dinosaur

The morning session was chaired by Professor Andy Rankin, Gem-A President, who began the proceedings by introducing **Andrew Cody** of Cody Opal (Australia) Pty Ltd, to talk about 'Opal and the dinosaur – discover the link'. Andrew started in the trade in 1971 and has served in a number of official capacities, including President of the Australian Gem Industry Association, and Foundation Member and Chairman of the Australian Jewellery and Gemstone Industry Council. In 2007 he became World President of the International Colored Gemstone Association (ICA).

In his talk Andrew spoke of the changes in, and growth of, the Australian opal

industry since the first discoveries of opal in the nineteenth century. Even into relatively modern times, conditions and facilities in the mining areas were primitive in the extreme, and in the previous decade buyers had to travel with cash as credit or cheques were not accepted. The genesis of opal is still not fully understood by scientists, with various models being proposed, but the opalization of soft organic tissue points to a rapid process – one that, in Australia, can be dated back to the Early Cretaceous

period more than 100 million years ago. The opal fields occur along what was then the shoreline of a huge inland sea.

The opalization ranges from shells to bones (1), and even to turds, but the ultimate example is an entire opalized skeleton of a marine dinosaur, now housed in the National Opal Collection in Sydney. More familiar to most gemmologists, of course, is the gem opal used in jewellery. This is now very much in demand and, in top qualities, fetches high prices. Andrew explained the

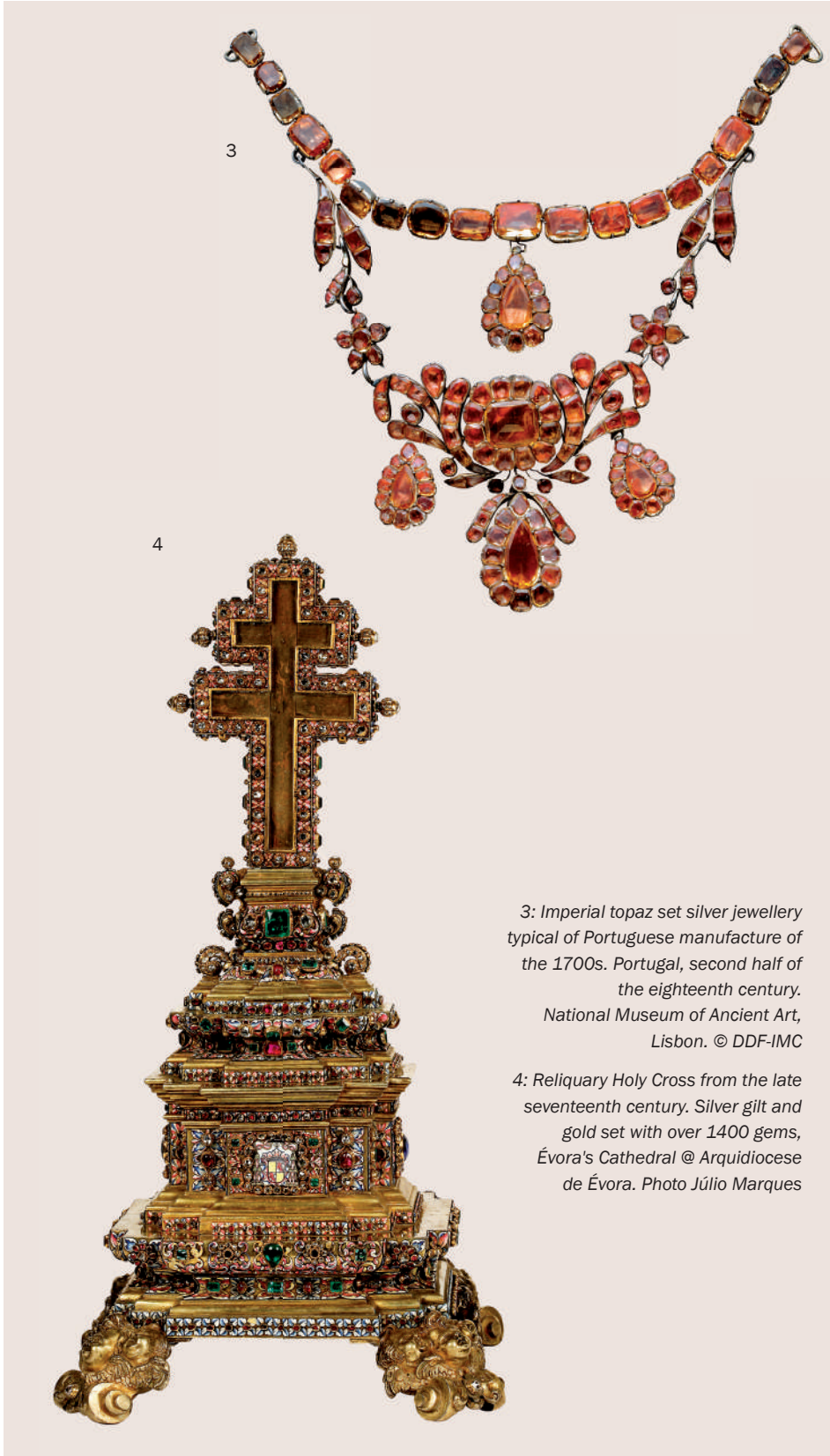
1: The opalized upper jaw bone of a kollikodon. 2: An extremely rare black harlequin opal.

Photos courtesy of Andrew Cody, Cody Opals (Australia) Pty Ltd.



## Gem-A Conference Special

### Conference 2010



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4

3: Imperial topaz set silver jewellery typical of Portuguese manufacture of the 1700s. Portugal, second half of the eighteenth century. National Museum of Ancient Art, Lisbon. © DDF-IMC

4: Reliquary Holy Cross from the late seventeenth century. Silver gilt and gold set with over 1400 gems, Évora's Cathedral @ Arquidiocese de Évora. Photo Júlio Marques

various types of gem opal and the factors that influence value; the latter being based on a combination of brilliance, body tone, transparency, pattern, dominant colour thickness and shape. The prices for fine opals are high, whilst best quality black opal (2) prices can match those for diamonds on a per carat basis.

During the breaks Andrew signed copies of his book *The Opal Story*, a book used worldwide by the industry.

### Portuguese Treasures

The next speaker was **Rui Galopim de Carvalho**. The speaker originally scheduled, Gioia De Simone, had been unable to attend the conference for personal reasons and so Rui kindly filled the gap at short notice.

Rui, a Fellow of the Gemmological Association of Great Britain since 1993, was the founder of the first gemmological laboratory in Portugal (LABGEM). He is currently researching historical jewellery and has recently published *Precious Stones in Sacred Art in Portugal*, the subject covered in his talk, 'A Guided Tour of Portuguese Jewellery'.

Rui explained the important position held by Portugal in the gem trade in the sixteenth to eighteenth centuries. Vasco de Gama's opening up of the direct sea route to India at the very end of the fifteenth century gave Portugal direct access to the gemstones and pearls of India and the East. About the same time, with the discovery of the New World, Brazil became a colony of Portugal – a huge source of gemstones – including diamonds from the eighteenth century onwards. Not surprisingly, as Rui explained, eighteenth century Portuguese jewellery has a very strong gemmological character.

His tour covered some of the most famous examples of Portuguese jewelled objects, as well as some less well known. Starting in Lisbon, his first object was Dom Sancho's Cross in the National Museum of Ancient Art. This thirteenth century gold object is set with sapphires, garnets and pearls – a relatively limited range of gems as is typical prior to the expansion of the Eastern trade. From the same museum



## Conference 2010

there was also the fifteenth century Morocco Martyrs Reliquary in silver, set with almandine, rhodolite and hessonite garnets. From the following century came the reliquary of Saint Leonor, set with emeralds, rubies, point cut diamonds and also point cut spinels. In contrast the Bemposta Monstrance, dating from the second half of the eighteenth century, showed a clear link with Brazilian gems; amethysts, topazes – including fine colour rose-cut examples – emeralds and brilliant cut diamonds. During this period white and yellow topazes became very popular and the use of a coloured foil back is typical of jewellery of this period (3). These jewels, mostly for their gem content with topazes from Ouro Preto, Minas Gerais, Brazil, are very characteristic of the rich and varied Portuguese production of that time.

Moving on to Coimbra and the National Museum Machado de Castro (MNMC), Rui introduced us to the fourteenth-century Our Lady of Tranquility Reliquary in silver and silver gilt, set with rock crystal, garnet and paste, as well as the St Isabel Necklace of similar date, set with yellow sapphire (a stone never before seen in Medieval Portuguese jewellery) and a wide variety of other gems including spessartine (also not reported before), quartz, ruby, emerald, paste and pearl. The same museum also houses a huge eighteenth-century silver monstrance set with an equally large citrine, as well as a yellow topaz set on red foil to imitate pink topaz – an interesting early imitation, but again a gem reflecting a Brazilian origin.

The Soares dos Reis Museum in Porto has several interesting jewels, including a mid-eighteenth century large bodice flower, fully covered with coloured gemstones; mostly quartz, with colourless and coloured foil backs. The museum also hosts an unusual Mughal style reliquary cross in nephrite jade with gold floral applications set with rubies, also from the mid eighteenth century (see front cover).

Rui's gem tour concluded with the magnificent Holy Cross of Évora (4) which is set with in excess of 1400 gems, including emeralds, sapphires, rubies, spinels, diamonds and hessonites. As Rui pointed

out, most of the surviving Portuguese treasures are church treasures because they have been kept in churches and, by and large, have avoided the melting-down and remodelling that has always accompanied secular treasures.

### Ruby treatments

The theme then moved from historical gems to contemporary gemmology when **Christopher P. Smith** discussed 'Rubies – untreated and treated: an update of rubies currently in the market'. Christopher spent the first five years of his career at GIA's Gem Trade Lab in California, moving on to the Gübelin Gem Lab in Lucerne, Switzerland, and eventually becoming Director of the Lab. In 2003 Christopher returned to the GIA Laboratory in New York, and is now President and Chief Gemologist of the American Gemological Laboratories (AGL), also in New York.

In his presentation, Christopher discussed the types of rubies currently available in the market place and their characteristics. There were three main categories: unheated ruby, heated ruby and what he classifies as Composite Ruby (5). It was shown that even though unheated rubies are generally considered to be 'untreated', these gems could still be clarity enhanced by oiling of fissures and although this treatment was common, it was seldom disclosed.

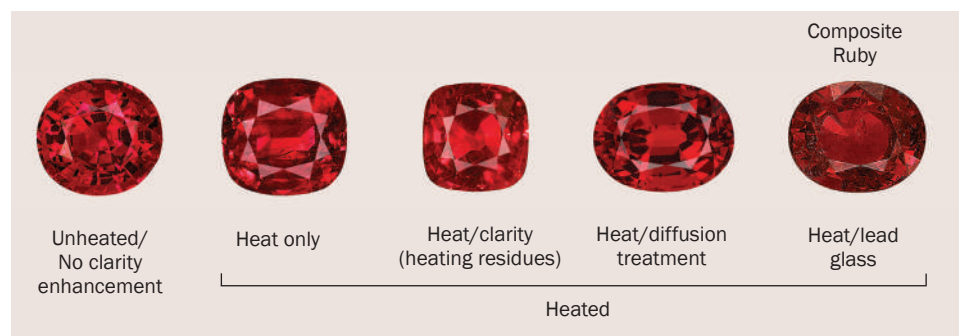
Under the category of heated ruby, various iterations are recognized in the trade. The general process of heating to improve a

ruby's colour by removing a blue/purplish tint or dark colour zones has been carried out for many centuries, this type of result may be achieved at lower temperatures.

An additional step may be taken during the heating process to facilitate the healing of fissures and potential filling of fissures and cavities with a vitreous material. To heal fissures, the rubies are coated in a slurry of fluxing agents (commonly borax); at elevated temperatures these fluxing agents melt and flow over the ruby's surface and into fissures. The molten flux partially dissolves the surface of the ruby and the fissure walls, bringing alumina into the melt. Upon cooling, aluminium oxide precipitates out of the melt and becomes deposited within the fissures, effectively healing them. What remains along these now healed fissures is a combination of re-grown corundum (synthetic), remnants of the fluxing agents that have become a vitreous material (glass) and tiny voids (contraction bubbles). The combination of these three components is what is referred to as 'heating residues' in the disclosure nomenclature of many laboratories issuing gemmological reports. This type of treatment thus improves stability in addition to clarity.

Some of the new ruby material from Mozambique shows evidence of both fissure healing, as well as the filling of fissures that have not been healed and surface cavities. This type of additional treatment is quite readily apparent, making it relatively easy to quantify the extent of such treatment.

Another additional treatment that may be performed during a heating process involves the introduction of additional elements (not



5: Heating procedures used for rubies today include heat alone, as well as heat combined with the healing of fissures (involving heating residues), heat combined with diffusing elements into the crystal (such as beryllium), and lead-glass treated ruby (also referred to as Composite Ruby).

## Gem-A Conference Special

### Conference 2010

including hydrogen), such as beryllium or chromium. Beryllium diffusion is best known from the 'Padparadscha-type' colours that were first encountered in 2000. However, beryllium diffusion has also been broadly applied to certain kinds of rubies as well. The most often encountered source for ruby that has been diffused in this manner comes from Songea in Tanzania. Beryllium will improve the colour of such rubies by driving out a brownish or dark colour appearance, making these rubies a brighter red. In addition, this form of treatment can be used to turn some rubies into orange sapphires.

Very briefly during the mid 1990s there was also some use of chromium diffusion in rubies, but the slow rates of diffusion for chromium means that the diffused layer is very shallow.

The third type of ruby material is perhaps the most abundant ruby product available today at very low prices. Lead-glass treated rubies have virtually exploded onto the worldwide gem market over the last few years and they come in all sizes from very small up to more than 100 ct. Most of the ruby rough so treated comes from Madagascar and Mozambique. These stones have attracted considerable media and industry attention. They are an amalgam of natural ruby and a high lead-content glass; in some cases the fashioned stones consist of more ruby than glass, in others there is more glass than ruby, while others prove to be disparate ruby fragments in a glass matrix. Christopher explained that he championed the name 'Composite Ruby' for all lead-glass treated rubies to better distinguish them from more traditionally heated ruby, as well as to demonstrate that these are not an imitation nor synthetic ruby product. This terminology has thus far gained a certain degree of usage, however it is not universally accepted within the trade. There is universal agreement however that in view of the considerable durability problems associated with these stones, a clear disclosure and explanation of special care requirements were of paramount importance at point of sale for these stones.

Christopher also highlighted a number of microscopic features that can help the average gemmologist to distinguish



6: Rubies may be heated utilizing a wide range of temperature, time and other conditions. However not all inclusions will react to such heating at the same time/temperature, making the identification of certain kinds of heating (in particular those utilizing relatively lower temperatures) more difficult. Shown in this image are two mineral inclusions, one showing clear evidence of thermal alteration, whereas another in close proximity does not show any evidence of being altered.

between the various ruby products. In general, however, it is much easier to identify conclusively when heating has been carried out on a ruby than to prove when it has not, due to the fact that some internal features are more temperature resistant than others (6). Christopher also dispelled a commonly held gemmological misconception that the presence of unaltered rutile within a ruby is 'proof' that heating has not been carried out. This is not the case; fine rutile dissolves at approximately  $\pm 1400^{\circ}\text{C}$  (the actual temperature can vary), but there can be a significant improvement in colour by removing the blue/purplish tint or colour zones below the temperature threshold necessary to dissolve silk.

Other mineral inclusions such as carbonates (calcite and dolomite) or aluminium hydroxides (such as diaspore or boehemite) do not withstand heating nearly as well; their presence in a pristine state is a good indication of lack of heat treatment, whereas zircon as an inclusion in ruby (and sapphire) is much more thermally resistant and so requires significantly higher temperatures before it will show signs of thermal alteration. An understanding and ability to recognize which inclusions are present in a ruby is important to better determine if the stone may have been heated

or not. Also a chalky bluish-white appearance of a ruby under short wave ultraviolet light is an indication of heat treatment, but is not always present as this chalkiness relates to zones of high titanium.

### Digital photomicrography

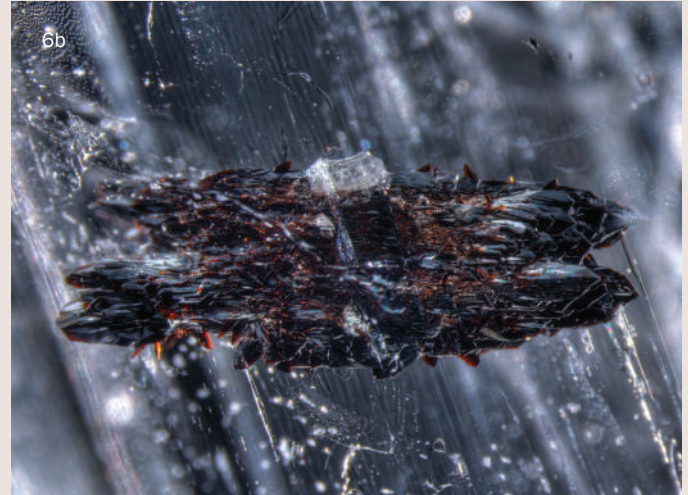
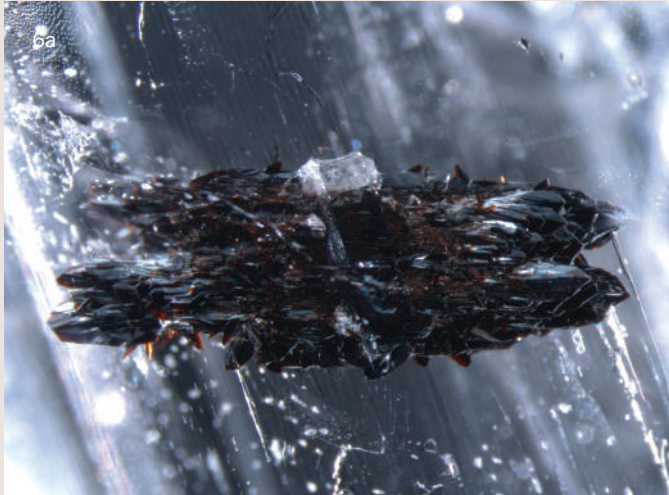
Following lunch in the WestEleven Restaurant, the afternoon session was chaired by James Riley, Chairman of the Gem-A Board. **Michael Hügi** was the first speaker of the afternoon, with 'Digital photomicrography: revealing the hidden beauty of inclusions in gemstones'. Michael is a mineralogy and geology graduate from the University of Berne, Switzerland, where he studied fluid inclusions in quartz crystals. In 1994 he joined the Swiss Gemmological Society (SGS) as a member of the scientific commission, becoming its head in 2003.

