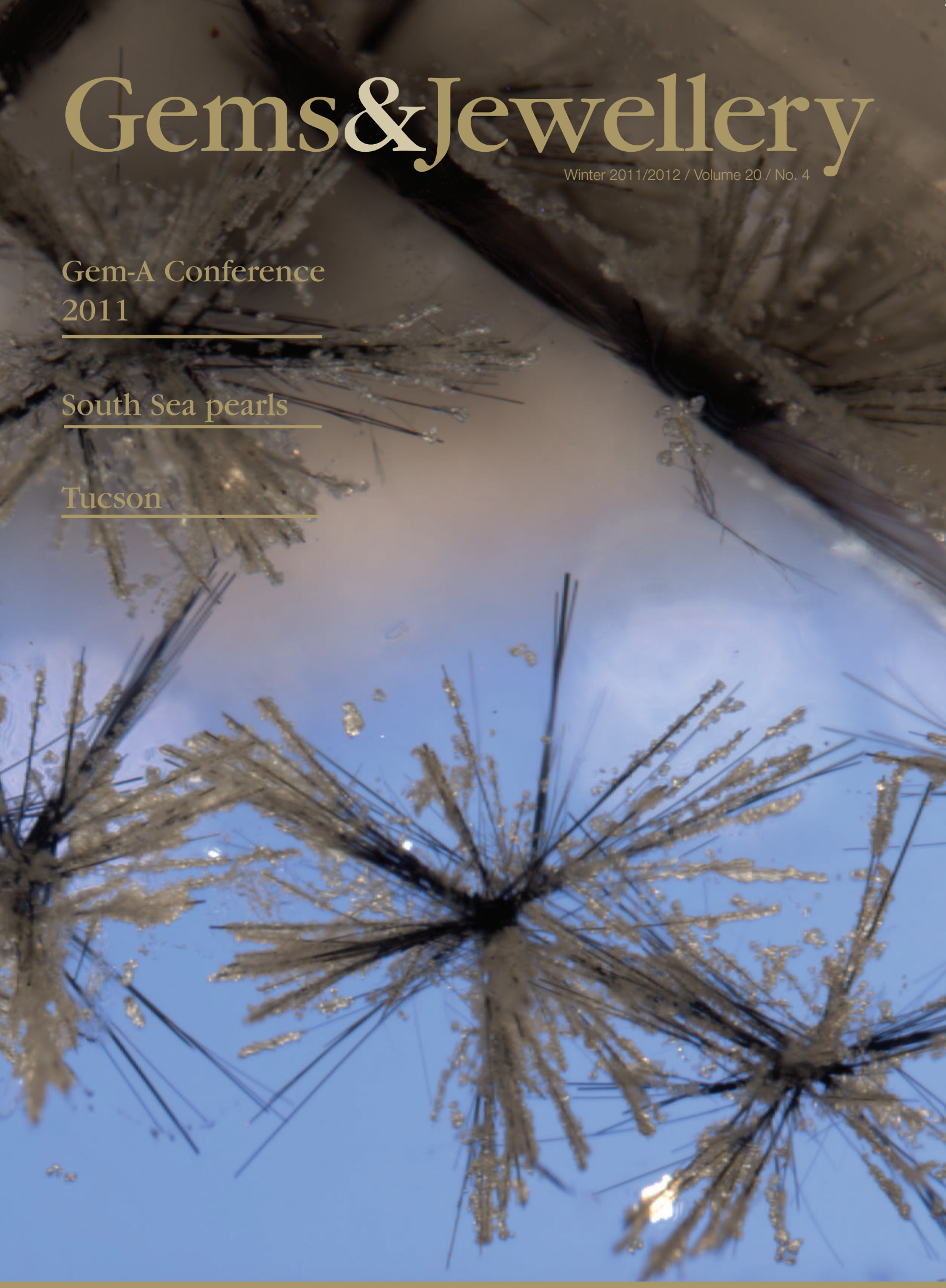
Gems&Jewellery

Winter 2011/2012 / Volume 20 / No. 4

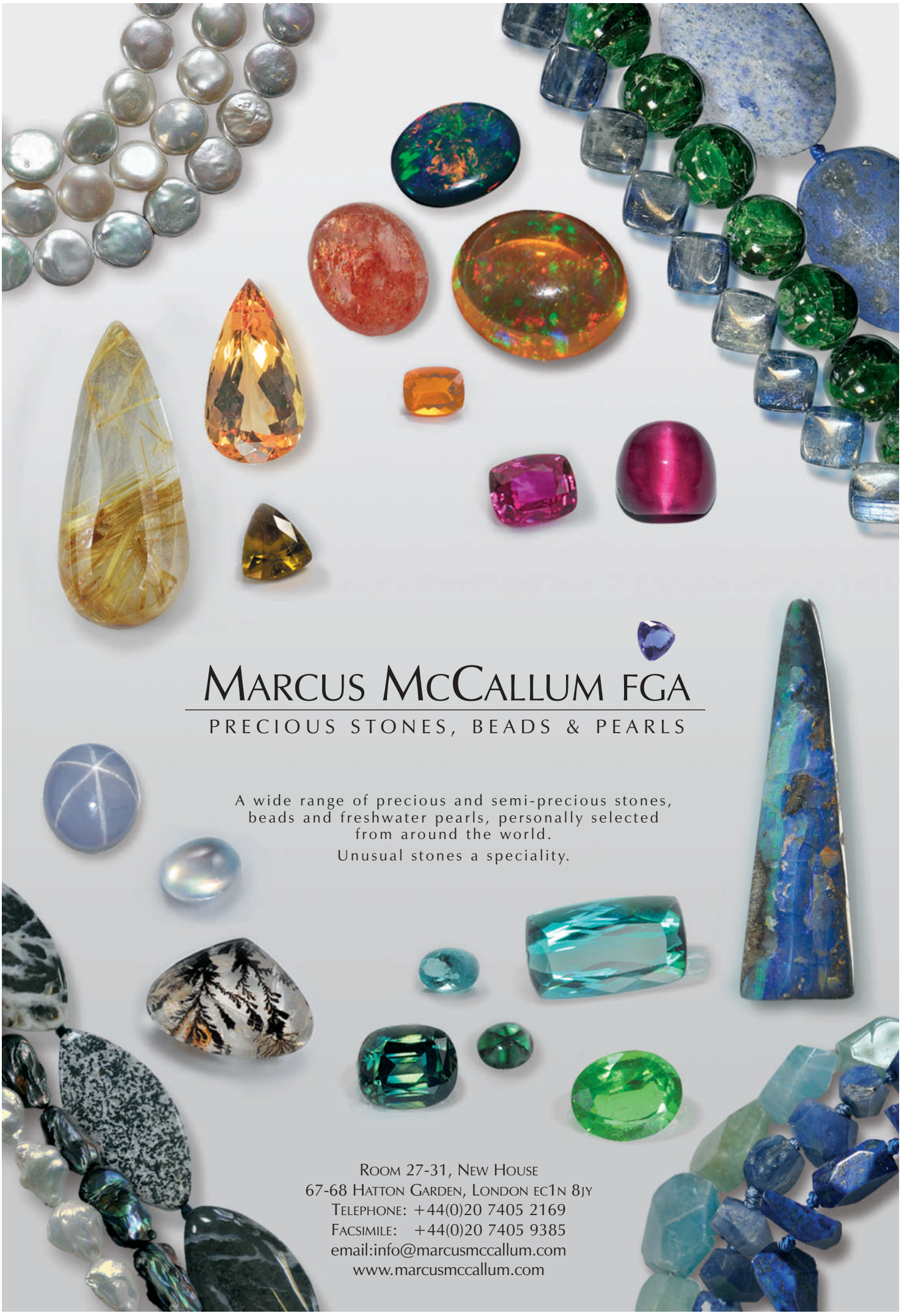


Gem-A Conference 2011

South Sea pearls

Tucson

The Gemmological Association of Great Britain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Editorial

Gems&Jewellery
Winter
11/12

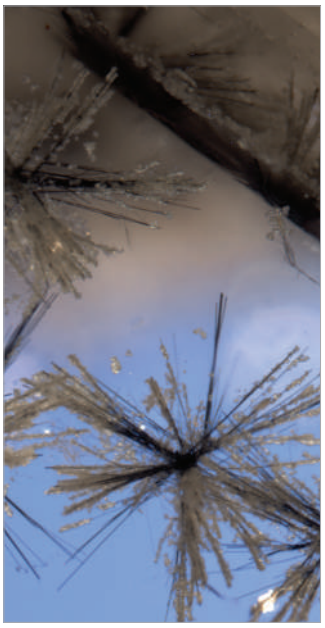
Contents

Sea change

Our New Year wish at the beginning of the Gem-A January Newsletter was that 2012 would bring improvements in the economic and political challenges that the world saw in 2011. The re-opening of diplomatic ties between the USA and Burma raises the question as to whether the US embargo on Burmese rubies and jade, and the European embargo on all Burmese gems, will soon be lifted. Regardless of the intentions of the embargoes, they were hardly consistent (the US predictably banned Burma rubies but not Burma petroleum products), were ignored or circumvented by much of the trade, and probably had little overall effect. The statistics reported by Pala International suggest that Burmese gem production was down in 2010/11 compared with previous years, but jadeite production was up very considerably as were jadeite prices, with China being the major market.

Talk of politics, the future and the gem trade brings us naturally to the thorny issues of disclosure and ethics. Will 2012 take us forward? The words we use to describe gems, and gems after they've suffered at the hands of our ingenious trade, have developed in a chaotic way over many generations. Gem nomenclature, its universality and policing is now desperately in need of a rethink — an opinion that seems to be shared by the majority of correspondents when the matter was discussed recently on Gem-A's MailTalk network. Ideally we need to start with a clean slate, draw up a consistent and logical nomenclature framework, and create or recreate an organization to seriously champion it at all levels. Can it happen? In theory yes, and it would be a tremendous service to the buying public, but in practice I won't hold my breath (see Harry Levy's article on pages 36–37). And what about ethics in the gem supply chain in 2012, in an environmental and human rights sense? Trade and customers are more aware of the issues and, ignoring those simply jumping on a convenient marketing bandwagon, things are changing slowly as people start to think about the issues. Significant change will take time, far longer than many might wish, and I am not yet convinced that the rapid growth in the number of jewellery-related companies who have been certified as showing 'evidence of responsible business practices' by the Responsible Jewellery Council (they range from Argos to Zenith) is a true indicator of fundamental change.

Jack Ogden
Chief Executive Officer



Cover Picture

The image shows stars of grey hollandite needles (a barium-manganese oxide) encrusted with an unidentified birefringent white mineral, all included in quartz from Ambositra, Madagascar. Magnification approx. 30×; illumination transmitted polarized light. Photo Michael Hügi. (See Gem-A 2012 Photo Competition, page 20.)

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Gem-A Conference Special

Kerry Gregory reports on the Gem-A Conference, held in November 2011

Conference 2011

This year saw new and exciting things for the Gem-A Conference. Held at a new venue — the opulent Hotel Russell in Bloomsbury, London — the Conference attracted a record number of delegates, as well as generous sponsorship from several quarters of the trade. The success of the event is in keeping with Gem-A's recent strong performances in 2010 and 2011, indicating that this is set to carry on well in to the future.

The international flavour of the Conference was evident, with speakers and delegates from around the world populating the full and very splendid room in which the main presentations were held. Many of these delegates had gold stars on their name badges, signifying that they were 2011 graduates of the Gem-A Gemmology and Diamond Diplomas, and not sheriffs, as Dr Jack Ogden was quick to note.

The winning photos from the 2011 Gem-A Members' Photo Competition were also on display. Relaunched and rebranded in 2011, the competition saw a runaway winner, with Michael Hügi taking the prize for overall winner, as well as for both the Natural and Treated categories (for full details please see *Gems & Jewellery*, Autumn 2011, pages 30–32).

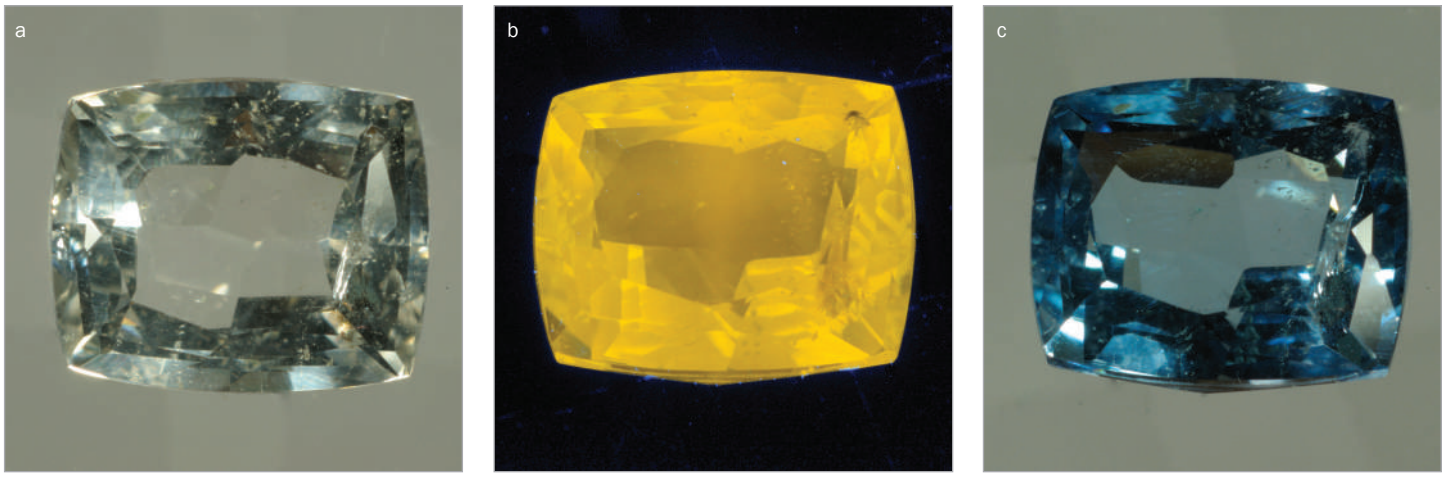
Optical phenomena

The morning programme commenced with a speaker well-known to Gem-A: **Brian Jackson**, Research Curator of Mineralogy at the National Museums of Scotland, and Chairman of Gem-A's sister association, the Scottish Gemmological Association. Brian has experience with Fourier transform infrared spectroscopy (FTIR), and has published works on the identification of carbonate minerals using infrared, as well as writing several chapters of the most recent edition of Webster's *Gems*.

Brian began by explaining that optical phenomena in gemstones are a product of the interaction of energy to produce a visible result in the stone. There are many types of optical phenomena, resulting from a number of causes such as mechanical force, heat, visible light or ultraviolet (UV) light, striking images of which were shown to delegates as examples.

Throughout his talk Brian explained the relevance of the optical effects to gem testing, stressing that they are not just pretty reactions, despite the fact that many designers use these effects to create new and unusual pieces of jewellery (such as jewellery designer Jayce Wong, who utilizes the fluorescent properties of both ruby and diamond in her pieces).

Uses of optical phenomena in gem testing include using UV light to separate diamonds from many of their imitations; UV light plays an important role in a considerable amount of diamond testing, as highlighted in the talks by both Branko Deljanin and Gary Roskin. Tenebrescence (the temporary change of a material's colour after exposure to UV) is also useful in aiding identification of a stone, for example, Afghan scapolite fluoresces a strong yellow colour under longwave UV light (LWUV) (**1**).



1: Images of scapolite showing (a) colourless scapolite in daylight, (b) the fluorescent yellow colour under LWUV and (c) the tenebrescent blue colour in daylight. Photos Brian Jackson.

Gem-A Conference Special

After removal of the LWUV the body colour is a steel-blue. The effect when seen under shortwave UV light (SWUV) is less noticeable, while a similar looking quartz will not show this effect.

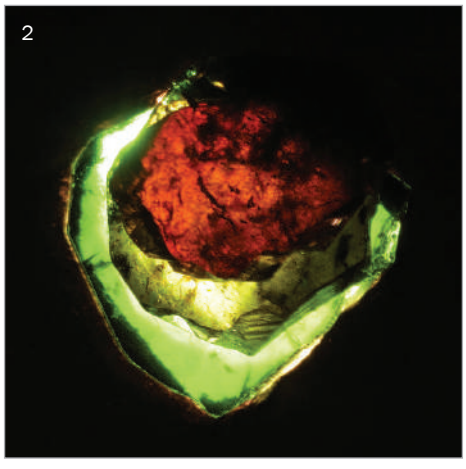
Heat can also induce spectacular effects in gemstones, and this effect is generally called thermoluminescence, although Brian (ever the stickler for correctness) tells us that it should, strictly speaking, be called thermo-induced phosphorescence. One of the most well-known examples of this effect can be seen in chameleon diamonds, which are known to glow yellow after being heated to temperatures as low as 120°C, creating colour change. Alongside the luminescent effects are colour change effects from heat — there are zircons that need only the heat from a light bulb to change colour, whilst some fluorite will change colour just from the heat of your hand.

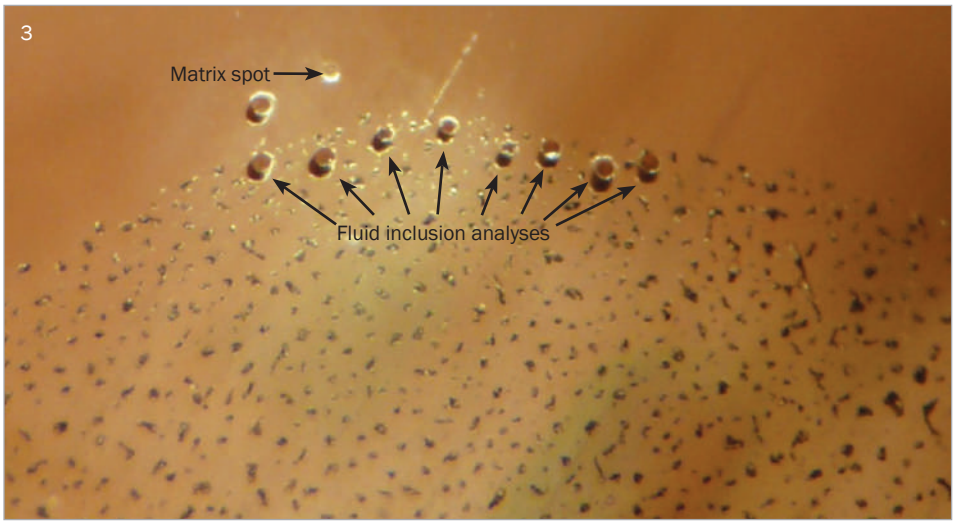
Colour change is also caused by visible light, as are other optical phenomena. Delegates were shown stones that change colour depending on the direction in which light travels through them, an effect known as pleochroism, as seen in tanzanite and kornerupine. Delegates were also shown stones that change colour depending on the thickness of the material, for example, the Usambara effect occurring in tourmaline, where it changes from green to red (**2**). Also shown were examples of reflection effects such as asterism in diopside, garnet and sapphire, as well as thin-film interference effects such as labradorescence, schiller, aventurescence and more, often transforming sometimes dull material into exciting, shimmering gemstones.

