Gems & Jewellery

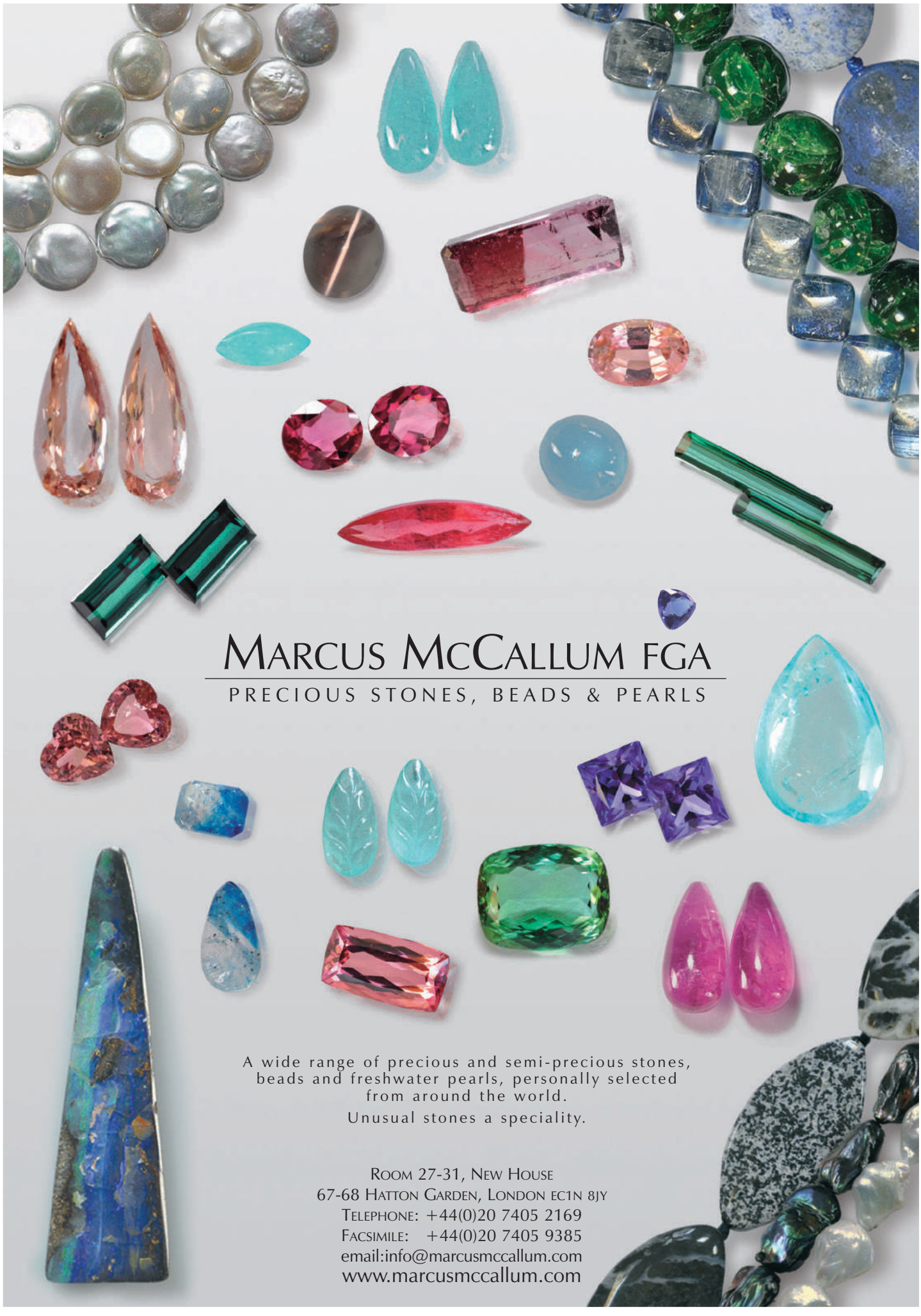
Autumn 2012 / Volume 21 / No. 3

The Argyle Pink Jubilee

Synthetic diamonds

Tiger's-eye revisited

The Gemmological Association of Great Britain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Editorial

Gems&Jewellery

Autumn 12

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Black box, white gems

Our time at the Gem-A booth at the September Hong Kong Jewellery and Gem Fair (see page 34) was punctuated by visits from jewellers and even gem dealers asking us if we sold a single tool that would easily differentiate between different types of gems, as well as spot synthetics and treatments, and so on. They wanted something simple that they could pop the gem in to get a reading which would identify the stone. We patiently explained that gem testing was a bit more complex than that. Some understood, and some will take our courses, but many looked crestfallen and muttered words to the effect that they just wanted to make money, not become scientists.

The above presents a question I've often considered and which I raised at a presentation at IJL — just how much gem knowledge should a member of the public expect of a jeweller selling them jewellery? I see the answer in terms of what we might call 'high street equivalents' — do we expect a local jeweller to have as much knowledge about his or her products as we would expect of a pharmacist? Or a wine merchant? I hope to pursue this at greater length in a future issue of this magazine, but for now I mention it solely because it brings us back, once again, to consumer confidence. Without this the gem and jewellery trade is on a very slippery slope. In the gem world of The World Jewellery Confederation, the Gemstone Industry & Laboratory Conference, and so on, we can agree nomenclatures and define special care requirements, but unless this stuff filters down to (and is understood on) the shop floor it is all hot air, and so consumer confidence suffers.

We really don't help ourselves. For example, a big trade worry now is synthetic diamonds on the market – we fear media exposure and consumers getting anxious about buying diamonds. You as members of the trade know that 'manufacturer' in the diamond production sense has traditionally meant diamond cutter, but does the average potential diamond buyer in the street know this? So isn't it a bit silly for a major diamond supplier to plaster Hong Kong's public Star Ferry service with posters proudly advertising themselves as 'The World's Largest Manufacturer of White Diamonds Below 1.50 Carats'. Isn't it time for the diamond trade to say that, in the current climate, to use the term 'manufactured' in its traditional sense is ambiguous and rather unwise?

Jack Ogden
Editor, *Gems & Jewellery*

Cover Picture

The Argyle Pink Jubilee, recovered from Rio Tinto's open pit Argyle Diamond Mine, Western Australia. The Argyle Pink Jubilee is the largest pink rough diamond crystal found in 26 years, weighing in at 12.76 ct. See *Gem News* From Gary Roskin on page 5. Image courtesy of Argyle Diamonds and The Melbourne Museum.

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Small rough emerald from Fazenda Bonfim, Brazil, measuring 5 mm. Photo by Hanco Zwaan.

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THOMAS HAINSCHWANG FGA
The challenge of identifying recent generations of melee-sized synthetic diamonds

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JERRY SISK GG
Expanding the market for coloured gems: the JTV experience

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Diamond tiara. Photo Jack Ogden.

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(Morning session) or
14:30 – 16:30
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Gem news from Gary Roskin

Gary Roskin FGA looks at the Argyle Pink Jubilee, the largest pink rough diamond found in 26 years.

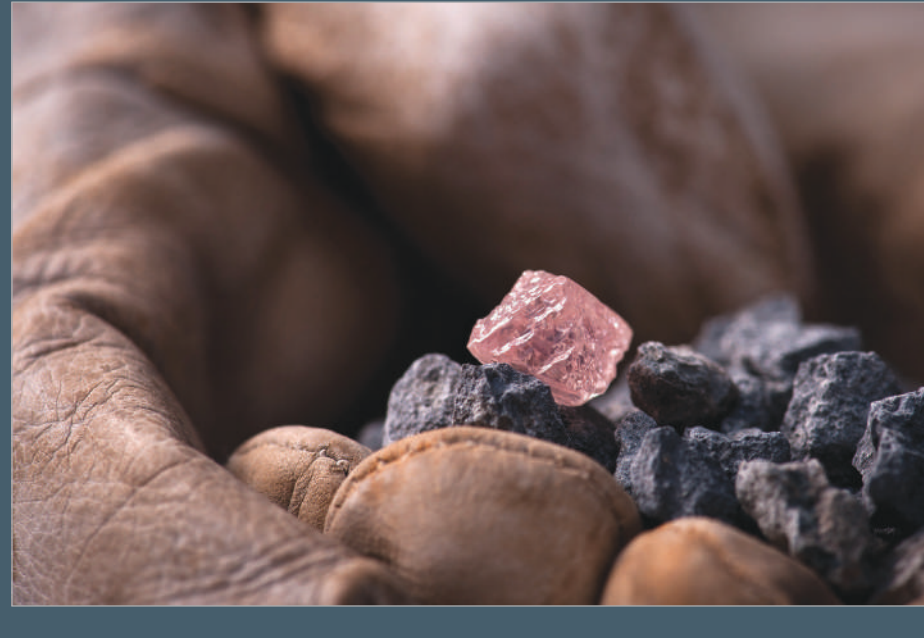
It was in February 2012 that we learned of the existence of the Argyle Pink Jubilee. Recovered in August 2011 from Rio Tinto's open pit Argyle Diamond Mine, located in the East Kimberley region of Western Australia, the Argyle Pink Jubilee is the largest pink rough diamond crystal found in 26 years. Weighing in at 12.76 carats, this was truly an important find.