Michael Hügi explained that photomicrography was an important part of gemmology; a means of recording the surface and internal features of a stone. He defined photomicrography as the taking of photos through a microscope, in contrast to microphotography, which he described as photos on a minute scale, such as microdots. The earliest images of gem inclusions may well be Athanasius Kircher's drawing of a locust in amber and a two-phase inclusion in quartz in the seventeenth century. Such images became more common in the nineteenth century, such as the lithographs of solid inclusions in minerals in Blum et al. (1854), as well as in Heinrich Göppert's 1864 drawing of inclusions in a diamond. At this time, drawings were still far more common than photographs; indeed in 1873 Ferdinand Zirkel stated that he doubted that photos would ever take over from drawings as they showed too much detail, distracting the viewer from the important elements. In the twentieth century Edward Gübelin and John Koivula set the standard for high quality and informative photography of gemstone inclusions.

The human eye is able to distinguish a far wider dynamic range (light to dark) than a camera with traditional film or even modern digital sensors, and the microscope optics limited the depth of field. However, the last

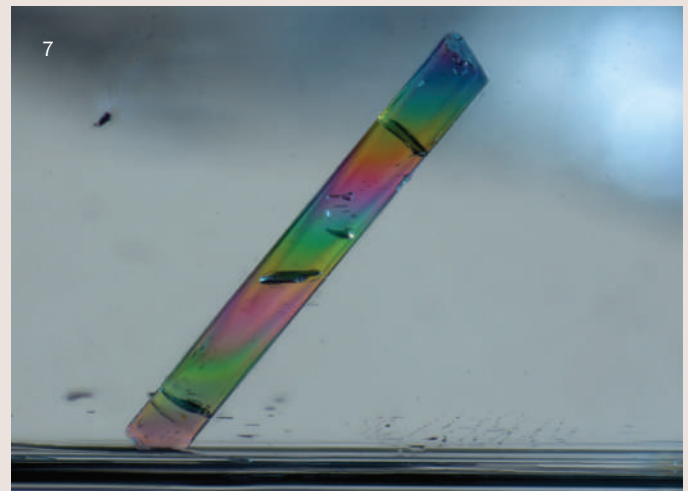


## Conference 2010



6a and 6b: Columbite-tantalite in aquamarine from Northern Pakistan. Width of field approx. 8 mm. Fibre-optic illumination. (Left) This single-exposure photo taken by conventional photography technique is dominated by strong contrasts, due to the strong lustre of the columbite-tantalite and bright so-called 'hot spots' in the background. (Right) The same object, processed by HDRI from a series of five photos, reveals more detail of the mineral inclusion as well as of the background.

7: Tourmaline crystal in aquamarine from Shigar Valley, Pakistan. Width of field approx. 1 mm. Transmitted light, parallel polarisers. This image depicts a typical paragenesis – tourmaline and beryl – of pegmatitic minerals. The colours of the tourmaline needle are interference colours due to the very small dimensions of the crystal.



All photomicrographs © Michael Hügi, SGS

ten years have seen the rapid development of digital photography, with ever increasing standards in resolution and innovation in computer processing of the images. One of these techniques is high dynamic range (HDR) photography. In this process several photos are taken with a series of exposures. When these images are combined using specialized computer software, the result is a single image that far more closely matches that actually seen by the human eye (6a and 6b).

The problem of limited depth of focus can be overcome by taking a series of photos with focal bracketing, i.e. by moving the focus of the microscope down a small step between each exposure. A computer program then combines these images, taking the in-

focus areas of each, to create a single image.

The advantages of these advanced photographic techniques lie in the greater information they can provide about the internal world of gemstones, as well as in the sheer beauty of some of the images – an aspect shown by some of Michael's superb photographs – but it must also be remembered that digital image processing also provides a potential for fraudulent use. Here a great responsibility is imposed upon a gemmologist to reproduce the objects how they are, and not how they should be.

### SSEF lab notes

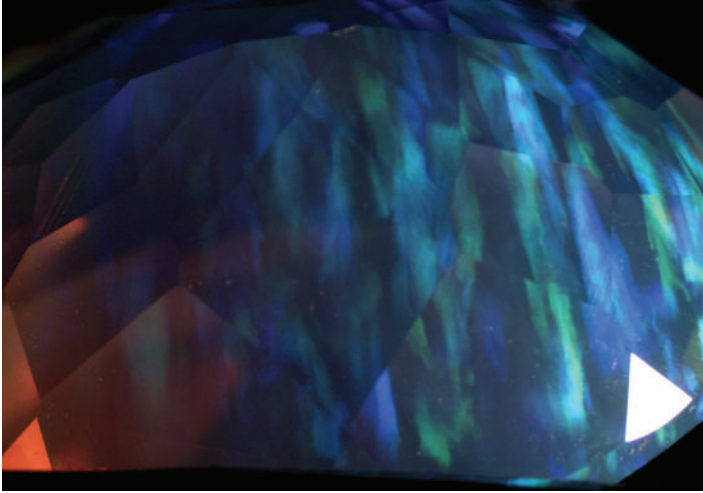
Taking the floor next was **Dr Michael Krzemnicki**. Michael has been working as

a gemmologist and instructor at the SSEF since 1998 when he completed his PhD thesis in mineralogy and, the same year, became an FGA. He was appointed Director of SSEF in June 2009.

Michael brought participants up to date with SSEF's recent research in 'Gem lab notes'. Laboratories are currently confronted with the problem of gemstones from new deposits, sometimes the characteristics of which overlap those of stones from other regions. One example given was the ruby from Montepuez in Mozambique, which has internal characteristics rather close to that from Mogok, Burma. Nevertheless a laboratory could distinguish them, allowing, for example, for the provenancing of a very fine, almost clear, ruby of some 17 ct to

## Gem-A Conference Special

### Conference 2010



8. A synthetic Inamori opal. Approx. 10x magnification. © M.S. Krzemnicki, Swiss Gemmological Institute SSEF.



9. Two nacreous blisters have been joined to 'imitate' a pearl. © M.S. Krzemnicki, Swiss Gemmological Institute SSEF.



10: Daiji Imura (left) of RAK Pearl Holding LLC and Dr M.S. Krzemnicki at the pearl farm in the Arabian Gulf. © M.S. Krzemnicki, Swiss Gemmological Institute SSEF.

Mogok. In addition to a range of very fine rubies, the SSEF had also seen some high quality and unusual emeralds, including a Moghul engraved emerald and the 472 ct 'el Itoco' emerald crystal from the La Pita mine in Colombia. Michael also mentioned the fine spinels from Ipanko mines at Mahenge, Tanzania.

Detecting treatments comprised a significant part of the lab's work, providing

some interesting challenges. As an example Michael cited the difficulties in detecting heat treatment in aquamarine, where the heat made greenish stones bluer by removing some of the yellow component in the colour. However, there is still plenty of research to be done on these issues.

As far as synthetics went, one unusual case was an Inamori synthetic opal (8). A faceted stone, it revealed the usual columnar

structure and had a high Zr content. Michael also mentioned the new opals from Welo in Ethiopia, although he noted that it was too soon to know if this material suffered from the same stability problems that had plagued some other Ethiopian opals from a different deposit. The lab had also noted the use of fissure filling in some opals on the market.

Set gems reportedly also came to the lab. One spectacular example illustrated by Michael was the Württemberg Parure, a magnificent set of jewellery set with pink topaz.

The SSEF Lab also does a considerable amount of work with pearls. One unusual piece examined was a ring in which the pearl was actually two blister pearls base to base with a diamond-set band hiding the joint (9). A particularly audacious fake pearl was a dyed fibre glass bead. It was reported that cultured pearls continue to offer many challenges; beadless saltwater cultured pearls, also known as Keshi cultured pearls, are offered on the market as natural, and various beads are now used as nuclei for cultured pearls, including poor quality natural pearls. Microtomography and 3D imaging are being increasingly used in pearl testing, making way for more advanced analyses. Michael also showed a number of slides from his recent travels to mines, including a trip to a cultured pearl farm in the Arabian Gulf (10), a joint venture between Ras-al-Khaimah and Japan.



## Conference 2010

### Amber

The mention of pearls was a good lead-in to **Maggie Campbell Pedersen's** presentation entitled 'Amber, copal and the green stuff'. Maggie, a specialist in organic gem materials, was elected an FGA in 1993. She is the author of *Gem and Ornamental Materials of Organic Origin* and editor of *Organic Gems*, an online information centre and archive.

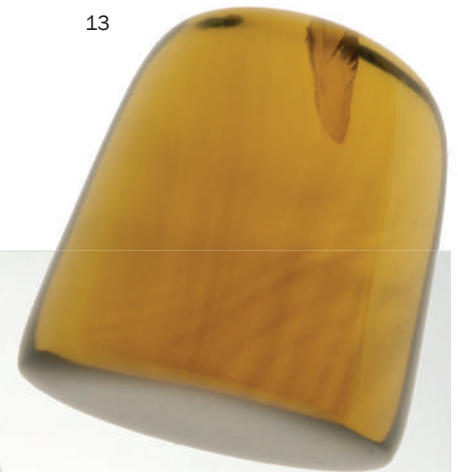
Maggie began by explaining that although both are tree resins, amber and copal should not be considered the same, and copal should not be sold as amber — she was adamant that a distinction should be made. The distinction lies in geological environment and the retention of the volatile components, and did not always relate to age; some copal can be 52 million years old, while some amber is as young as 12 million years old. A hot needle will go into copal, which makes it sticky, but it will not go into amber.

The production of amber jewellery and ornamental objects has a very long history. Maggie cited carved amber animal motifs in the National Museum in Copenhagen that were some 8000 years old. As Maggie explained during the questions session, these survived in such good condition because they had been preserved in a peat bog, in contrast to the degrading and crumbling nature of amber objects from other ancient burial environments.

Amber can be treated in various ways, including heat treatment, clarification and the use of burning or black lacquer on the reverse to provide a greenish colour. This raised the question as to whether there really was such a thing as natural green amber, to which Maggie's answer was that there is no real green amber. The nearest are some types of Dominican amber which can have a greenish appearance, but this is purely a fluorescence effect; the body colour is not green. Much of the so-called amber on the world market is brown Colombian copal, some 200–300 years old, which has been heat treated in an autoclave under pressure. Some Baltic amber can also be turned to an oily 'peridot' green using this autoclave treatment. However, some of the more emerald-coloured hues are the result



11



13



12

11: Broken bead: clarified Baltic amber with a coating of red synthetic material.

12: Colombian copal, treated in an autoclave to turn it green.

13: Mexican amber, which fluoresces green but is golden when seen by transmitted light.

Photos © Maggie Campbell Pedersen.

of autoclaving and dye.

Maggie also touched on red amber. Fine red Burmite amber exists, but is very rare. Much of the so-called red amber on the

market is cast plastic (phenolic resin) or Baltic amber which has been clarified and then given a red surface coating. Similarly, amber with a blue coating has also been noted.

# Gem-A Conference Special

## Conference 2010

### Gem Guide

It was fitting that a day devoted to various aspects of gemmology and the market should be rounded off with a look at prices in **Richard Drucker's** talk, titled 'Historical and gemmological influences on pricing'. Richard is the president of Gemworld International, Inc. In 1982 he began a pricing publication, now known as *The GemGuide*, which prices coloured gems and diamonds to aid in accurate wholesale gem pricing.

Richard began by noting that with coloured gems, unlike diamonds, there had been no cartel able to set and control prices. As a result the value of gems was influenced by a whole range of social, political, gemmological and other influences. For the valuer, a major issue was treatment, and Richard quoted the Roman writer Pliny's opinion that gem treatments are fraud. New treatments can even have an effect on the value of the untreated stones.

With ruby, the traditional source of fine stones was Mogok, Burma. The discovery in the 1990s that far poorer stones from

	Commercial	Good	Fine	Extra fine
1992	0%	Up to +10%	Up to +10%	Up to +20%
1999	0% to +5%	+5% to +10%	+10% to +15%	+15% to +25%
2004	0% to +20%	+10% to +30%	+25% to +30%	+35% to +100%
2006	0% to +25%	+25% to +40%	+30% to +60%	+50% to +100%
2010	0% to +25%	+25% to +100%	+100% to +200%	+200% to +300%

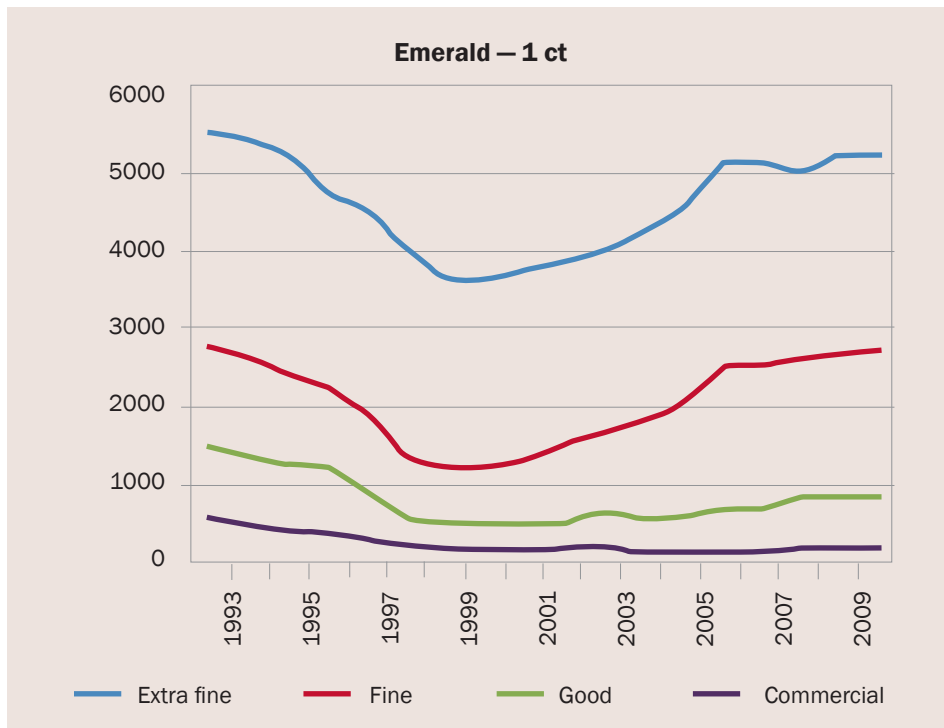
14: This chart shows the progression of untreated ruby prices since 1992. As treatments advanced, the price for treated rubies declined while the premium for unenhanced climbed. Today, very high premiums are realized for top quality unenhanced rubies.

Mong Hsu (also in Burma) could be greatly improved in appearance by a flux healing process brought a large number of 'fine' rubies on to the market. The widespread acceptance of these stones meant that flux residues in rubies were now almost accepted

by the trade, with such stones only attracting a discount of 0%–10% below the price of untreated material, unless there were significant residues, in which case a discount of between 10%–30% applied. On the other hand, there could be a 200%–300% premium on top quality untreated rubies (14). The effect on prices of the legislation against the import of rubies from Burma in the EU and USA remains to be seen, although some dealers are undoubtedly ignoring the rules. Glass filled rubies, however, are a very different matter in value terms. They are available from upwards of a dollar a carat and are becoming abundant on the world market.

With blue sapphires, the heating of the milky white Geuda sapphires to turn them blue seemingly became accepted in the trade and disclosure is still not common. Since the mid 1990s there have been a large number of sapphires on the market from Madagascar, similar to the Sri Lankan material, but even so there has been an upward trend in prices in recent years. With beryllium-treated orange sapphires there was difficulty in detection, leading to a price drop for the untreated material, and thus a laboratory report became a necessity for an important stone.

In the 1980s, emeralds suffered from their association with the Colombian drug trade and money laundering, and this



15. As discussed, the 1990s saw a drop in emerald prices for many reasons including the Ward emerald trial, the confusion over Opticon, and the supply of emeralds out of the La Pita mine. Prices today however, are on the rise.