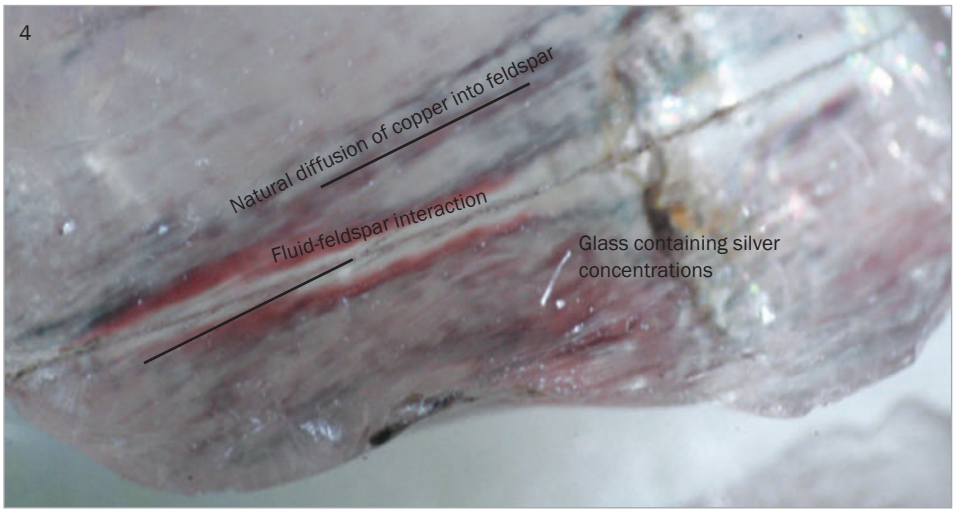
All in all the diverse optical phenomena shown in this illuminating and well-received talk were as seemingly endless as Brian's passion and enthusiasm for such effects.

The andesine issue

At the last minute **Willy Bieri**, gemmologist of GemResearch Swisslab (GRS), kindly stepped into the shoes of Dr Adolf Peretti, who was unable to attend the Conference due to the severe flooding in Bangkok. Mr Bieri delivered Dr Peretti's talk entitled 'Distinguishing natural Tibetan copper-bearing andesine from its diffusion-treated counterparts using advanced analytical methods', presenting a well-researched study into what has been a very contentious issue in the gem trade.







2: Three 3 mm slices of Usambara tourmaline are stacked on top of each other, depicting the change in colour with path length. Photo Brian Jackson.
3: This copper-bearing andesine collected from Yu Lin Gu (Tibet) shows an isolated colour zone, with red and green bands associated with a fluid inclusion trail, adjacent to which red stripes are found at a 30°. Copper naturally diffused into these zones, directly emerging from the fluid inclusion trails, some of which emerged from a glass-like substance at the surface of the sample. Fluid inclusions and the colour-zoning in the stone formed after the formation of the feldspar itself and are clearly linked to an entry point containing glasslike materials and a hydrothermal alteration event. Sample hand-collected by Richard W. Hughes. Photo © GRS.
4: A fluid inclusion trail that was measured by laser ablation (LA-ICP-MS) in a sample of andesine, hand collected by Adolf Peretti from Gyaca, Tibet. Photo © GRS.

Gem-A Conference Special

Conference 2011 (cont.)

Utilizing a combination of video footage, slides and narration, Mr Bieri took us on the journey undertaken by Dr Peretti and GRS to identify whether it is possible to distinguish between diffusion-treated and natural andesine. Mr Bieri began with an explanation of the properties of andesine: a plagioclase series feldspar on the border between andesine and labradorite, with similar RI and SG values to those of quartz.

In 2002 it was claimed that red andesine had been found in the Congo, while large quantities of the material were seen at the 2006 Tucson Gem Show. However, it later transpired that the material from the Congo was unverified and that it had the same properties as the material from Tibet.

The talk was split into two parts; the first showing the field work and method of collecting the samples, while the second half gave an overview of the detailed gemmological research undertaken on the material.

During the talk footage was shown of andesine material that had been collected loose from the ground in an inactive mine. In a three hour excursion, at least 3 kg of andesine was collected, although it was proven that some of the material had actually been planted by hand at the site — indeed, at one point in the video we see a guide dropping something anonymous on the ground at a site where andesine was later collected. Most of the samples collected in the trip were natural, although not from the same location, and actually corresponded to samples personally collected by Richard Hughes 700 km away (**3**).

GRS's in-depth laboratory testing included the use of scanning electron microscopes on the material collected in Tibet. These results showed that a melted green glass on top of the treated material was a product of the treatment. Fluid inclusion analysis on the natural samples collected by Hughes and carried out by Laser Ablation Inductively Coupled Plasma Mass Spectrometry (LA-ICP-MS) showed fluid inclusions containing copper (**4**). Natural stones showed a high concentration of silver at the surface. Isotope tests were carried out on the copper content of stones, showing that diffusion-treated stones have a lighter copper isotope than that of natural stones.

Mr Bieri concluded the talk with the notion that Oregon sunstones can be distinguished from 'Tibetan' andesine by RI and chemical composition, that there are both real and fake mines in the Tibetan area, that natural copper-bearing andesine from Tibet does exist, and that separation between faceted samples of natural and treated stones can only be achieved through highly sophisticated methods including the analysis of copper isotopes.

Gems TV

In what some might call a brave move, **Steve Bennett**, CEO of Gems TV (**5**), delivered a talk entitled 'Gems TV: The market and the media', where he gave us an overview of the past, present and future of Gems TV. Steve began with the history of the company, taking the audience from Gems TV's inception in 2002 with the purchase of a TV studio, through the milestones of the company, which include the merger with Thaigem in 2005, Steve's break with the company in 2006 and the company's subsequent decline, to Steve buying back the business in 2010.

Described as a vertically integrated business, Gems TV buys rough and cut gemstones from all over the world. They have offices in Jaipur, India, where the jewellery is designed and manufactured, which is then sold on to the company's own TV channel and website, although interestingly only a very small percentage of jewellery is sold online.

Most of Steve's talk was dedicated to the ethics of running a company such as Gems TV — a paramount concern, considering that over 80% of the gemstones sold are sourced from third world countries. Taking into account the perceptible increase in public awareness over such issues, an openness concerning ethical practice is pertinent to the smooth running and wellbeing of the company. The company's focus has been on trading fairly and transparently,

5: Steve Bennett, showing emerald in host rock in Zambia. Photo © Gems TV.
6: Kapila Community School, Zambia. Recently built with funds from Gems TV and Gemfields, the school educates the children of the village. Photo © Gems TV.

Gem-A Conference Special

Conference 2011 (cont.)

and on trying to give back to the communities and the environments from where the stones originate. As Steve quite rightly points out, any negative publicity not only affects his company but the industry as whole. To mitigate their impact on the environment, Gems TV support many international projects, as well as projects founded by Gems TV, such as the Colourful Life Foundation, which supports communities in mining areas (**6**).

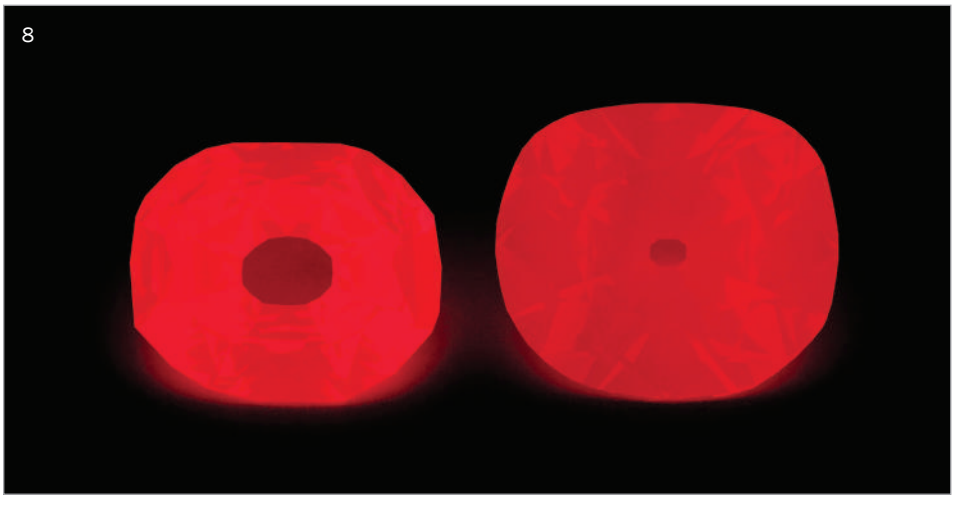
Another priority of the company is to educate the consumer about gemstones, and to inspire passion for product. Educational videos are shown on the channel throughout the day, while the Gems TV website contains a wealth of information about gemstones. Every customer also receives a book about gemstones written by Steve himself, in a bid to further the gemmological education of consumers.

Steve ended the talk with the proposition that Gems TV and the gem and jewellery industry should work together. As Steve pointed out, there are plenty of things that Gems TV cannot and does not do that traditional retailers can, putting the idea out there that perhaps Gems TV isn't the enemy of traditional retailers, but instead a valuable ally.

Comparing the Hope and Wittelsbach-Graff diamonds

After a delicious and welcome buffet lunch, **Gary Roskin**, diamond grader, author of *Roskin Gem News Report*, former editor of *JCK* magazine and a Gem-A USA tutor, gave his personal tale of two diamonds, entitled 'The Blues Brothers, or not: comparing the Hope and Wittelsbach-Graff diamonds' — the story of Gary's part in the testing of the famous Wittelsbach-Graff and the Hope diamond (**7**), in an attempt to determine whether the stones came from the same piece of rough.

The amazing opportunity to test the loose stones side by side came about when the Hope diamond was being remounted from its original Cartier mount to a more modern one by Harry Winston, to celebrate the fiftieth anniversary of its residence at the Smithsonian, where it has been the most visited artefact in any museum anywhere in the world. Around the same time, Laurence Graff purchased the Wittelsbach for a record $24 million, making it the most money ever paid for one stone, and was keen to show off his newly recut purchase.



7: The Hope Diamond (left) and the Wittelsbach-Graff (right) side by side. Photo Gary Roskin.
8: The Wittelsbach-Graff (left) and Hope Diamond (right) phosphorescing after being exposed to ultraviolet light. Image courtesy of the Smithsonian Institution's National Museum of Natural History, Photo Chip Clark.

The stones were subjected to a number of tests; firstly, the phosphorescence of both was compared side by side. The Hope famously phosphoresces bright orange-red, and to much excitement it was found that the Wittelsbach-Graff does also, although it was noted that the Hope faded sooner than the Wittelsbach-Graff (**8**). FTIR spectroscopy was also used to compare the phosphorescence spectra and again the stones appeared the same.

The final test involved looking at the strain patterns under a polarizing microscope. The Wittelsbach-Graff showed a crosshatch pattern similar to that of the 'tabby extinction' seen in synthetic spinel, but alas the Hope showed a completely different pattern with some cross hatching, but this was alongside chevrons. In light of the results it was concluded that the stones were not from the same piece of rough and therefore not 'brothers', but due to their immense similarity in other ways they were possibly 'cousins' from the same mine in India. Interestingly, the piece of equipment that dealt the deciding blow was the humble polariscope.

Gem-A Conference Special

Conference 2011 (cont.)

9: An irradiated fancy red colour, type Ib synthetic diamond, 0.53 ct. Photo Branko Deljanin, Canadian Gemological Laboratory.

10: HPHT-treated E colour, type IIa natural diamond, 1.00 ct. Photo Branko Deljanin, Canadian Gemological Laboratory.

Diamond screening

With 15 years' experience as a research gemmologist, as well as having managed projects on natural, treated and synthetic diamonds and running the Canadian Gem Lab in Vancouver, **Branko Deljanin** was more than qualified to deliver a talk on the screening and identification of enhanced and synthetic diamonds.

Today, in comparison with 20 years ago, we have many more issues to face when dealing with diamonds. Diamond treatments such as old fashioned coatings or cyclotron irradiation with its tell-tale umbrella effect were relatively easy to spot. Branko gave us many ways in which we can begin to identify diamond types and various treatments and synthetics by simply using the polariscope, microscope and UV lamp. With some experience, and with the intelligent application of data, it is possible for the everyday gemmologist to gain a better understanding of these stones, and to rule out certain identities using these methods. Often with modern-day gemmology, knowing what the stone is not is as close as we can get to an identity without laboratory testing, and often that is enough.

Delegates were informed that in-depth studies into diamond types have shown that around 98% of natural diamonds are type Ia, and that synthetics of this type are extremely rare. Type Ib accounts for less than 1% of natural stones, and most Ibs on the market are high pressure/high temperature-grown (HPHT) synthetics (**9**). The majority of type IIa diamonds are chemical vapour deposition-grown (CVD) synthetics with only 2% being natural (**10**), whilst type IIb accounts for only 0.1% of natural diamonds — most IIbs seen are HPHT-grown synthetics. By knowing the diamond type we can estimate whether the stone is most likely to be natural or synthetic. Branko then showed detailed slides of different diamond type reactions under crossed polars — interestingly HPHT-grown diamonds show no strain under crossed polars, whilst CVD-produced diamonds showed a characteristic columnar appearance — both of which differ from natural strain patterns, typically high interference colours in type I and 'tatami' patterns in type II diamonds.

Branko also gave a brief overview of recent diamond treatments, and it was seen that multi-step treatments are now common, with up to three processes occurring in some cases. Stones can be irradiated, annealed and HPHT-treated. With the use of FTIR and visible near infrared (VIS-NIR) spectroscopy most treated stones can be identified as treated from their characteristic absorption peaks, except for rare type II diamonds (colourless and blue) that need to be checked using photoluminescence (PL) spectroscopy to see if they are HPHT-treated or not.

It is worth noting that it is still difficult to prove whether type IIa green diamonds are coloured by natural or artificial irradiation, which, after red diamonds, are the rarest of all natural colours.

Original Paraíba tourmaline

The penultimate speaker of the day was **Brian Cook**, geologist and co-owner of Nature's Geometry, who gave us what he described as a "tall tale about one of the most beautiful and magic stones to emerge from earth, the original Paraíba tourmaline".

Brian showed delegates slides of the fantastic array of intense neon colours found in Paraíba; electric blue, purple, green and pink, produced by the addition of copper (and to a lesser extent manganese) in the stone's composition. It is the vividness of colour that makes Paraíba tourmaline the most valuable and sought after of all the tourmalines. An overview of the geology showed that the tourmaline occurs in pegmatite veins, and that well-formed complete crystals are rare. In the past the mine has mainly been worked out of very narrow hand-dug shafts, but in recent years

Gem-A Conference Special

Conference 2011 (cont.)

11: Unheated Paraíba rough looking into the c-axis. Photo Brian Cook.

more modern technology has been used to access the material.

Delegates were treated to an overview of the mine, including its history and ownership, as well as the local power struggles for the mine, a story which seems to be all too common with valuable commodities.

Brian finished with pictures of exquisite jewellery showcasing these rare tourmalines, each piece unique in keeping with the stone's beauty. The most recent creation was a wheel with a central piece of Paraíba tourmaline that reflects through a faceted piece of rock crystal to disperse the brilliant colour — a simply stunning piece of design utilizing the optical properties of both stones.

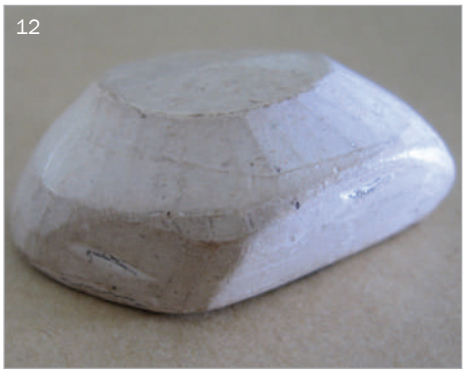
Evaluating the Koh-i-Noor

Final speaker on the agenda was **Alan Hart**, Head of Collections and Curator of Minerals at the Natural History Museum, London, with a talk on the re-cutting of the famous Koh-i-Noor diamond. The Koh-i-Noor (meaning 'Mountain of Light' in Persian) arrived in the UK in 1849, having been acquired by the East India Company as a gift to Queen Victoria. Once the world's largest diamond, the stone was the size of a hen's egg and weighed 186.10 ct. It was displayed in the Great Exhibition of 1851 in Hyde Park, although it did not cause the huge excitement expected, with many visitors criticizing the diamond for its lack of sparkle.

After the public dismissal of the Koh-i-Noor, Prince Albert had the stone recut in 1852, from its original Mogul-style cut to an oval, reducing its weight by two fifths to 105.60 ct. Luckily, at the time, the Trustees of the British Museum had a plaster cast made from the original stone before the recutting in 1851 (**12**). The cast has allowed for a comprehensive study of the original form to be undertaken and for a cubic zirconia replica to be produced (**13**), both of which can be seen today in The Vault exhibition at the Natural History Museum.

When evaluating the re-cutting, research was conducted into how the original had been cut, how it would have interacted with light and how it would have been displayed at the Great Exhibition. Interestingly, it seems the differential hardness of diamond was the major factor resulting in the form of the original stone and how it was worked, resulting in the Mogul cut. Several factors contributed to the lacklustre appearance of the stone at the Great Exhibition, including poor lighting, the original lack of brilliance of the Mogul style, and the stone itself having (at one point) been displayed the wrong way up.

Alan also shared with delegates his joy at having discovered the actual display that the stone was mounted in within the Natural History Museum collection, and the subsequent discovery of images of the actual display 'cage' it was put into.



12: Plaster-cast of original Koh-i-Noor diamond before recutting.
13: A model of the Koh-i-Noor diamond. Photos Natural History Museum Mineral and Gem Collections.

Alan lives in hope of someday finding the complete showcase and cage from the original exhibition.

The story of the diamond and the amount of work that has gone into research and detailed replicas will have certainly compelled delegates who had not visited the museum to put it high on their 'to do' lists.

Evening dinner

Many delegates stayed on for the evening's entertainment, a dinner/dance held in the Wharncliffe room of the Hotel Russell, which had been transformed into an elegant candlelit suite for the evening. Attendees were invited to a drinks reception prior to the dinner, before enjoying a delicious three course meal, after which delegates danced, networked and chatted the night away with friends old and new.

Gem-A Conference Special

Conference 2011 (cont.)