The Roskin Gem News Report published Argyle's press release of the find, together with images of the rough crystal. What a beauty, especially for the gemmologist. Even without magnification you can see that it is covered in undulating deep three-dimensional trigons and partial dodecahedrons.

The press release also noted that the crystal would be cut and polished, and then presented at the upcoming 2012 Argyle Pink Diamonds Tender. The decision to cut the crystal was not made lightly, and only after two months of careful study did they finally agree to cutting the stone. The approximate time to work on the crystal and finish the diamond was estimated at 10 days.

Once the diamond was cut and polished it would then be graded by the grading staff at Argyle, as well as by GIA (U.S.) and the AGT Gem Laboratory (Japan). The Pink Jubilee would then be showcased before being sold in the Tender. Cutting began on 21 February 2012. And then we heard nothing.

Fast forward to early September, when I received a call from a friend telling me that he'd seen a video clip on Australian Broadcasting Corporation (ABC) news that I might be interested in. It was a donation by Argyle Diamonds to the Melbourne Museum of a



The Argyle Pink Jubilee before cutting, originally weighing 12.76 ct.

Gems and Minerals

Gem news from Gary Roskin (cont.)

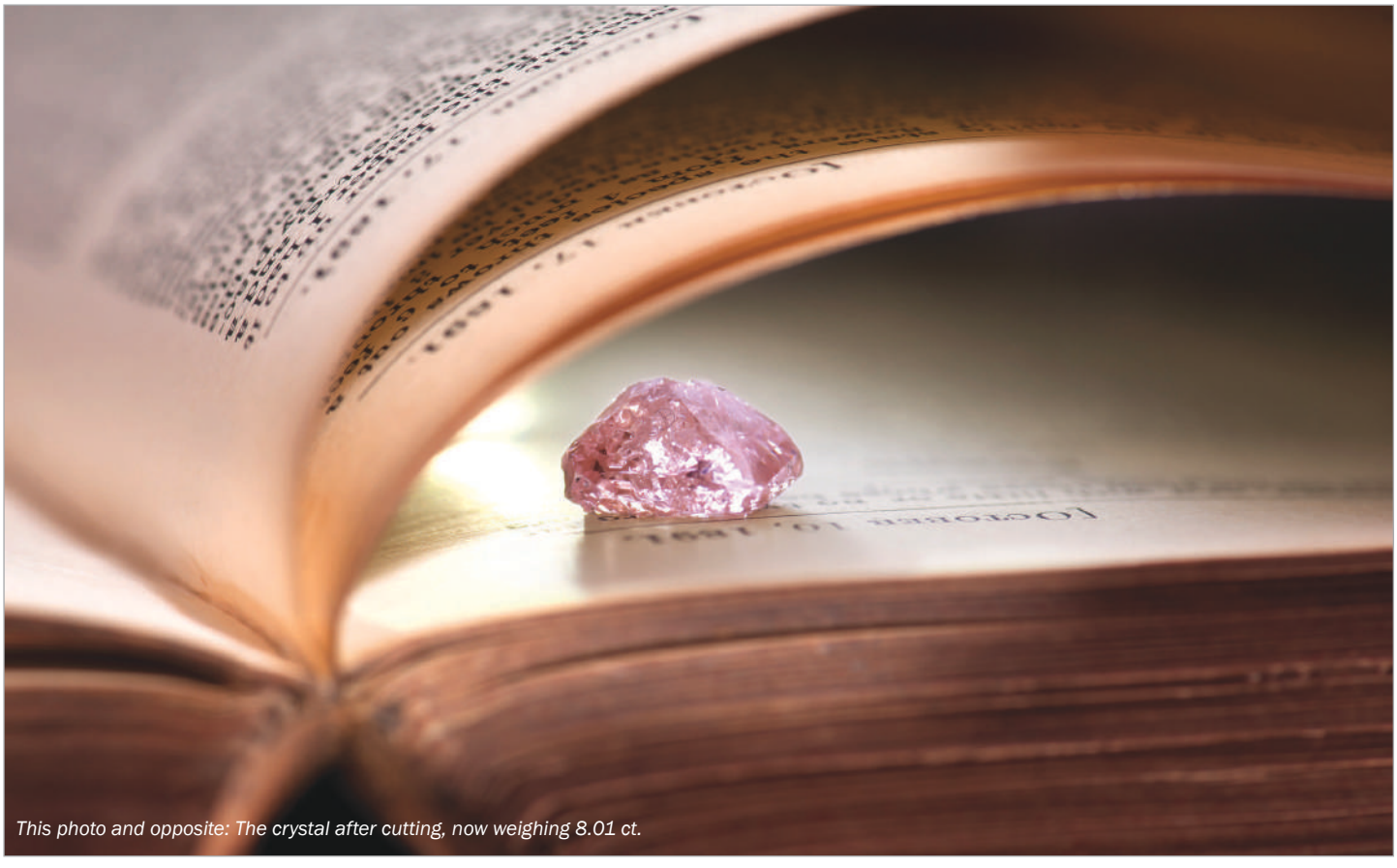
Note the wonderful growth markings visible on the rough crystal.

partially faceted pink rough crystal — the Argyle Pink Jubilee. Cutting had been abruptly halted with the diamond now weighing 8.01 ct.

As gemmologists we know that anything can happen to a diamond when it goes on the wheel. Through no fault of the cutter, even after careful study and preparation, Mother Nature takes over. In this case the Argyle Pink Jubilee fractured on the wheel. With the crystal still in one piece, Argyle decided that trying to salvage smaller finished pinks from the stone would not be in the best interests of such an historical find, and so they did what they have done in the past with other rare finds: they donated it to the Melbourne Museum, home to Australia's most comprehensive natural science display.

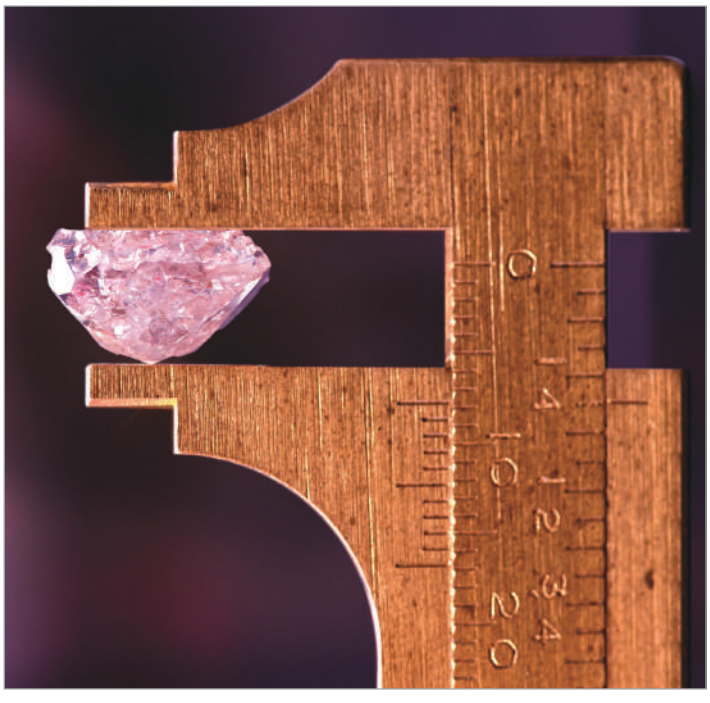
Tim Hart, acting CEO of Museum Victoria said: "As the largest pink diamond found in Australia, this is an important and spectacular piece of Australia's mining history. We are very appreciative of Rio Tinto for donating the diamond, and are excited to be able to share its story at Melbourne Museum... This is a wonderful opportunity for Museum Victoria to have a permanent record of an important piece of Australian mining history."

The Argyle Pink Jubilee will feature as part of the 'Dynamic Earth' exhibition. According to the museum's public relations department, this is a favourite of visitors to the Melbourne Museum. 'Dynamic Earth' features more than 3,000 precious minerals and gems from the museum collection.



This photo and opposite: The crystal after cutting, now weighing 8.01 ct.

Gem news from Gary Roskin (cont.)



David Peever, Managing Director of Rio Tinto Australia, said: "There is a long tradition of Rio Tinto gifting important mineral collections to Museum Victoria. We are delighted to partner with Museum Victoria to showcase this special diamond and its mysterious geology. We hope it will be enjoyed by many generations to come."

This is not exactly how Argyle expected to unveil the Argyle Pink Jubilee, but this is the business of the gem cutter and Mother Nature. As lapidaries and gemmologists, we understand the risks, and hope for the best. The best has been done with the Argyle Pink Jubilee, and with its new status as a mineral specimen it will now be enjoyed by all at the Melbourne Museum.

All images courtesy Argyle Diamonds and The Melbourne Museum.