## Gem-A Conference Special

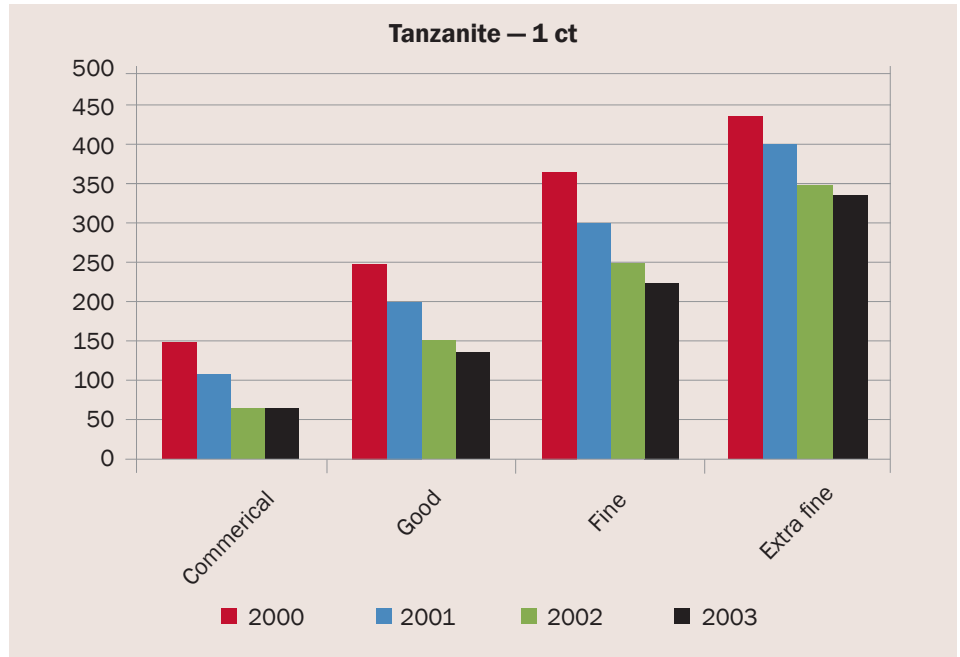
### Conference 2010

was followed in the 1990s with the 'Fred Ward' case relating to emerald clarity enhancement with Opticon resin. Combine this resin confusion and controversy with a new abundant supply of emeralds from the La Pita mine in Colombia, and emerald prices fell as a consequence (15). After about 2000, prices began to rise again and are holding steady even in the current economic situation, largely due to lower mine output, more focused marketing by suppliers and currency differences. New treatments to stabilize emeralds – in effect gluing fractured emeralds together – were now in use and there were considerable concerns relating to the durability of such stones.

Tanzanite has seen a price fluctuation; in the mid 1980s prices were high and there was a good demand. By the late 1980s there was a free-for-all in effect at the mines and so prices fell. In 1990 the Government introduced some controls and from the mid 1990s until 2000 there was a steady rise in prices. However, after 9/11 in 2001 there was the accusation that terrorists had been partly funded by tanzanite mining, leading to some fall in demand (16), but this accusation was then disclaimed. Since then, aggressive marketing – including the nomination of tanzanite as a birth stone – have kept prices at a high level.

Paraiba tourmaline prices were already high in the 1980s, but have recently risen considerably for the true, bright stones from Brazil. No one could have predicted that the few hundred dollars per carat, which seemed high when the stones were introduced to the market, would today command prices in the thousands of dollars per carat.

With cultured pearls, the main factors over the last generation have been the rise of Chinese cultured freshwater pearl production and the slowly declining output of Japanese Akoya. Chinese cultured freshwater pearls first entered the world market around 1980 in the form of the small and irregular 'Rice Krispie' pearls. By 1992 larger, Chinese freshwater 'potato' and round cultured pearls were being produced and this development, plus significant pollution problems, seriously affected Japanese Akoya production. It is worth noting that in 1966 Japan produced



#### 16. 9/11 Effect

Following the accusations of tanzanite possibly funding some terrorist acts, tanzanite prices fell for the next few years. Today, the prices have rebounded and 1 ct stones sell for as much as US\$500 per ct wholesale.

230 tons of Akoya; in 2001 just 18 tons. Japan is now focusing on the production of Akoya in 7 mm diameter and over.

The conference closed with a vote of

thanks to the speakers, the sponsors and the Gem-A staff. The participants had a brief rest, mainly in the hotel bar, before the evening's dinner and disco started.

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## Gem-A Conference Special

# Graduation Ceremony

Gem-A graduates from around the world gathered at Goldsmiths' Hall in the City of London on Monday 8 November to be presented with their diplomas and awards.

Gem-A President Professor Andy Rankin presided at the ceremony and welcomed those present. He then introduced Rui Galopim de Carvalho, founder of LABGEM in Lisbon, Portugal, who presented the diplomas and awards.

Following the presentations to the graduates, the first members to be awarded Fellowship status in recognition of their demonstrably high level of expertise and who have made a significant contribution to the field of gemmology for no less than ten years were presented with their Fellowship Diplomas. They were Dr Douglas Nichol of Wrexham, Christopher P. Smith of New York and Mary Burland of Gem-A London (see pages 40 and 41).

Evelyne Stern who retired from the Gem-A Council in 2010 was presented with a certificate honouring her contribution to the work of the Association.

Rui Galopim de Carvalho then gave his address in the form of a passionate and well-informed plea for Gem-A graduates to continue their interests and their learning. There is an exciting and rapidly developing field which provides the background for a fascinating career and participation in a worldwide community of like-minded people. Gemmology might not provide great wealth for most of its professionals, but it gives access to amazing objects, opportunities for travel and the ability to, in Rui's words, "starve comfortably".

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



*The graduates and award winners in the magnificent Livery Hall following the ceremony.*



## Gem-A Conference Special



1. Guest speaker Rui Galopim de Carvalho.

2. Gem-A President Professor Andy Rankin welcomes the graduates. From left: Rui Galopim de Carvalho, Professor Andy Rankin, Gem-A Chairman James Riley and Gem-A CEO Dr Jack Ogden.

3. The reception for graduates and guests in the Drawing Room.

4. The prize winners: (left) Hirsh Foundation Award and Anderson Medal winner Robin Hansen of Warminster, Wiltshire, and (right) Christie's Prize for Gemmology winner Louise Dennis, Halesowen, West Midlands.

All photographs © Photoshot.

# Jewellery through the ages



John Benjamin

John Benjamin's seminar covering jewellery design from the fifteenth century to date was truly a tour de force. Olga Gonzalez reports on this important presentation.

Like speed dating, there is the good, the bad and the ugly in jewellery design. Reminiscent of the eight-minute table sessions of my twenties, John Benjamin's talk 'From Medieval to Modernism: A Thousand-Year Tour of International Jewellery Design' covered a lot of ground in a short amount of time, while maintaining the ability to be brilliant and entertaining, all in four well-organized parts.

John's first session covered the history of jewellery design from the fourteenth century through to the seventeenth century, organizing design by categories such as cameos, talismanic, religious jewellery, etc. I particularly enjoyed the memento mori jewellery, such as the Moresques on the surface of a coffin lid placed on a bed of human hair. I was also delighted to learn the function of the long silk cordettes one sometimes sees on a young woman's hand in paintings; cordettes hold a ring onto the girl's finger while the rest of the cording is wrapped around the wrist for security (e.g. for when one inherits a ring that is too large).

Next on the agenda were pearls. Because natural pearls were so expensive and rare, many ladies wore large imitation pearls made from glass beads with a fish scale coating. John showed examples of imitation pearls in paintings, before appropriately going back in time to the days when jewellers occupied London's Cheapside, to the 1912 discovery of the Cheapside Hoard: an incredible seventeenth century treasure trove of jewellery made for the middle class shopper.

Session two involved an elegant romp through eighteenth century jewellery dripping with diamonds; an age where the effective advances in cutting must have looked spectacular when the cut diamonds

sparkled under candlelight. Never too much, the layering of three, five or even ten-diamond bow brooches was acceptable, and looked quite extravagant alongside delicate, yet romantic, posy, giardinetto and fede rings. Cut steel as a new material also made an appearance, and was embraced by the famed Matthew Boulton in the form of diadems, necklaces, bracelets and earrings. The era of saying how you felt in flowers needed an explanation of floral symbolism which John Benjamin provided; e.g. marigolds are given for jealousy, thistles for pleasure combined with pain, and roses for passion. Ending on an oriental note, John presented examples of Moghul jewellery from the eighteenth century, incorporating a large number of spinels and thin, flat, polished diamonds. Often fetching a good price at auctions if from the eighteenth century, it certainly is a period to pay attention to.

After lunch the Gem-A group assembled in the beautiful Goldsmiths' Hall to continue the immersion in jewellery design history. The next session covered the nineteenth century, "[a] sometimes hideous time for jewellery, but a time when technical virtuosity was coming into play", in John's words. He couldn't be more correct. From 1800-1825 the fashion for sentimentality — jewels containing woven hair or spelling a message in little gems were universally popular and by the 1840s nature and naturalism held sway, for example a serpent grasping its own tail with its mouth was a potent symbol of everlasting love. It is around this time that much jewellery was sentimentally made with woven hair. Neapolitan Italian coral was also often used, although this greatly depleted the local coral sources. Jet from Whitby was all the rage during the reign of Queen Victoria, and imitations popped up



## Gem-A Conference Special



1



2



3



4



5



6

1. Sky blue glass and cut steel double cluster brooch, circa 1795. The multiple facets on the little steel studs differentiates this from later, cruder nineteenth-century examples. 2. Three English Victorian butterfly brooches circa 1890: (top) butterfly wings covered by rock crystal, (centre) all diamond-set tremblant, (bottom) carved opal wings with diamond borders and abdomen. 3. A complex water sapphire, polychrome enamel and emerald pendant by Henry George Murphy circa 1928. 4. Two examples of late eighteenth-century Neo-Classical mourning jewels. 5. Medieval gold ring mounted with a simple polished sapphire cabochon, circa 1150–1250. 6. A novelty gold pendant circa 1870 mounted with a reverse crystal painting of a bumble bee — a prime example of Victorian naturalism and realism combined. Photos courtesy of John Benjamin.

such as Bog Oak (fossilized peat) vulcanite and French Jet (black glass). Although jet is a beautiful material for carving, the fashion dissipated after the death of Queen Victoria, when there was a revivalism of Medieval and Gothic motifs within jewellery design. Fortunato Pio Castellani was one of the most famous and skilled nineteenth century jewellers, and his micro-mosaic jewellery was absolutely stunning in detail. Although he created tourist jewellery for those in Italy on the Grand Tour, his skill as a craftsman is undeniable. During the 1870s there was a Renaissance Revivalism, and the pieces of Carlo Giuliano beautifully conceptualized the trend, and are still very saleable and

fashionable today. John explained that much of this colourful jewellery was so redolent of the Renaissance that it is known today as 'Holbeinesque', and praised his work in enamel and subtle understated gems.

In the last section of his talk, John Benjamin discussed twentieth century jewellery, as well as several fun moments in design such as the Belle Époque, Art Nouveau and Art Deco styles. Jazz and the Ballet Russes influenced Art Deco with colourful, bold and striking fruit salad jewellery, and so the selling of giftware in jewellery stores began after the war. The gems used in design changed, and one saw more tourmaline, aquamarine and zircon

pieces.

When John Benjamin's whirlwind lecture concluded those present were extremely impressed by the quality and quantity of the amount of history covered, and when James Riley from the Gem-A Board of Directors thanked John for his voluntary time, all felt surprised by what they had learnt, but were very thankful. I cannot imagine how long it must have taken to prepare for such a long talk, but I am certainly very appreciative of his time and generosity towards Gem-A. Hopefully we shall be treated to another lecture this time next year!

## Gem-A Conference Special

# Photomicrography

Olga Gonzalez reports on Michael Hügi's photomicrography workshop held at Gem-A as part of the Gem-A Conference weekend, fusing the art of photography with the observation of gemstone inclusions.

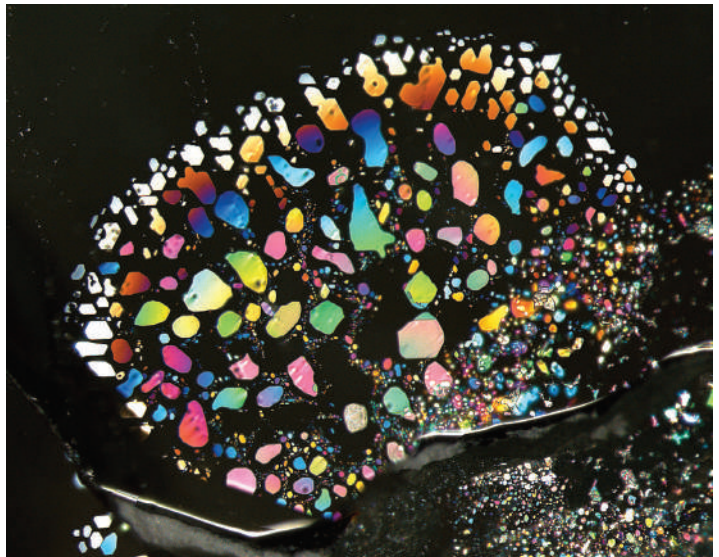
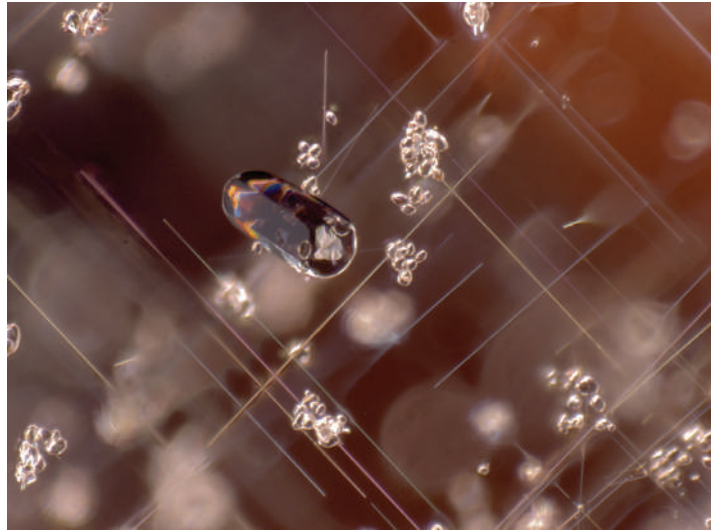
Known for his stunning photomicrographs, I was eager to sign up for Michael Hügi's workshop and learn the secret to creating such beautiful imagery.

Quoting John Koivula, Michael began by stating that "There is no substitute for good optics." Hardware is very important. One needs a microscope, a good camera, various illumination sources, a clean specimen to work with and, most importantly, patience; necessary for taking the images as well as for editing them.

Michael recommended a microscope with a minimum zoom ratio of 1:10 (6 to 60 times magnification), with a 10x ocular and a trinocular tube for the mounting of the camera. For those who are curious, he uses a research stereomicroscope Leica MZ16 with the Leica DFC500 camera. The downside is that because such microscopes are not made for gemmology, they have to be customized; for example, there is no catch if the stones fall, so one must practice with the tongs before purchasing.

To capture effective photos a long exposure time is needed, as well as a vibration-free environment. An ideal location for the equipment is a basement; everything should be set on solid tables, with a remote control by a computer connected to the camera, or a cable release on another table for the taking of images. A room that is capable of total or near total darkness is preferable in order to deter reflections. The manipulation of light sources is crucial to photomicrography; Michael suggested experimenting with different sources such as darkfield, lightfield, fibre optic, diffusers and polarizers, as well as other materials that can be used for shadowing. Often a combination of several of these can produce a unique effect. The removal of dust and fingerprints is important, as well as the use of an antistatic brush on electrostatically charged materials, such as diamond, amber and tourmaline.

After receiving a 'how to' lesson on photographing images, those attending the workshop worked in pairs and experimented with different light sources to create their own ideal photomicrography



Top: Inclusion of a rutilite crystal, rutilite needles and rounded zircon crystals in spessartine — almandine garnet (umbalite), Umba Valley, Tanzania. Width of field approx. 1 mm, fibre-optic illumination.

Bottom: Thin films of fluid inclusions in yellow beryl from Padre Paraiso Mine, Minas Gerais, Brazil. Width of field approx. 3 mm. Fibre optic illumination. Partially healed, very thin fissures parallel to the basal pinacoid of the beryl, containing water and/or CO<sub>2</sub>, show this firework of interference colours when illuminated nearly parallel to the viewing direction.

Photos by Michael Hügi.



## Gem-A Conference Special

backdrop for inclusions. Working with both amber and aquamarine specimens, we experimented with light, shadowing and optics to create levels in which different parts of the gem were best in focus.

Michael then generated a High Dynamic Range (HDR) image using Photomatix Pro and began 'tonemapping' using an exposure series of pictures taken of one gemstone inclusion, all at the same angle. The computer generated a possible image and using this

Michael made his adjustments by working from the histogram. For the extension of the focal depth of a picture, he usually uses the Helicon Focus software, which is more affordable than Syncroscopy Automontage.

All were impressed by Michael's beautiful rendering of inclusions and were in awe of the detailed images produced through photomicrography.

# Gem treatment day



Ted Themelis explains how to identify the various types of treatment (above) and (right) looking at treated ruby samples with participant Natascha Trolle of Copenhagen, Denmark. Photos © Jack Ogden.

On Saturday 6 November gem treatment specialist Ted Themelis presented a full day seminar 'An update on the heat treatment of ruby and sapphire'. Ted, who lives and works in Bangkok, provided the packed teaching floor at Gem-A with a detailed programme covering all aspects of the treatment of ruby and sapphire, from the science and practice of treatment to the pricing structure for the treated stones.

The day was divided into eight sessions during which Ted discussed the basics of diffusion and heat treatment of ruby and sapphire, revisited beryllium treatment and covered the classification of heat treatment. He then showed a short video on the heating of Geuda sapphires, filmed by Ted Themelis in Sri Lanka in 1986.

Next on the agenda was an update on the fracture-filling processes, including a comparison between borax-filled and lead-filled rubies, and fracture-filled rubies, including their identification and stability. Ted then moved on to the commercial aspects with a look at the pricing structure and value of treated gems. As he



noted, treaters wouldn't treat stones unless it was economically viable. Following a round-up of the day, including some thoughts on terminologies, Ted gave a preview of some of the new challenges that could face gemmologists in the near future — including the treatment of garnets.