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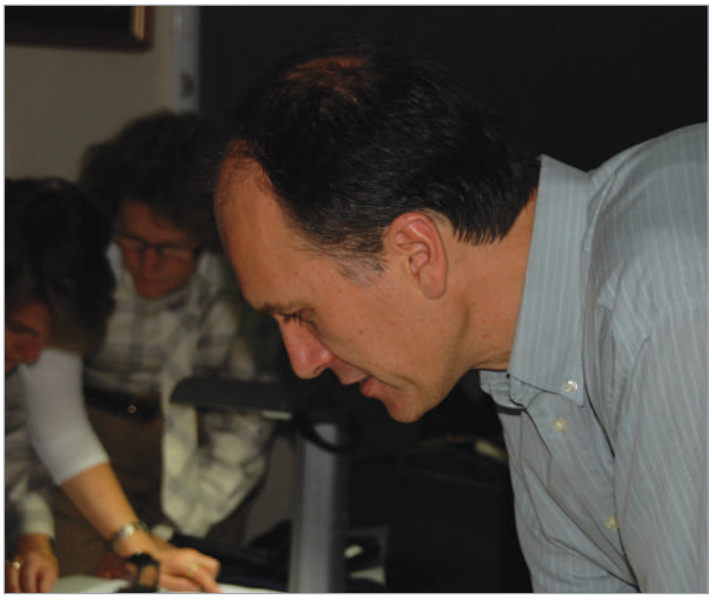
Gem-A Conference Special

Andrew Fellows reports on the hands-on workshops held during the Conference

Basic gemmology and diamond identification

An update of the talk presented by Branko Deljanin and Dusan Simic in Tucson 2011, this workshop gave attendees the chance to put into practice the theory presented in Tucson, and later at the 2011 Gem-A Conference, that a combination of magnification and crossed polarizers can be employed to show the different interference patterns caused by internal stresses that are seen in diamonds, which, with practice, can be used to determine the diamond type.

With years of experience in the field, Branko brought his knowledge to the participants in a friendly, well-structured workshop which enabled even the least experienced gemmologist to grasp the basics of this theory.



Branko Deljanin discussing diamond types. Photo Gem-A.

Optical phenomena

Complementing his Conference talk, Brian Jackson's workshop on optical phenomena focused on a wide range of optical features and properties that can be seen in the gem world. From simple effects such as chatoyancy and asterism through to advanced effects like tenebrescence, the workshop was very much a hands-on approach, with a large range of gem materials available for the participants to view and test. In closing, Brian demonstrated an effect shown by pumpkin oil, in which different colours are transmitted through the liquid depending upon orientation and thickness — similar in many ways to pleochroic gems.

Snap decisions

In the final workshop of the 2011 Gem-A Conference season, Gary Roskin demonstrated that even with the simplest of digital cameras and the most basic lighting, near-professional quality images of gems can be captured. The main approach of this workshop was to achieve the correct combination of exposure/white balance, and to exploit the use of artistic angles. As digital images can be captured quickly and at almost no expense, a key feature and requirement when visiting shows/fairs was to capture numerous images, leaving the final choice to a time after the dealers had gone.

(Left) Confetti sunstone with iridescent hematite platelets in oligoclase. Photo courtesy of Brian Jackson, Trustees of National Museums of Scotland.
(Right) Photographing an opal at the Chats Cafe, Lightning Ridge. Photo Gary Roskin.

Gem news from Gary Roskin

There are some very close seconds, but of all the gem shows, if I had to pick just one favourite, it would be Intergem.

(Below left) This magnificent 28.91 ct multicolour Imperial Topaz from Constantin Wild is a stunning example of what Mother Nature can produce, and typical of what Intergem and the gem suppliers in Idar-Oberstein can bring to the table: unique, beautifully cut, stellar examples of the finest quality available.
(Below right) A fine example of a Munsteiner piece: ordinary rutilated quartz, carved and faceted by Tom Munsteiner, with ring designed and manufactured by Jutta Munsteiner.
Images courtesy of Intergem, Idar-Oberstein.

After all the years I have been covering gem and jewellery shows, I sometimes think I've seen it all, and so what's the point in going to another? But then I realize that I don't want to miss out on even one new morsel. And so it goes, year after year, that I and many others continue to cover the world's gem and jewellery shows.

While writing this review I am also getting ready for the 2012 Tucson GemFair. This year there are 39 individual shows making up the GemFair and, if I may be so brash, there is no way for anyone to actually see it all without flying through many and outright skipping many others. After 30 years of attending Tucson shows, it is now relatively easy for me to breeze by dozens of exhibitors, looking for that special one — the one that catches your eye, that makes you stop and enjoy the gems and stories that go along with them.

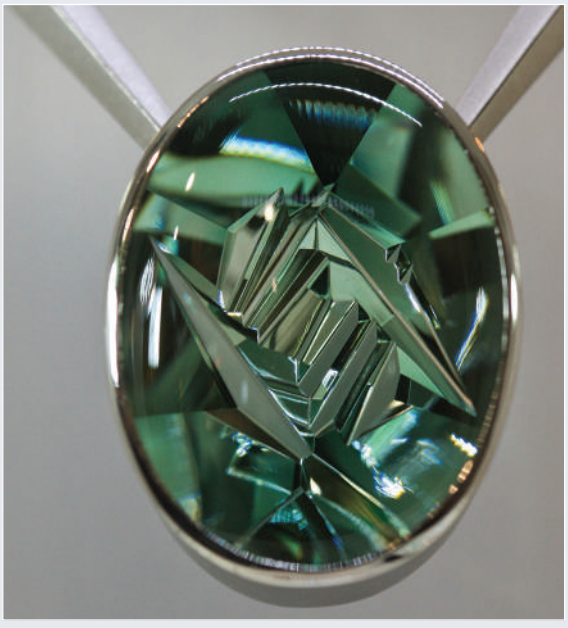
That being said, let's talk about a show which took place just a few months back. I am talking about my all time favourite gem show: Idar-Oberstein's Intergem.

The Intergem show is quite the opposite of Tucson. First of all, size wise, they do not compare. There are thousands of exhibitors in Tucson, opposed to just over one hundred in Idar, and so it was quite a shock when I arrived at Intergem for my very first visit in 1998. There were probably some 80 exhibitors, and being used to the enormity of Tucson, my first thought of Intergem was simple: "I will be through covering this show by noon. What am I going to do for the remainder of the four days I have scheduled?" But as it turned out, by noon, I had only visited three exhibitors. At that rate, I would need an additional week to cover the show. The moral of the story: never judge a show by its size. The Intergem features so many fine quality gems and gem exhibitors concentrated into just one modest venue that it is hard to imagine this type of show anywhere else in the world.

So now it's time to back up my preference. Let me show you just a very small taste of some of the gems on show this past year.

Gems and Minerals

It's all in the details as we see here in this wonderfully carved leaf. Sure, you can buy carved gem leaves elsewhere, but you will probably see less of the attention to detail that we see here. Image courtesy of Intergem, Idar-Oberstein.



I love what Munsteiner (Bernd, Tom and Jutta) can do to what would otherwise be just another ordinary faceted gem. They use nice quality gem material to make fabulous gem art, as seen in this aquamarine. Image courtesy of Intergem, Idar-Oberstein.

Some of the finest gem carvings come from the firm of Emil Becker. Look at the attention to the art form as well as the accuracy of the animals being carved. Features rock crystal, smoky quartz and 18 ct yellow gold. Image courtesy of Intergem, Idar-Oberstein.

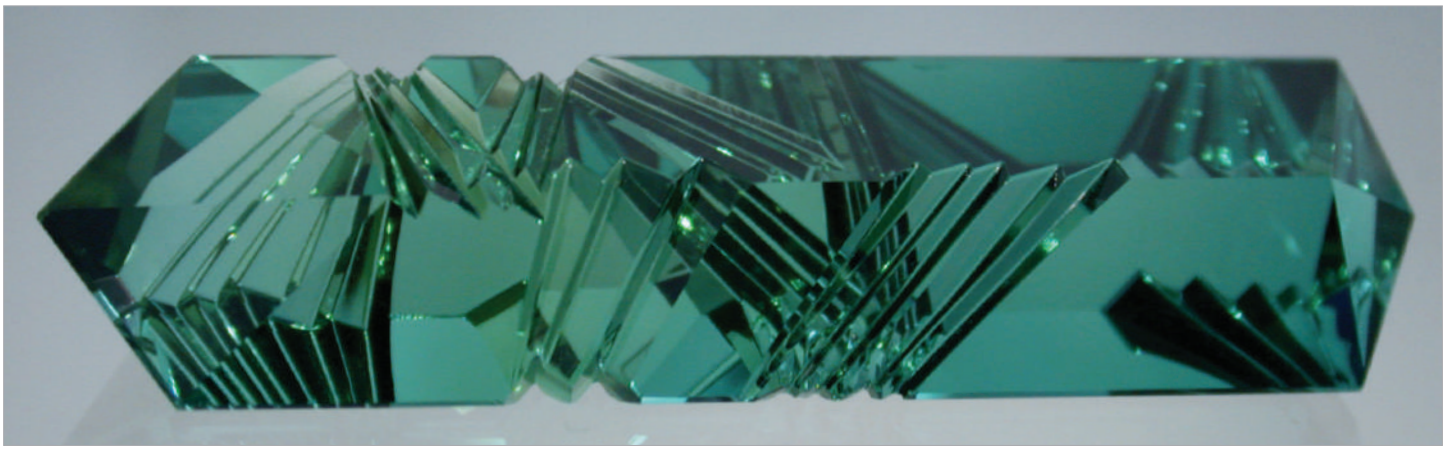
This spessartine garnet shows great colour and terrific cutting — what a combination. What I notice at Intergem is the attention to getting a great polish. Too often the gem relies on its own merits, and the cutting is simply there to give shape to the stone. Here in Idar-Oberstein, there is equal if not more attention paid to the finish of the gem. Gem cut by Ekkehard Schneider. Image by Gary Roskin.

Gems and Minerals

Gem news from Gary Roskin (cont.)

Manfred Wild of Emil Becker (top left) is always presenting something great at Intergem. This year he presented this gem-encrusted working replica of the Riesenrad, a giant Ferris Wheel located in Austria. It is made up entirely of 18 ct yellow gold and gemstones. Standing at 415 mm high, the piece features 1296 diamonds, and its weight in gold is more than 10 kg. The large faceted citrine at the ticket office (left) weighs 234.44 ct.
Images courtesy of Intergem, Idar-Oberstein.

Gem news from Gary Roskin (cont.)



Ekkehard Schneider uses his skills, carving both top and bottom, and finishing this tourmaline with that expected excellent final polish. Image by Gary Roskin.

This beautiful bicolour tourmaline orchid is from Stefan Klein at Herbert Klein. Whether it's a skiing polar bear, a smiling hippo, flowers or frogs, Klein can show you just about anything — and with everything you expect — fine quality gem material, and exquisite detailed carvings. Image by Gary Roskin.

One thing's for sure, the gem suppliers at Intergem sure do know how to acquire the finest quality gems from all over the world. Here are two magnificent Mexican opals, courtesy of Emil Weiss. The fire opal on the right, with play-of-colour all the way around, weighs 23.22 ct, and the water opal on the left weighs 38.70 ct. Image by Gary Roskin.

Bowled over

If you did not see this from the 2010 Intergem, then have a look at Helmut Wolf's large rock crystal bowl — Guinness world record breaking large.

I first met Helmut during my first visit to Intergem; he had created a vase for the show. The image of the vase that I had seen prior to my arrival had no perspective and so I did not realize, until I saw it in the gem hall, that the vase was close to 5 ft tall. This year, when I received an image from Helmut of a beautiful crystal bowl with no perspective, I knew it must be large, but just how large? I asked Helmut to send me an image with him in the picture. Suffice to say, it bowled me over!

Photo courtesy Helmut Wolf.

Star ruby

Dr Karl Schmetzer and Thomas Hainschwang investigate an interesting star ruby.

A star ruby of 5.98 ct was submitted for examination. The stone had been offered in the gem trade in France as natural and could be traced back to a local gem merchant in Afghanistan, but the first inspection showed no natural inclusions, growth structures, concentrations of rutile needles, or any of the commonly observed curved striations of Verneuil synthetics.

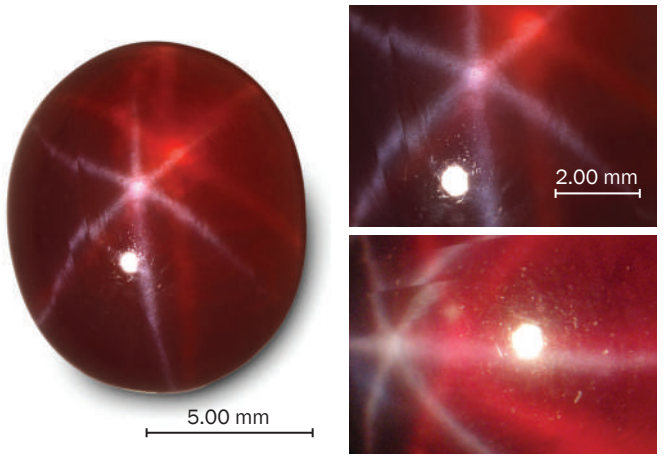
Visual observations

The oval shaped stone (**1**) measured 10.3 × 8.7 mm, thickness about 6.3 mm, and has a polished transparent upper part and a rough (unpolished) translucent, only slightly curved, almost flat base. The transition between the polished and unpolished parts of the gemstone is shown in **2**. In a view more or less perpendicular to the base through the centre of the ruby, an off-white star with six arms was also seen. With a somewhat oblique fibre-optic illumination, however, an additional orange red star was seen, which is clearly distinct from the off-white star on the curved surface of the ruby. The orange red star seemed to originate from the back of the cabochon (see again **1**). The visual appearance of the stone therefore resembled early synthetic star rubies and sapphires of high transparency, in which the star was confined to the outermost layers of the cabochons (see Crowningshield, 1965; Arem, 1987).

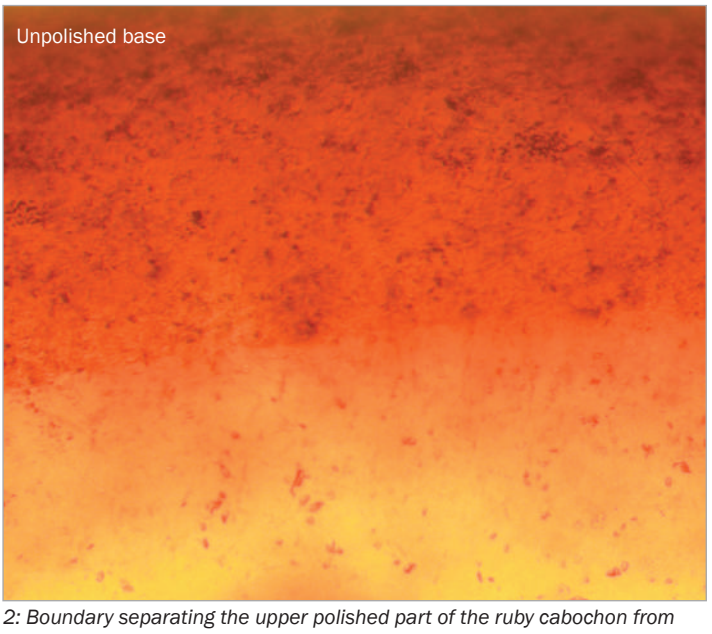
In some orientations, the arms of the off-white star appeared as if they had been cut or displaced from their main direction (**1**). This effect was caused by thin lamellar boundaries which traversed the complete stone showing interference colours under crossed polarizers (**3**, **4**). This observation indicates that the corundum crystal consists of several domains with slightly different crystallographic orientation. In addition to the boundaries mentioned, the stone shows an irregular extinction pattern under crossed polarizers which is caused by internal strain of the corundum crystal (**4**). Similar, but usually more regular patterns (Plato lines) are seen in Verneuil-grown synthetic corundum.

In immersion, the outermost thin layer of the stone can be seen to be a stronger red than the interior (**5**). In a view from the side, it was also observed that the colour of the transparent upper part of the cabochon was somewhat irregular (**6**). In this direction of view, i.e. in a view perpendicular to the *c*-axis of the corundum crystal, the pleochroism was determined as yellow-orange parallel and red perpendicular to the *c*-axis. Due to the intense yellow to yellow orange colour component in this stone, the purplish red coloration seen normally in ruby perpendicular to the *c*-axis was not observed. This implies that, in addition to chromium, other elements that cause colour may be present.

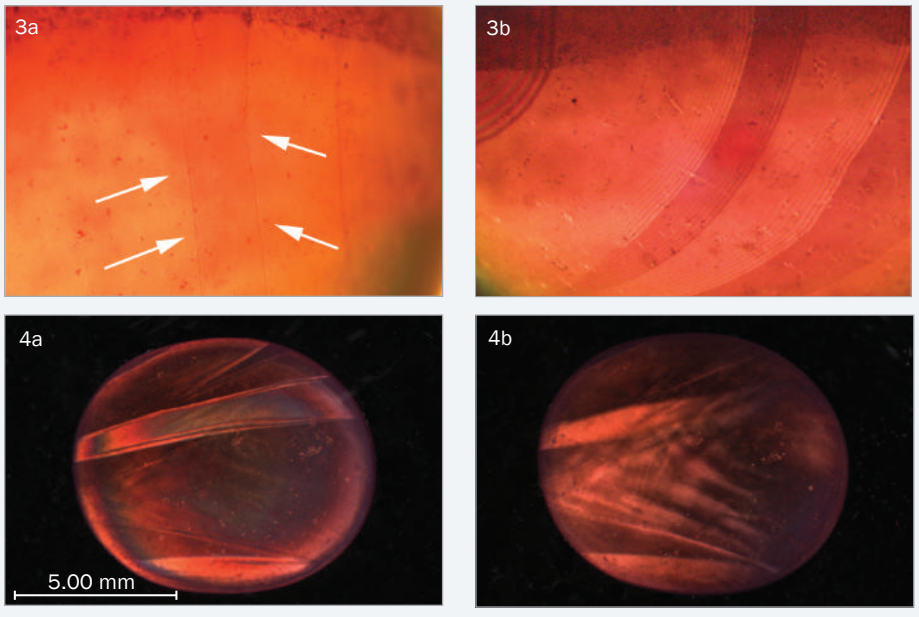
Close to the surface of the slightly curved unpolished base of the cabochon, some spots formed by foreign material were seen (**6**). Under crossed polarizers, the larger



1: The star ruby submitted for examination shows two stars: an off-white six-rayed star on the upper surface of the cabochon, and under slightly oblique fibre-optic illumination, an orange red star. In particular orientations, one or two of the off-white arms of the ruby are displaced by lamellar boundaries, particularly in two of the arms. Size of the stone is 10.3 × 8.7 mm.



2: Boundary separating the upper polished part of the ruby cabochon from the lower unpolished base. Immersion, 50×.