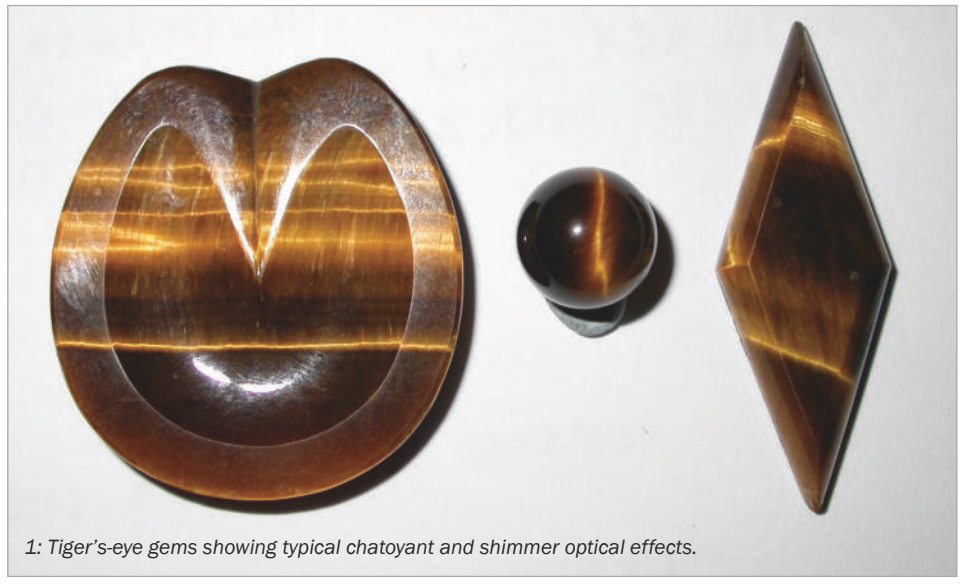
About the author

Gary Roskin is the author of *Photo Masters for Diamond Grading* and hosts the online gem news magazine *The Roskin Gem News Report*. For more information visit www.roskingemnews.com.

Gems and Minerals

Tiger's-eye revisited

Doug Morgan examines the origin of chatoyancy in tiger's-eye.



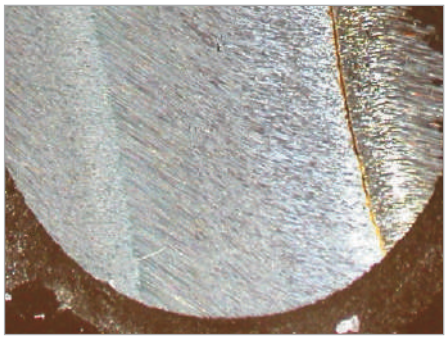
1: Tiger's-eye gems showing typical chatoyant and shimmer optical effects.

2: Base of tiger's-eye cabochon used for thin section. This shows bright bands and streaks. Length 17 x 12 mm.

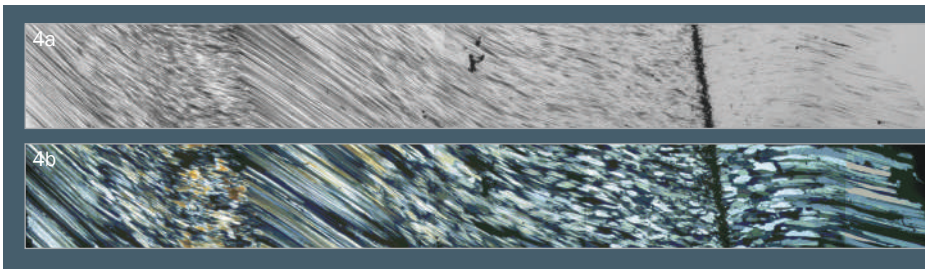
Introduction

Among the many attractive rocks which are used as gem material, tiger's-eye is one which gemmologists have known for about 150 years. It has long been considered to have been formed by a pseudomorphic replacement process, where the original asbestiform mineral, crocidolite, is replaced by quartz, and it is this process that is currently taught to many gemmology students. However, my recent observations do not support this theory of tiger's-eye formation, and confirm that it is more likely to have been formed by a classic crack-seal vein-filling process as proposed by Heaney and Fisher[1], ten years ago.

For some time now I have been writing articles for the magazine of the Midlands Gemmology Activities Group, *Midlands Focus*, entitled 'The Inside Story', in which I show that by taking opaque gem materials, such as jade, turquoise, star diopside and amazonite, which are usually cut as cabochons or beads, or carved, and making a thin section, we can examine their internal structures and explore some beautiful and interesting phenomena.



3: Thin section of cabochon viewed in reflected daylight, showing texture bands.



4a and 4b: Panoramic view of cabochon thin section under the microscope, in plane polarized transmitted light (PPL), and in crossed polars (XP), showing general texture of crocidolite, and quartz crystals. The thin black zone on the right consists of goethite and is probably a surface from which quartz grew at high angles. Total width 10 mm.

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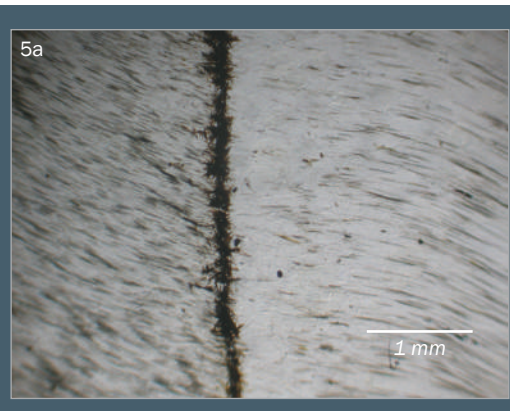
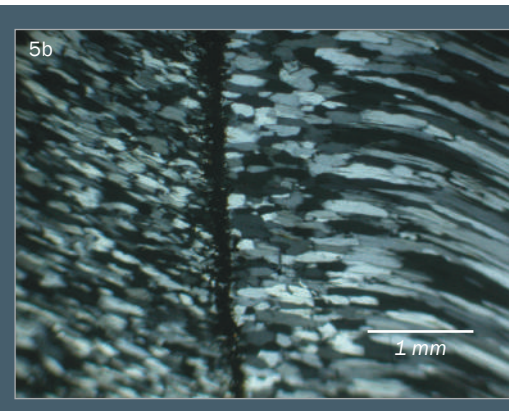
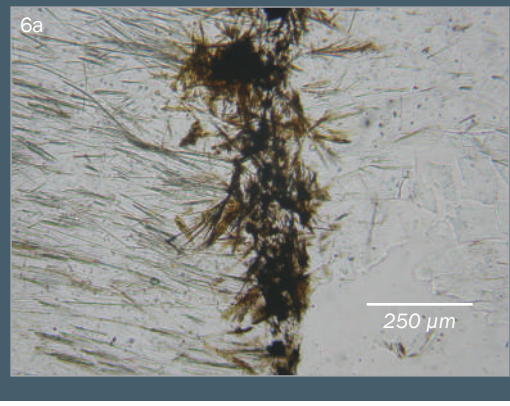
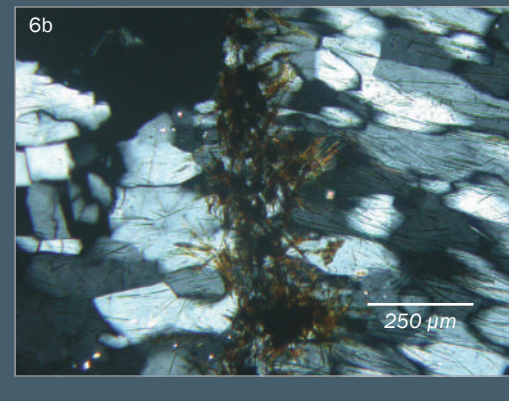
5a and 5b: Magnified view of the goethite zone in 4 in PPL and XP.





6a and 6b: Highly magnified view of goethite crystals in PPL and XP.





The method involves making what is known as a petrological thin section for microscopic examination: a slice of the rock is taken, one side ground flat and cemented to a standard glass slide, and then thinned down by grinding to a thickness of 30 microns (µm). At this thickness, most rocks and minerals are surprisingly transparent, and can be viewed in transmitted plane or polarized light under the microscope, enabling various optical properties of the constituent minerals to be observed, so that their identity and structure can be determined. As can be imagined, making the slide is not an easy procedure by hand, and where large numbers are required, there are machines designed to assist in making thin sections.

My method is painstakingly slow, but I have found it very worthwhile and even exciting, since one cannot guess what will be seen until the section is actually under the microscope.

Tiger's-eye

One material I have recently examined for 'The Inside Story' series is tiger's-eye. This gemstone is an attractive rock which shimmers when moved under a light source, and when correctly orientated, cut and polished, can give a chatoyant effect. It is novel in that polished flat plates give bright bands of varying width, which also resemble a chatoyant effect. As expected, a true chatoyant streak is produced from a convex surface, such as a cabochon, hence the name 'tiger's-eye'. These optical effects are shown in the gems illustrated in **1**. The colour is normally golden to red-brown, but various shades of cream, blue and red do occur.

The first sample chosen for sectioning was a brown and cream cabochon having bright streaks and some bluish bands (**2**). In reflected daylight the thin section clearly shows these bands (**3**), and the panoramic view under the microscope indicated that the structure was very complex and needed some explanation (**4a,b**).

The composition of tiger's-eye rock was first examined and reported upon nearly 200 years ago (1815) by the German chemist M.H.Klaproth[2] who identified the rock called 'tiger's-eye' from South Africa as a species of fibrous quartz, using analytical methods that

7: Typical slab of tiger's–eye rock as mined.