Following the sessions there was an opportunity for participants to examine a selection of gems, both before and after treatment, and to purchase copies of Ted's book *The Heat Treatment of Ruby and Sapphire* (2nd edn).

## Gem-A Conference Special

# The 600 ct diamond evening

Report by Olga Gonzalez of the talk by Marijan Dundek at the Gem-A Gem Discovery Club on Tuesday 9 November entitled 'The Magic World of Diamonds'. Dundek currently works with Graff Diamonds in London and is the author of *Diamonds*, now in its third edition.



*Different colours of rough diamonds. Image courtesy of Anna Moltke-Huitfeldt.*

Intriguing his guests, Marijan Dundek began by answering the question he gets asked most often: "What is the largest diamond in the universe?" The answer is the diamond star, Lucy, named after the Beatles' song (yes, like the first hominid skeleton, the song 'Lucy in the Sky with Diamonds' is quite popular among scientists). The star is ten billion trillion trillion carats, but the largest single diamond on earth is the Golden Jubilee, which is now cut to 545.67 ct.

Marijan discussed the 13 billion dollar diamond industry and highlighted the importance of watching China's role as a major player in the buying of rough diamonds — China currently has the second largest economy in the world and is its second largest consumer. India's role was also discussed as a soon-to-be major player in production, particularly when Rio Tinto launches its diamond mine there, projected for 2014. Marijan also touched upon the roles of several companies within the industry and stressed the importance of ethical production — particularly important in moving the industry forward in countries like Zimbabwe.



*Lesotho necklace. Image courtesy of Graff Diamonds.*

During the talk Marijan also reviewed the beauty of natural coloured diamonds from around the world; detailing the history of the science behind stones of different colours, and ending with a focus on the Australian Argyle mine where 90% of all pink diamonds originate.

Delightfully, Marijan then transitioned into showing images of the 603 ct Lesotho Promise, the diamond rough purchased by Graff which was beautifully cut into a 223.35 ct diamond necklace consisting of 26 D flawless diamonds.

Appropriately, Gem-A staff brought out the famous Bruton diamonds for members and guests to handle after the talk. Definitely a night to remember for those diamond lovers!



*The 603 ct Lesotho Promise. Image courtesy of Graff Diamonds.*



## Gem-A Conference Special

### Gem-A Conference Dinner

An exciting day was rounded-off perfectly with the Gem-A Conference Dinner. Held in the Gunnell Suite of the Hilton London Kensington, attendees were served a delicious three-course meal – undoubtedly well-deserved after the day's activities.

After the dinner a special presentation ceremony was held in honour of Mary Burland, editor of *Gems & Jewellery* and Director of Publications at Gem-A, who is retiring at the end of 2010 (see page 41). In recognition of Mary's outstanding commitment, enthusiasm and work for the gemmological community, the Scottish Gemmological Association presented her with a beautiful brooch set with Scottish smokey quartz, while from the Board of Gem-A Mary received flights and accommodation

to attend the 2011 Tucson Gem Fair – a trip that has been on Mary's wish list for many years. She was also presented with an invitation from the Accredited Gemologists Association (AGA) to attend their Conference and Gala dinner dance while in Tucson. The thunderous applause for Mary clearly demonstrated how respected and loved she is amongst her peers and friends.

After the presentation the lights were lowered and the dancing got well under way. A sing-song followed, accompanied on the piano by multi-talented Rui Galopim de Carvalho – an evening which will surely be remembered by all present.

Georgina Brown



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## Organics

# Ivory carving in Germany

Maggie Campbell Pedersen visits a unique museum and school

About an hour's drive south of Frankfurt, Germany, lie the two medieval towns of Michelstadt and Erbach im Odenwald. They are in fact so close together that it is difficult to tell where one ends and the other starts. But to today's gemmologists they have one very important bond: ivory. The Deutsches Elfenbeinmuseum (German Ivory Museum) is situated in Erbach; it is the only museum of its kind in the world with displays concentrating solely on ivory.

Count Franz I of Erbach-Erbach started the ivory trade in his town – originally a wood-carving centre – in the mid eighteenth century. During a visit to Italy he observed ivory being carved and so decided to set up a centre in Erbach. He sent some of his wood carvers to ivory carving centres to study the craft and, in 1783, formed the Ivory Carvers' Guild. Elephant tusks were bought from agents who imported them from Africa, and for the first hundred years or so the items were made mostly for local

*A student cutting bone on a band saw. Photograph © Maggie Campbell Pedersen.*



*Top: Entrance to the Germany Ivory Museum. Bottom left: a workshop at the school. Bottom right: demonstration area at the museum. Photographs © Maggie Campbell Pedersen.*

consumption. Hunting scenes and animals were very popular subjects for both jewellery and figurines. Such ivory ornaments were not restricted to the nobility; anyone who could afford to buy ivory was permitted to do so.

However, it took a while for the world to realize that Erbach was an ivory carving centre. At the Vienna Exhibition in 1873 the carvers displayed some of their work, including carved roses. They were so popular that the Erbach ivory rose became an emblem for the city and its trade, and the ivory trade's main export item.

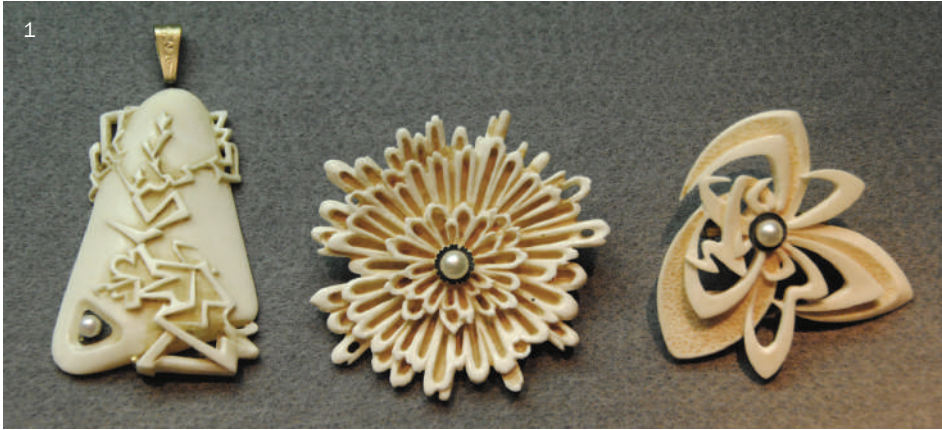
The ivory carving school, Berufsfachschule für das Holz und Elfenbein verarbeitende Handwerk, was founded in 1892. Housed in Michelstadt, the school still exists today and is the only school of its

kind in Europe where students can study either wood or ivory carving. The full-time course takes three years and is recognized as a degree course; it can be followed by a further two years' training to become a Master Carver. The students learn to carve in bone, tagua nut, mammoth ivory and, occasionally, elephant ivory. The latter is only possible because the school has a stockpile of ivory material left over from before the ivory bans came in. The school was given special compensation to continue to use the ivory, although it can only be done under immensely strict supervision and with regular visits from government officials.

The museum lies on Otto Glenz Strasse, the road named after Erbach's most famous ivory carver of the early twentieth century.



## Organics



1. Carved ivory jewellery by Adam Amend. 2. The Erbach ivory rose. 3. Stag carving by Otto Glenz, 1900. 4. Dancers by Otto Glenz, 1900.  
Photographs © Maggie Campbell Pedersen.

Originally opened in 1966, the museum was completely renovated in 2006. The museum's display is divided into sections; firstly, it gives an outline of how an ivory carving is made, with drawings, models and live demonstrations. The next sections house a good collection of ivory artefacts most of which have been carved in Germany over the

past three hundred years. Continuing through the museum, one is taken past sections displaying ivory use in various cultures around the world: African, Inuit, Japanese, Chinese and so forth. Some of the items on display are on permanent loan from other museums. Finally there is a chronological display of local work, including recent

additions created by students at the school.

In London, Paris, New York and many other places besides, we can find collections of medieval ivories or ivory objects in general collections. The Erbach museum is unique in that it is an all-round introduction to elephant ivory. It is a museum not to be missed if travelling in that part of Germany.

## Organics

# New information on old ivory

A chance to examine some rare mastodon ivory leads Maggie Campbell Pedersen to an interesting conclusion

For some time we have accepted that there is a visible difference between elephant and mammoth ivories which helps us to identify them, namely the angle of the intersecting arcs (also called Schreger lines\*), observed in a cross section of the material. Those in elephant ivory (1) are wider than those in mammoth (2). This is seen most clearly towards the outer edges of the tusk.

Some years ago there was discussion about these lines and it was said that it was not always correct and therefore inconclusive. Until a couple of weeks ago I had never seen anything that altered my opinion that this rule held fast. But when visiting Bobby Mann (GG, expert on ivory and co-founder of the International Ivory Society) in Washington DC, I was shown some mastodon ivory.

Mastodons died out about 11,000 years ago. They were smaller than woolly mammoths, and their tusks, like those of elephants, were long and only slightly



A mammoth (left) and a mastodon.

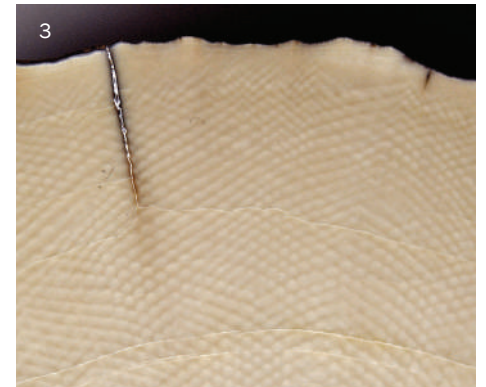
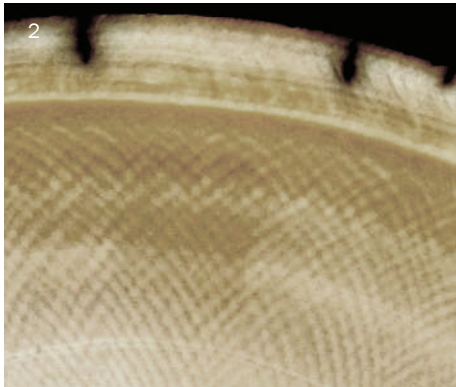
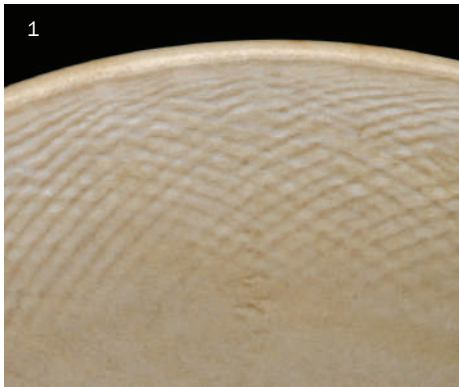
curved. Although elephants are not direct descendants of either mammoths or mastodons, it seems that the internal structure of their tusks is similar to that of the mastodons. The intersecting arcs in mastodon ivory are wide (3), and not narrow like those of mammoths. Could it be that this is where the confusion has lain?

Fortunately very little mastodon ivory has

been carved as it tends to be more friable than mammoth ivory. So as a rule of thumb, we can still trust the angle of the intersecting arcs seen in cross section to tell us whether we are dealing with ivory from an extinct or from a protected animal.

\* See 'Let's forget those lines of Retzius', *Gems & Jewellery*, July 2009, page 22

The intersecting arcs in (1) elephant ivory, (2) mammoth ivory and (3) mastodon ivory. Photos © Maggie Campbell Pedersen.





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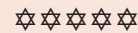
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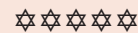
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# Gem-A Calendar

## February

### 1-6

#### AGTA TUCSON GEM SHOW

Tucson Convention Center  
260 South Church, Tucson, Arizona



Gem-A will be exhibiting at Booth #29 (upper gallery) at the AGTA show, so if you will be visiting Tucson do come along and say hello. Gem-A CEO Dr Jack Ogden, Director of Education Lorne Stather and Diamond Tutor Claire Mitchell will be at the booth and look forward to meeting you.

### 3

#### GEM-A HANDS-ON SESSIONS AT THE AGTA TUCSON GEM SHOW

##### Cross-purposes: using the gemmological polariscope

Gila room, 9:00 to 10:00 am

Claire Mitchell will present this essential guide to the useful but too often ignored polariscope. The small, portable polariscope is a gem identification tool that is finding increasing popularity among gem dealers and appraisers. This presentation introduces you to this neat little instrument and shows you how to get the best results from it. If you have a portable polariscope and conoscope, bring them along with you to this hands-on practical session – but some equipment will also be available. Seating is limited, first-come first-served.

#### The blues: distinguishing blue stones that look alike

Gila Room, 1:00 to 2:00 pm

Meet with Gem-A to look at quick separation tools for the blue stones. This practical session looks at some of the quick and easy tests that can be used to help distinguish between blue stones using simple, handheld and portable equipment – vital skills when you are at a trade show, doing an appraisal or out on a buying trip. The focus will be on the Loupe, Chelsea Colour Filter and the Dichroscope – bring yours along for practice or use samples provided. Seating is limited, first-come first-served.

### 22

#### ORGANICS

##### Gem-A one-day workshop\*

Gem-A's London headquarters  
10:00 am to 4:30 pm



A day with organics specialist Maggie Campbell Pedersen who will explore a variety of different materials including amber and copal, horn, ivory, jet, coral and shell. Areas covered will include origins and formation, different varieties and detection methods. The emphasis will be on hands-on observation and discussion.

## March

### 7

#### ALLURE OF GEMS

##### Gem-A one-day workshop\*

Gem-A's London headquarters  
10:00 am to 4:30 pm



An informative and informal workshop, ideal for those new to gemmology. No previous experience is required.

### 21

#### INTRODUCTION TO PRACTICAL GEMMOLOGY

##### Gem-A one-day workshop\*

Gem-A's London headquarters  
10:00 am to 4:30 pm



A day to help you understand the principles required for effective gemstone identification. The use of gem-testing equipment will be demonstrated.



28

**RUBY, EMERALD AND SAPPHIRE****Gem-A one-day workshop\***

Gem-A's London headquarters  
10:00 am to 4:30 pm

A hands-on day looking at natural ruby, sapphire and emerald, followed by their treatments (including lead-glass filling of ruby), simulants and synthetics. Whether you buy, sell or value gems or gem-set jewellery, or simply have a love for these gems, this is your opportunity to update your knowledge.

30

**WHAT'S NEW IN THE GEM MARKET?****Gem-A North East Branch meeting**

Innovation Centre, York Science Park,  
York

A talk by gem dealer Tracey Jukes.  
For further information contact Mark Houghton at markhoughton1@hotmail.co.uk.

## April

12

**DIAMOND BUYING GUIDE****Gem-A one-day workshop\***

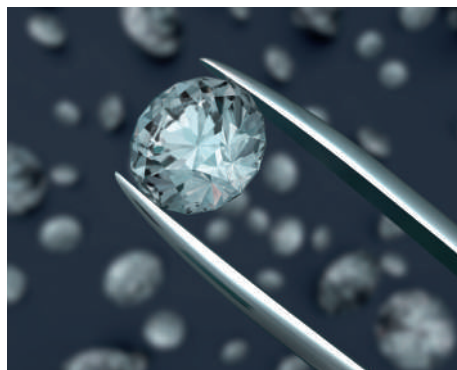
Gem-A's London headquarters  
10:00 am to 4:30 pm

An introduction to the 4 Cs (colour, cut, clarity and carat weight), this course provides the practical information required to enable you to give sales advice or to make informed choices when buying a diamond.

13-15

**ADVANCED DIAMOND GRADING****Gem-A three-day certificated course**

Gem-A's London headquarters  
10:00 am to 4:30 pm



This concentrated three day certificated course is designed to teach you about advanced diamond grading and is taught by a grader with 25 years' experience. Topics covered include the use of the microscope to clarity grade and plot diamonds, colour grading with master stones, fluorescence grading and various aspects of cut, such as measurements, proportions, symmetry and polish.

Applicants must hold either the Gem-A Gem Diamond Diploma or Diamond Practical Certificate.

## 29 April to 2 May

**SCOTTISH GEMMOLOGICAL ASSOCIATION  
2011 ANNUAL CONFERENCE**

The Queen's Hotel, Perth

Speakers will include David Callaghan, Alan Hodgkinson, Dominic Mok, Stuart Robertson and Dr Karl Schmetzer. Further information is given on page 30.

**\* Gem-A Workshops**

Further information on our popular one-day workshops is given on page 31.

For the latest  
information on Gem-A  
events and  
workshops go to  
**www.gem-a.com**

## Around the Trade

Harry Levy reports on the continuing saga of the Kimberley Process

# KP-Plus



After I had finished writing my last article on the KP (*Gems & Jewellery*, Autumn 2010), matters regarding diamonds took a dramatic turn. Substantial quantities of diamonds had been found in the Marange district in Zimbabwe and at first local diggers started gathering them, but eventually the government moved in and took over the diamond fields. The NGOs

pointed out that the government move-in was brutal; miners and local civilians were killed whilst others suffered violations of their human rights. The NGOs approached the KP participants and the World Diamond Council (WDC), demanding that Zimbabwe be suspended from the KP until they stopped their human rights abuses.

Many involved with the KP, including Zimbabwe, pointed out that the KP had been put in place to stop and prevent civil wars, not to reprimand governments, and that as a result there was no mechanism within the KP to suspend or expel a government. To complicate matters further an NGO employee, Farayi Magawu, was arrested whilst working in Zimbabwe and charged with “spreading falsehoods detrimental to Zimbabwe” (*Guardian*, July 2010<sup>1</sup>). The NGOs tried to have Farayi freed but their efforts had no effect on the Zimbabwean authorities. They turned to the KP and WDC to bring pressure on Zimbabwe — they themselves presumably scared of going to Zimbabwe in case they too were arrested.