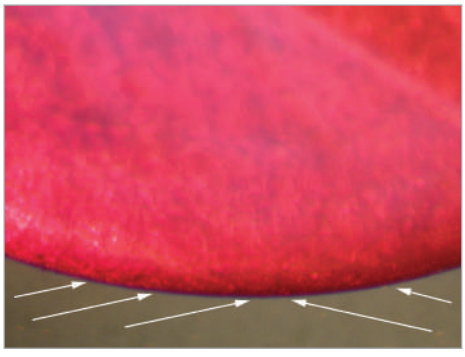
3: Slightly curved lamellar boundaries (a, indicated by arrows) separate different parts of the ruby, while under crossed polarizers, these lamellae show interference striations (b). Small birefingent crystals are also present in the outermost layer of the upper (polished) part of the cabochon. Immersion, 50×.
4: Slightly curved lamellar boundaries are also seen as in 3. Under crossed polarizers, the various parts of the crystal show interference colours (a). In a somewhat different orientation, the stone also shows an irregular extinction which can also be described as irregular strain pattern (b). Immersion.

spots were seen to contain some birefringent small crystals of unknown composition (**7**, **8**). In the polished upper part, no such crystal aggregates were seen, but numerous isolated birefringent small crystals are present (**3**). Furthermore, the six-rayed star effect was seen to be caused by a dense network of oriented needle-like or fibrous inclusions (**9**).

Chemical and spectroscopic examination, cause of colour

The composition of the upper polished side of the cabochon and the unpolished base of the star-ruby was obtained by X-ray fluorescence spectroscopy (EDXRF). The spectra obtained on both sides were more or less identical; they consist of dominant peaks of chromium, an unusually strong peak of titanium and weaker peaks assigned to iron and nickel. Polarized absorption spectra in the visible and ultraviolet range, measured in both directions parallel and perpendicular to the *c*-axis, show absorption maxima which were assigned to Cr^{3+} and Ni^{3+} (see, e.g., McClure, 1962).

These analytical and spectroscopic results explain the colour of this stone. If only traces of nickel are present in synthetic corundum, samples show an intense yellow coloration. Chromium, on the other hand, is responsible for the colour of ruby. Corundum samples with both chromium and nickel are more orange or reddish orange (Table I; see Schmetzer and Peretti, 1999), and this is the case with the star ruby described in this paper. The presence of both chromium and nickel causes the colour to shift from the ordinary purplish red ruby colour to a more pure red or slightly orange red coloration.



5: The dark red colour is concentrated at the surface of the cabochon. Immersion, 80×.

The superficial thin chromium-rich layer is responsible for its intense red coloration, in contrast to the much lighter core, and dominates the face-up appearance. When this ruby is observed in light polarized perpendicular to the *c*-axis, no purplish red colour is visible, i.e. the purplish colour component seen in most rubies perpendicular to the *c*-axis is shifted to a more pure red.

Discussion and possible growth scenario

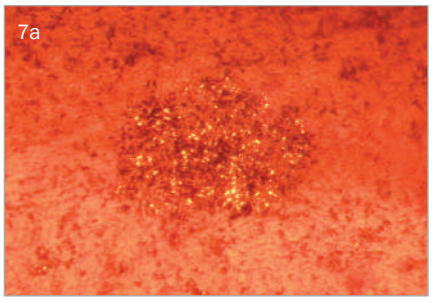
The star ruby consists of a pale, most probably yellow or orange core and an intense red rim. Due to the presence of the deeply red rim, which is thinner on the upper surface due to the polishing process, the core is not directly accessible, but the presence of lamellar grain boundaries with interference colours under crossed polarizers and the distinct strain pattern indicate the core to consist of Verneuil-grown synthetic corundum. Most probably, a nickel-doped yellow core or an orange core with nickel and small amounts of chromium was used, because — in contrast to chromium-bearing Verneuil synthetic ruby — such Verneuil-grown yellow or orange synthetic corundum

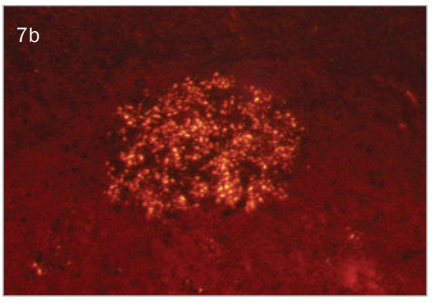
Sample	Cause of colour	Pleochroism	
		∥ *c*	⊥ *c*
Ruby	Cr^{3+}	Yellowish red to orange	Red to purplish red
Reddish orange sapphire	Cr^{3+} and Ni^{3+}	Light reddish yellow	Intense reddish orange
Yellow sapphire	Ni^{3+}	Yellow	Yellow

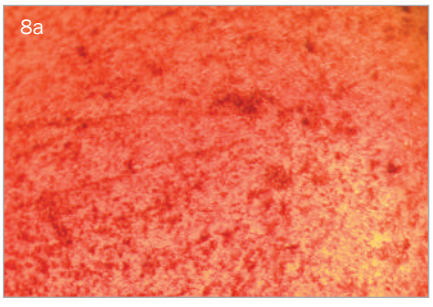
Table I: Colour and pleochroism of chromium- and nickel-bearing corundum (after Schmetzer and Peretti, 1999).

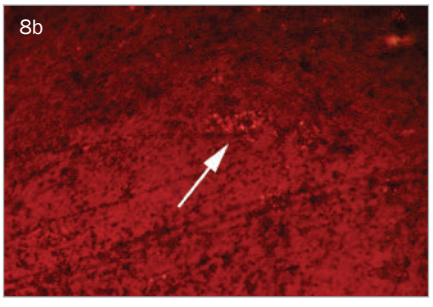
Gems and Minerals

Star ruby (cont.)









6: Irregular colour distribution at the surface of the ruby cabochon. The unpolished part of the cabochon contains several spots of foreign material (indicated by arrow). Immersion.
7: The spot of foreign material depicted in 6 consists of fine grained, birefringent crystals. Immersion, slightly uncrossed polarizers (a), crossed polarizers (b), 70×.
8: Polycrystalline material confined to the outer layer of the ruby is almost invisible in plane polarized light (a), but becomes clearly visible under crossed polarizers (b). Immersion, 70×.

frequently shows no curved growth striations.

To evaluate the treatment of this stone and the formation of a deeply red coloured rim with inclusions causing asterism, we have to consider two possibilities:

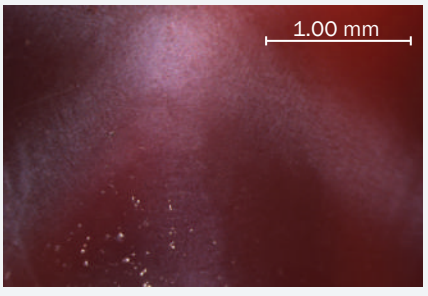
a) Diffusion treatment to induce chromium and titanium at extremely high temperatures into the outermost layer of the corundum cabochon and subsequent formation of rutile precipitates by exsolution at lower temperatures (see, e.g., McClure *et al*., 1993; Crowningshield, 1995 a,b; Johnson and Koivula, 1997; Mayerson, 2001).
b) Formation of a thin chromium- and titanium-bearing layer by overgrowth of a corundum cabochon in a flux-bearing environment and subsequent formation of rutile precipitates by exsolution at lower temperatures (see, e.g., Schmetzer and Bank, 1988; Smith, 2002).

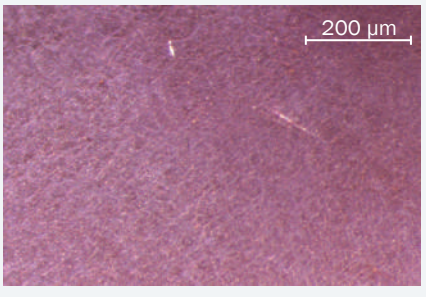
In our stone, the presence of a sharp boundary between core and rim and the presence of small birefingent crystals in the unpolished base and in the polished upper part suggests that the second possibility is the more likely one.

In either possible treatment process, the polished upper part as well as the unpolished base would contain tiny elongated titanium-bearing precipitates. The oriented needles in the upper part of the rim interact with white light of a fibre optic source, in this way forming the off-white six-rayed star reflected from a layer confined to the upper surface. The light reflected from the red base of the cabochon interacts with needles or fibrous inclusions in this layer, but part of the white light is also absorbed by this chromium-bearing layer and — in addition — the light path runs twice through the chromium- and nickel-bearing upper layer and the core, where absorption and scattering processes also take place. This complex interaction could explain the orange red coloration of the second star.

So, although the stone was initially marketed as natural, detailed examination has shown that the ruby was manufactured, cut as a cabochon and then treated to improve its colour and induce asterism.

All photos by the authors.





9: The off-white star on the upper curved surface of the ruby cabochon is caused by a network of oriented needles or fibres. Reflected light.

Star ruby (cont.)

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Gem alert

Bear and Cara Williams of Stone Group Laboratories report on cat's-eye stones that are not what they seem.

Cat's-eye quartz has not been prevalent in the market in recent years, whether due to loss in popularity or lack of availability of quality material. The particular stones we describe are just a finer grade of tiger's-eye quartz, cut in a fashion that displays the chatoyancy. As a 'poor man's cat's-eye chrysoberyl', it is attractive and was once common in men's rings. Recently seen in Hong Kong (**1**) were various parcels of cat's-eye quartz represented as having been irradiated. As the tiger's-eye variety of quartz is naturally brown and commonly bleached to lighten it, this disclosure seemed odd. Normal face-up examination of this new material with the naked eye showed strong reflections from straight and prominent fibres forming the 'eye'. Taking a side view near the base of the cab, a semi-regular pin-dot effect is visible on both sides (**2**). From this orientation, a see-through projection of images was observed. This would not be observed in a tiger's-eye quartz, and thus it was concluded that the stones were glass.

Closer observation of the top and bottom of this material showed a strong horizontal grain and the overall polish was poor. Even running a finger over the surface one could detect irregularities. One might suppose it could be reject material from a fibre optic manufacturer, which was nevertheless good enough for a gemstone. While fibre optic glass is generally considered a stone

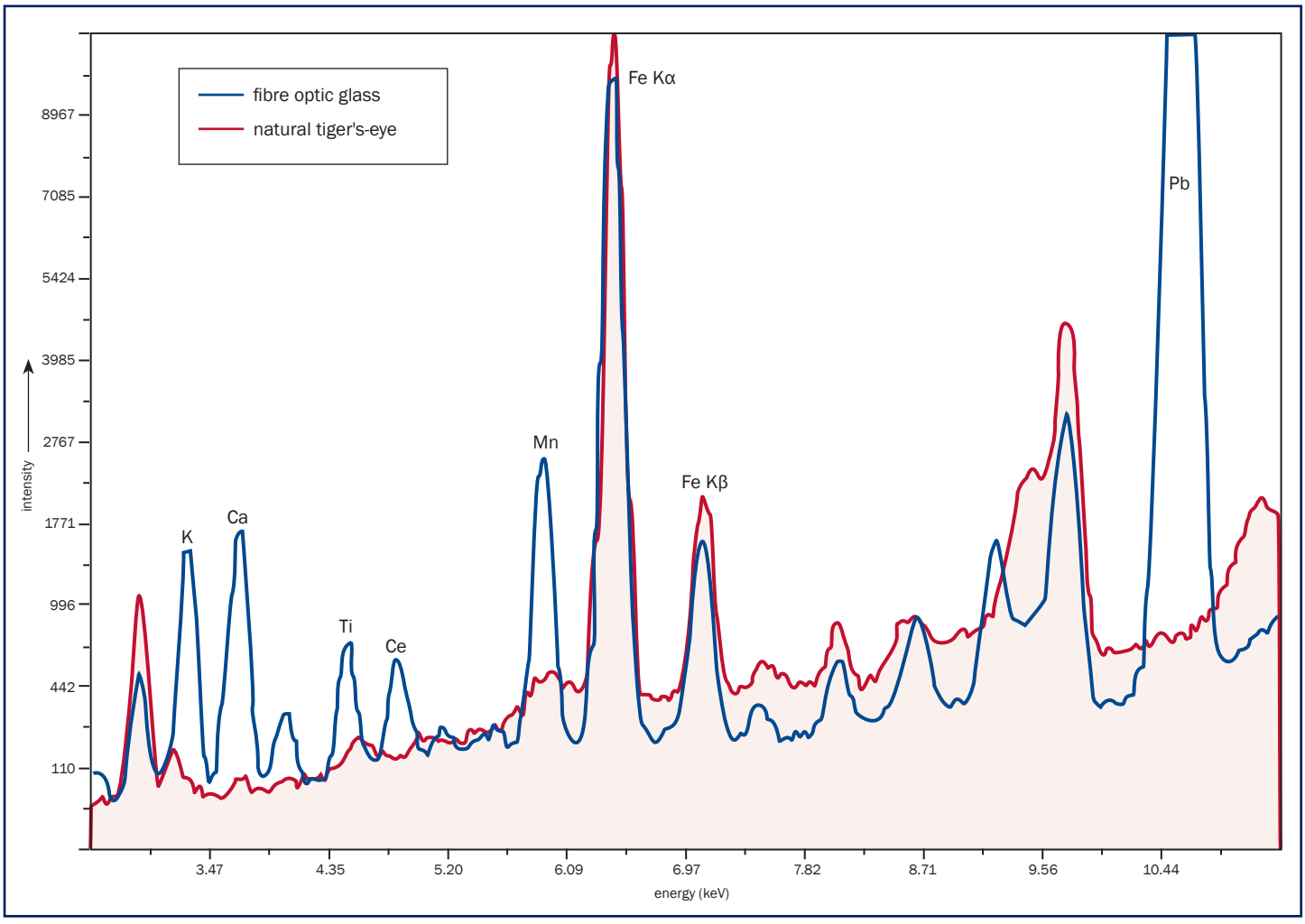
1: Large parcel of irradiated cat's-eye quartz.

to be identified on sight alone, this one did not exhibit the uniformity and hexagonal structure of most of such glasses. It is more commonly seen in vibrant rainbow colours, or colourless, not a natural-looking brown.

Samples were sent to the Stone Group Laboratories (SGL) for further confirmation. Microscopic observation revealed a slightly distorted hexagonal structure, giving the impression that the material had been stressed after manufacture. Raman analysis confirmed this material to be a type of

2: Fibre optic cat's-eye, showing see-through effect and ordered dots with a distorted pseudo-hexagonal shape.
3: Comparison between a tumbled tiger's-eye quartz (left) and imitation tiger's-eye (right).

Gems and Minerals



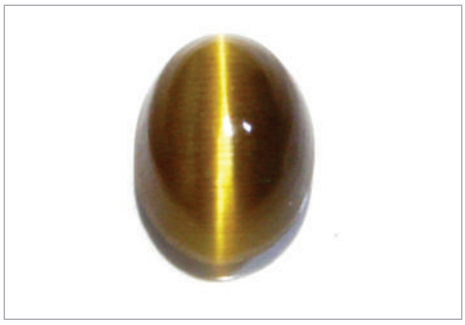
3: EDXRF spectra, comparing fibre optic glass with natural tiger's-eye.

glass. While irradiation treatments can be difficult to prove, many materials are known to change colour to an amber-brown after irradiation, as seen in this sample. The uniformity of the stones and the disclosed irradiation triggered suspicion, but careful observations confirmed the nature of this material.

Energy dispersive X-ray fluorescence (EDXRF) spectra comparisons seen in **3** confirm the presence of iron and elevated levels of elements such as lead, calcium, potassium, manganese, titanium and cerium (seen at the 4.84 keV peak). In other glass imitation materials, cerium and cadmium (which has a peak at 23.17 keV, not shown on the chart) have been used to create colours such as reds, oranges and yellows. In this material they may be the cause of the colour, so as both cadmium and cerium are present, the claim of irradiation may well be spurious.

At the SGL lab we are aware of an increasing number of cases where certain 'disclosure diversions' have been stated to make a story more believable. Such statements only mislead and create suspicion around the companies promoting these stones.

Special thanks to the JTV gemstone buyers and Chatchai Klangtongduang for bringing this specimen to our attention.



A close up observation of the fibre optic cat's-eye reveals neatly organized parallel lines across the surface.

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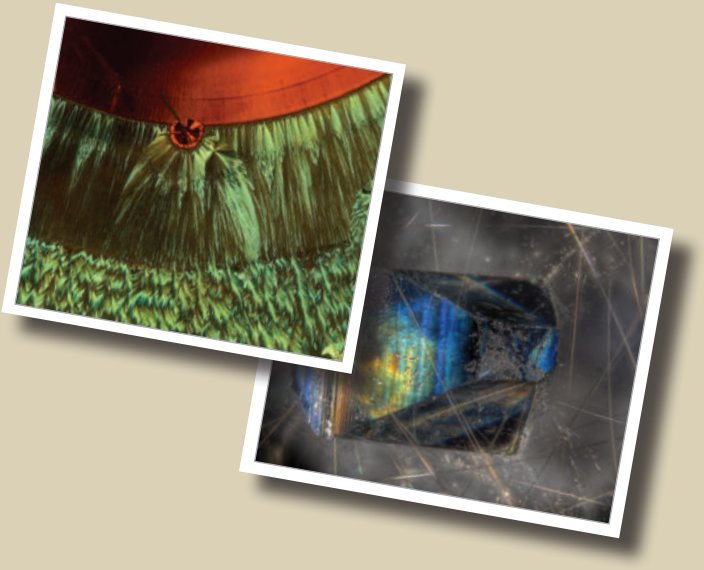
Gem-A 2012 Photo Competition

The competition is now open!



To enter

Please send a low-res version of your photo to editor@gem-a.com. Full details of the competition, including copyright information, can be accessed at www.gem-a.com/membership/photographic-competition.aspx or call Georgina on +44 (0)20 7404 3334.

Closing date: 29 June 2012.

Winning entries will be announced at the Gem-A Conference 2012 and feature in *Gems & Jewellery*.

Photos: (Left) Winner of 2011 Gem-A Photo Competition and Natural category: Fibrous hematite and goethite aggregates in quartz from Minas Gerais, Brazil, by Michael Hügi. (Right) Winner of Treated category: Blue anatase crystal and rutile fibres in quartz from Minas Gerais, Brazil, by Michael Hügi. All photos © Michael Hügi.

A moldavite story

Anthony de Goutière shares remarkable pictures of moldavite (natural glass), as seen through the microscope.