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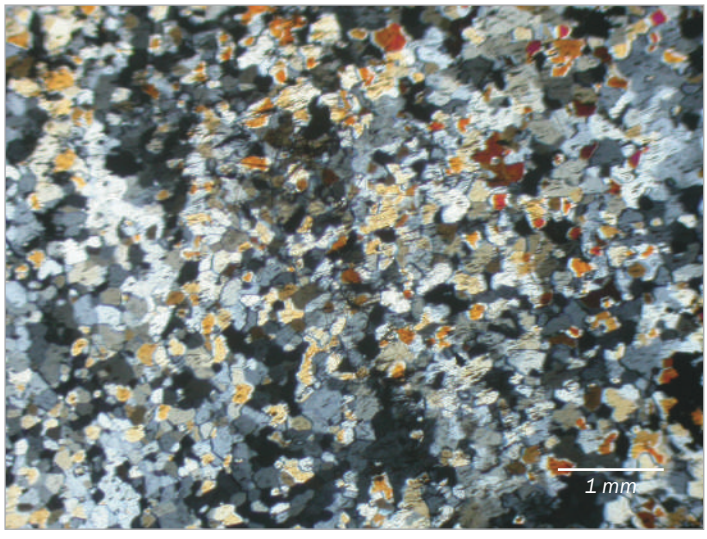
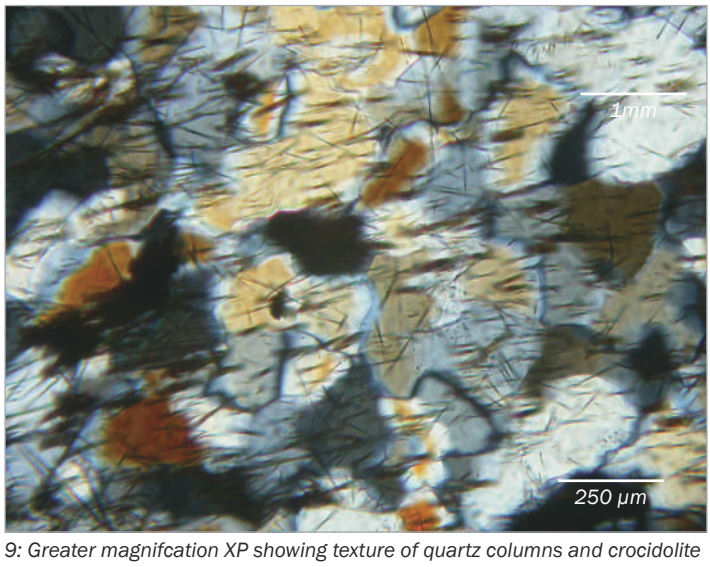
Tiger's-eye revisited (cont.)



8: Thin section of tiger's–eye rock in XP across the quartz columns.



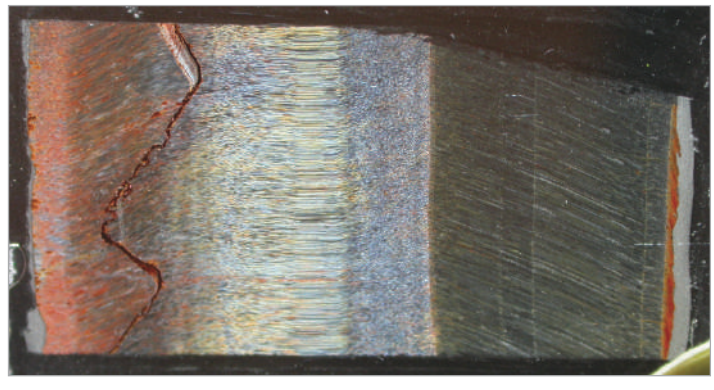
9: Greater magnifcation XP showing texture of quartz columns and crocidolite needles or fibrous inclusions.

were in their infancy at that time. It was not until 58 years later that Wibel[3] who was studying the mineralogy and physical properties of tiger's-eye deduced that it was a pseudomorph of crocidolite, which is the asbestos form of riebeckite. By this is meant that the mineral quartz over a period of time took over the form of the asbestos by a replacement process. This is one example of a well-known crystal change which, in the right circumstances, can occur between many types of minerals, and between minerals and other objects (e.g. the Petrified Forest in Arizona).

Consequently, I was expecting to see some evidence of pseudomorphism, such as traces and remnants of the crocidolite after replacement. But the section which I had prepared (**4ab** and **5a,b**), showed that the quartz was not present as fibres, but as crystalline columns, with minute needles or fibres of included crocidolite which did not always exactly follow the quartz column

Comments on the tiger's-eye section from D.M. Fisher

Donald Fisher, Professor of Geosciences, Penn State University, Philadelphia, USA, a world expert on textures associated with veins produced in rocks experiencing tensile shear stress, examined the photographs shown in **4a,b** and commented as follows: "What it looks like to me is classic: a medial suture in an antitaxial vein. In other words, the initial fracture is the dark rind down the middle. Quartz grew outward from this medial suture toward the vein wall with cracking at the interface between the vein and the wall rock. That is consistent with the increasing grain size of the quartz (anisotropic quartz growth from the suture outward). The crocidolite grew from the wall in. Also, veins represent cracks that open parallel to the least compressive stress, so the vein initially should open perpendicular to the suture. The curvature of the inclusion trails in these cases reflects rotation of the vein relative to the stress field during strain. (The vein initially forms along a crack parallel to the maximum compressive stress, but rotates as a line marker away from this orientation as deformation progresses. This vein rotated counter clockwise.) Note that the inclusion trails on the left side are perpendicular to the medial suture, but aren't on the right side. This means that, initially, cracking and vein growth was restricted to the vein wall rock interface on the left side, but it began cracking on the right side (now both sides) after a certain amount of rotation had already occurred. The other interesting thing about this example is the variation from inclusion bands to real fibres over time (from right to left on the left side of the vein). I would probably attribute this to the pinning effect that occurs as the vein rotates and doesn't open as much during each cracking episode (something one might predict as there isn't complete detachment of inclusions from the wall during vein opening so quartz growth parallel to the wall stays pinned)."



10: Thin section across complete vein of tiger's–eye viewed in reflected daylight and showing texture bands, and crack-seal pathway of growth inclusions. Total width 35 mm.

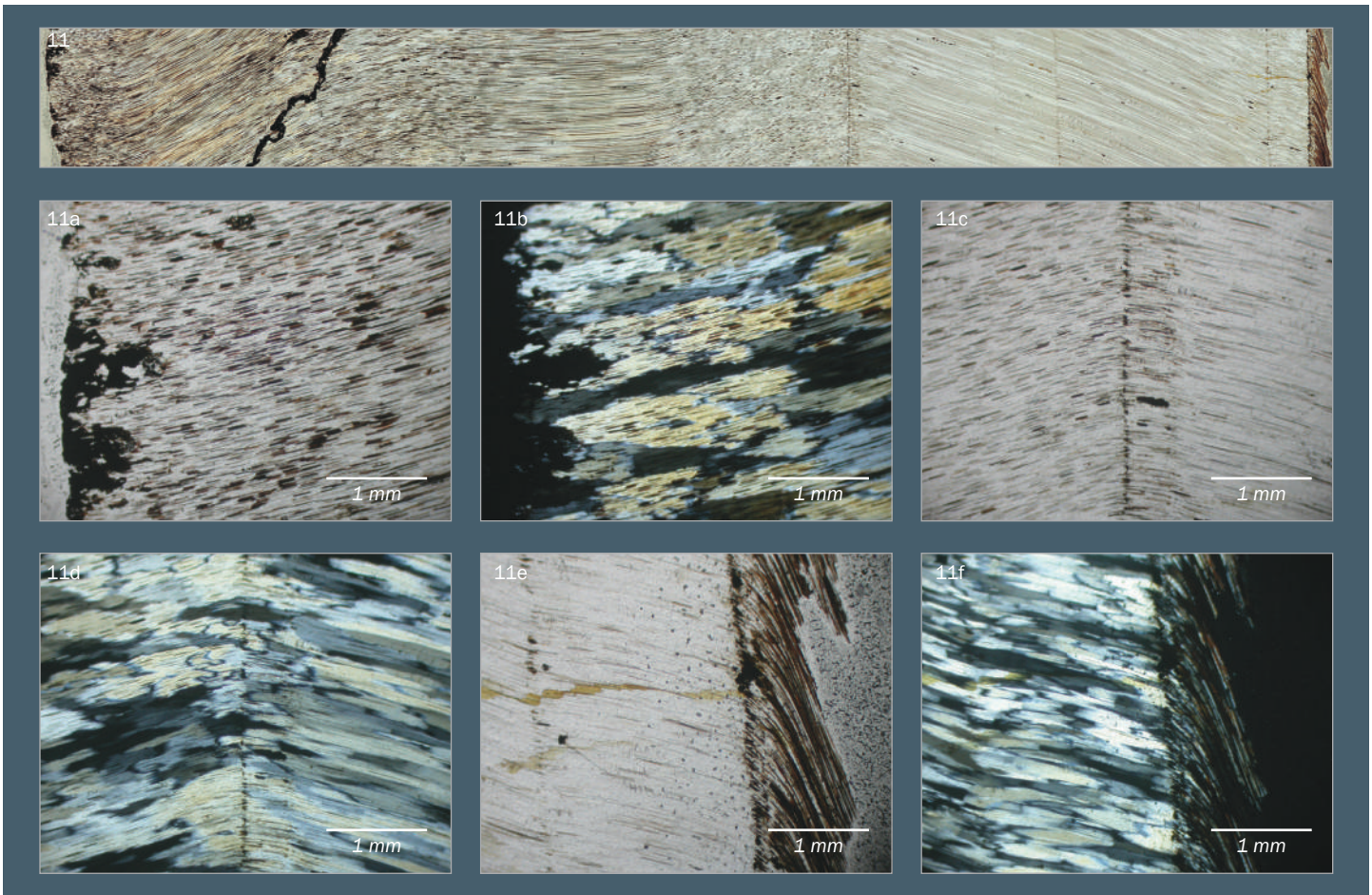
Tiger's-eye revisited (cont.)