I attended the WDC meeting in St Petersburg, where much of the day was taken up with trying to get the release of Farayi. Eventually the NGOs agreed that they would not oppose the idea of a limited amount of rough diamonds being exported from Zimbabwe under the KP, on the condition that a further review would be conducted to see how compliant Zimbabwe had become in their approach to human rights. Opposition continued from Canada and Australia — both large exporters of rough diamonds — as well as the USA, who opted to wait for the review before agreeing to further Zimbabwean exports.

The review meeting was held in Israel — Israel was holding the Chairmanship of the KP at that time — but again very little

progress was made. A further meeting in Brussels was proposed, but Zimbabwe decided to boycott the meeting and declared that it would export its diamonds regardless. Thankful Musukutwa, Mines and Mining Development Secretary, claimed that they were compliant with all the requirements of the KP Certification Scheme (KPCS) and would “not be stopped by NGOs and hostile nations” (DIB Online, December 2010<sup>2</sup>).

The “hostile nations” remark perhaps refers to a proposal made by the US to introduce a KP-Plus system, a plan whereby certain KP participant countries could commit to a higher level of compliance with KP requirements, in order to enhance their standing within the scheme (Even-Zohar, 2010<sup>3</sup>). Supported by Canada and Australia, such a move could be seen as an attempt to by-pass the current KP system of defining conflict diamonds as “rough diamonds used by rebel movements to finance wars against legitimate governments”. The KP-Plus would have written into it assurances about human rights; as a result, the material coming through the KP-Plus scheme would be superior to diamonds coming through the KPCS, with consumers being able to distinguish between the two streams of rough diamonds. However, it seems that it is concentrating more on separating diamonds from Africa from those diamonds coming from other parts of the world. For those familiar with the Kosher analogy, we are moving from Kosher to Glatt-Kosher, supervised to a greater degree than normal Kosher products.

Naturally there is complete opposition to this proposal from those countries that would not be able to participate in this plan; introducing a two-tier system into diamond distribution would become a nightmare to monitor once the rough diamonds are polished and put into jewellery. If the Zimbabwe issue is not resolved, their rough will begin to appear in cutting centres. It could mean the break up of the KP, something which many participants would like to see happen.

At the time of writing there seems to be no resolutions to the problems of the KP; the KP-Plus is getting the thumbs down. Whilst some claim that there is a shortage of rough in the market, others claim that there is enough rough to meet demand and that introductions of vast amounts of stock-piled rough could only bring instability to diamond prices. And so the saga continues. Perhaps we will have another film soon to follow up the new shenanigans in the diamond industry — ‘Blood Diamond 2’.

Global Witness has produced a report titled ‘Return of the Blood Diamond’ — this can be downloaded from their website, together with



more information on the diamonds of Marange and the accusations made against Zimbabwe, the KP and the diamond trade. Wikileaks<sup>4</sup> has also made public a cable from the American Embassy in Zimbabwe relating to the illegal smuggling of diamonds from the Marange fields.

1. Guardian.co.uk, July 2010, <http://www.guardian.co.uk/commentsfree/2010/jul/19/zimbabwe-diamonds-ngos>
2. DIB Online, December 2010, <http://www.diamondintelligence.com/magazine/magazine.aspx?id=9148>
3. Even-Zohar, C., 2010, Diamond Intelligence Briefs, [www.diamondintelligence.com](http://www.diamondintelligence.com).
4. Wikileaks, December 2010. <http://213.251.145.96/cable/2008/11/08HARARE1016.html>

## Burma ruby

It can be said that there is a counter to blood diamonds, namely blood rubies. Once upon a time the best rubies were Pigeon Blood stones from Burma. The Americans, in their opposition to the Junta in Burma, introduced a ban on all ruby and jade coming out of Burma. Why only these stones? Burma produces many other gemstones, including beautiful golden pearls. It is because legislation was set hastily in the United States in their efforts to bring down the government in Burma.

At one of the Congresses I met up with several US officials who had been appointed to put the ban into practice. It was said that Congressmen and Senators often approved legislation because of 'vanity votes' — a vote that they thought would be approved by the electorate. They wanted to hurt the government in Burma; Aung San Suu Kyi had been put under house arrest and had been prevented from taking part in the elections, and the USA were told that some of the most lucrative exports from Burma were ruby and jade. No other stones were mentioned, and so the ban did not extend to all gems originating from Burma.

Most trade associations felt that they had to comply with this law and so other countries decided to back the boycotts. There was an outcry within the trade that most of the gem trade and its mining is in the hands of local miners and artisans, and that the ones who would be hurt most would be these people rather than the government. The boycott has been in existence now for several years; the Burmese government is still there but the boycott has produced some strange results.

A museum found itself in a dilemma when it realized that some of the jewellery pieces it wished to send to the USA for an exhibition contained Burma ruby. Further enquiry showed that the rubies had originally been sent with no origin specified, that some of the stones had been documented for many years and were known to be Burmese in origin, and because of this they could be impounded and confiscated. It appeared that it was up to the officer on duty to decide what to do. The ban is against Burma rubies only, and with no date given as to when the rubies had left Burma, a strict reading of the law by the officer would dictate that he would impound the goods. Although I do not know

what happened in this case, I can presume that it would be a long and expensive process to try to recover the stones through the American courts — although the ban was clearly set up to prevent goods coming out of Burma at the present time.

Another strange result of the boycott was the case of a London dealer who had bought goods from Thailand — no rubies this time. When he came to send money to his supplier through his bank (something he had done for years), he was told that the money could not be sent. A bank official had looked up the website of the dealers in Thailand, which mentioned that they sold Burma rubies, and was barring the transaction. It unfolded that the Thai dealers had not updated their website in a long time and had thus not removed the reference to Burma rubies. Eventually the London dealer had to send the money to Hong Kong to an associate company of the Thai dealers. The dealer had pleaded that he was paying for goods which did not include ruby of any sort, but was told that if the bank sent the money they could be accused of breaking the boycotts.

Often people do not fully understand the consequences of the actions they take — “They know not what they do.” This can be seen in the case of both the diamond and the ruby. There was much rejoicing by traders when they were told recently that Aung San Suu Kyi had been released from house arrest; they believe that the ban on rubies will be rescinded. The ruby market has been difficult enough this past few years with a shortage of nice stones — the stones that are available are heat treated, leaving glass residues. There is also the advent of lead-glass filled rubies, where very low-quality rubies can be turned into fine gem-looking stones.

The hope is that Burma rubies will again come into circulation. Setting a new law may be easy, but to change one or to remove it from legislation can be far more difficult and can take much longer — it is as if these laws are truly set in stone.



# And now composite chalcedony

Gagan Choudhary reports on a very unusual composite submitted to the Gem Testing Laboratory of Jaipur.



1: These three composite specimens, (a) dark green, (b) light green and (c) orange with golden and silvery white matrix, were made up of chalcedony pieces in a polymer matrix.

In the Autumn issue of *Gems & Jewellery*, as part of my series of articles on various types of new and innovative composites, I described a specimen made up of chips of rough diamond stuck on to a piece of rock crystal. Similarly, in this issue I give a brief report on another interesting composite, this time made up of pieces of green and orange chalcedony. I examined three specimens (1) submitted for identification at the Gem Testing Laboratory, Jaipur; these were small pieces of chalcedony held together in a polymer-based matrix.

## Visual appearance

The three specimens varied in colour from dark green (1a) to light green (1b) and orange (1c), with a golden and silvery white matrix. The visual appearance of the stones alone was enough to identify the specimens as composites. The darker green specimen had a golden matrix while the lighter green and orange specimens had a silvery white

matrix. All three specimens were fashioned as cabochons. The lustre of the specimens were waxy to dull vitreous, indicating the possibility of chalcedony, while the matrix portions displayed even duller lustre (2), commonly associated with polymers. The specimens with the silvery white matrix also displayed a sheen effect similar to that which is observed in some shells. Furthermore, transparency of the individual green and orange chips varied from semi-transparent to translucent.

## Microscopic examination

Even though the specimens were readily identified as composites by their visual appearance, the exact nature of the individual pieces was still to be determined. When magnified, many of the individual pieces displayed a circular to semi-circular banded structure in botryoidal pattern (3), in addition to some cloudy patches. This structure is typically



associated with microcrystalline materials such as chalcedony. When focusing on the white areas distinctive flow patterns were observed with some depressions (4); this is due to the softness of the polymer at various places within the vein. In certain areas large gas bubbles (5) were also seen confirming the presence of some polymers, as well as hemi-spherical cavities formed as a result of the explosion of gas bubbles during polishing. A needle probe in the white areas made indents quite readily. At higher magnifications this white area displayed the presence of some densely packed tiny white particles/platelets (6) which appeared iridescent at some angles. The shapes of these platelets were mostly irregular, although some were triangular (6). These tiny platelets appeared to be responsible for the sheen effect observed in the white veined areas. The brassy yellow veins in one of the samples (1a) were composed of a flaky substance which was readily observable even at a lower magnification, and was identified as a Cu and Zn based substance (brass) by

energy dispersive X-ray fluorescence (EDXRF) spectrometer analysis.

#### UV fluorescence

Another interesting feature of these composites was their reaction under long wave ultraviolet (UV) light. The white veined areas in the light green (1b) and orange (1c) specimens displayed a bright blue reaction, while the brassy yellow veins remained inert (7). However, this reaction was expected for the white areas because of the presence of the polymers and tiny white platelets.

#### Gemmological examination

Although the specimens had been identified as composites, the exact nature of the green and orange pieces was still in question. Standard gemmological testing was undertaken, identifying the pieces used as chalcedony. Key properties are listed in **Table I**.

#### FTIR analysis

In addition to the standard gemmological

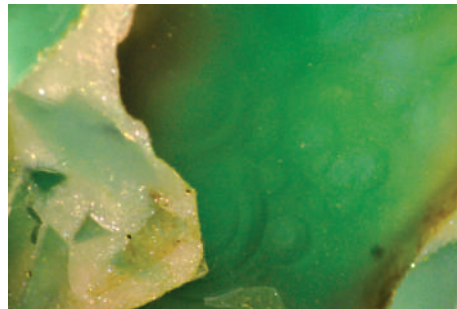
examination, Fourier transform infrared (FTIR) spectra were also collected for all three samples. The spectra displayed complete absorption of wavelengths at around  $4000\text{ cm}^{-1}$  and two humps at around  $4500$  and  $5250\text{ cm}^{-1}$ . This spectral pattern is typically associated with the chalcedony; providing additional support to the composites' identification. Features related to the polymer could not be seen due to the complete absorption of wavelengths in the region associated with polymers.

#### EDXRF analysis

In order to find out the nature of the brassy yellow and white veins, EDXRF analysis was conducted on all three samples. The sample with brassy yellow veins (1a) displayed peaks for Cr, Fe, Cu and Zn, as well as Si; Cu and Zn are brass forming components, hence the possibility of fine flakes of brass occurring along the veins cannot be ruled out. The white veined samples (1b and c) exhibited the presence of Ca in addition to Cr (centre), Fe (right), and



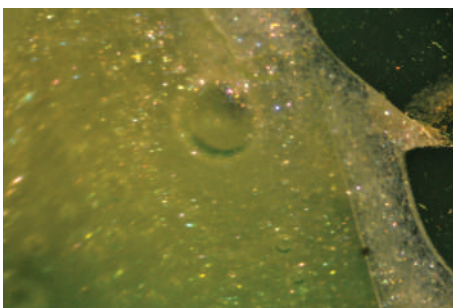
2: The green and white veined areas displayed distinct differences in lustre. Note the duller lustre of the polymer filled areas. Magnified 25x.



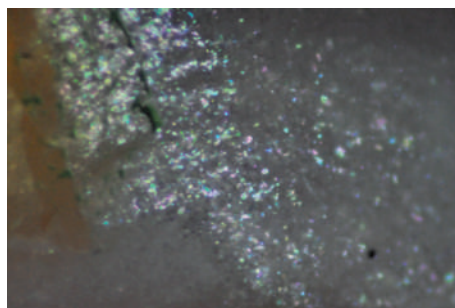
3: Some of the pieces displayed a circular to semi-circular banded structure in botryoidal pattern. Magnified 45x.



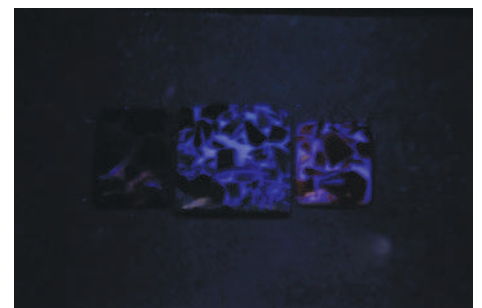
4: The white areas displayed distinctive flow patterns. Also note depressions at various places. Magnified 45x.



5: Presence of large gas bubbles also confirmed the existence of polymers. Magnified 45x.



6: White areas displayed some densely packed tiny white particles/platelets which appeared iridescent at some angles. 60x.



7: Under long wave UV, white veins displayed a bright blue reaction.

## Gems and Minerals

### And now composite chalcedony

Table I: Properties of the three composite chalcedony specimens:

Property	Dark green with brassy yellow veins ( <b>1a</b> )	Light green with white veins ( <b>1b</b> )	Orange with white veins ( <b>1c</b> )
Weight (in ct)	31.10	57.12	19.30
Dimensions (in mm)	28.00 x 19.82 x 6.01	32.00 x 30.20 x 7.24	24.90 x 19.91 x 5.57
RI	1.54 (spot) – green area	1.54 (spot) – green area	1.54 (spot) – orange area
SG (low SG values due to the presence of polymers)	2.18	2.08	1.82
Absorption spectrum	Chromium lines in the red region	Chromium lines in the red region	None
UV fluorescence	Inert	Bright blue along the veins in long wave	Bright blue along the veins in long wave
FTIR spectra	Complete absorption of wavelengths up to around 4000 cm <sup>-1</sup> and two humps at around 4500 and 5250 cm <sup>-1</sup>		
EDXRF analysis	Si, Cr, Fe, Cu, Zn	Si, Ca, Cr, Fe	Si, Ca, Fe

centre) and Si. On the basis of microscopic observations, fluorescence reaction and EDXRF analysis, it is a possibility that these white veins may be composed of crushed shell (CaCO<sub>3</sub>) mixed in a polymer.

#### Conclusions

These composites, formed from pieces of chalcedony held together in a polymer matrix, are similar in nature to the composite turquoise with metallic veins I described in *Gems & Gemology* (Choudhary, 2010). Although these provide a wider range of

materials for the consumer to choose from, care has to be taken regarding its correct and proper disclosure.

#### References

- G. Choudhary, 2010. Another interesting composite – diamonds and rock crystal. *Gems & Jewellery*, **19**(3), 20-21
- G. Choudhary, 2010. A new type of composite turquoise. *Gems & Gemology*, **46**(2), 106-113
- All photographs and photomicrographs by G. Choudhary.*

#### About the Author

##### Gagan Choudhary FGA

Gagan Choudhary has been a Deputy Director of the Jaipur Gem Testing Laboratory since 2001. Currently he is involved in the education, testing and research activities of the institute, and is in charge of the laboratory.  
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## THE SCOTTISH GEMMOLOGY CONFERENCE

The Queen's Hotel, Perth Friday 29 April to Monday 2 May 2011

This popular event organized by the Scottish Gemmological Association attracts participants from many corners of the world. The well-balanced programme of lectures has something for everyone with an interest in gems.

Sunday afternoon will be devoted to displays, workshops and demonstrations. On Monday morning there will be a visit to the National Museum of Scotland, Edinburgh, with a rare chance to view Scottish gems and minerals not currently on display to the public.

Social events are held each evening, including the Ceilidh (dinner/dance) on the Saturday.

Speakers will include:

DAVID CALLAGHAN

ALAN HODGKINSON

DOMINIC MOK

PROFESSOR MARCIA POINTON

STUART ROBERTSON

DR KARL SCHMETZER

For further information or to book go to [www.scotgem.co.uk](http://www.scotgem.co.uk) or call Catriona McInnes on +44 (0)131 667 2199

# GEM-A WORKSHOPS – Spring 2011

Tuesday 22 February **ORGANICS**

A hands-on day led by organics specialist **Maggie Campbell Pedersen**, exploring a variety of different materials, including amber and copal, horn, ivory, jet, coral and shell. Areas covered will include origins and formation, different varieties and detection methods. The emphasis will be on hands-on observation and discussion.

*Price: £140.00 (Gem-A members and students £120.00)*

Monday 7 March **ALLURE OF GEMS**

An exciting day of discovery delving into the fascinating world of gemstones, ideal for those taking their first steps into the world of gems. After learning how to look at gemstones and crystals correctly by using a loupe, you will be able to handle and examine a wide range of gemstones from Gem-A's extensive collection learning about many different varieties, their origins, localities and properties. This is both an informative and informal workshop, ideal for those new to gemmology.

*Price: £97.00 (Gem-A members and students £79.00)*

Monday 21 March **INTRODUCTION TO PRACTICAL GEMMOLOGY**

Are you considering studying gemmology? Or do you require an introduction to the use of gem-testing equipment? If so, this is the workshop for you. This practical day will help you understand the principles required for effective gemstone identification. The use of different types of gem-testing equipment will be demonstrated. You will then have the opportunity to try gem testing for yourself with the guidance of a Gem-A tutor. No previous experience is required.

*Price: £97.00 (Gem-A members and students £79.00)*

Monday 28 March **RUBY, EMERALD AND SAPPHIRE**

An informative day covering these beautiful and important gemstones. You will begin by looking at the physical properties and identification of natural ruby, emerald and sapphire, followed by their treatments (including lead glass filling of ruby), simulants and synthetics. A wide range of these gems will be available for you to examine with guidance from our tutors.