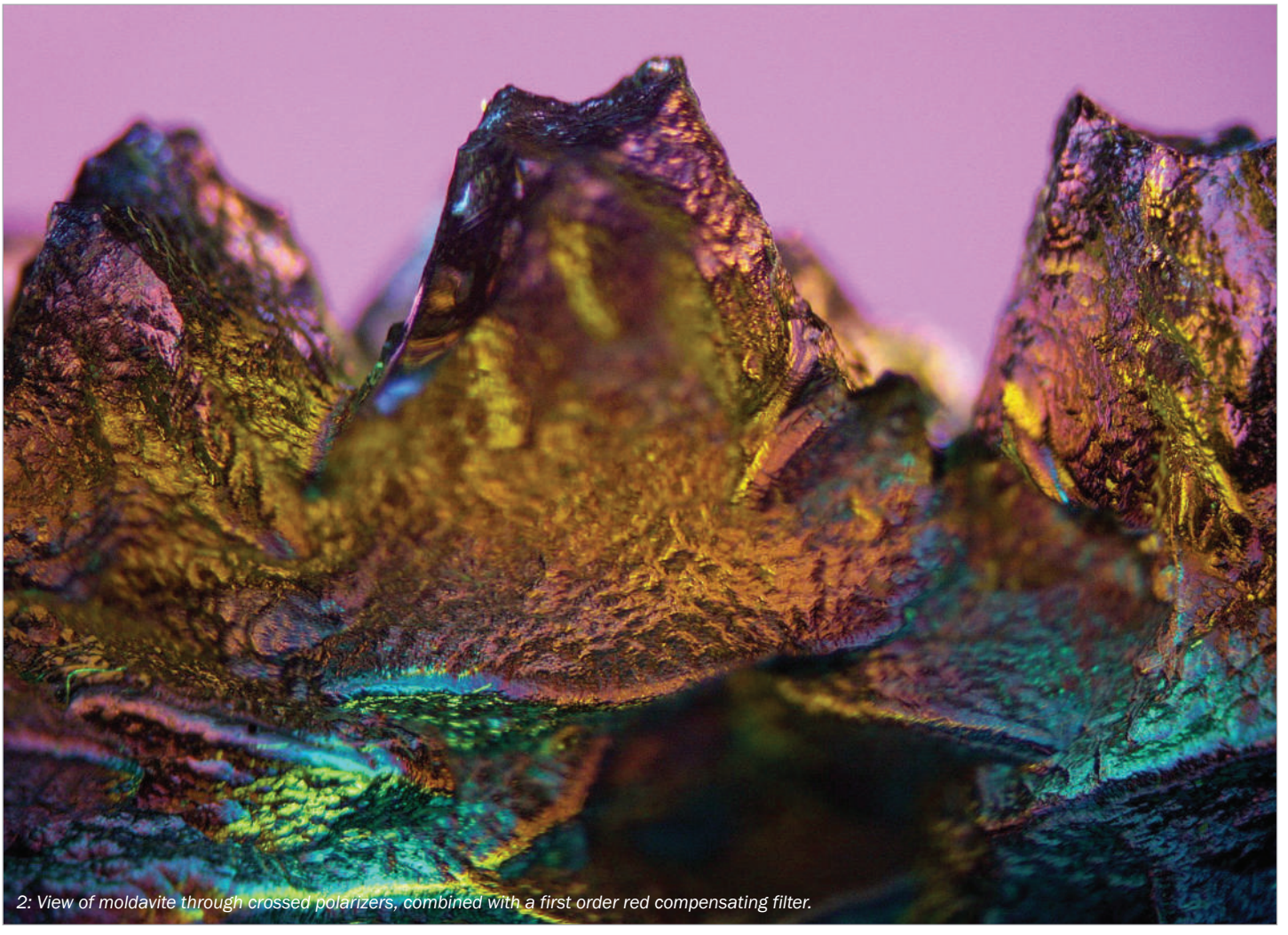
In my collection I have a moldavite specimen (**1**) that I thought would be an ideal subject on which to practise my Helicon Focus photographic stacking program. The specimen measures 34 × 14 × 9 mm and weighs 2.28 grams. Under the microscope there are multiple views of mountains and valleys. I have taken quite a few photomicrographs of this specimen, as the scenes become quite spectacular when using crossed polarizers combined with a first order red compensating filter (**2**). I searched around with the microscope looking for a suitable area to take a series of four photomicrographs at different depths, and as I focused downwards this little bird-shaped object came into view on a ledge in a fold in the specimen (**3a**). Most moldavites contain gas bubbles and often contain tendril-like inclusions of hard silica glass called lechateliérites, also known as schlieren. What I'd discovered was a minute swirl of fragile colourless lechateliérites that had survived a trip through space and a hard landing somewhere in southern Czechoslovakia. It resembles a sea bird and is very small, approximately 0.38 mm in length and beautifully formed. A large version of it would look good on a coffee table (**3**). I then proceeded to go over the specimen in all directions in the faint hope I might find more of these microscopic phenomena, but the bird appeared to be on it's own. I then read that lechateliérites occasionally break the surface of specimens but are rarely seen because of their microscopic size. So now I forgot about Helicon stacking and concentrated on getting one good photomicrograph of my little bird (**3**). The oval faceted specimen of 6.53 ct contains excellent examples of lechateliérite and gas bubble inclusions (**4**). Area photographed approximately 2 × 3 mm.

The theories about how moldavites were formed vary somewhat. The accepted theory is that they were formed when a large meteorite struck the earth in southwest Germany about 14,000,000 years ago. The resulting crater formed by the impact still exists and is known as the Ries Crater. It is believed the meteor arrived from a westerly direction and sent a shower of debris and molten glass into the atmosphere. The attractive green glass particles known as tektites came down like rain in what are known as 'strewn fields' in the southern Bohemia and south western Moravia area of southern Czechoslovakia.

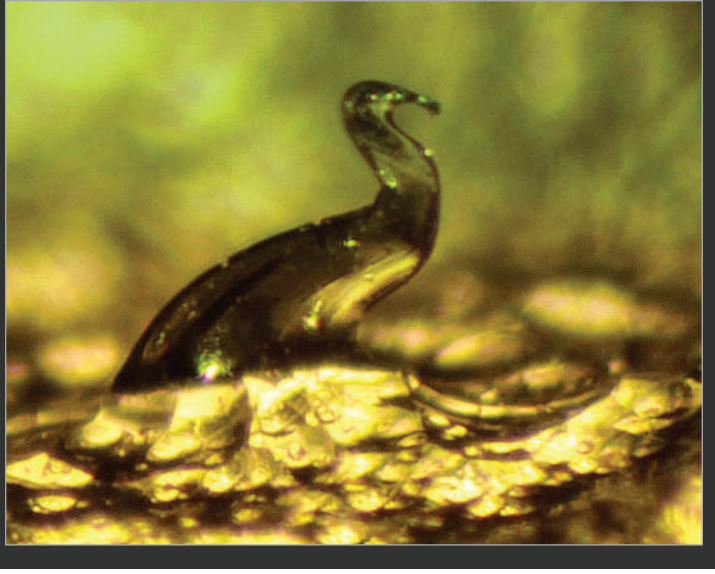
1: Moldavite specimen, measuring 34 × 14 × 9 mm and weighing 2.28 grams.

Through the Microscope

A moldavite story (cont.)



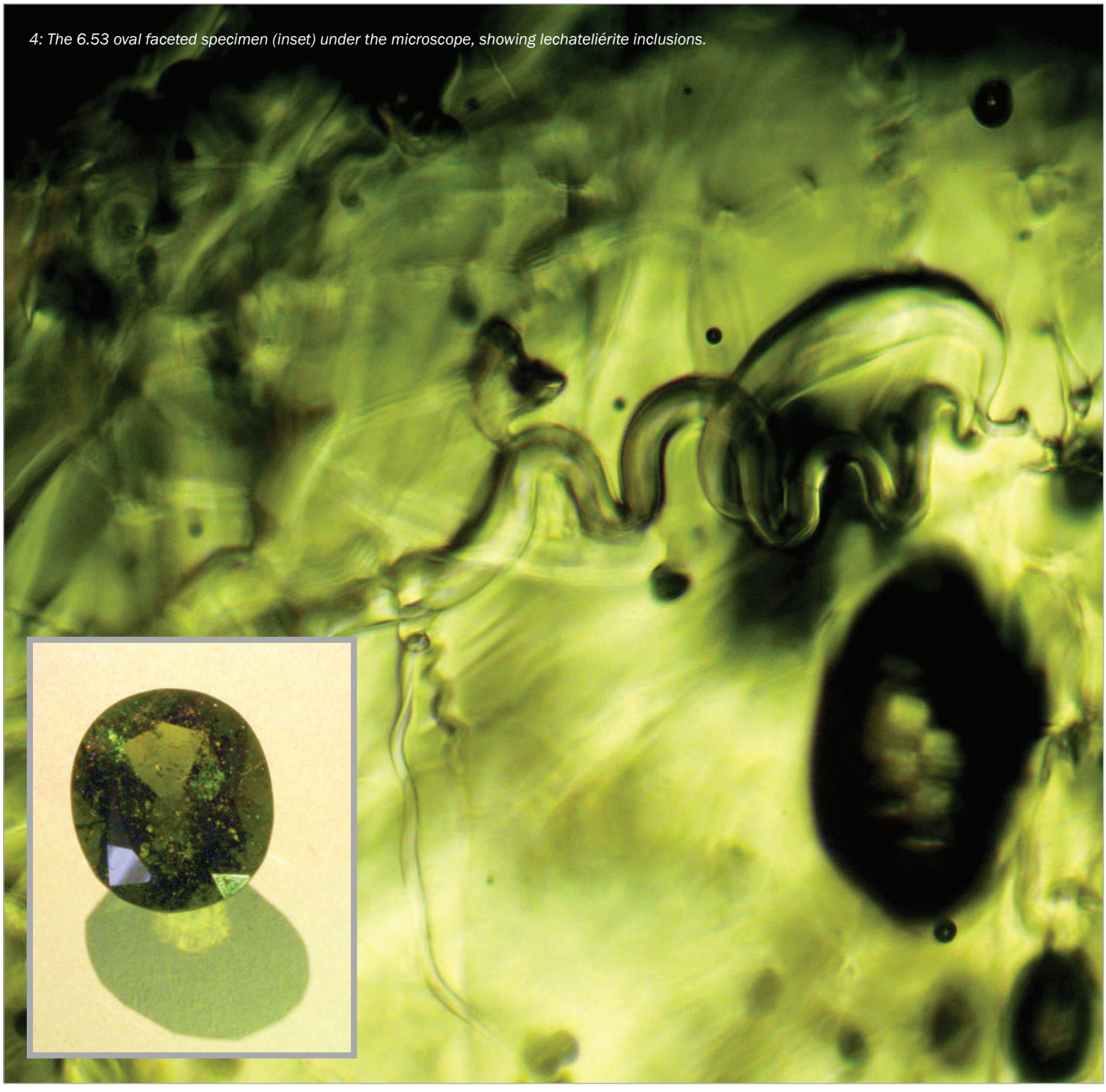
2: View of moldavite through crossed polarizers, combined with a first order red compensating filter.



3: Photomicrograph of the external lechateliérite inclusion, resembling a sea bird. Area photographed approx 2×2 mm.

Through the Microscope

A moldavite story (cont.)



4: The 6.53 oval faceted specimen (inset) under the microscope, showing lechateliérite inclusions.

About the Author

Anthony de Goutière GG of Victoria, BC, Canada, has been specializing in gemstone photomicrography for many years. His photographs have been published in gemmological journals around the world and his photomicrographs have adorned three covers of *The Journal of Gemmology*.

Gem-A Calendar

April

3

GEM DISCOVERY EVENING:
IMITATION, SIMULANT OR NATURAL?
With Andrew Fellows
To be held at the Gem-A Headquarters.
18:15 – 20:00.
Test your knowledge in a competition — prizes to be won! Free for Gem-A Members, Gem-A Students and Corporate Members. £5 for non members.

17

GEM DISCOVERY EVENING:
SHOW AND TELL
With Andrew Fellows
To be held at the Gem-A Headquarters.
18:15 – 20:00.
Bring in a gem that you think to be special in some way and talk about it for five minutes — stones will be available for everyone to look at and discuss. Free for Gem-A Members, Gem-A Students and Corporate Members. £5 for non members.

27

THINGS I HAVE FOUND: GEMS UNDER THE MICROSCOPE
By Grenville Millington
Gem-A Midlands Branch
To be held in the Earth Sciences Dept, Birmingham University, Edgbaston.
Grenville Millington will discuss gems under the microscope. There is a pre-talk topic on Diamond Formation by Paul Phillips beginning at 18:15. For further information contact Paul Phillips at gem-a-midlands-branch@hotmail.co.uk.

May

4 – 7

SGA CONFERENCE
Scottish Gemmological Association
To be held at Queens Hotel, Perth
This highly popular event attracts delegates from all over the world. Events this year include a trip to Killin to hunt for rutile, hyaline and quartz. See page 38 for more information.
To book, please visit www.scotgem.co.uk/SGAConference2012.

8

GEM DISCOVERY EVENING:
REFRACTOMETER CHALLENGE!
With Andrew Fellows
To be held at the Gem-A Headquarters.
18:15 – 20:00.
Test your knowledge on a range of stones, from basic to challenging.
Free for Gem-A Members, Gem-A Students and Corporate Members. £5 for non members.

22

GEM DISCOVERY SPECIALIST EVENING:
MYSTERY STONE
With Letitia Chaplin and Ken Harrington
To be held at the Gem-A Headquarters.
18:15 – 20:00.
Letitia Chaplin and Ken Harrington discuss a mystery stone. Free for Gem-A Members, Gem-A Students and Corporate Members. £5 for non members.

For the latest information on Gem-A

Gem-A Calendar

June

6

TREASURES FROM THE QUEEN'S PALACE
Scottish Gemmological Association
A private visit to the forthcoming exhibition, Treasures from The Queen's Palaces, at The Queen's Gallery, Holyrood, Edinburgh
18:30 – 20:30
This exhibition brings together some of the finest treasures from the Royal Collection to celebrate Her Majesty's Diamond Jubilee in 2012.

The Royal Collection © 2011 Her Majesty Queen Elizabeth II.

Treasures from The Queen's Palaces reflects the tastes of monarchs and other members of the royal family who have shaped one of the world's greatest art collections. Highlights include paintings by Rembrandt, Canaletto and Monet, drawings by Leonardo, Michelangelo, Raphael and Holbein, and Imperial Easter Eggs by Fabergé.
£15 per person, to include a short introductory talk and a glass of wine or soft drink. To book, visit www.scotgem.com/events.htm.

26

SGA AGM AND TALES OF A RECENT TRIP TO RUSSIA
Scottish Gemmological Association
To be held at The British Geological Survey, Edinburgh, 19:00.
The AGM will be followed by several short talks by SGA members on their personal views and experiences of the recent field trip to the Urals in Russia.
Doors open at 18:30. AGM commences at 19:00. Talks start at approximately 19:30. Free for SGA members, guests £5.

Save the date

4 November

GEM-A CONFERENCE 2012
This year the Gem-A Conference is again to be held at the magnificent Hotel Russell, Bloomsbury. For more information and to keep up-to-date with the latest news, please visit www.gem-a.com/news--events/gem-a-conference-2012.aspx. More details to follow in the Spring 2012 issue of *Gems & Jewellery*.

events go to www.gem-a.com

The new, the large and the gorgeous

Olga Gonzalez FGA reports on two of Arizona's hottest gem shows: Centurion and the AGTA Tucson GemFair.

During the chill of February it is always a pleasure to escape to Arizona, the home of great weather and fantastic annual gem shows. With more time than usual to explore the shows, I made the Centurion show my first stop in Arizona to see how things were working out at the new venue in Scottsdale, just outside Phoenix.

Centurion

Business was buzzing with the brands, with all the vendors I spoke to saying they were happy with Centurion's move from Tucson to Scottsdale. Gurhan's beautiful contemporary jewellery looked stunning with their Couture Silver collection debut. Stephen Webster, always fun and original with his designs, caused a stir with his 'Murder She Wrote' collection, in which diamonds and 18 ct gold combine to create femme fatale motifs, such as pistols and splattering gunshots. Jacques Vorhees was promoting gemfling.com, the much anticipated jewellery search engine, while stunning jewellery designs were to be found in every corner, with Arunashi making a splash with his carved emerald and opal earrings and 'Paraíba' necklace and earrings. Edward Mirell displayed some refreshingly interesting men's rings incorporating tiger's eye and onyx. Mirell said: "We are now selling high end jewellery to a younger generation, and our collections reflect that."

Above: Smoking Gun Ring by Stephen Webster, featuring 18 ct white gold and pavé-set colourless diamonds.
Top right: Poison Apple Ring by Stephen Webster, featuring 18 ct rose gold, mixed pavé-set rose gold ruby (5.90 ct total) apple and pavé-set white diamond detailing (0.13 ct total). Photos Stephen Webster.

Howard Hauben, Centurion President, said: "We were extremely gratified at the great response Centurion 2012 received from retail invitees and exhibitors alike. Full pass retailers staying as our guests in our show hotel were at record numbers and our last show day, 31 January, was by far the busiest we've ever had, with many exhibitors still occupied when the show closed at 6 pm." Hauben noted: "Our total invited retail attendee count also set a record and the substantial exhibitor wait list continued to grow. All in all, participants were very pleased with our new location in Scottsdale."

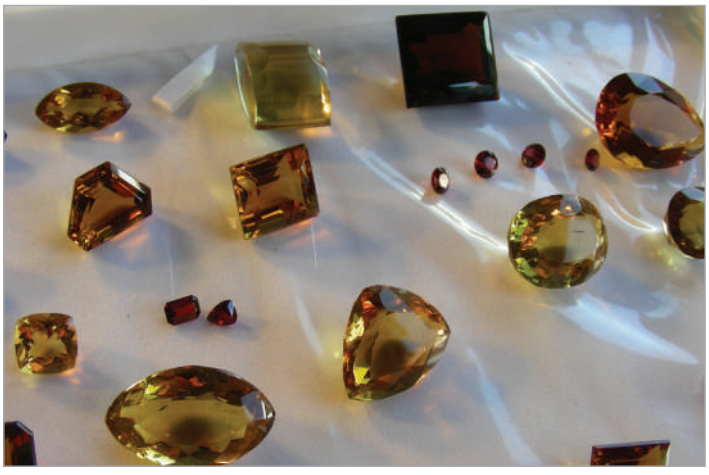
AGTA GemFair

After Centurion closed, I made my way down Interstate 10 to Tucson towards the hub of the gem shows, where I managed to cover ten shows during the remaining time. The AGTA GemFair was of course the first stop, where I visited the Gem-A booth. Reflecting on the positive response towards their courses in the USA, Jack Ogden said: "Gem-A has had an amazing Tucson, one of the best ever. Our education is really gaining traction here in the USA, with ever-growing recognition of the relevance and strengths of our international qualifications."