boundaries. Also, when viewed in crossed polarized light, it could be seen that there was optical continuity between some quartz columns. My section did not contain remnants of crocidolite in the quartz, but showed rather that the two minerals grew together, with the crocidolite fibres as inclusions. Details of the textures at higher magnifications are shown in **6** and **7**. Quartz is well known as a mineral which can host all manner of inclusions — in fact, this is often used to advantage by lapidaries to create unique faceted stones.

In a literature search, the paper most relevant to this investigation proved to be that by Heaney and Fisher[1]. In this, the authors report that their study revealed that the quartz in tiger's-eye typically occurred as columnar crystals, not fibres, and that the reflective cat's-eyes were oriented normal to the fibrous crocidolite inclusions rather than the quartz columns. They concluded that the chatoyancy is generated by the fibrous crocidolite inclusions and not by pseudomorphic replacement of crocidolite by quartz. They further considered that tiger's-eye is a classic example of synchronous mineral growth in a process described as crack-seal vein-filling.

My observations on the cabochon described above (**2, 3** and **4**) are consistent with Heaney and Fisher's conclusions but to properly investigate the relationship of quartz and crocidolite, a transverse section of a piece of the rough rock was needed. A typical slab of tiger's-eye bounded above and below by iron oxide layers is shown in **7** and a section was prepared from this; the details are shown in **8**–**11**. The quartz columns are clearly intergrown and interlocked and crocidolite is present as minute needles. In the images taken in cross-polarized light the extents of the optical continuity of the quartz columns can be inferred from the extents of the bluish grey or yellow areas.

The complexity of structure of the tiger's-eye vein is shown in the panoramic image of **11** and in the detailed pictures. The bright streaks visible in the hand specimen are closely related to changes in direction and concentration of the included crocidolite. This can be seen by comparing **10** and **11** where each band in **10** can be related to a quartz-crocidolite structural change. The crocidolite needles are most clearly visible in the plane-polarized images **11d** and **11e** where they are of consistent appearance and show no evidence of any resorption.



11: Thin section across the complete vein of tiger's-eye viewed in PPL. It shows traces of iron oxide host walls, inclusion growth band, thin suture trace of crocidolite, and general texture of included crocidolite. 11a-f: details of host walls and centre suture, in PPL and XP.

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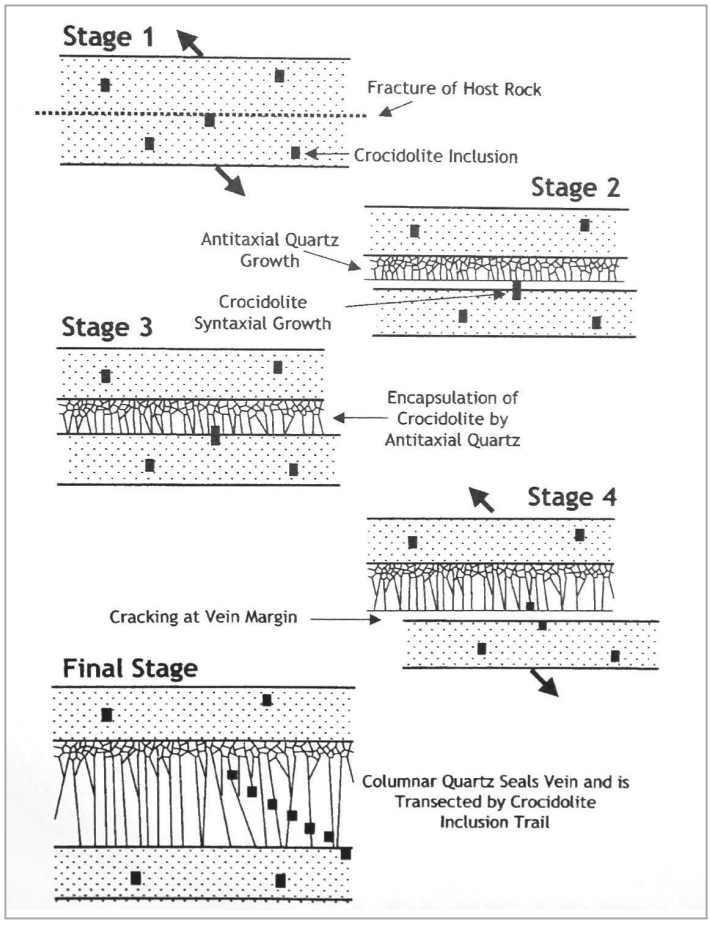
Tiger's-eye revisited (cont.)

Discussion

How might the structure shown in **11** have formed? Heaney and Fisher[1] concluded that such a structure was consistent with formation by a discontinuous crack-seal mechanism which had first been proposed by Ramsay[4] to account for anisotropic growth textures, inclusion bands and stepped grain boundaries. Some detailed remarks on my tiger's-eye sections have kindly been provided by Heaney and Fisher and appear in the accompanying boxes. Some tiger's-eye bands or veins can be very complex and one example of a possible process is shown in **12** (Heaney and Fisher[1], modified from Cox[6]). Those wishing to pursue the mechanisms involved in how veins might form should visit the VIEPS/Mainz Microstructure Course[7]; and more information about tiger's-eye can be found at The Quartz Page[5].

Although Heaney and Fisher's work on tiger's-eye[1] was published about ten years ago, it has yet to be incorporated in some gemmology teaching materials. I believe that the revised ideas on the origin of the chatoyancy in tiger's-eye are now sufficiently established for the appropriate changes to be made to teaching notes and for students to be provided with this confirmed interpretation.



12: Diagrammatic representation of texture development during crack-seal process of vein filling. After Heaney and Fisher (2002), modified from Cox (1987).

Comments on the tiger's-eye section from P.J. Heaney

Peter Heaney, Professor of Mineral Sciences, Department of Geosciences and Materials Research Institute, Penn State University, Philadelphia, USA, wrote: "What is interesting from your panorama is that the direction of quartz growth changes across the specimen. For example, in **4a,b** quartz grows from right to left in the left side of the image, and from left to right in the right side of the image. The opaque band separates the growth regimes, and I interpret this band as the original vein wall of the haematite. **5a,b** is a wall of the original host rock that has almost disappeared. Remember that the host rock was a banded iron formation with bands of solid haematite. When you see the brown crystals with spidery extensions, you know that the crocidolite has completely dissolved and transformed to haematite/goethite. With transmission electron microscopy, we have seen haematite coating the crocidolite fibres. The haematite/goethite imparts the brown colouration to the tiger's-eye."

Acknowledgements

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About the author

Doug Morgan FICME FGA is a retired research metallurgist and has pursued a lifelong scientific interest in microscopy, mineralogy and gemmology. Doug is a retired tutor in gemmology, an accomplished gem faceter and practical engineer.

Gems and Minerals

Treated ruby

Dr Karl Schmetzer[1], Dr Michael S. Krzemnicki[2] and Alan Hodgkinson FGA DGA[3] investigate a new treatment of ruby.

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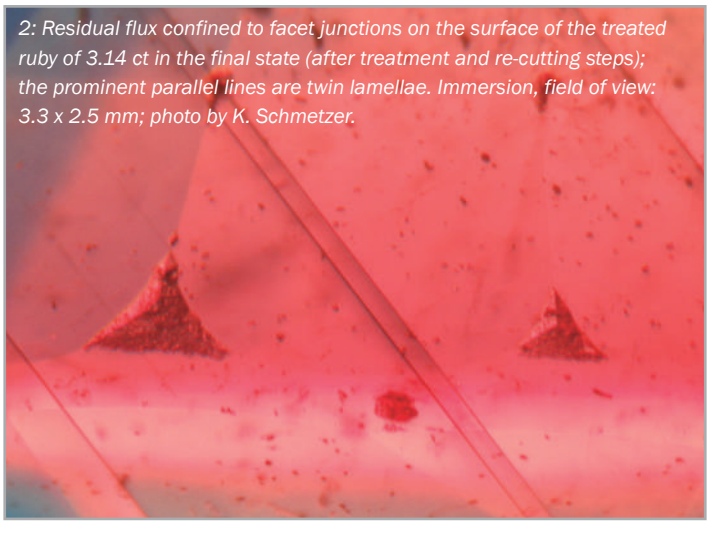
Introduction

At the Tucson gem and mineral show in 2011, Ted Themelis (of Bangkok, Thailand) presented a new treatment process for ruby to a group of staff members of different gemmological laboratories. This is a heating process developed by him especially to lighten darker rubies, and comprises multistep heating in which the samples are annealed in lithium-based fluxes, without the addition of beryllium, at temperatures between 1300 and 1350°C in an oxygen-bearing atmosphere. The use of lithium-bearing fluxes had already been published by Themelis (2010) prior to this presentation.