*Price: £97.00 (Gem-A members and students £79.00)*

Tuesday 12 April **DIAMOND BUYING GUIDE**

An introduction to the 4Cs – carat weight, colour, clarity and cut – this workshop provides the practical information required to enable you to make informed choices when buying or to give sales advice.

*Price: £97.00 (Gem-A members and students £79.00)*



From its London headquarters, Gem-A provides a varied programme of one-day workshops, from an introduction to the fascinating world of gemstones to information on the latest synthetic and treated gemstones. Workshops are held from 10:00 am to 4:30 pm unless otherwise stated.

For information on the latest workshops or to book go to [www.gem-a.com](http://www.gem-a.com) or call Paveet Amrit on +44 (0)20 7404 3334 or email [paveet.amrit@gem-a.com](mailto:paveet.amrit@gem-a.com)





# Stamps of excellence

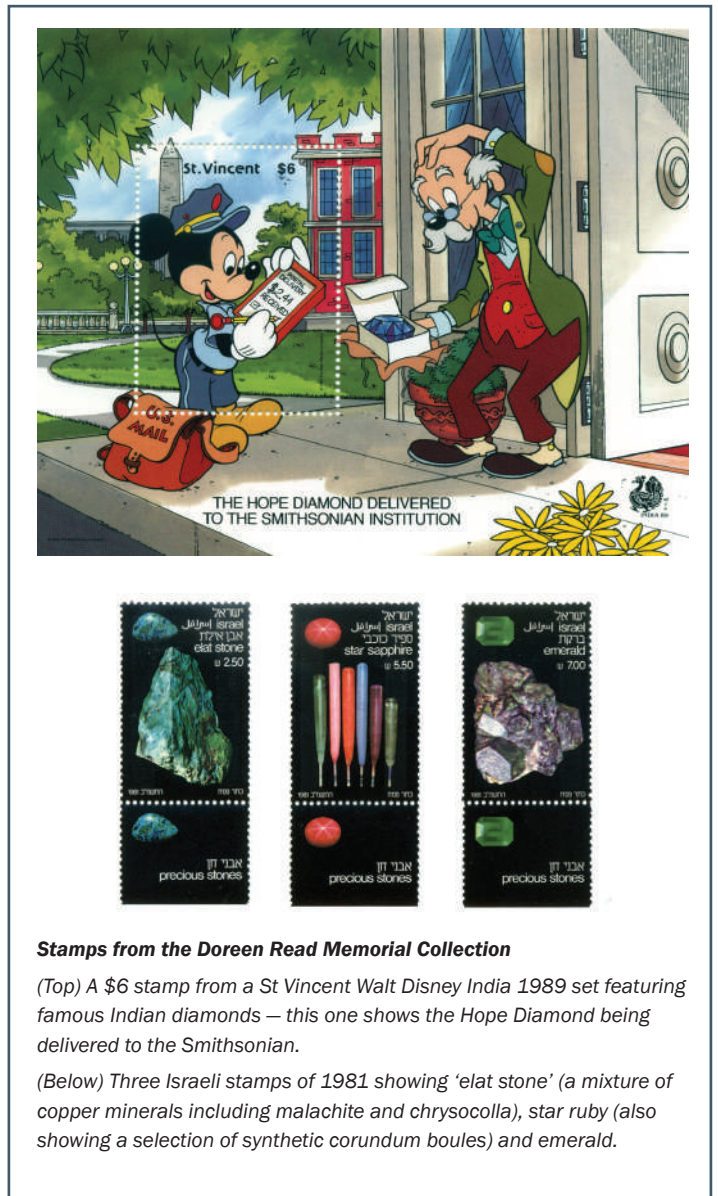
Inspired by the Doreen Read Memorial Stamp Collection donated to Gem-A by the late Peter Read, Harry Levy talks about the popular and absorbing hobby of thematic stamp collecting.

Many of us collected stamps in our childhood, and we could all probably find an old stamp album, or a box or packet of stamps, left neglected over the years. Some continue to collect; philately is still a popular subject today, with many stamp fairs, magazines and dealers all over the country. My own interest in stamp collecting was revived when I attended a function at Goldsmiths' Hall where a Hatton Garden jeweller had displayed two large frames containing stamps which depicted various gems, minerals and jewellery.

It is impossible to collect all the stamps of the world — there are now too many — and so after a while one tends to specialize. Many collect by country only, whereas others collect by a topic or a theme. Such thematic collecting has become very popular as there are no rules as to what the theme should be, or how it should be arranged. Popular themes these days include trains, birds, ships, chess pieces and many more; in fact, almost anything you have an interest in could become a theme.

Gem-A now has the Doreen Read Memorial Collection stamp album in its library, donated to the Association by Peter Read — lifelong supporter of Gem-A — in memory of his first wife Doreen. It consists of over 450 stamps, showing cut gemstones, minerals and jewellery, and is arranged alphabetically by country. The stamps are very colourful and cover almost the whole spectrum of gemstones; some show mining techniques whilst others show the mineral (rough) from which the gems are cut. It is worth noting that there are still many stamps being printed showing these themes. There are also fun stamps showing Walt Disney characters with gemstones, as well as some more serious stamps showing pioneers in the diamond trade. There is also a note book giving details of the stamps in the album. Unfortunately, however, Peter stopped collecting in the 1980s and so the collection stops there.

Such a collection is of considerable interest to gemmologists because it shows how countries have used their gem industry or jewellery history as part of their national identity. Thus Israel includes its 'national stone', Eilat stone, on its series of gem-related stamps



## Stamps from the Doreen Read Memorial Collection

(Top) A \$6 stamp from a St Vincent Walt Disney India 1989 set featuring famous Indian diamonds — this one shows the Hope Diamond being delivered to the Smithsonian.

(Below) Three Israeli stamps of 1981 showing 'elaf stone' (a mixture of copper minerals including malachite and chrysocolla), star ruby (also showing a selection of synthetic corundum boules) and emerald.

from 1981. The 1989 Walt Disney Indian diamonds series from St Vincent in the Grenadines relates more to that island's flourishing stamp industry than gemmology, but it is interesting to see that the stamp referring to the Hope Diamond, perhaps in acknowledgement of its uncertain earlier history, depicts, albeit it humorously, a defining

moment in its modern history – delivery into the safe hands of the Smithsonian Institution.

Should you be inspired to collect on this theme, or any other, a good place to start would be at a stamp fair. Many dealers now arrange their stamps not only by country but by theme as well – useful if you're looking for something in particular. Prices vary from a few pence to a few pounds, but there is now a tendency for prices

to increase as there are a limited number of certain stamps and ever more collectors. Another way to collect is to join a local stamp club and get on the list of people who are sent packets by members wanting to sell some of their stamps. Should you start collecting you will find it interesting and educational, and you will begin looking for stamps and stamp shops all over the world.



**Gem-A**  
THE GEMMOLOGICAL ASSOCIATION  
OF GREAT BRITAIN

## ORGANICS

### A new Gem-A workshop

A day led by organics specialist **MAGGIE CAMPBELL PEDERSEN** exploring a variety of different materials including amber and copal, horn, ivory, jet, coral and shell. Areas covered will include:

- origins and formation
- different varieties
- detection methods

The emphasis will be on hands-on observation and discussion, supported by PowerPoint.

**Tuesday 22 February 2011**

**Gem-A's London headquarters**

**Price: £140**  
**(Gem-A members and**  
**students £120)**



# LONDON JEWELLERY WEEK

6–12 JUNE 2011

[londonjewelleryweek.co.uk](http://londonjewelleryweek.co.uk)

## Hands-on Gemmology

# Black Beauty

Kerry Gregory tells how a black stone set in a pendant proved very difficult to identify

At the recent Gem-A Conference I wore one of my favourite pieces of jewellery: a silver pendant set with a large black, pear-shaped, checkerboard-cut opaque stone measuring 35 x 22 mm. At dinner the pendant caught the eye of the gentleman to my left who asked what it was. Rather than tell him, I did what all gemmologists do; I passed the necklace over and said, "What do you think it is?"

At Gem-A's 2009 Conference I hawked round a yellow trillion asking people what it was, but no one would give an opinion as to the identity. The reason for this was because I was asking gemmologists. At dinner this year my table was populated mainly with stone dealers. Now, I am not saying stone dealers are not gemmologists — far from it — but in my experience they don't work in the same way as those gemmologists who are involved solely in testing stones or as valuers, for instance. Stone dealers look at a stone and decide within a few seconds what it is and what it isn't, rather than spending an hour observing and testing the stone. So this year, instead of nobody giving me their opinion, everyone at the table who was listening weighed in with a guess at what it was, based on instinct.

Obviously I am never going to hold anyone to their opinion based on this method of assessment, but it amused me to see the vast difference in the two types of gemmologist; those who test and those who trade. Those who test will not give an identification on a stone without fully testing it regardless of who is asking or why, whereas those who trade seem willing to have a guess. (I realize the situation would be different if you were not sat round a dinner table after a few glasses of wine, and were in fact about to hand over thousands of dollars based on instinct!)

After the pendant had been handed round, the guesses started coming: sapphire, onyx, jet, glass, resin, tourmaline and diamond, but it was none of these. Comments such as "It's too warm to be a gemstone" and "It has quite a few chips" were bandied around. I pointed out that I had been wearing it for two hours, so it was bound to be warm. Also I am rather heavy handed and often careless with my jewellery — particularly the cheaper pieces — and these are often thrown into a pouch with diamond and sapphire rings (ouch, poor things!), hence the abrasion and chips. A few more guesses were tossed about, until one gentleman who had previously remained



*The checkerboard-cut top of the black stone and (inset) the unpolished back. Photos by Kerry Gregory.*

silent on the subject looked up and said quietly "Black spinel". He was right.

Or was he? I had bought the stone, coincidentally, from one of the dealers at the table and, because I have done business with them for years and know their reputation, I would not think to question anything bought from them. I had never actually tested the stone myself and, although I don't doubt that the stone is black spinel as sold to me, it got me thinking: how would I test it if I needed to? It is a fairly tricky stone to test; it has, as has been mentioned, an



# Hands-on Gemmology

## Properties of black gem materials.

	RI	Birefringence	SG	Hardness	Lustre	Transparency	Cleavage	Fracture
<b>Beryl</b>	1.56–1.60	0.003–0.010	2.65–2.8	7.5–8	vitreous	sub-translucent to opaque	very imperfect	conchoidal
<b>CZ</b>	2.171–2.177	none	5.65–5.95	8.25–8.5	bright vitreous	opaque	none	conchoidal
<b>Diamond</b>	2.417	none	3.52	10	adamantine	sub-translucent to opaque	perfect - octahedral	conchoidal
<b>Diopside</b>	1.67–1.70	0.024–0.030	3.26–3.32	5.5	low vitreous	opaque	distinct	conchoidal
<b>Garnet - almandine</b>	1.76–1.81	none	3.8–4.2	7.5	bright vitreous	sub-translucent to opaque	none	sub-conchoidal
<b>Garnet - andradite</b>	1.85–1.89	none	3.8–3.9	6.5–7	adamantine	opaque	none	irregular to conchoidal
<b>Glass</b>	1.4–1.7 (generally although may be up to 2)	none	2-3.5 (generally although may be up to 6.5)	5–7	vitreous	sub-translucent to opaque	none	conchoidal
<b>Jet</b>	1.66 (approx.)	none	1.3 (approx.)	2.5–4	waxy to vitreous	opaque	none	conchoidal — dull
<b>Obsidian</b>	1.45–1.55	none	2.35–2.6	5–5.5	vitreous	sub-translucent to opaque	none	conchoidal
<b>Onyx</b>	1.544–1.553	none	2.6	7	vitreous	sub-translucent to opaque	none	conchoidal
<b>Sapphire</b>	1.76–1.78	0.008–0.009	3.80–4.05	9	bright vitreous	sub-translucent to opaque	none	conchoidal
<b>Spinel</b>	1.77–1.78	none	3.63–3.90	8	bright vitreous	opaque	imperfect/ none	conchoidal - brittle nature
<b>Tourmaline</b>	1.62–1.65	0.014–0.021	3.0–3.1	7–7.5	vitreous	sub-translucent to opaque	difficult, indistinct	conchoidal
<b>Zircon</b>	1.78–1.99	none to 0.059	3.9–4.8	6.5–7.5	vitreous to sub-adamantine	sub-translucent to opaque	none	conchoidal to splintery — brittle nature

unpolished back, a checkerboard-cut top, small facets, is opaque and is mounted in a heavy silver setting. And so, in the interest of practical gemmology, and just to prove that my cherished black spinel is actually a spinel, I decided to test it conclusively. I started by compiling a list of all black gem materials (a condensed version of which is given above) and, by process of elimination, have tried to come up with a positive identity.

### Observations

As always I started with a thorough visual inspection of the stone. Because it is opaque there were no inclusions to see,

so it was possible only to concentrate on the surface features. One of the first things I noticed about the stone was its bright reflective lustre, despite the fact that it was rather poorly polished. The small conchoidal fractures on the facet edges also showed a bright lustre. Using this as a starting point I could already discount many of the materials in my original list including many stones that were softer or had lower refractive indices (RIs) that would not take this degree of polish or exhibit the same lustre. Conversely, it did not look reflective enough to have the adamantine lustre associated with diamond or andradite garnet, or the metallic lustre

you would see in a hematite. And at £45, the price I paid for it, it was highly unlikely that I would have been lucky enough to get a black diamond. (When I say lucky, I mean only fiscally — being a coloured gem fanatic I find diamond a little boring (dare I say it) and actually prefer the spinel.)

Making allowances for the weight of the mounting, the stone itself had a fair heft; plastic and resin would certainly have felt lighter than this, as would most types of glass. However, it did not feel weighty enough for corundum. When I have not been wearing the pendant and it is taken from room temperature the stone feels cold. These

## Hands-on Gemmology

non-scientific gemmological observations certainly convinced me that the item was not glass, plastic or resin, as well as the fact that it did have the look and feel of a gem material. All this considered, I had narrowed the stone's identity down to tourmaline, corundum, garnet, spinel or even possibly black CZ.

### Testing

Due to the opaque nature of the material, the polariscope, usually my first port of call, was redundant, as was the dichroscope. Although a result was very unlikely, I did try for a spectrum from light reflected from the stone but got nothing. I did, however, get a single RI reading of 1.776, thus ruling out tourmaline, corundum and CZ. However, despite all the observations I was still left with two possibilities: black spinel, with RIs ranging from 1.77 to 1.79, and almandine garnet, which can occur in opaque black ranging from 1.76 to 1.81.

Magnetism was a possible avenue for investigation, but both spinel and garnet can be attracted to magnets and the presence of the mounts meant that accurate measurements were not possible.

### Conclusion?

My conclusion, therefore, is inconclusive. As far as I can see, when this material is set there is no way to tell categorically with 'everyday' gemmology whether you have black spinel or black garnet. The main difficulty here is economics; the material cost is very low, so the time and money needed to identify the stone would not be viable.

The prices of the materials are very similar so arriving at a value is not really an issue, but you do have to be very careful when making a statement about identity. In my experience, and also having done further research, black spinel certainly appears more regularly on the market than the rarer black garnet (although the latter can be seen fairly frequently as beads rather than faceted stones), but it can rarely be found in large sizes, i.e. over 10 ct.

Unfortunately I shall have to add this to my list of stones that I consider difficult and too expensive to identify when set in relation to the cost of the material, along with 2 mm transparent green stones pavé set, and natural or synthetic amethyst.

## rock, gem & bead shows 2011

15/16th	January	Chepstow Racecourse, Chepstow, (Rock, Gem 'n' Bead)
22/23rd	January	The Hop Farm (Nr Tonbridge), Beltring, Kent. (Rock 'n' Gem)
5/6th	February	Newton Abbot Racecourse, Newton Abbot, Devon. (Rock 'n' Gem)
12/13th	February	York Racecourse, York, North Yorkshire. (Rock, Gem 'n' Bead)
12/13th	March	Kempton Park Racecourse, West London. (Rock 'n' Gem)
26/27th	March	Cheltenham Racecourse, Gloucester. (Rock, Gem 'n' Bead)
9/10th	April	Brighton Racecourse, Freshfield Road, Brighton. (Rock, Gem 'n' Bead)
16/17th	April	Newark Showground, Winthorpe, Newark, Notts. (Rock, Gem 'n' Bead)

All Shows open

10am - 5pm Saturdays • 10am - 4pm Sundays. All Shows are indoors with free parking, disabled access and refreshments  
Admissions

Kempton Park Racecourse and Alexandra Palace, Adults £4.50, Seniors £3.00 • Children £1.00 (8-16 years) under 8s free  
All other Shows: Adults £3.50, Seniors £1.50 • Children £1.00 (8-16 years) • under 8s free

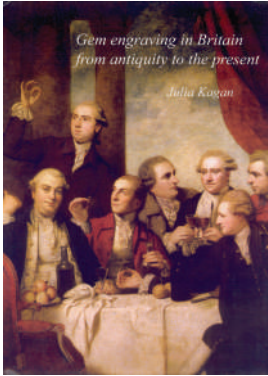
For a list of all shows, directions, maps and exhibitors attending each show, go to

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## Gem engraving in Britain from antiquity to present



Julia Kagan, 2010  
Volume V in the series  
'Studies in Gems and  
Jewellery'. Archaeopress,  
Oxford.

Hardback, 495 pp.  
ISBN: 9781903767122  
Price £134.82

This remarkable new 495-page book by Dr. Julia Kagan, curator of the post-classical engraved gems in the State Hermitage Museum in St. Petersburg, Russia, pays homage to all masters of the English School of Glyptic Arts. Kagan, curator of the collection since 1959, is the author of several scholarly articles and publications, predominantly on English and Russian glyptic art.