I was excited to view the AGTA Spectrum Award winners, an award for designers which recognizes and promotes fine jewellery pieces that utilize natural gemstones and cultured pearls. My favourites were Todd Reed's moonstone, sapphire and grey and white diamond-encrusted locket in palladium and 22 ct gold with a carved moldavite Buddha inside; 'Green Arrow' cufflinks by Llyn Strelau from Jewels By Design, in 19 ct white gold with black onyx, Gibeon Meteorite, tsavorite garnets and black diamonds; and Dalan Hargrave's 'Hugs and Kisses', a 30 ct morganite with an innovative XOXO pattern in the gemstone cut.

I found a lot of interesting things while searching for what's new at the show. At the Pueblo show, James Zigras, owner of Avant Mining, had a high demand for Aqua Aura quartz crystals, which have a cassiterite coating on quartz and display an attractive blue colour. Nearby, Alfred Kaiva

Shows and Exhibitions



Natural citrine, rough and cut, from Alfred Kaiva at Wasambo Enterprises Ltd. Photo Olga Gonzalez.

of Wasambo Enterprises was selling a new find of natural citrine from Zambia, rare because it was not heat treated amethyst, as is most citrine. Both faceted gemstones and rough were available for purchase. New Era Gems had beautiful untreated tanzanites in pink, purple and green colours, both faceted stones and crystals, which sold quickly due to high demand. Steve Ulatowski of New Era Gems said: "We sold a lot of fossil bamboo from Indonesia, a new find of pink tanzanite, ruby, zoisite and smaller crystals. What our customers want from us is faceted rough."

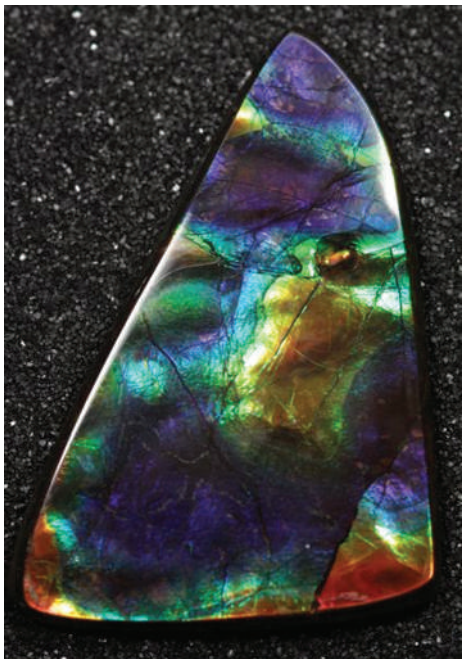
> "People want more interesting and unique pieces. Lots of larger pieces are selling this year." John Dyer, GJX

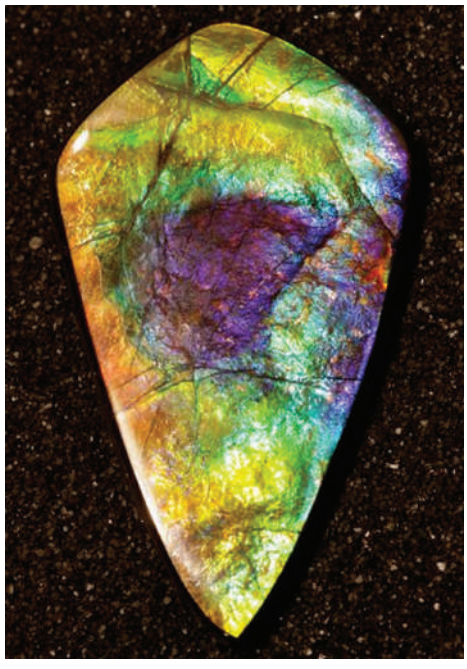
Making for a fun twist were InnSuites, who were amusingly selling movable dinosaurs on the volleyball court outside amongst gem and fossil exhibitors. At their new high end gallery location, Pangea Fossils had stunning ammolite from a new source in Canada, none of which had been lacquered or polished.

Overall, as with last year, the trend seemed to be a demand for the rare, and for large pieces of it. Omi Gems, who also exhibited at AGTA, had beautiful alexandrites, sapphires, rubies and emeralds. Manos Phoundoulakis said: "The show is going well. There isn't a lot of instant buying, since people want to check out all of their options first, but what they are really looking for is large pieces again." John Dyer of John Dyer & Co., exhibiting at GJX, echoed this sentiment: "People want more interesting and unique pieces. Lots of larger pieces are selling this year." Also worthy of note were C.W. Sellors, also exhibiting at GJX, who are mixing man-made reconstituted bauxite with Whitby jet in jewellery, to create an elegant and consistent black and 'dewy' white colour combination.

The last stop of the show was an interview with Bruce Bridges of Tsavorite USA, who said: "The demand for tsavorite is very strong, with demand outpacing supply and a demand for large sizes taking precedence. We are currently working on stabilizing security in preparation for the re-opening of the Scorpion Mine."

With another year full of fun gemmological surprises and interesting jewellery, the shows in Arizona certainly did not disappoint. It was encouraging to see exhibitors enjoying the upswing of buying and seeing large pieces selling. Roll on 2013!





Canadian ammolites. Photo © Pangea Fossils.

Tucson brief

Gary Roskin gives us the lowdown on the large and small at this year's Tucson.

1: Synthetic emeralds combined with natural diamonds by Tom Chatham.
2: Edison pearls.
3: Soufflé pearls. Photos © Gary Roskin.

This year Tucson was as wonderful and interesting as it usually is, and what follows is just a small sample of what I saw.

Coloured gems are, of course, the main focus of Tucson for most gemmologists, and this year provided a bonanza of all types and sizes. A fine selection of green demantoid garnets from the Green Dragon mine in Namibia caught my eye. Their high dispersion was readily noticeable through two layers of glass — the show case, and the individual glass-topped boxes. These were amongst the huge range of gems on display in the GJX Show, one of the 'must-visit' shows at Tucson, with an outstanding mix of international gem merchants. There was everything; from the finest gems to the synthetic, the treated and the imitation — not always all correctly described. Speaking of which, Jack mentioned yet another rumour — the availability of synthetic tourmaline of Paraíba-like colour. Highly suspect — I'll be reporting back to you on that.

Whilst on the subject of properly disclosed synthetics, pictured is a bracelet combining synthetic emeralds with natural diamonds by Tom Chatham (**1**).

Also seen were pearls — indeed, pearls everywhere. What especially grabbed my attention were Chinese freshwater bead-nucleated cultured pearls that were both big and round — 12 mm to 14 mm. They are being called 'Edison Pearls' (**2**) although nobody seems to know why exactly. Also on show were the hollow soufflé pearls (**3**), some as large as 20 mm or more. Light, and beautiful. These have no solid nucleus and are much lighter than either tissue-activated or bead-nucleated cultured pearls. They come in a range of white, pink, lilac, greyish and golden hues. Jack Ogden mentioned that he'd been shown Chinese freshwater cultured pearls that had been treated by a laser technique to improve their appearance — I'll be investigating that rumour too.

Size-wise, at the other end of the scale were round brilliant-cut sapphires just 0.8 mm in diameter. The parcels contained 200 such stones, with a total weight of just 0.057 ct. Put another way, that's 3500 stones to the carat. And while on the subject of small, a novel way of displaying these small gems was shown by ChinaStone in their black and 'white' sapphires, arranged as a QR code (right).

View Gary's full Tucson Report at http://roskingemnewsreport.com.

An Arizonian adventure

Claire Mitchell searches for fire agate at Deer Creek Mine in Arizona, USA.

Sample of fashioned fire agate material (above left) and (above right) Deer Creek, showing mine tailings. Photos Claire Mitchell.

I was first introduced to this most eye-catching of gemstones by my good friend and Arizona resident Eric Van Valkenburg, and have been enamoured with the gem ever since. At its finest, fire agate displays a rainbow of colours within its brown hued body, which appears especially spectacular in direct sunlight. When Eric mentioned the possibility of a visit to one of the locations for this stone I booked some additional holiday time and jumped at the chance, and so a visit to Deer Creek was arranged.

A three hour drive from Tucson, much of this time is spent driving off-road, crossing dried creeks and river beds and winding up and down narrow dirt tracks in the hills. Good weather, supplies and a sturdy vehicle (preferably a 4x4) are a must. A spray water bottle is also an invaluable tool.

Situated near the foothills of the Galiuro Mountains, Deer Creek is exactly that: a creek bed. The fire agate deposits are located on the small hills which rise up above and near the creek. The mining is very low scale and open cut, with no apparent mechanization. Creamy coloured host rocks (volcanic rhyolite) containing the fire agate nodules are extracted, and the tailings piled into mounds. This broken rock is very friable and can be easily broken by the fingers.

The ground leading up to one of the mining areas is strewn with beautiful white chalcedony forms, some partly stained brown by iron — this is where the learning process begins! Closer to the mine the pieces of rock that were examined steadily displayed a browner coloration with increasing iron content.

At this point the spray water bottle becomes invaluable. What may at first look like an innocuous piece of iron-stained material with a milky looking cap, is transformed into a beautiful iridescent sample of fire agate once wet. After collecting several of these samples I had managed to get my eye in, and several happy hours where spent fossicking in the area.

The beauty and peace of Deer Creek and the surrounding mountains is truly breath-taking. The beauty of the area is complemented by the beauty of the stones it occasionally yields. Just before sundown it was time to leave Deer Creek for the long dusty drive back to Tucson. It really was a privilege to visit this stunning location to look for these beautiful stones.

I would like to say a huge thank you to the owners of the mine who kindly gave their permission for us to visit. Special thanks also to Eric Van Valkenburg for coordinating the trip, and to my fellow travellers, Doug Garrod and Patricia Scragg, for their excellent company.

Fire agate facts

- Commonly forms as nodules in the pockets or void spaces of volcanic rhyolite. In ideal conditions silica and other impurities form layers.
- Only a small percentage of the mined material produces fine quality fire agate. 'The Red Lady' of Deer Creek is one such example.
- The stones are mainly fashioned in freeform style, and set in custom mounts.
- For connoisseurs of this material certain dominant colours and patterns can carry a premium on price such as strong reds, violet, green, blue or strong combinations of all. The stones found at Deer Creek may display more green and purple-blue, with strong botryoidal (grape-like) structure.
- Fire agate is found only in localized areas of South West USA and Mexico.

Recent Events

2012 FEEG symposium

Amandine Rongy reports on the 2012 FEEG symposium in Paris, France. Founded in 1995, FEEG brings together European gemmological institutes who are interested in supporting gemmological education and providing a European certificate.

The 14th Annual Symposium of the Federation for European Education in Gemmology (FEEG), was held in Paris at the National Institute of History of Art from 19 to 21 January 2012, gathering together a host of European gemmological institutes and students. As a founding member of FEEG, Gem-A were invited to attend.

Ulrich Henn, President of FEEG, opened the symposium, organized this year by the Institut National de Gemmologie. The symposium promised a packed agenda with talks by researchers, designers and teachers.

Professor Emmanuel Fritsch, from the University of Nantes, gave delegates valuable tips and hints on maximizing their use of basic gemmological tools to aid better identification of diamonds and their treatments, before using further laboratory testing. Patrick Voillot, curator at the Collection of Mineralogy, Faculty of Pharmacy Paris XI, gave an insight into the often overlooked ancient source of diamonds from Borneo, and brought the audience up-to-date with the current mining practices being used in Borneo through a selection of videos.

Isabelle Reyjal, gemmologist and ING graduate, also discussed the story of cultured pearls from the Sea of Cortez, an area which was once a prolific pearl farm in the mid-nineteenth century, but which was abandoned due to the political instability of the period. Despite difficult environmental changes, since the 1980s production has started again. Led by an enthusiastic team, the region is now producing sumptuous iridescent pearls. The colour of these pearls comes from the use of the 'Rainbow Lipped Pearl Oyster' (*Pteria sterna*) and, given the opportunity, these unique pearls are well worth a closer look. The pearls from the Sea of Cortez are also the only ones to fluoresce red under long wave ultraviolet light (LWUV). The day finished with the Graduation Ceremony of the FEEG students in a venue near to the Champs Elysees.

The following day, Hanco Zwaan, Director of the Netherlands Gemmological Laboratory, gave a detailed description of African emeralds, emphasizing source, origin, size, colour and their importance, both past and present. Hanco explained that Egypt (the first known producer of emerald in the world) still has some sources of the material, but that the emerald is unfortunately not cost effective to extract, preventing further recovery. Hanco also discussed the important emerald deposits in Zambia, Africa's largest emerald producer, second only to Colombia worldwide. During this fascinating talk Hanco not only looked at the different deposits and their relative importance but also at their geological occurrences and the important inclusions of each, and showed slides of three-phase inclusions in emeralds from Zimbabwe.

Following the conference, delegates were given the option to attend a wide range of visits and museum tours including the Louvre, the Place Vendôme and the Museum of Mineralogy.

Top left: Graduates of the EG (European Gemmologist) certificate.
Bottom left: Delegates attending the conference talks.

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Hands-on Gemmology

Here we go again

Grenville Millington revisits the 1970s with a set of mystery brown stones.

Towards the end of last year I received some stones for testing: four yellow sapphires, a lustrous sphalerite and three brown to golden coloured stones, whose identity, unlike the others, was not immediately evident. These brown stones were quite splendid, and if you conjure up in your mind the average brown stone then the word 'splendid' is not one that you might use. The stones showed areas of pale golden yellow adjacent to rich, rusty brown, somewhat reminiscent of andalusite but not as green (**1**). I've seen tourmaline show something similar, so that was my best guess, especially as the surface lustre appeared right for tourmaline.

On examining the stones it was evident that there were colour zones and that the colours changed with the viewing angle (**2**). Under the dichroscope they also showed very strong differences of pale yellow and deep reddish brown. The spectroscope was of no help, but under the 10× lens natural-looking feathers and doubling of the back facet edges were visible, although not as much as we would expect with tourmaline. The microscope resolved the feathers in one of the stones into planes of parallel lines of two-phase inclusions (**3**). What would the refractometer reveal? The result was 1.610 to 1.620, with a birefringence of 0.010,

1: Brown topazes of varying weights; from left to right 7.40 ct, 8.58 ct and 18.66 ct.
2: Triple view of the 8.58 ct topaz showing the pleochroic colours.

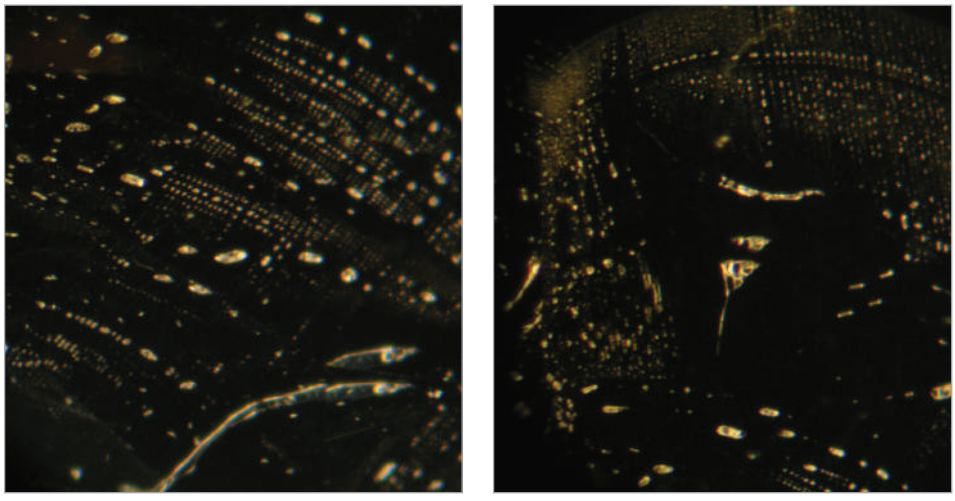
Hands-on Gemmology

indicating topaz — cue alarm bells! I've not seen topaz resembling andalusite before. A specific gravity test gave the figure of 3.57. Both sets of figures were in line for topaz. But what about the colour? This is where the title comes in — a case of history possibly repeating itself.

In the early 1970s I needed to produce some topaz and diamond cluster rings as part of a range of jewellery supplied to retail shops. I needed 10 × 8 mm oval yellow topazes which were not available in quantities, unlike citrines, for example. Then a dealer came in and said he'd found a source, except that they appeared to be browner than the normal yellowy gold topaz colour. We needed to fulfil the orders and so we agreed. A month or two later I received a telephone call from one of the shop managers (it was a Geoffrey Richards shop, for those with long memories) to say that he thought the topaz had lost its colour. I asked for it to be returned and sure enough the topaz was almost colourless. I asked other shops to return their topaz rings from this batch. In all cases where the ring had been sitting in the window, the topazes had become paler or colourless. The dealer (a much respected, well-established one) was at a loss to explain it. He contacted his German wholesaler, who contacted the mine owners.

The answer was yes, it was white topaz, but it had been irradiated and this had produced the yellowish brown colour. And no, they didn't realize it would lose its colour on prolonged exposure to light. This was when we discovered that the RIs were 1.61–1.62 rather than the normal yellow topaz figures of 1.63–1.64, and are consistent with colourless or blue topaz. I managed to refuse topazes from other dealers once I had taken a refractometer reading of the stones offered. Needless to say, the original dealer managed to replace all the affected topazes we'd purchased with natural yellow topazes.

Obviously, once this was discovered, the originators sought ways of making the colour stable and no doubt tried heat treatment. Imagine their surprise when the irradiated brown stones turned blue! This offered a



3: Two-phase inclusions in one of the samples of topaz.

4: Irradiated topaz from the 1970s.

5: All three topazes showing zoning.

Hands-on Gemmology

Here we go again (cont.)

6: The 23.43 ct blue topaz, and immersed in water (b).

7: Sphalerite, 13.25 ct.

very lucrative aquamarine substitute, and fading tests seemed to be passed with flying colours. The 'browned' topazes disappeared from the trade scene virtually overnight, with any remaining ones in shop windows losing their brown colour fairly quickly. One that I bought as a sample at the time and that has remained in total darkness ever since, except for showing to students is shown in **4**.

The colour zoning present in all three, but especially the one, seemed puzzling at first (**5**), and then I recalled seeing such strong colour differences in a treated blue topaz before. A trawl through my photo files found the one reproduced here (**6**).

I returned the stones (there was no information available as to where they had originated) with the note that they may possibly be treated (irradiated) and that they may lose their colour on prolonged exposure to light.

While carrying out the SG measurements on the topazes, I also determined the SG of the sphalerite stone (**7**), mentioned at the beginning. After all, its RI is outside the range of the standard refractometer and I needed something other than "It looks like sphalerite to me!" It is easy to confuse this stone with sphene, especially with the obviously high dispersion of both stones. Under a hand lens and microscope no doubling of the back facet edges was visible, indicating single refraction (sphalerite or blende is singly refractive and sphene is very strongly birefringent). The SG figure, allowing for the room temperature of the water, was 4.12, which is consistent with sphalerite and significantly different from that of sphene (3.5–3.6).