Subsequent to the 2011 Tucson show, Mr Themelis presented this new development in several talks in Australia, the United Kingdom, Italy and Korea. He also informed the authors that all samples treated using this technology have been released by him as treated to the trade, but he has been informed by some of his clients that at least some of these rubies, mostly samples above 5 ct in weight, have attracted certificates stating that they were natural ruby without any 'indication of heat' by some gemmological laboratories. We also understand that a heat treatment process using lithium-bearing fluxes is also applied to ruby by other treaters in Thailand.

A faceted dark purplish ruby owned by one of the authors (AH) was submitted to T. Themelis who treated it with his new process in several stages, and the stone was then re-cut. We feel that an examination and description of that particular stone and its gemmological properties may be helpful for the industry to properly describe and distinguish between treated and untreated samples.



2: Residual flux confined to facet junctions on the surface of the treated ruby of 3.14 ct in the final state (after treatment and re-cutting steps); the prominent parallel lines are twin lamellae. Immersion, field of view: 3.3 x 2.5 mm; photo by K. Schmetzer.

1: Original dark purplish violet ruby of 3.80 ct as purchased by one author some years ago (a); the sample in an intermediate state of treatment still covered with residual flux (b); the ruby sample in its final state after re-cutting, viewed in daylight (c) and incandescent light (d). The ruby now weighs 3.14 ct and measures 8.9 x 8.0 mm; photos by A. Hodgkinson (a,b) and K. Schmetzer (c,d).

The ruby

The ruby specimen was purchased by one of the authors (AH) as an untreated cut stone in the 1990s (**1a**). The geographical origin of the sample was not communicated at that time. Originally, the stone weighed 3.80 ct (**1a**) but, after several treatment and re-cutting steps between 2009 and 2011 (**1c**,**d**), it now weighs 3.14 ct. It is clear that the colour after treatment is lighter and less purple. The ruby is shown in an intermediate step, after treatment and before re-cutting (**1b**), where it is still covered with some residual flux. In the final state, the ruby shows typical pleochroism and the normal colour variation of ruby between daylight and incandescent light (**1c**,**d**).

Examination of residual flux

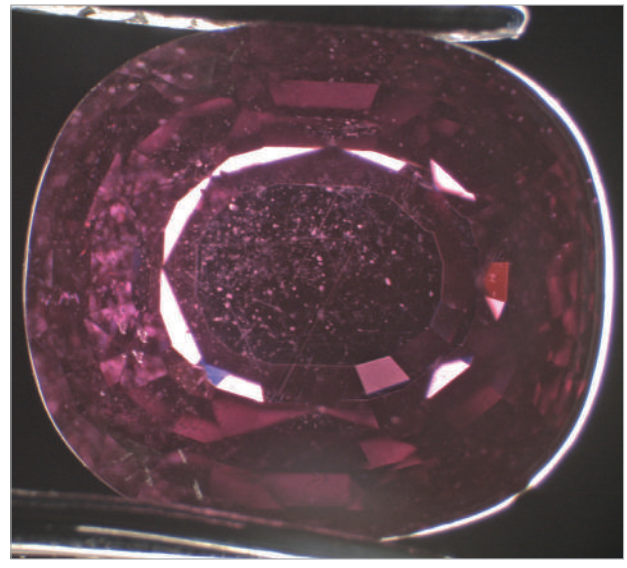
After recutting, parts of the surface of the ruby still retained some triangular spots at facet junctions which have lower reflectivity

than the ruby (**2**); these obviously did not represent ruby material. Chemical examination by Laser Ablation Inductively Coupled Plasma Mass Spectrometry (LA-ICP-MS) showed the material to be composed of boron (B), lithium (Li), sodium (Na), aluminium (Al) and silicon (Si) as major components. This result confirms the details given by Mr Themelis about the fluxes used in his treatment process. The flux remained only on original facets which had not been completely re-cut and we did not see any evidence of flux penetrating into or actively healing open fissures in the stone.

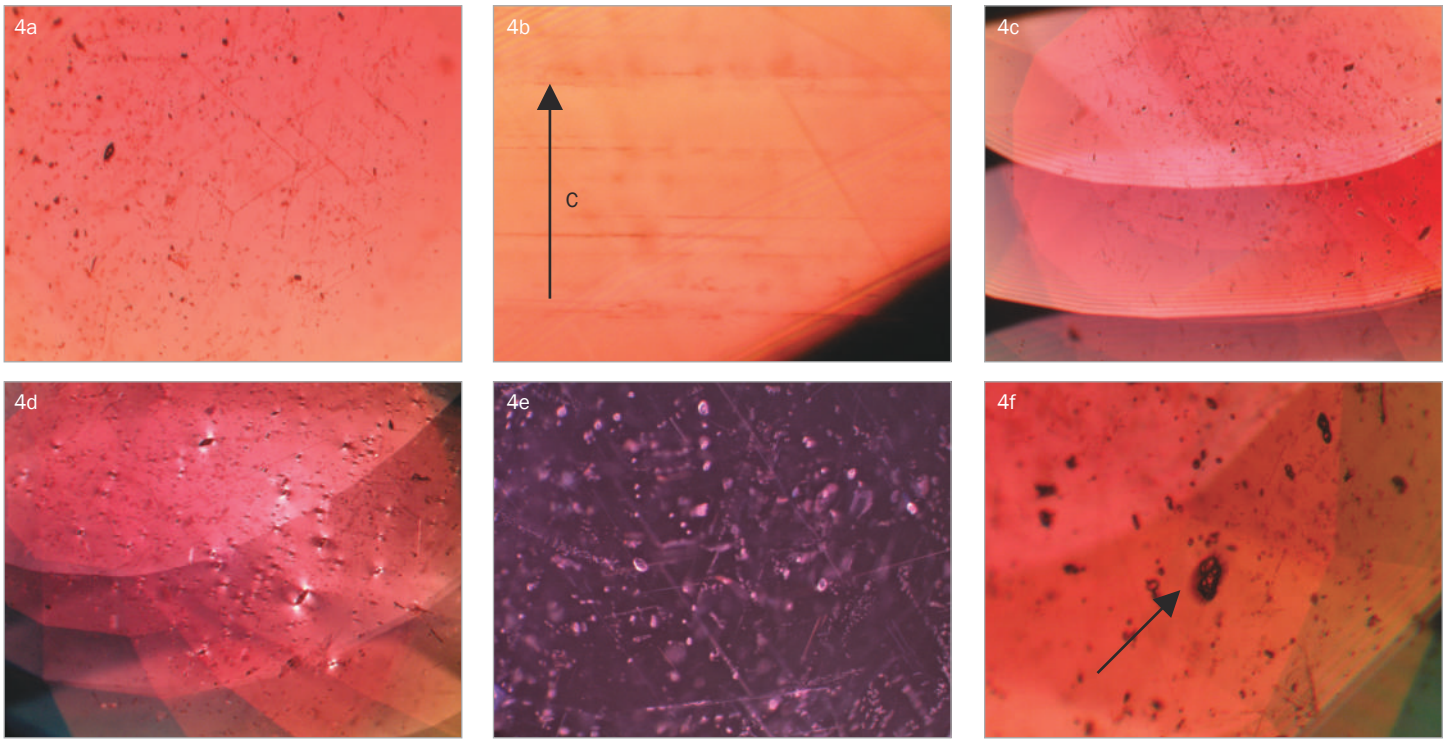
Microscopic features

The ruby shows some microscopic inclusion features which seem to be unaltered by the heat treatment (**3**). In particular, a network of oriented rutile needles, particles or dust is present (**4a**), and the needles are concentrated on planes or layers perpendicular to the optic axis of the ruby (**4b**). Furthermore, the sample showed several twin lamellae (**4c**) as well as numerous tiny birefringent mineral inclusions, mostly zircon crystals (**4d**,**e**), which in places form clusters of inclusions. No internal colour banding or growth pattern was detected. This absence of a specific growth structure is related only to very few natural sources.

Other inclusion features, however, might indicate heat treatment (**4f**): some of the larger zircon crystals were surrounded by disc-shaped tension cracks. This feature, however, is not definitive,



3: General overview of the inclusion pattern in the heat-treated ruby of 3.14 ct, size 8.9 x 8.0 mm. Darkfield; photo by M.S. Krzemnicki.