In this volume Kagan has devoted her lifetime of scholarship in gem engraving to charting the history of the art in Britain, from antiquity through to the modern day. Throughout the book Kagan provides an art-historical interpretation of the artists and their work, locating them within their relevant socio-historical contexts, whilst exploring the relationships between those individuals and workshops that were influential in the artists' lives.

Included with the book is a CD, containing a table of British Gem Engravers from the fourteenth to the twenty-first century. The table includes 230 names of

gemstone engravers, including several that focused on imitation materials such as paste (glass) and ceramic, and follows a timeline with as much information as is available for the artists; including their countries of origin, dates of birth and death, apprenticeship connections and materials worked with, as well as signed engraved gems and exhibits that the artists have participated in. The table is co-authored by Helen Serras-Herman, a gem sculptor, jewellery designer and FGA gemmologist, whom we were fortunate enough to receive at our Gem-A Gem Discovery Club in May 2010 (see Summer 2010 issue of *Gems & Jewellery*). Kagan's volume devotes a chapter to Helen's work, that of her teacher, Nik Kieilty Lambrinides, as well as Lambrinides' own teachers, Cecil Thomas and Alfred Pocock.

**Helen Serras-Herman**

## Emeralds: A Passionate Guide by Ronald Ringsrud

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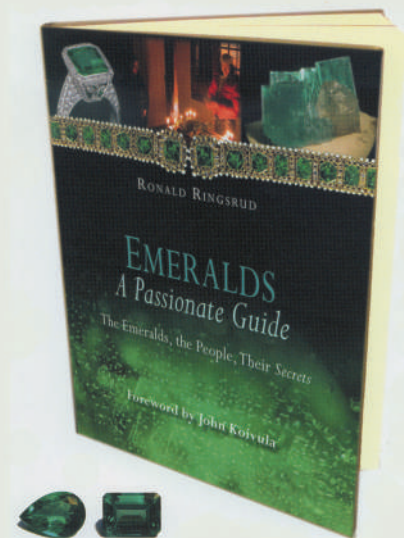
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\* Offer available until 28 February 2011





## The Journal of Gemmology

Summary of an article to appear in *The Journal of Gemmology*.

The full articles may be viewed by Gem-A members only at [www.gem-a.com/publications/journal-of-gemmology/the-journal-online.aspx](http://www.gem-a.com/publications/journal-of-gemmology/the-journal-online.aspx)

# Pink CVD synthetic diamonds\*



*CVD-grown synthetic pink diamonds ranging from 0.01 ct – 0.27 ct). Photo by H. Kitawaki.*

Chemical vapour deposition (CVD) grown synthetic diamonds are beginning to appear in jewellery and, although production is limited so far, wider use and further technical development can be expected in the future. The GAAJ-ZENHOKYO laboratory in Japan recently conducted an in-depth examination of 48 faceted intense orangey-pink CVD-grown synthetic diamonds, most of which weighed less than 0.2 ct. The characteristic features of these stones permitted their identification.

All the stones examined proved to be coloured by irradiation and annealing at low temperature after CVD synthesis and succeeding high pressure high temperature (HPHT) treatment.

### **Gemmological observations**

The colours of the stones ranged from fancy intense orange pink to fancy pinkish orange to light pinkish orange. Thirteen of the stones over 0.1 ct were graded for clarity. Three were VVS2, four VS1, three VS2, two SI1 and one SI2. Most of the stones contained a few tiny pinpoint inclusions which are presumably non-diamond structure carbon. Several of the samples contained black graphite in their cleavages and etched surface features resembling frosted glass. These latter features are similar to those seen in HPHT-treated diamonds and thus their presence strongly indicates that the samples have been HPHT treated after CVD synthesis. No patchiness in colour

distribution was noted, in contrast to almost all natural pink diamonds which display characteristic colour zoning ('pink graining').

Most of the CVD-grown synthetic diamonds show double refraction in low-order interference colours in a characteristic streak pattern. The kind of birefringence seen in natural pink diamond originates from plastic deformation and in most such stones strain accompanied by high order interference colours is associated with 'pink graining'.

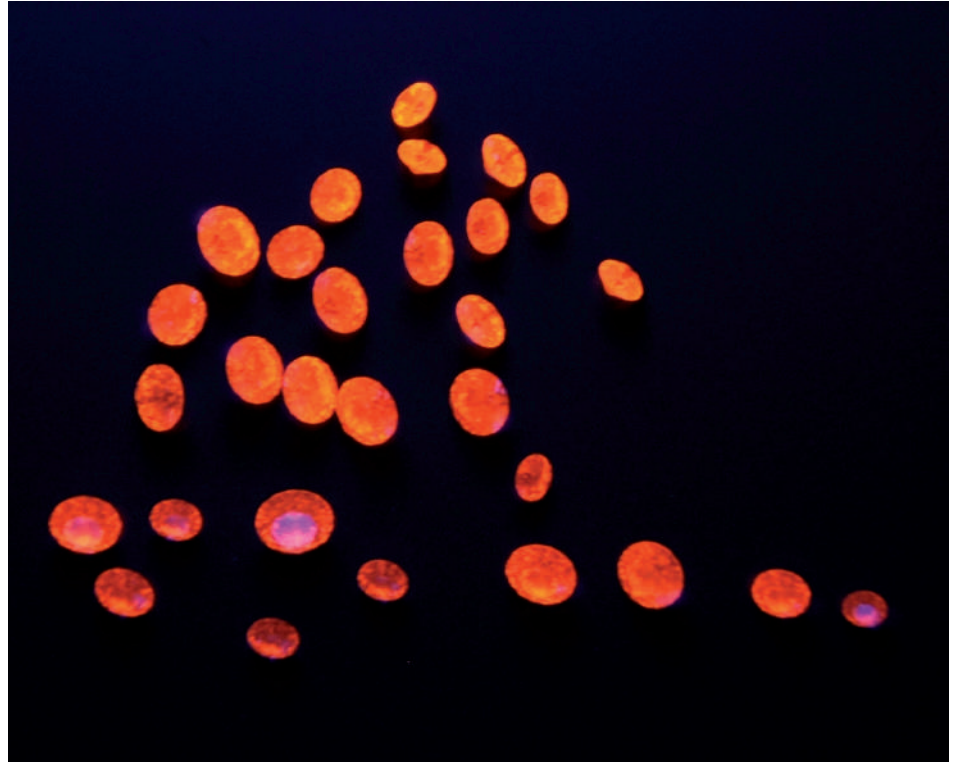
All the CVD-grown synthetic diamonds examined showed very strong orange fluorescence under ultraviolet (UV) light, generally stronger under long wave UV than short wave UV, but no phosphorescence. Although some natural pink type IIa diamonds show orange fluorescence, most fluoresce bluish white. Irradiated and annealed natural or HPHT-grown synthetic diamonds also show orange fluorescence.

#### Spectral analysis

The UV-Visible absorption spectra all displayed absorption at 637, 595 and 575 nm with stronger absorption at 575 nm than at 637 nm. In addition, some of the stones showed very weak peaks at 741, 503, 392, 271 and 268 nm. The 741 and 595 nm peaks related to irradiation and indicate that these CVD-grown synthetic diamonds have been irradiated.

#### FTIR spectra

Fourier transform infrared (FTIR) spectra were obtained from all 48 stones. As they were apparently free of nitrogen, they were classified as type IIa. Absorption at  $1344\text{ cm}^{-1}$  (originating from isolated single nitrogen atoms) was not detected in any sample. Absorption at  $3107\text{ cm}^{-1}$ , common in natural diamond, was not recognized as a distinct peak in some samples and was only vague in others.



When exposed to long- and short-wave UV radiation, the CVD-grown synthetic diamonds display strong reddish orange fluorescence. Photo by A. Abduriyim.

#### Other techniques

Photoluminescence (PL) spectra were obtained from all 48 stones stimulated by lasers of wavelengths 633 nm (red), 514.5 nm (green) and 325 nm (UV) as excitation sources. Amongst other observations, one stone also contained a weak peak at 435.3 nm which may be unique to CVD diamond. Peaks at 389, 409, 411.7, 413 and 439 nm were detected in all 48 stones and these are probably related to irradiation and annealing.

UV luminescence images of all 48 samples were observed using DTC DiamondView™ equipment. Seven stones revealed parallel laminated growth structure, which may indicate an even rate of deposition of diamond from vapour. Cathodoluminescence (CL) imaging was also employed.

#### Conclusion

The research shows that CVD-grown synthetic pink diamonds in melee sizes can be easily distinguished from most natural pink diamonds (such as those from the Argyle mine) by means of their vivid orange UV fluorescence combined with their CL images. In addition to this, the 737 nm peak detected in the PL spectra when excited by a 633 nm laser can be an important indication of CVD-grown synthetic diamond.

J.O.

\* A summary of 'Identification of CVD-grown synthetic melee pink diamond' by Hiroshi Kitawaki, Ahmadjan Abduriyim, Jun Kawano and Makoto Okano - *The Journal of Gemmology* (in press).

To view the full article, login as a member on the Gem-A website and go to [www.gem-a.com/publications/journal-of-gemmology/the-journal-online.aspx](http://www.gem-a.com/publications/journal-of-gemmology/the-journal-online.aspx)

# In the news

There have been several new Gem-A developments in recent months and some exciting initiatives for 2011. The first members to receive FGA status on the basis of “a significant contribution to the field of gemmology or the promotion of gem knowledge, over no less than ten years” were duly proposed and elected by the Board. From 2011, all of our Gem-A Gemmology Foundation graduates may use the designation Cert. GA; we have new bursaries and scholarships lined up; and are reintroducing our photographic competition with a novel twist.

## FGA status

At the end of 2009 the Board of Gem-A agreed to consider for election to Fellowship of the Association those who could demonstrate a significant contribution to the field of gemmology or the promotion of gem knowledge, over no less than ten years. Prior to this, the only route to FGA status was as a graduate of Gem-A's Diploma in Gemmology. The first of those to be elected to Fellowship in this way were presented with their diplomas at the Graduation and Awards Ceremony held at Goldsmiths' Hall, London, on November 7 2010 (see pages 12 and 13).

### Christopher P. Smith accepted into Gem-A Fellowship

During the Gem-A Graduation and Awards Ceremony one of those receiving a Fellowship Diploma was Christopher P. Smith, President and Chief Gemologist of the American Gemological Laboratories (AGL). Christopher was elected to Fellowship of the Gemmological Association of Great Britain (Gem-A) on the basis of his significant contribution to the field of gemmology over his 20 year career. Smith earned his Graduate Gemologist degree (GG) from the Gemological Institute of America (GIA) in 1986 and, in addition to working at AGL, has worked for both the Gübelin Gem Lab (GGL) and GIA laboratories. He has published and lectured internationally on a broad range of gemmological topics, including gem identification, coloured stone treatments and their detection, country-of-origin determinations, colourless and coloured diamond treatments and identification, as well as others. In 2009,



he was awarded the Antonio C. Bonanno award for Excellence in Gemology from the Accredited Gemologists Association (AGA).

During the awards ceremony Dr Jack Ogden, CEO of Gem-A, said: “Christopher is highly respected internationally for his gemmological research, and he has demonstrated his commitment to upholding the standards of the gemstone and jewellery industry and furthering the advancement of gemmology over the many years of his career. We are pleased to welcome him into our Association and for him to become an FGA.”

Following his election to FGA status Christopher said: “I feel very privileged to have received this special consideration and I am proud to become a member of this famous organization.”

### Doug Nichol

Also present at the Graduation and Awards ceremony to accept a Fellowship Diploma was Dr Douglas Nichol of Wrexham, North Wales. Doug is a geologist and geotechnical engineer with 40 years' experience and a long association with Gem-A. Nephrite jade is one of his research interests, and a number of his articles on jade and other ornamental materials have been published in *The Journal of Gemmology* during the past ten years. He has served in government institutions, multinational mineral co-operations and universities, and has worked throughout Australia, North America, Middle Europe and Africa, as well as the UK. Currently he is a Research Associate in the Department of Geology at the National Museum of Wales.





## Mary Burland retires



Mary Burland retired from Gem-A at the end of 2010. Mary had joined the Association in 1964 and began working on *The Journal of Gemmology* the following year; she was appointed Production Editor in 1994. She has been Managing Editor of *Gems & Jewellery* and its predecessor *Gem & Jewellery News* since its launch in 1991. Mary was also Gem-A Membership Secretary

for ten years and organized 15 Gem-A conferences.

In addition to being much loved and highly respected by the gemmological world at large, she is held in equally high regard by several generations of Gem-A Boards and by successive waves of Gem-A staff. Following her retirement, she will be taking on a consultancy role of Production Editorship for *The Journal of Gemmology*.

On the basis of her undoubted contribution to the 'promotion of gem knowledge over no less than ten years', Mary was also elected to Fellowship status of Gem-A (FGA) and was presented with a Fellowship Diploma at the 2010 Graduation and Awards Ceremony.

## Foundation graduates permitted use of Cert GA designation

Successful graduates of Gem-A's celebrated Gemmology Foundation Exam since 2004 may now use the designation Cert GA after their names. This stands for Certificate of the Gemmological Association of Great Britain. There is no associated paid membership obligation, although continued membership of Gem-A with its access to publications and forums is highly recommended.

Gem-A's gemmology courses, taught in more than 20 countries worldwide, form two levels: the Gemmology Foundation, followed by the Gemmology Diploma. The Gemmology Foundation course was launched worldwide in 2004, adding a fuller practical component to its predecessor the Preliminary Gemmology course. It was fully updated in 2008. Diploma Graduates have long been eligible for election to Fellowship status, when they may then use the letters FGA after their name. Hitherto graduates of the Gemmology Foundation

exam had no formal recognition.

Gem-A Director of Education, Lorne Stather, said: "Our Gemmology Foundation course is a perfect gemmological grounding for those in the gem or jewellery industry. It provides trade-relevant information tested by a rigorous and meaningful exam. Granting the use of the Cert GA designation to graduates gives them the recognition they deserve."

Those Gemmology Foundation graduates wishing to use the Cert GA designation and who are not current members of Gem-A should notify the association of their name, current contact address, email address and the year of Foundation graduation so that records can be checked and updated. If the name at the time of graduation was different then a proof of name change should be provided, such as a scanned marriage certificate.

## Gem-A Bursaries and Scholarships

As an educational Charity, Gem-A is keen to ensure that as many people as possible with the ability and aspiration to study with Gem-A are able to do so. It is unfortunate that the number of scholarships and bursaries we can offer is limited because we receive no national or local government funding. Nevertheless, we are happy to announce that we are introducing several new scholarships and bursaries to be in place for the academic year 2011/12. A Gem-A Scholarship is an award based on merit or achievement that covers the whole or partial cost of certain courses provided by Gem-A. A Gem-A bursary is a discount on student fees for certain courses provided by Gem-A linked to need or location.

### Regional Scholarships

This one will be for our Branches. Each active UK Branch of Gem-A plus the Scottish Gemmological Association (SGA) will be able to nominate an annual recipient for a Gem-A Regional Scholarship which will cover 35% of the course costs of a Gem-A ODL Foundation

Course. The criteria and name for the Scholarship may be defined by the regional group, and need not remain the same from year to year. As examples, the Scholarship might be based on a jewellery design competition, submitted essay or some aspect of collections care. More details will be provided to our Branches soon.

### International Scholarship

A Scholarship of 50% of course and exam fees for the UK daytime Foundation in Gemmology, Diploma in Gemmology or Diamond Diploma may be offered each year to a maximum of two Non-UK nationals from gem-producing developing countries. The applicants must demonstrate a current or recent connection (as a student or employee) with a gem-related organization or business accompanied by a personal statement explaining why they are suitable recipients and how they think Gem-A training will help their careers or their country. Full details will be available shortly.

## Gem-A News and Views

### Local Resident Bursary

A bursary equal to 15% of the costs (including exam fees) for the Gem-A Gemmology Foundation or Diamond Diploma daytime courses will be offered for the academic year 2011/12 to a number of applicants who live or work within the London boroughs of Camden

or Islington. This bursary is increased to 35% of the costs (including exam fees) for Camden or Islington residents who, on the date the course starts, are over 65, registered unemployed or registered disabled. Full details will be available shortly.

## A photo competition for the twenty-first century

A few years back Gem-A put its annual photographic competition on hold. Digital photography was becoming prevalent, and the possibilities of computer manipulation of images were creating anything but a level playing field for photographers and headaches for the judges. Now the competition is back, embracing and celebrating these new technologies, and open to all Gem-A members.

There are now four categories under which an image may be submitted:

### 1 Natural

Digital photograph (including photomicrography) with minimal post-production work (may include basic cropping, contrast and minor hue/saturation adjustments).

### 2 Treated

Digital photograph (including photomicrography) with significant post production work (such as background manipulation, HDR, and contrast masking).

### 3 Synthetic

Computer rendered 3D models of gemstones, crystals, crystal structures, images from microtomography, etc.

### 4 Melange

This category includes any gem-related image that doesn't fit in the above and may include such things as photos of a spectrum, a scanning electron microscope image, mining, cutting etc.

The subjects may include any type of gem materials (including organics), crystals or cut stones, and internal or other features of these. Jewellery settings may be included, even wearers, but the gem or gems must be the main subject. In the case of categories 1, 2 and 4, the original photo as taken, with no cropping or manipulation whatsoever, must also be submitted to us.