So, are these three stones a new attempt at producing colour by irradiating colourless topaz or has a new source of natural brownish topaz been discovered? Perhaps someone reading this can expand further.

About the author

For many years Grenville Millington ran his own gem and jewellery business in the Birmingham Jewellery Quarter and taught gemmology and retail jewellery at the Birmingham School of Jewellery. He is now retired and lives in the West Midlands.

rock, gem & bead shows 2012

31st/1st	March/April	Brighton Racecourse, Brighton (Rock, Gem 'n' Bead)
21st/22nd	April	Newark Showground, Newark (Rock, Gem 'n' Bead)
12th/13th	May	Event City, Manchester (Rock, Gem 'n' Bead)
9th/10th	June	Kempton Park Racecourse, Kempton (Rock 'n' Gem)
16th/17th	June	Bath & West Showground, Shepton Mallet (Rock 'n' Gem)
7th/8th	July	Newcastle Racecourse, Newcastle (Rock, Gem 'n' Bead)

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For a list of all shows, directions, maps and exhibitors attending each show, go to
www.rockngem.co.uk info@rockngem.co.uk

Make yourself heard

Harry Levy advises on how to make yourself heard in the gemstone industry.

I continue to follow most of what is written on the Gem-A MailTalk forum. Much sense is written on many gemmological issues, but things can get unrealistic when a contributor goes on to suggest how their views and ideas can be put into practical effect. The most popular theme of discussion is the desire of some to establish an international body which will supervise the trade, correct the actions of wrongdoers, determine terminology, set disclosure methods and verbiage and sort out disputes. Another theme that goes through much of the correspondence is a distrust of dealers and traders, who are regarded as the originators and supporters of much of what is wrong in the trade, and are powerful enough to determine much of what is done in gemmology.

This latter view has some truth in the sense that if there were no trade in gemstones there would be little need to study gemmology, other than for academic reasons, and there would be no money and funds to support much of what we see today.

Laboratories were set up and funded by traders and trade organizations to distinguish natural from cultured pearls, and to identify and differentiate natural stones from imitations and synthetics. Subsequently, laboratories developed in a natural way, and this involved a need for them to do research, much of it designed to identify stones. The next step was to satisfy a need for education of those within the trade and so educational courses developed. In the early days there was little need for determining treatments as these were few and far between.

Diamond grading is a more recent innovation. Initially it was a method for dealers to convey the appearance and quality of their diamonds. Having determined an internationally agreed methodology for grading diamonds it was a simple step to progress to a pricing system. Once this was established the next development was for dealers to use grading reports as an aid to selling, to the extent now that it is almost impossible to sell a diamond of half a carat and above of any commercial quality, without some sort of report to state its colour and clarity.

Laboratories have become businesses with their funding coming from identifying and grading, and also from education. Originally traders formed trade associations, and money for these came through subscriptions and annual dues from their members. Many centres set up gemmological laboratories for their members and tried to make them independent of the traders or any section of the trade to ensure truthful reporting.

Many of those who take gemmological training do so with the aim of making a living using this knowledge, either through the trade or by giving service to some sort of gemmological institution. I am sure many who study gemmology acquire a love for the subject and develop interests in aspects which have nothing to do with directly making money. But if the subject was left to those who just love it, with no profit motive involved, it would diminish to a very small enterprise with only a few rich adherents.

As treatments proliferated the trade found a need to differentiate between natural stones that had been mined, cut and polished, and those stones that been further worked on to make them more attractive to market. Some thought that appearance was more important than the inherent nature of a stone and that the value of a stone could be determined merely by how it looked. This was not sustainable, as one of the important factors in determining value is a stone's rarity.

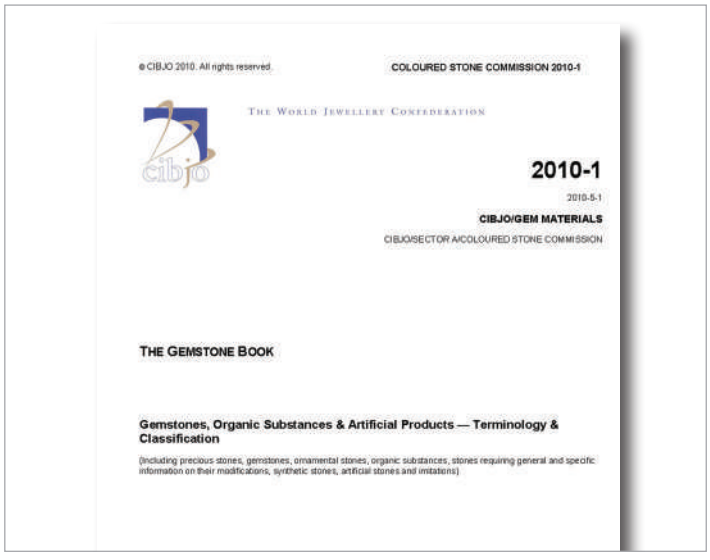
So we now come to the crux of the issue. Gemstone traders are not charitable institutions; they accept the need to disclose, not primarily because they want to protect the consumer but in order not to lose consumer confidence in buying jewellery which contains gemstones. They also recognize that they themselves do not wish to be misled by what they buy. The moral and ethical attitude taken by many MailTalk readers and contributors is a result of this past history, and many take the high moral ground to feel they support a trade that is ethically correct.

In order to justify their position of independence, laboratories do not want to support the seller or the buyer. They report on what they see and the trade supports this position.

Traders realized that as international trade increased, it should be monitored. One of the first institutions to be set up in Europe was the World Jewellery Confederation, or CIBJO, as it is alternatively known, to supervise nomenclature, terminology and disclosure. It is a confederation of national jewellery associations (not individual jewellers) from a wide range of countries. (This position has been modified to some extent in recent years, not for altruistic or political ideals, but to generate sufficient revenue.) CIBJO is a forum for all aspects of the jewellery industry.

Other organizations which cover more particular sectors of the trade also exist. For example, the World Federation of Diamond Bourses (WFDB), and its technical arm, the International Diamond Council (IDC), is there to serve diamond dealers; the International Diamond Manufacturers Association (IDMA) is for those who work with rough diamonds; and the International Coloured Stone Association (ICA) is for those working in the coloured stone industry.

Around the Trade



CIBJO's Gemstone Book, one of the so-called Blue Books which provide nomenclature and disclosure guidelines. From tinyurl.com/CIBJOBluebooks.

The cry from Gem-A members to form yet another body is a tall order. It will have to be independent of the trade, and so to find people with a working knowledge of the trade to serve on this Committee will be difficult. It will need very large funding if it is to generate rules and regulations, and crucially, to police them. It will need headquarters, and an expectation that its members would travel all over the world to sort out disputes as and when they arise. I am sure many will claim that in this electronic age expenses can be kept to a minimum, but nevertheless expenses will arise, and in my experience, there is nothing to compare for effectiveness in solving a problem than people sitting in a room, face to face, for such discussions. One political hurdle to overcome initially is that most existing trade groups would not readily surrender their autonomy to another body.

Historically, many have felt that CIBJO has just been a talking shop, too much influenced by the national biases of the Associations, and by the needs and partisan voting of some of the delegates. Furthermore, it has no international enforcement authority so that any wrong-doing had to be sorted out on a national basis through a country's own legal systems. This can lead to different solutions in different countries and create the conditions for further disputes between these countries.

By about 1990 the extent of penetration of the gem market by synthetics and treated natural stones prompted the trade to have a dialogue with the laboratories, and so the Gemstone Industry Laboratory Conference (GILC) was formed. The first meeting was organized and chaired by Roland Naftule, who held positions in the American gem trade and who was a delegate to CIBJO. He invited a number of interested traders and some of the larger labs to meet in Tucson, just prior to the annual Tucson Gemstone Fair. He realized the limitations of the new group, so he invited Jack Ogden and myself to co-chair the meeting, the hope being that the concept would be taken up by CIBJO where we held prominent positions. However, in CIBJO, laboratories were still on the periphery of activities because they were affiliates to their own national associations, and had no independent voice at the congresses. As can be expected CIBJO totally disassociated itself from the GILC, I suppose fearing that it would challenge the existing CIBJO groups, and, furthermore, would not allow GILC to hold a meeting just before, during, or just after, its congresses at any CIBJO venue.

GILC was designed as a forum for traders and laboratories to harmonize the language used on their Certificates and Reports. To implement the ideas expressed, the laboratories formed the Laboratory Manual Harmonization Committee (LMHC), comprising some of the larger laboratories, with other interested laboratories co-opted on a need or rotation basis. It took them over a year, according to my memory, to produce their first report on rubies. Neither GILC nor LMHC have any legal standing, but rely for their authority on their reputation in the trade and those involved in the industry. The GILC meeting has now become an annual event held in Tucson; LMHC also meet there, but I understand they organize their own meetings on an ad-hoc and need basis.

So how can you make your voice heard? Gem-A's MailTalk forum is a start. But anything posted there will stay just there. Some members are active and will present views to a larger audience, some may promote some sort of action. There are many interest groups within our industry, most local or national, a few international. You can find these and express your ideas to them. LMHC is closed to outsiders, but GILC is allowing participation through invitations to attend; if you are unable to attend the annual gathering in Tucson, find somebody who is attending and let them represent you. The problem is that without further lobbying, any proposal may just stay within that forum after the meeting

One powerful method is to contact the associations who represent your country, and join their delegation as a member or observer. On the diamond side express your views to the leaders of your Diamond Bourse. Shows like Tucson are often the venues for many peripheral meetings, some of which are advertised on MailTalk; if any cover your interest then contact the organizers of such meetings. All these will involve effort, time and perhaps expenses on your part.

Jack and I will try to come up with some new ideas to improve CIBJO's decision-making process and try and give it some teeth for the future. Ideally it needs a total rethink. We will tackle this at the next Congress in May in Vicenza, but it would probably be easier to start a national revolution than move one of CIBJO's bricks.

As a last resort write to me with coherent ideas and I will try to present them at some future international meeting.

Contact the author

To contact Harry Levy, email harrylevy1@btinternet.com.

Making the grade

Qualifications count, especially robust professional ones such as Gem-A's gemmology or diamond diplomas. Jack Ogden gives five tips to help you make the most out of your Gem-A qualifications.

It is not about bragging, it is about good marketing. High status international qualifications are reassuring to clients who, by and large, know little about gems or who to rely on when they buy. Because of this, individuals and companies are increasingly using Gem-A qualifications as part of their marketing strategy. One way to get the message out is to issue press releases or contribute articles and comments to the local or national press. In an article called 'How to Choose a Diamond', published by the Western Mail, Michael Laing (owner of Parkhouse Jewellers in Cardiff) was careful to describe himself as a Fellow of the Gemmological Association. Similarly, when Cheryl Owen (a member of the hallmarking team at The Birmingham Assay Office) passed her Gem-A Gemmology Diploma and was elected to FGA status, the Assay Office issued a special press release to this effect.

If you are of FGA or DGA status, remember the following:

1. After your name on letters and emails put 'Fellow of the Gemmological Association of Great Britain' if you have FGA status or 'Diamond Graduate of the Gemmological Association of Great Britain' if you have DGA status.
2. Ensure that your website and any printed literature clearly states that you are a Fellow or Diamond Graduate of the Gemmological Association of Great Britain or, when applicable, note that your company employs a Fellow or Diamond Graduate.
3. Refer to your status (or that of your staff) in any press releases you issue or articles you write.
4. Make use of the Gem-A Coat of Arms (see *Gems & Jewellery*, Autumn 2011, page 42).
5. If you are a UK business, apply for Corporate Membership. This provides you with more publicity material and, if you employ two or more Gem-A Members, will cost you nothing extra.

Also remember that all graduates of Gem-A's Foundation in Gemmology course may now use Cert. GA after their names.

THE SCOTTISH GEMMOLOGY CONFERENCE

The Queens Hotel, Perth

Friday 4 May – Monday 7 May

UPDATE: It is with great pleasure that the SGA can confirm that Darko Sturman has been added to the list of speakers.

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.

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

Speakers will include:

PROFESSOR HENRY HÄNNI

MAGGIE CAMPBELL PEDERSEN

PROFESSOR GODFREY FITTON

DR ELIZABETH GORING

DARKO STURMAN

DR ULRICH HENN

RICHARD SLATER

For further information or to book go to **www.scotgem.co.uk** or contact Pauline Jamieson at membership@scotgem.co.uk

In the news

Roger Harding steps down as Editor of *The Journal of Gemmology*

As announced in the Summer issue of *Gems & Jewellery*, Dr Roger Harding relinquished his role as Editor of *The Journal of Gemmology* at the end of 2011 and the Council has appointed Elise Skalwold to succeed him.

Roger became Editor of *The Journal* in 1994 following the resignation of Alan Jobbins. He was instrumental in introducing an editorial structure which included assistant and associate editors, who possessed the skills needed in the ever-changing and expanding world of gemmology. Roger's knowledge of gems and minerals and his meticulous attention to detail have ensured that *The Journal* has maintained its standing as a major international gemmological publication. Roger will continue to serve on the advisory panel for Gem-A Publications.

We are most grateful to Roger for over 30 years of dedicated service that he has given to the Association and to *The Journal* in particular. We wish him many years of happy and healthy retirement.

Craftsmanship and Design Awards

Sanni Falkenberg (left) and Anabela Chan (right), winners of the Gem-A Diamond Scholarships in the 2012 Craftsmanship and Design Awards.

Our congratulations go to Anabela Chan and Sanni Falkenberg, winners of the Gem-A Diamond Scholarships in the 2012 Craftsmanship and Design Awards. Organized by the Goldsmiths' Craft and Design Council, the annual Awards aspire to promote excellence in students of silversmithing, jewellery and the allied crafts. The awarded scholarship entitles Anabela and Sanni to complimentary study of Gem-A's famous five-day diamond grading course, a hands-on class which leads to Gem-A's Diamond Practical Certificate.

Sanni Falkenberg said: "Gemstones have always fascinated me. Learning more about stones would help me with the cutting process but also with the use of stones for jewellery." Anabela Chan said: "I have always been passionate about craftsmanship. The Gem-A Diamond Scholarship will be fundamental for me to further my development and ambition to become a fine jewellery designer and to establish my own collections — jewellery that embodies the power of love and passion, desire and excitement." Of her design, Anabela said: "I am fascinated by the treasures of nature. The design

Gem-A News and Views

In the news (cont.)

is a unisex piece consisting of a diamonds and white gold brooch, designed to be pinned on the pocket of a smoking jacket, concealing a hidden natural grey pearl. Yellow, pink, blue and white diamonds are used to create a shimmering effect, like dew drops glistening under the morning sun."

(Below) Monster silver ring by Sanni Falkenberg, with coloured gemstones. Photo © Goldsmiths' Craft & Design Council.
(Below left) An illustration of Anabela Chan's winning design, a brooch featuring coloured diamonds and a natural grey pearl. Image © Anabela Chan.

Gem-A in Asia

Gem-A is rapidly developing its education in Asia, recently opening a new Taiwan Accredited Teaching Centre (ATC), whilst consolidating its presence in Japan.

Asia now constitutes Gem-A's largest market for its Gemmology Foundation and Diploma courses. Gem-A courses have been offered in the area since the 1980s, and there are now Gem-A ATCs in seven locations in China, four in Hong Kong and three in Taiwan, as well as others in Singapore, Korea and Myanmar. All ATCs are now accredited by Gem-A under a uniform ATC agreement to ensure a consistent delivery of our education worldwide, and all ATC instructors must be Gem-A graduates. Gem-A's presence in the region was illustrated by its sponsorship of the Hong Kong Gemmological Association's illustrious annual dinner in November. Unfortunately the event clashed with Gem-A's own conference in London, but gemmologist and gem author Richard Hughes represented the Association, speaking on Gem-A's behalf and presenting Gem-A Diplomas to recent graduates from Hong Kong.

In Japan, Gem-A courses were formerly run by VO-GAAJ. With the demise of GAAJ, the Japan Gem Society (JGS) has been launched which will operate under the auspices of the Japan Jewelry Craft School. The agreement for JGS to provide Gem-A courses was finalized at meetings in Hong Kong in February 2012 between Akira Ito (JGS Chairman), Nilaam Alawadeen, James Riley (Gem-A Chairman) and Dr Jack Ogden (Gem-A CEO).

Following the Hong Kong Jewellery Show in February, at which

Gem-A graduates receiving their certificates at the GAHK dinner with Richard Hughes (fifth from left).

Gem-A exhibited, Jack Ogden visited Taiwan to meet with the newly formed Taiwan Gemmological Institute (TGI) who were applying to become the third ATC in Taiwan. After discussions, visits to premises and a checking of the available equipment and teaching stones, the new ATC agreement was finalized. Jack Ogden noted that Taiwan had huge potential and a thirst for gem knowledge. He added that TGI President, Shen Mei, had worked enthusiastically to meet the requirements to be accredited as a Gem-A teaching centre. TGI will teach Gem-A's Gemmology Foundation and Diploma courses from its premises in Taipei.

The culturing of South Sea pearls

Maggie Campbell Pedersen visits Paspaley Pearls in Darwin, Australia.

On a recent visit to Darwin, Australia, I was fortunate to be able to spend some hours at the head offices of Paspaley Pearls — the largest and best known South Sea pearl farmers in Australia — and to learn more about the production of these beautiful gems.

The cultivation of South Sea pearls may vary a little from one company to another, but as Paspaley Pearls sell 97% of their production wholesale to other dealers, keeping only the best 3% to be sold as jewellery in their own showrooms, it is clear that a lot of the South Sea pearls on the market today are in fact produced by Paspaley, indeed their South Sea pearls account for 75% of the Australian production.

'Dolce collier' with diamonds (18.09 ct) in 18 ct white gold. Image courtesy of Paspaley.

The oysters used are *Pinctada maxima*, the white or gold-lipped oysters that can measure up to 20 cm across. They thrive in the seas around the north-west coast of Australia, where the water is unpolluted and they can enjoy huge tides and abundant food supplies. This enables them to produce copious layers of good quality nacre.

Originally only the shells were collected for their nacreous mother-of-pearl lining, and used in the manufacture of such items as buttons, belt buckles and jewellery. The occasional natural pearl found in one of the oysters was simply a bonus. But the trade in mother-of-pearl was virtually killed off by the advent of plastics which could imitate it, and most companies ceased using them. A few — Paspaley included — continued collecting wild shells, but switched to using them for cultured pearl production.

It took many years to perfect the process (which was originally based on the Japanese Akoya pearl cultivation), which was started at Kuri Bay, about 230 miles north of Broome in Western Australia, in 1956. Over the next 30 years systems more suited to the larger *Pinctada maxima* oyster were developed, trialled and put into production. It was felt that it might be more successful to culture the pearls 'doing it the oyster's way' than to try to force them. Paspaley pioneered most of these systems and thus became one of the world's leading producers of high quality pearls.