4: Microscopic properties of the treated ruby of 3.14 ct; network of oriented rutile needles and particles in a direction of view parallel (a) and perpendicular (b) to the c-axis (indicated by an arrow); oriented rutile needles and twin lamellae (c); twin lamellae, rutile needles and birefringent mineral inclusions, most probably all tiny zircon crystals (d,e); zircon crystal with tension cracks (f). Immersion, plane polarized light (a,b) and crossed polarizers (c,d,f); darkfield (e); field of view: 4.6 x 3.5 mm (a); 2.1 x 1.6 mm (b); 5.9 x 4.4 mm (c); 6.0 x 4.5 mm (d), 4.2 x 3.1 mm (e); 3.6 x 2.7 mm (f); photos (a-d, f) by K. Schmetzer, photo (e) by M. S. Krzemnicki.

Gems and Minerals

Treated ruby (cont.)

5: Our heat-treated ruby of 3.14 ct (8.9 x 8.0 mm) is probably from Vatomandry, Madagascar, which is the source of the untreated sample of 0.62 ct (5.8 x 4.6 mm) on the right; photo by M. S. Krzemnicki.

as similar tension cracks can be present in unheated rubies from several localities, but more detailed microscopic and spectroscopic data on the zircon inclusions do lead to a clear result (see below).

Comparing these microscopic features and the chemical composition (determined using Energy Dispersive X-Ray Fluorescence (EDXRF)) with samples of known origin, the closest match is found with rubies from the Vatomandry deposit in Madagascar (see Schwarz and Schmetzer, 2001).

Detailed examination of zircon inclusions

Zircon crystals are common inclusions in rubies from several localities worldwide and may be used as indicators for high temperature treatment. As inclusions in corundum, pure zircons are stable up to about 1685 °C and decompose to ZrO_2 and SiO_2 above this temperature. Any presence of melt indicates that the stone has been heated above 1750 °C (Schmetzer and Schwarz, 2005).

At lower temperatures, the crystalline structure of zircon crystals (present as inclusions in rubies and sapphires) also undergoes some alteration. Many natural zircons are in a metamict or partial metamict state due to damage to their structure by radioactive decay (caused by traces of uranium or thorium). Upon low temperature heat treatment, these zircons undergo some healing process and regain their crystal structure. These changes are reflected or indicated in the Raman spectra of the zircon inclusions. Two effects can be observed: compared to untreated zircon inclusions in rubies the spectra of heat-treated zircons show a shift of the peak position and a reduced peak diameter, described as full width at half maximum (FWHM) (Zhang *et al*., 2000; Nasdala *et al.*, 2001; Krzemnicki, 2010 a,b).

This new method was applied to our stone. For comparison, we selected (from about 10 samples available) an untreated ruby from Vatomandry which has been kept in a private collection since the discovery of the deposit (**5**). The sample showed the typical inclusion pattern of rubies from Vatomandry, especially numerous clusters of tiny zircon crystals (**6a**). At higher magnification, several slightly elongated euhedral zircon individuals are visible (**6b**,**c**). The zircon crystals in the treated ruby, in contrast, show a somewhat inhomogeneous, patchy white appearance (**7**).

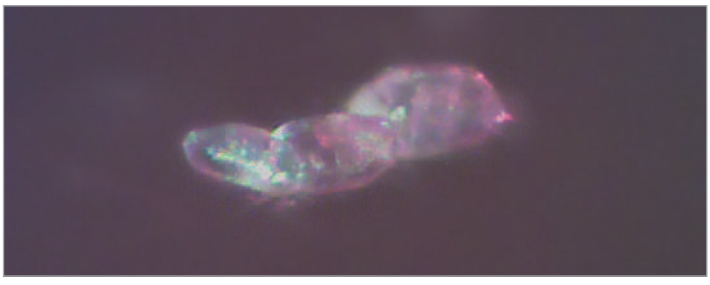
The Raman spectra obtained from several zircon inclusions in both samples are quite similar (**8a**), but clear shifts of peak positions near 980 and 1015 cm^{-1} and differences in their peak shape (FWHM) are clearly visible (**8b**). These results indicate that the zircon inclusions in the untreated sample were in a partly, but not in a full, metamict state.

Discussion

The authors want to underline that it is beyond the scope of this contribution to discuss the reaction mechanism of the colour alteration in detail. From the examination of one single sample with analytical data from the surface only and without chemical data from a traverse from the rim to the centre of the treated stone, we are unable to decide at this point if there is any boron or lithium diffusion into the corundum structure at the annealing temperatures applied to the sample. Furthermore it is unknown to us if this would have any effect on the colour of the ruby.

6: Inclusion pattern in the untreated ruby from Vatomandry, Madagascar (see 5), showing rutile needles and clusters of tiny zircon crystals (a); at higher magnification, euhedral zircon crystals with elongated prismatic habit are visible (b,c). Transmitted light, field of view: 3.5 x 2.6 mm (a), 0.30 x 0.23 mm (b), 0.30 x 0.23 mm (c); photos by M. S. Krzemnicki.

Treated ruby (cont.)



7: Cluster of zircon crystals in the heat-treated ruby (see 1 and 5); the tiny zircons show a diffuse white encrusting surface, which is a characteristic result of heating zircon inclusions, even at relatively low temperatures. Transmitted light, field of view: 0.30 x 0.23 mm; photo by M. S. Krzemnicki.

However, it has been known for decades that the intensity of the Fe^{2+}-Ti^{4+} charge-transfer absorption band of blue sapphire or purplish ruby is effectively reduced by low temperature heat treatment under oxidising conditions (see, e.g., Schmetzer and Bank, 1980; Nassau, 1984; Krzemnicki, 2010 a,b). The colour of dark blue sapphires can be somewhat lightened, and the colour of purplish rubies can be shifted towards a more pure ruby red. Based on present data, we suppose that this mechanism is mainly involved in the colour alteration of our ruby, but we cannot exclude that other additional mechanisms might also be involved.

To investigate a possible content of lithium and/or boron in the corundum structure which might indicate diffusion processes needs a more detailed study of chemical zoning in samples in the treated and untreated states. Hopefully, some other well documented samples will be available in the near future to be then chemically examined to prove a possible chemical zoning with traverses from the rim to the core of the sample and to shed more light on the treatment process and the mechanism of colour alteration. Only after this can we be sure of whether we are dealing with a new treatment involving diffusion of lithium or just with a classical flux-assisted heating, with a variation of the flux composition applied for the treatment process.

It is clear that the rutile needles have not been affected by this treatment process at relatively low temperatures. If the sample had been cut with complete removal of the residual flux, it would have lost some more weight, but this indication of treatment in a lithium-bearing flux could have been completely removed. The microscopic examination of zircon inclusions at high magnification, however, gave a first indication for possible heat treatment of the ruby, and this was then confirmed by the Raman spectra obtained from the slightly altered zircon crystals.

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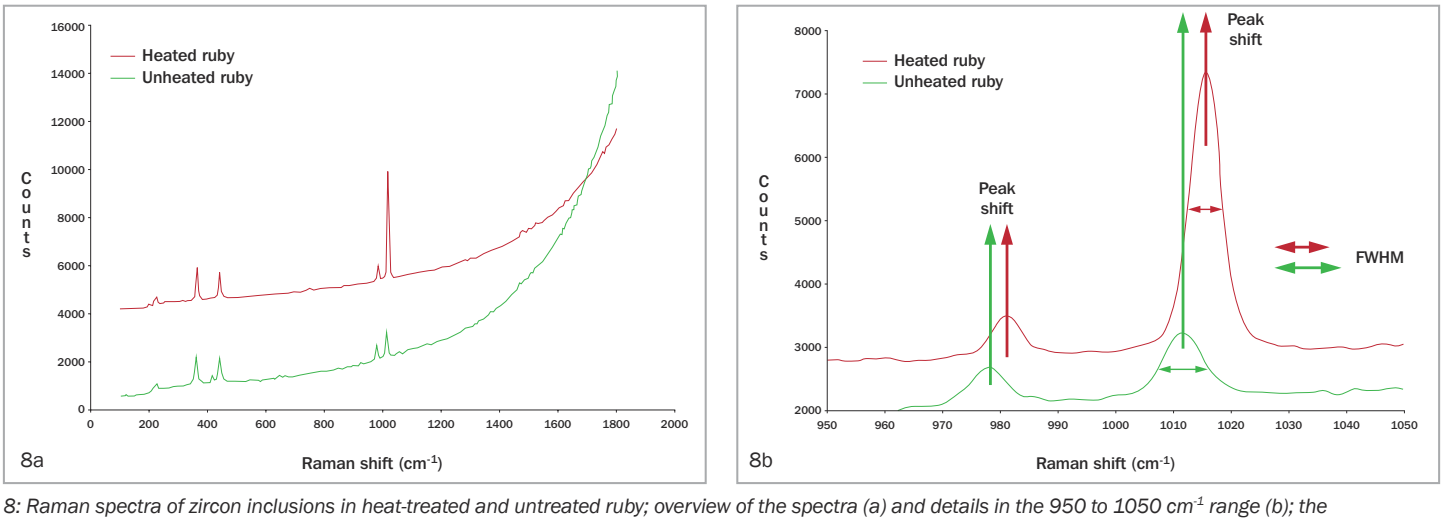


8: Raman spectra of zircon inclusions in heat-treated and untreated ruby; overview of the spectra (a) and details in the 950 to 1050 cm^{-1} range (b); the spectrum of the heat-treated ruby shows more intense and somewhat sharper Raman lines (i.e. lines with smaller FWHM); a shift of the peak positions between the treated and untreated sample is clearly visible; similar shifts were also observed for Raman lines in the 350 to 450 cm^{-1} range.