The entries will be judged by an industry panel on the basis of gemmological interest, inspiration, artistic quality and, in the case of categories 2 and 3, computer skills and ingenuity. A prize will be awarded in each category and, depending on submissions and at the judges discretion, an additional prize for the most humorous or unusual image might also be awarded. All prize winners will receive their image within a frameable mount. In addition there will be one overall winner who will receive a free Gem-A membership for the following year

All winning entries will appear in *Gems & Jewellery* and winning photos and selected images will be exhibited in Gem-A's London



### First prize in the 2005 Photographic Competition:

*Lepidocrocite inclusions in quartz* by Luella Dykhuis FGA DGA, Tucson, Arizona, USA

headquarters and possibly at other venues during the year.

The entry form and full terms and conditions, including copyright information, can be accessed at [www.gem-a.com/membership/photographic-competition.aspx](http://www.gem-a.com/membership/photographic-competition.aspx)



## Gem-A in China



Beijing Jewellery Show. Photo © Jack Ogden.

Gem-A was represented at the Beijing Jewellery Show in November when CEO Dr Jack Ogden attended the show in Beijing as a Guest of Honour. The visit was also an opportunity for meetings with various representatives of the Chinese organizations housed under the umbrella of National Gems & Jewelry Technology Administrative Center, whose director, Madam Zhang Bei Li, was one of the first Gem-A Gemmology Diploma graduates in China. Meetings were held with another Gem-A Diploma Graduate, Dr Yang Li Xin, director of the National Gem Testing Center (NGTC); Mr Sun Fengmin, Director of the Gem and Jewelry Trade Association of China (GAC); and Dr Xiaojun Meng, Associate Editor in Chief of China Gems magazine. A variety of joint business, education and publishing initiatives were discussed, including the possibility of short courses and the establishment of a new Gem-A teaching centre in Shenzhen, in addition to our eight teaching centres already established in China. The visit and meeting were facilitated by Han Jie FGA, recently appointed International Liaison Director for GAC.



Jade is still the main focus in China. Photo © Jack Ogden.

## Gem-A Caption Competition



Ed Johnston (GIA London) and Jack Ogden (Gem-A) apprehended by the long legs of the law during the 2010 Hatton Garden Festival.

In this competition, we are giving a prize for the best caption for the picture. What are one or more of the four, and/or the bystander, saying?

The winner will receive 'Gemmology Tools Professional', the Windows software featuring a gemstone database, diamond and coloured stone weight estimators, and much more. The winning caption and others of suitable (publishable!) merit will be printed in the next issue of *Gems & Jewellery*.

Send your entries to [editor@gem-a.com](mailto:editor@gem-a.com) giving 'Caption Competition' as the subject, by 1 March 2011.



## Letters to the Editors

# Geological field investigation on the reported occurrence of 'red feldspar' in Tibet

Dear Sirs

The existence of a red feldspar (andesine) deposit in Tibet has been a controversial subject since 2008. In view of the upcoming focus on the subject at the Gemstone Industry and Laboratory Conference (GILC) to be held in Tucson on 31 January 2011, we would like to record here the research carried out by the undersigned members of the National Gemstone Testing Center (NGTC), China.

In 2009, we selected 120 stones with surrounding rock features from a warehouse of the Jingxing Company which contains hundreds of kilograms of 'red feldspar' raw material on which we carried out petrological and gemmological research. The main techniques we used were traditional petrological methods, such as detailed thin section observation under polarization microscopy for the fine structures of the surrounding materials, and comparison of the spectroscopic data between the so-called Tibetan red feldspar and feldspar crystals collected from other sources. We found that the adhering materials on the surfaces of the rough red feldspar crystals were mainly glassy, enriched with copper and iron impurities, suggesting that the 'red feldspar' had been subjected to high temperature treatment with colouring elements added. This was reported by three of the undersigned, Yan Lan, Taijin Lu and Weiwei Wang<sup>1</sup>.

In order to verify our laboratory results and to investigate the reported red feldspar deposit in Tibet (Abduriyim, 2009<sup>2</sup>), the NGTC team undertook a field investigation in Tibet between 26 May and 1 June 2010, with the support of two jewellery companies.

Our team consisted of nine members. These were NGTC: Taijin Lu, Yan Lan, Chun Chen, Zhongming Chen, Qi Li, Jun Xie; Dr. Wan Jiang (Chinese Academy of Geological Sciences, geologist); Ying Wang (TTF); Hechuan Zhang (Zhanfan) accompanied by Liping Lou, the wife of miner Tong Li. We arrived at Shigatse (Xigaze), Tibet, on 28 May. In Lhasa and Xigaze, we interviewed about 60 persons including 30 jewellery buyers, asking them about the occurrence and the existence of red feldspar. We also visited the Sixth Geological Team, Tibet Autonomous Region, located near Lhasa city, responsible for geological work on Tibetan gem materials. On 29 May, we carried out field work and sampling in the villages Mencuo and Zhalin (29° 04' 01.5" N, 89° 20' 54.8" E) located at the border area of BaiLang (BaiNang) county and Jiangze (Gyangzê) county in Shigatse Prefecture, Tibet.

In the purported mining area, our team divided into three groups: one for the geological survey and analysis, one for digging and another for interviewing and recording activities. We dug at three sites, and spent more than eight hours on site. We interviewed chiefs,

villagers and mine workers from Mencuo and Zhalin villages. It is important to note that despite multiple requests for geological survey and sampling in the so-called 'native deposit' as reported by others (such as Ahmadjan, 2009<sup>2</sup>), we were not able to visit that site. We left Shigatse on 30 May and returned to Shenzhen on 1 June.

Two investigation team members (Wan Jiang and Hechuan Zhang) performed a second period of field work during August 2010. They investigated two sites: D465 (29° 02' 42.5" N; 89° 22' 10.9" E, 4049 m) and D466 (29° 02' 33.9" N; 89° 22' 10.1" E, 4072 m). They failed to find any red feldspar in primary rock, but did pick up one sample on the ground at site D466.

The major results and observations are:

- We didn't dig out any 'red feldspar' crystals from solid sedimentary rocks in either of the two sites.
- All the red feldspar samples we found were dug out or picked up from either loose soils (21 samples) or from the surfaces of alluvial fan slopes (142 samples). Nine samples were collected from a miner's bag and 15 samples were purchased from a 'digging worker' in the field, who said that 14 of the samples he sold were treated. In addition, 11 rock samples, such as diabase, slate, phyllite and basalt, were collected in the field. They are major rocks in the alluvial fan.
- All the red feldspar samples we collected as well as the ones we saw in the villagers' bags displayed rounded morphology without any sharp edges and corners. The surfaces are etched or dissolved with numbers of small pits filled with white powder.
- The white powder on the surfaces of the stones can easily be cleaned off. It is difficult to accept that the white powder could have survived the abrasion during geological transport which would be expected for minerals in an alluvial deposit.
- The 'red feldspar' samples picked up from different places in the alluvial fan are of similar sizes, ranging from 5–10 mm in length. Other minerals typically display size distribution (i.e. geological sorting in size) from the top to bottom of the valley but there was no evidence of this size range in the feldspars. In other words, the size distribution of the 'red feldspar' was not consistent with normal alluvial sorting of mineral grains.
- The density and distribution of the 'red feldspar' crystals on the surface and within loose soils vary significantly. We picked up 21 red feldspar samples within one square metre.
- In Lhasa and Shigatse none of the people interviewed knew of the occurrence and existence of the red feldspar in Tibet. They all stated that they had neither seen nor heard of red feldspar found in Tibet.

## Letters to the Editors

- Geologically, the east and west of the valley we visited are mountain summits where the bedrocks ( $T_{3n3}$ ) are exposed (relative height: 200~400 m or so). The valley from south to north was formed by turbulent floodwaters. The alluvial fan is a secondary river terrace, comprising mainly black-grey silty slate, phyllite, diabase and basalt. The fragment sizes of the rocks on the surface range from 1–10 cm, depending on the position in the valley.

Based on our investigations, we find it hard to believe that there are gem grade feldspar deposits in the BaiLang and Jiangze areas of Tibet. In our opinion, the red feldspar samples that we collected and recovered from the supposed mining areas during our field investigations were deliberately planted on the ground surface and within loose surface soil. However, limited access to the investigated area means that the field investigation performed by our whole team lasted only one day. The second opportunity for fieldwork by just part of the team lasted two days. Since the local geology could in theory allow for the presence of feldspar, we suggest that the relevant Government Department undertakes a more detailed investigation as soon as possible.

We would like to thank Ying Wang (TTF) and Hechuan Zhang (Zhanfan corporation) for participating in this field work, and Fenghua Wu, Jie Ke and Hua Chen for their assistance in planning and organization.

**On behalf of the NGTC feldspar investigation team:**

**Weiwei Wang, Yan Lan, Taijin Lu, Wan Jiang, Chun Chen, Qi Li, Zhongming Chen and Jun Xie**

- Yan Lan, Taijin Lu, Weiwei Wang, 2009. The so-called petrologic characteristics of 'Lazasine' – A kind of red feldspar. *Proceedings of 2009 China Gems & Jewelry Academic Conference*, 2 Nov. 2009, 35–40
- A. Abduriym, 2009. The characteristics of red andesine from the Himalaya Highland, Tibet. *The Journal of Gemmology*, **31**(5–8), 283–98

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diamond merchants

# Set in style: the jewellery of Van Cleef & Arpels

The extraordinary designs of Van Cleef & Arpels will be on show at the Smithsonian's Cooper-Hewitt Museum, New York, USA.

Since opening in 1906 on the Place Vendome in Paris, Van Cleef & Arpels has significantly shaped the world of jewellery design and design innovation, particularly during the twentieth century. Its use of pioneering designs and techniques — combined with its attention to craftsmanship — has characterized both its jewellery and its precious objects collection, and has guaranteed its place as one of the most famous and influential jewellery designers in the world.

Held at the Smithsonian's Cooper-Hewitt Museum in New York, 'Set in Style: The



1. 'Mystery-set' peony brooch, featuring gold, platinum, diamonds and rubies. Paris, France, 1937. Photo © Patrick Gries/Van Cleef & Arpels.

Jewelry of Van Cleef & Arpels' is structured around six principal themes of Innovation, Transformation, Nature, Exoticism, Fashion and Personalities. The exhibition approaches the work of Van Cleef & Arpels from the perspective of a design museum, focusing on the establishment of the design house in New York and the role of American style and taste in the market in relation to over 300 of Van Cleef & Arpels' pieces, including jewels, timepieces and *objets d'art*, as well as design drawings, fabrication cards and imagery from the firm's archives.

Featured in the Innovation section of the exhibition is arguably one of the most famous innovations in twentieth-century jewellery design, the 'mystery setting' technique, in which gemstones are set in

2. Zip necklace/bracelet, in yellow gold set with diamonds. Paris, France, 1952. California Collection. Photo: Tino Hammid.



such a way that the setting does not show between the stones, thus creating a solid field of colour. Highly desirable, the 'mystery setting' (or invisible setting) technique requires a highly skilled craftsman and expert lapidary work; not only do all the stones need to be of the same colour, they must be cut to fit the design and channel setting exactly, and then grooved on all sides ready to be slotted onto a net-like lattice of wire. Although jewellery houses such as Van Cleef & Arpels and Cartier became adept practitioners of the art during the early twentieth century, they have often been mistakenly named as the inventors of the technique. However, the 'mystery setting' design was actually conceived by Jean Baptiste Chaumet of Paris who registered the patent for the design in 1904, some two years before Van Cleef & Arpels were founded. However, although they did not invent the technique, Van Cleef & Arpels have certainly mastered and perfected Chaumet's innovation, creating several extraordinary pieces in this style, including the 1959 boulevards ring with mystery-set sapphires and the 1937 peony brooch with mystery-set rubies (1).

Design developments focusing on transformation are also celebrated in the exhibition. One of the most influential themes in Van Cleef & Arpels' history, transformation has played a key role in the design of many of its pieces. With the

3. Brooch/pendant of bird and briolette diamond owned by Ganna Walska. Mounted in yellow gold and set with sapphires, yellow diamonds (briolette 95 carats) and white diamonds. New York, 1971. Courtesy of Private Collection  
Photo: Patrick Gries/Van Cleef & Arpels



relocation of the family to New York at the outbreak of World War II, the idea of American style took hold and the principles of high-quality execution were transferred to objects reflecting American taste. Notable transformative designs include 'zip' jewellery, an idea proposed by the Duchess of Windsor in the late 1930s and consisting of a necklace that can be 'zipped' together to form a wearable bracelet (2), or the pendant of a necklace that can also become a brooch. Another transformative piece is the beautiful bird brooch (3), where the bird's wings transform into earrings and the tail into a separate brooch. Commissioned

to celebrate the birth of the owner's first child, the brooch also features the stunning 'Walska' 95 ct yellow diamond suspended from the beak of the bird.

Focusing on the American influence, other works on view include the Bronx cocktail bracelet, a piece proclaiming the popularity of the cocktail during the 1920s and 1930s and containing charms of all the ingredients used for the drink. The exhibition also includes various pieces showing the impact of fashionable American women upon design. Objects on show include a tiara worn by Grace Kelly (4); Elizabeth Taylor's amethyst, coral and diamond bracelet and pendant earrings; a bracelet and necklace owned by Eva Peron; and Etruscan cuffs, similar to those worn by Jacqueline Kennedy Onassis.

Truly Van Cleef & Arpels have been influential pioneers of contemporary and unique designs since their founding over 100 years ago, and continue to dazzle the world with their exceptional style and elegant pieces. The exhibition is a must for all jewellery connoisseurs and for those wanting to pursue the extraordinary in design.

**Georgina Brown**



4. Gold, platinum and diamond tiara worn by HSH Princess Grace of Monaco. Paris, France, 1976. Van Cleef & Arpels Collection. Photo: Patrick Gries/Van Cleef & Arpels

'Set in Style: The Jewelry of Van Cleef & Arpels' will be exhibiting at the Smithsonian's Cooper-Hewitt Museum from 18 February until 5 June 2011. [www.cooperhewitt.org/exhibitions/set-in-style/](http://www.cooperhewitt.org/exhibitions/set-in-style/)

## Stone Scoop



# Rules of engagement

The announcement of a British Royal wedding in the New Year has brought one tangible bit of evidence — the engagement ring — to the forefront of the media frenzy. Here are some past media reports relating to engagement rings.

## The Foolish Captain

An early newspaper report mentioning an 'engagement ring' occurs in an 1858 court case concerning Breach of Promise. When the man refused to marry the woman, she was awarded £350, thought by the jury to represent the "loss a person in the plaintiff's station in life had sustained in not being made the wife of a captain in her Majesty's service with an income of £400 per annum". The report noted that "It was to the defendant's credit that he had never attempted to take an unfair and dishonourable advantage of his intimacy with the plaintiff." The judge concluded that "The whole affair was the result of a foolish young man falling head over heels in love with the first pretty girl he met with."

## Age before beauty

In a case a few years later, the man may have been foolish, but he was not young. He was "about 70", his intended bride just 22. The marriage was called off because the man's daughter "would not tolerate it". The man had bought an engagement ring but it was too large, so he took it back to have it 'reduced'. It would seem that the bride-to-be (or not) saw no further sign of it — or of the wedding ring which he said he had also purchased.

## Hot date

In 1899, in a US case, Albert Smith was jilted by Nellie Stuart, but she refused to return his ring to him so he took her to court. The trial found in Nellie's favour and although Albert started an appeal, he

reconsidered and abandoned the suit. A period touch was provided by Albert's mother trying to get paid to offset the cost of "gas and coal used in the courting".

## Diamonds

A UK Breach of Promise case from 1869 shows that the equation of diamond ring with engagement is not simply the result of De Beers' twentieth-century marketing. Here a man "... had given Miss Cynthia a ring ... which was considered an engagement ring between them". Although she had not formally promised to marry the man at that time, "the ring was considered to be an engagement ring, because it was a diamond."

From the 1860s discoveries of diamonds in South Africa were widening the market for the stones in Europe and the USA. An 1869 American book on etiquette noted that it was customary for the gentleman to make some present to his fiancée soon after the engagement. The "most elegant and desirable present" was a ring and this ring should be either of diamonds or pearls.

## Blazing spangles

A fictional account of a diamond engagement ring at the same period which would bring tears of joy to De Beers is an 1866 short story titled 'The Diamond Engagement Ring' by Lucy A Randall. In this romantic tale published in *Pearson's Magazine*, the heroine Milly received a "a slender circlet of gold, supporting a star of blazing diamonds, beneath which was engraved the single word 'Millicent'". It elicited her aunt's reaction: "Superb!

Magnificent! The gems are of the very first water; it cannot have cost less than three hundred dollars!" The story continues: "But Millicent was not thinking how much it cost, as she turned the sparkling trinket round and round on her slender forefinger. She was musing on the true, passionate love of which these white drops of light were but the mute emblem." It all went haywire, of course, with Millie selling the ring to pay her foolish young cousin's gambling debts. But love wins, the ring is restored and the author enthuses: "Millicent's diamonds had wrought their work of charity and redemption, and come back to her, a score of times more precious than they were before."

## Ring

We started by referring to the Royal Wedding, so it is perhaps befitting to end with a passage which is a satirical Royal Decree published in 1812 and which suggests that engagement rings were by no means universally employed by that time. It explained that "Various melancholy, dismal, and tragical events, have frequently occurred from the circumstance of many of the male species falling in love with some of the opposite sex when they have been previously engaged and there upon in despair drowning, hanging, and shooting, and by other ingenious devices destroying themselves, and vice versa." To prevent further "similar mistakes, accidents, and occurrences" the decree ordered that "All our loving members do forthwith use their influence, persuasion, and entreaty, with their female friends immediately on their being engaged, to exchange with the object of their engagement a plain broad gold ring to be worn by the lady on the third finger of the left hand, and by the gentleman on the fourth finger of the right; by which means the possibility of a mistake will be totally excluded."

Jack Ogden



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