The Australian South Sea pearl production is based almost entirely on wild caught shell, unlike other pearl-producing countries which rely on hatchery produced oysters. Divers collect the shells aged about

Organics

The culturing of South Sea pearls (cont.)

Above left: Pinctada maxima *shell used by Paspaley. © Maggie Campbell Pedersen.*
Top right: Edges of two Pinctada maxima *shells, showing the very thick nacre of the Paspaley shell on the left. © Maggie Campbell Pedersen.*
Below right: Paspaley South Sea pearl. Image courtesy of Paspaley.

three to five years old from the seabed. The oysters are left for the first few months of the process in the area in which they have been found; they are never kept in baskets or rafts. Initially after capture they are tied onto lines, and left on the seabed in the area in which they were found to rest for two months.

The seeding — implanting with a freshwater bead nucleus made from a Mississippi clam and measuring 4–6 mm, which is inserted in the gonad — takes place between April and July (late autumn to winter in the southern hemisphere, though not cold in NW Australia). This is done on a purpose-built vessel in the area where the oysters are living. They are then returned to the seabed for a further couple of months' rest.

Finally they are transferred to pearl farms about 20 miles offshore, located in the wild and remote Kimberley region, where they are suspended on lines at a depth of two to three metres, and left to work their magic. Throughout all these processes they are cleaned and tended every two weeks.

The South Sea pearl culturing process takes about two years in total, after which the oysters are harvested and any resulting pearls removed. The thickness of the nacre depends on the individual oyster, but it can be anything up to 3 mm. At a thickness of 0.5 microns per layer, this would equate to 6000 layers of nacre, or, to put it another way, about eight layers a day.

The success rate is reckoned to be in excess of 75%, of which only a very small percentage is of gem quality. Oysters that are deemed suitable for re-seeding are implanted with a slightly larger bead, 10–14 mm, and the process is repeated. About half the oysters that have produced a second pearl will be seeded a third time, though by this stage the nacre quality is usually decreasing slightly as the individual layers are thicker and fewer.

Paspaley does not culture black pearls,

The culturing of South Sea pearls (cont.)

Left: Sorting and grading pearls.
Below left: Stringing pearls with invisible knots,
Photos © Maggie Campbell Pedersen.

but concentrates on white and a small amount of 'champagne'. The whites can be graded into a dozen different shades, according to lustre and overtones of other colours.

The bulk of the pearls produced are 10–15 mm, but on rare occasions they can reach almost 20 mm. The most famous pearl produced by the company was a white, flawless, round pearl with pink overtones, measuring 20.4 mm and weighing 60.9 carats. Harvested in 2003 from a pearl farm on the Kimberley coast, it was the result of a second seeding with a bead nucleus of 14 mm. It is called 'The Paspaley Pearl' and is considered by many to be the finest South Sea pearl ever found. Its beauty is so perfect that the company's Executive Chairman, Nicholas Paspaley AC, gave it the title of 'pearl of pearls'. A unique gem, it was displayed at the Smithsonian Museum in Washington in 'The Allure of Pearls' exhibition in 2005, alongside eleven other spectacular pearls, including the Hope Pearl and La Peregrina.

After harvesting and sorting, the best pearls are sent to the Paspaley jewellery atelier in Darwin. Here bespoke and limited edition collections are created to be sold exclusively by the company themselves in their own showrooms. Strands of pearls are knotted with invisible knots (i.e. no thread is visible) — a Paspaley tradition. It can take as much as five years or longer to perfectly match the shape, size, lustre, colour and complexion of pearls for a whole strand.

From beginning to end, nothing can be rushed in the cultivation of South Sea pearls, and attention is paid to detail every step of the way. The whole process is very costly and the pearls are expensive, but they have a beauty all of their own.

The author is indebted to Richard McLean, Senior Adviser, Pearling, at Paspaley Pearls, for his help with this article.

About the author

Maggie Campbell Pedersen is a Fellow of the Gemmological Association of Great Britain and an Associate of the British Institute of Professional Photography. The author of *Gem and Ornamental Materials of Organic Origin*, Maggie is also the editor of 'Organic Gems', online at www.maggiecp.com.

Journal Files

The Journal of Gemmology

Summary of an article to be published in *The Journal of Gemmology*.

Testing a yellowish orange sapphire*

A summary by Jack Ogden of the article 'Untreated yellowish orange sapphire exhibiting its natural colour' by J.M. Duroc-Danner.

Many of the orange shades of sapphire on the market today are treated, whilst many others are synthetic. This study of a 3.85 ct pear-shaped sapphire of yellowish orange colour demonstrates what can be determined with basic gemmological tests. The sapphire was investigated using refractometer, polariscope, hydrostatic weighing, dichroscope, spectroscope, ultraviolet light and immersion microscopy. Among the properties observed were very weak yellow orange to slightly darker yellow orange pleochroism, lines in the red region of the spectrum at 660 and 680 nm, and a faint uneven dark apricot fluorescence under UV. The other properties are summarised below.

These basic tests quickly showed that the stone was sapphire, but was it natural or synthetic? There are at least four commercial processes used worldwide to produce synthetic corundum. These are:

- Verneuil inverted blow-pipe process
- Czochralski (pulling) growth technique
- Flux fusion growth technique
- Hydrothermal growth process.

Examination with a gemmological microscope using dark field illumination and overhead lighting revealed broad parallel straight growth zonal striae lying in different planes, crossing each other

Weight	3.85 ct
Dimensions	11.38 × 9.55 × 4.88 mm
RI	ε = 1.762, ω = 1.770 birefringence 0.008, Uniaxial negative
SG	3.99
Pleochroism	Very weak, yellow orange to slightly darker yellow orange.
Absorption spectrum	No lines in the blue, but lines in the red at 660 and 680 nm.
UV	Faint uneven dark apricot fluorescence

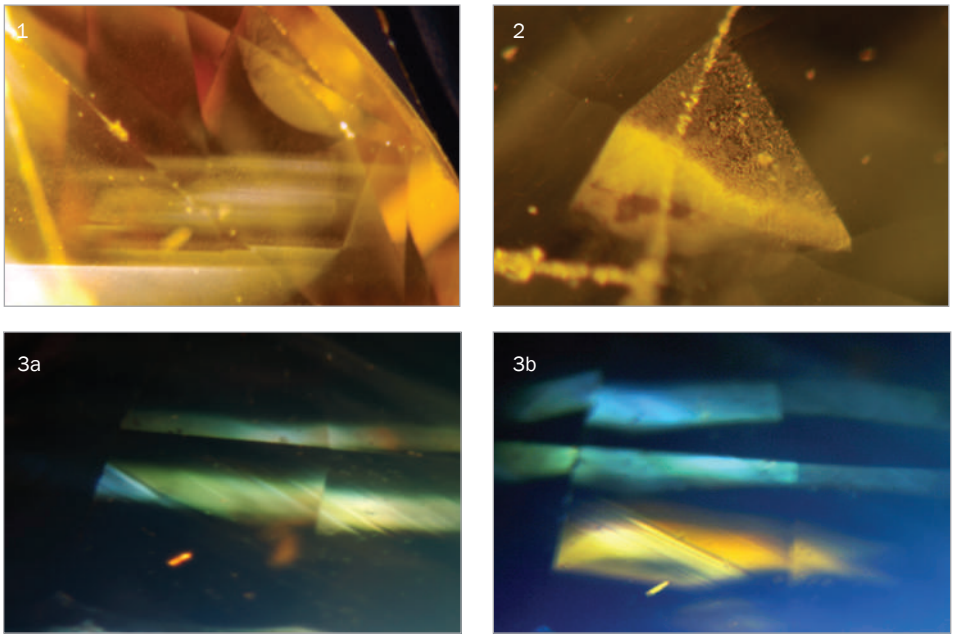
Above: Pear-shaped yellowish orange sapphire of 3.85 ct, magnification 10×, and a table of its constants.

Journal Files

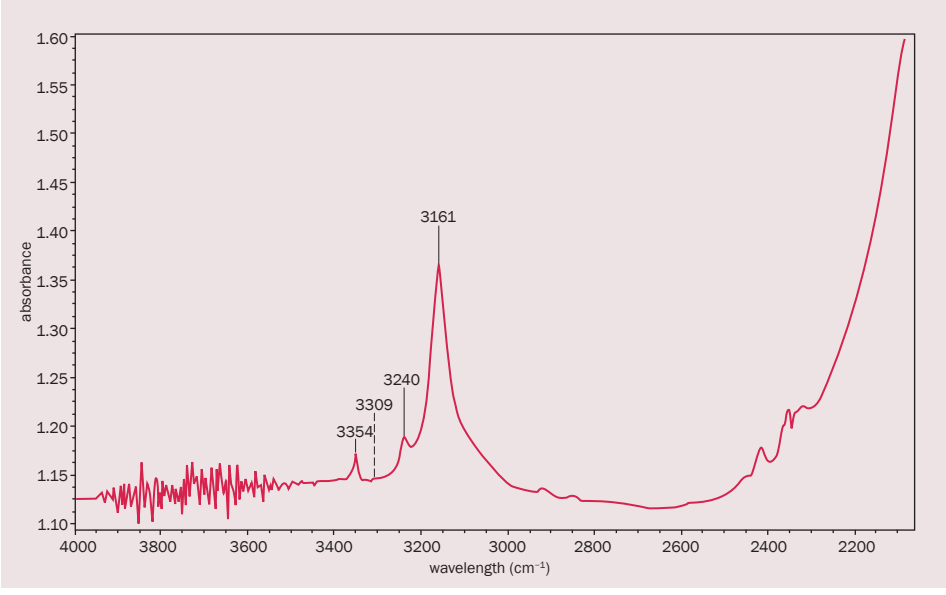
at angles immediately under the table facet (**1**). Numerous clouds of exsolved substances aligned with these zonal striae are responsible for the 'sleepy' appearance of the stone. Such angular zoning is characteristic of natural sapphires. Lying in the bottom of the pavilion, parallel to a basal pinacoid is a tiny 'feather' consisting of very fine acicular droplets (**2**). Polysynthetic twin lamellae are also visible (**3**). These internal characteristics exclude Verneuil and Czochralski synthesis which display curved colour and growth banding. The commonest inclusions in flux-grown sapphires are twisted veils of flux resembling net curtains or veils blowing in the wind. The type of growth striae seen in the present sapphire do not appear in flux-grown synthetics. On the other hand, hydrothermally grown synthetic corundum usually shows fluid inclusions different to those in their natural counterparts.

This examination using basic gemmological tests, including study of the internal characteristics, pointed to a natural origin for the sapphire, and its colour distribution of angular yellow zoning alternating with colourless areas also excluded heat or diffusion treatment. This identification was supported by Fourier transform infrared (FTIR) spectroscopy which also pointed to a natural metamorphic origin and no heat treatment (**4**).

J.O.



1: Broad parallel straight growth zonal striae lying in different planes and crossing each other at angles. Dark field illumination, magnification 15×.
2: Tiny 'feather' consisting of very fine acicular droplets. Dark field illumination, magnification 30×.
3a,b: Polysynthetic twin lamellae, stone immersed in ethyl alcohol, between crossed polaroids, magnification 20×.



4: FTIR spectrum showing the 3161 cm^{-1} series of peaks due to structurally bonded OH associated with Mg^{2+}, and the absence of a 3309 cm^{-1} peak (indicated on the spectrum to show its location), confirming that the yellowish orange sapphire is of non-magmatic origin (probably metamorphic) and has not suffered heat treatment.

* A summary of an article appearing in *The Journal of Gemmology*, 2011, **32**(5–8): J.M. Duroc-Danner, Dip. IUED, DUG, FGA, GG, 'Untreated yellowish orange sapphire exhibiting its natural colour', 174–8.

Obituaries

It is with great sadness that Gem-A announce the deaths of several well-known and loved members and associates of the gemmological community.

Professor Robert Howie

As we go to press we have learnt of the death of one of our Vice Presidents, Professor Robert Howie. Professor Howie was President of the Association from 1996–2000. He was an outstanding research scientist and a key writer of the twentieth century in the field of mineralogy. After wartime service in the RAF he completed a degree in Chemistry, Geology and Mineralogy at Trinity College, Cambridge, followed by a Doctorate studying dark granites of India, known as charnockites. Professor Howie served as a lecturer at Manchester University, at Kings College, London and then later Professor at Royal Holloway, London. He was a winner of the Murchison Medal and the Public Service Award of the Mineralogical Society of America. He passed away on 10 March following health complications connected to his polio condition, contracted during World War II. A full obituary will be published in the 2012 edition of *The Journal of Gemmology*.

Photo of Professor Robert Howie on the day in February 2009 that he received his Honorary Doctor of Science award from the University of Derby. Photo courtesy of University of Derby.

Brian Dunn

Brian Dunn passed away suddenly in December 2011. Brian, a former chairman of the NAG Valuations Committee, ran several seminars for Gem-A members on the valuation of antique and modern jewellery. Steve Collins, who worked with Brian at Garrards, wrote the following in memory of Brian:

I have many memories of Brian from the 15 years that I knew him, but my lasting one will be from the Institute of Registered Valuers Loughborough conference last year. I hadn't seen [Brian] for a while but he met me like a long lost friend, and he came and sat next to me for the dinner on the Saturday evening, wearing a particularly tasteful Hawaiian shirt — one of many in his wardrobe I gather.

I thought to myself that here was a man who was surrounded by friends and people that he had known and worked with for years. He was one of the "top brass" of the valuation world, but he knew it was my first IRV conference so he came and sat with me, just the same as the first time I met him, just to make sure that I was OK and to introduce me to the others on the table.

A kind, thoughtful, incredibly knowledgeable and entertaining man, he will be sadly missed by everyone fortunate enough to have known him. As he would have said, "See ya, man!"

Peter Watson

Peter Watson, founder of PJ Watson Ltd, passed away in 2012. Born in 1926, Peter was awarded his Diploma in Gemmology in 1953. Our condolences go to Vivian, Phillip and the Watson family.

Howard Rubin

Howard Rubin passed away in January 2012 aged 86. He was the inventor of the GemDialogue colour description system and served as secretary of the National Association of Jewellery Appraisers.

Martin Ansell

Martin was awarded his Diploma in Gemmology in 1982 and received his DGA in 1983. He was also a correspondence tutor for many years.

The Royal Collection

Diamond Jubilee

To celebrate the Queen's Diamond Jubilee, Gem-A is organizing a unique private viewing of the Royal Collection on Tuesday 2 October 2012.

Where
Buckingham Palace

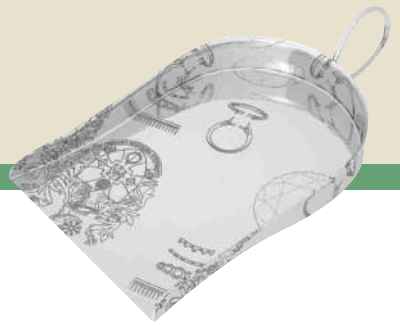
When
Tuesday 2 October 2012
17:00 to 19:00

Price
£75 to members
£90 to non-members

Including a glass of champagne.

Booking open from 10 April 2012. To book or for more information contact events@gem-a.com, telephone +44 (0)20 7404 3334. See Gem-A website for more details. Only one guest per member. Tickets allocated on a 'first come first served' basis. Please note places are limited.

Stone Scoop



Pearls of wisdom

Jack Ogden discusses taste, tragedy and lost pearls.

I was in a pearl mood recently after having seen the late Liz Taylor's amazing La Peregrina pearl on show at Christie's New York, and, on the same day, having handled the extraordinary matched pair of perfectly spherical, huge, pink freshwater pearls described in the Spring 2010 edition of GIA's *Gems & Gemology*. Then, as these things happen, I was trying to get an insight into what people thought about gems a hundred years ago for this column and instead encountered a fascinating article on gems and taste, and this brought me full circle back to pearls.

I make no apologies for reprinting the article here because it is an interesting historical insight on gems a century ago. It is also witness to the then-developing fashion for using un-faceted gems and sheds light on the owner of some fine pearls, illustrated in my most favourite of the books on pearls. The article is from the *New Zealand Evening Post*, dated 14 July 1914.

"The value of precious stones like most other details of dress is ruled by fashion, and the correct way to wear treasured possessions is regulated in the same way. It is said that not one woman in six knows how to wear jewellery, and this accusation may be applied to the woman who owns jewels of enormous value, as well as to she whose gems comprise nothing more than a diamond star, a ring or so, and necklet. To wear jewels correctly a fine sense of colour is required and a combination of stones that defy each other in the matter of colour must always be avoided. A great authority on the subject says that to mix pearls with coloured stones is an unpardonable offence against the ethics of jewel-wearing. Pearls may be worn with diamonds but with no other stone. In these times, when there is more wealth in use throughout the world than there has been at any time recorded in history; and when the supply of precious stones is plentiful enough, the possession of jewellery is common enough and women with exclusive tastes make every endeavour to find something new and original to wear. Some pride themselves on a collection of uncut stones, and, although these may be unique, the ordinary person cannot give the same admiration as to those which are finely cut. By 'uncut' is meant that the stone is smoothly polished, without the facets which enhance colour and lustre. The late Madame Nordica had a wonderful collection of uncut emeralds, of which she was extremely proud (says a Melbourne writer). They were set round with sparkling diamonds and in their own way the emeralds were said to be unequalled in the world. They resembled nothing more costly nor interesting than ordinary green glass marbles and so little did they appear like the emeralds we know, that when it happened during Madame Nordica's visit to Melbourne, one of the extremely large stones was lost from its setting, it was subsequently found on the hotel steps, where it had been lying for some hours, without anyone realizing it was anything of more importance than a piece of green glass."

(Left) A drawing of Madame Nordica's coloured pearl necklace. The pendant pearl weighed 175 grains. Photo from The Book of the Pearl, *Macmillan & Co., 1908.*

Lillian Nordica, the famous American opera singer, performed in Melbourne in August 1913. She was on her way home to the USA via New Zealand when the ship she was on hit a reef and was stranded. Madame Nordica suffered badly from this experience and never recovered, dying of pneumonia in 1914. She was famed for her jewellery and clearly was something of a trend-setter gem-wise. A recent biographer commented that "Jewel cases filled with bracelets, necklaces, tiaras and diadems, of gold and precious stones, attest the unaffected sincerity of her admirers in all the great music centres of the world." I must admit that when I came across the 1914 article I didn't know who she was, but I recognized the name. That favourite book of mine (G.F. Kunz and C. H. Stevenson's *Book of the Pearl*, 1908) mentions her "famous collection of coloured pearls" and the illustrations include a fine coloured pearl necklace (shown left) that they say belonged to her, as well as a portrait of her bedecked in pearls. She appears to have been famous for her pearls, but where are they now? There is also a brief mention of her collection of pearls in a New York newspaper account of a dispute over her will, including mention of a large yellow pearl, but so far I have found no record of where they went.

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