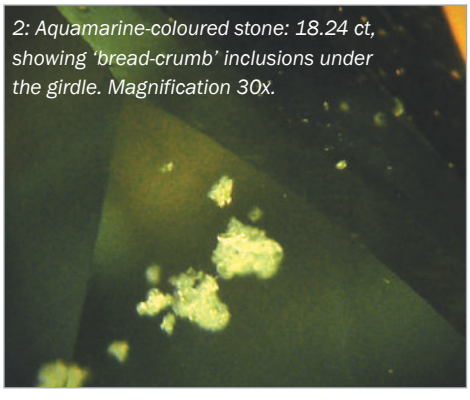
Hands-on Gemmology

Some days are stone

Grenville Millington FGA discusses some mystery stones received for testing.

1: Aquamarine-coloured stones: Cushion-cut stones are 29.21 ct and 27.61 ct, pear-shape stone is 18.24 ct.

As usual, we have no control over what gems we receive for testing, or whether they prove to be interesting or not, so when I received a parcel through the post from a retail jeweller I had no idea what to expect. The telephone call preceding delivery had simply indicated "faceted stones for testing, brought in by a customer".



2: Aquamarine-coloured stone: 18.24 ct, showing 'bread-crumb' inclusions under the girdle. Magnification 30x.

The parcel contained three rather large 'aquamarines', a trilliant-cut attractive bluish-green stone, unlabelled, a pleasing blue stone labelled 'apatite', and a rather large bright red stone (which was labelled, but I'll leave it until later to disclose the wording).

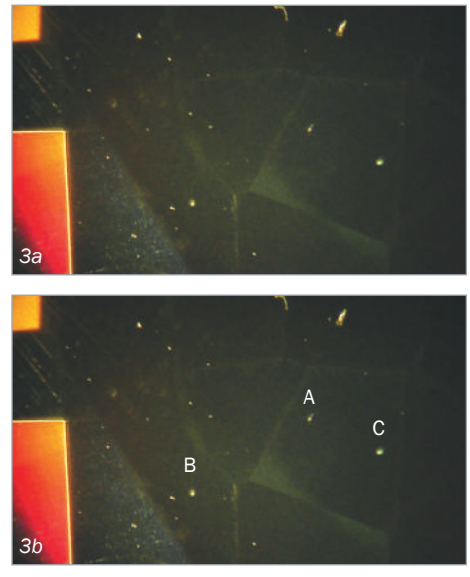
The three 'aquamarines' were examined first, perhaps because I was expecting them all to be the same type of stone. They were all of similar colour, fairly large in size and had the same quality of cutting (**1**).

The first test was to measure their refractive indices (RIs). All three gave the same reading, 1.545–1.554, indicating quartz. A quick, general inspection with the loupe of one of the stones showed small, isolated dot-like inclusions, that could possibly be described as 'bread-crumb', which would indicate synthetic quartz.

The microscope would be needed for a closer look at all three. The most promising stone (in terms of number and size of inclusions) was the pear-shape stone of 18.24 ct. Although superficially appearing to be clean, a group of inclusions was present close to and under the girdle (**2**).

The cushion-cut stone of 27.61 ct also had some inclusions, but they were more difficult to spot and could very easily be overlooked. Look at photograph **3a**, taken through the microscope. The picture shows the edge of the table with outlines of the back facets just visible. However careful you may be with cleaning the stone beforehand, once under the microscope, especially with the heat of the lamps, small specks of dust etc., can find their way onto the surface of the stone.

Rotation of the stone and changing the plane of focus enables one to locate the



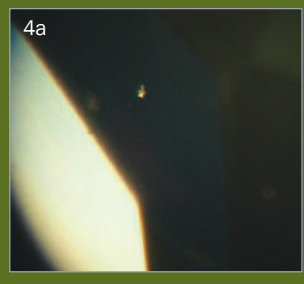
3: (a) Aquamarine-coloured synthetic quartz, 27.61 ct, and (b) labelled to show inclusions (A, B and C). The rest are dust specks. Magnification 7x.

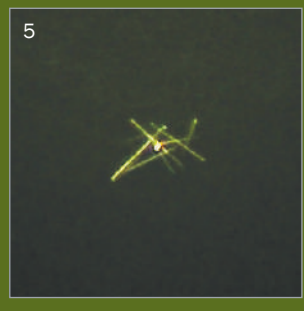
Hands-on Gemmology

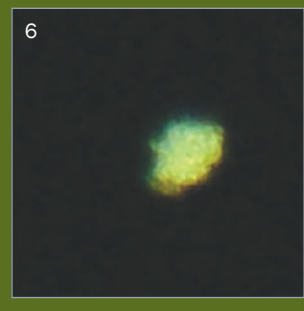
4a, 4b: Aquamarine-coloured synthetic quartz 27.61 ct. Showing spot B in 3b enlarged. Magnification 15x and 60x .

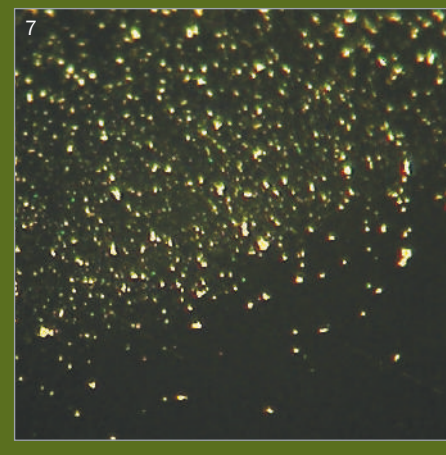
5: Aquamarine-coloured synthetic quartz 27.61 ct. Showing spot B in 3b as seen through a pavilion facet. Magnification 75x.

6: Aquamarine-coloured synthetic quartz 27.61 ct. Showing spot A in 3b taken at microscope maximum magnification of 80x and given further enlargement on the computer screen. Estimated magnification 150x.









7: Aquamarine-coloured synthetic quartz 29.21 ct. Quite a dense cloud of tiny 'breadcrumb' inclusions gives way to a near-clean stone at the edge of the table facet in the lower right. Magnification 70x.

true inclusions and these are labelled in photo **3b** with the remaining specks being dust. A closer look using the zoom control on the microscope on spot B gave the image shown in **4a** and an even closer one from a slightly different angle gave that in photo **4b**.

The result (**4b)** shows the effects of image doubling and a clearer view was found through a pavilion facet (**5**). This revealed an acicular or needle-shaped habit of the inclusion which could hardly be described as a 'breadcrumb'.

Spot A in **3b** still remained a 'spot' under 80× magnification, the limit of the microscope. However, when the photo was transferred and displayed upon the computer screen it could be enlarged even further. The result is that in photo **6**. Without this increase in magnification I would have had to dismiss this inclusion as indeterminable, so if this was all that was showing in this stone I would not have been able to identify it as synthetic quartz.

The other cushion-cut stone of 29.61 ct showed a full cloud of small, similar inclusions that gave a slight mistiness to the stone's appearance through the table, although the margin of this cloud could be clearly seen near the edge of the table facet (**7**).

So that too was identified as synthetic quartz. All three showed pale green through the Chelsea Colour Filter and had no distinctive absorption peaks in their visible spectra.

The trilliant-cut stone weighed 12.45 ct and was much greener than the quartzes described above (**8**). Although resembling some tourmaline, it too gave the refractive index readings of quartz.

As hinted at above, without something useful inside the quartz to indicate one way or another whether it is natural or synthetic, the ordinary gemmologist is left rather frustrated, but fortunately this stone had a single 'spot' inclusion, that at around 70–80× magnification proved to have a breadcrumb appearance.

All four stones discussed so far gave a distinct bull's-eye interference figure

8: Green synthetic quartz, 12.45 ct.

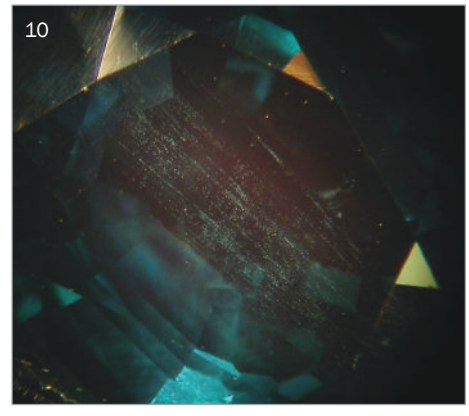
Hands-on Gemmology

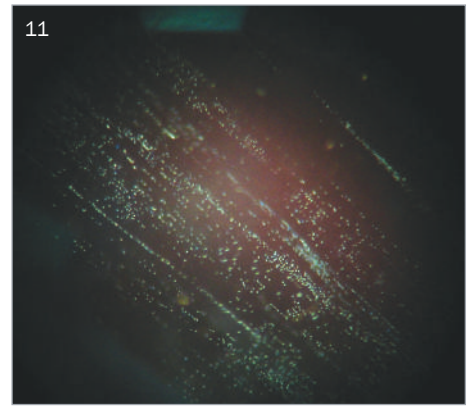
Some days are stone (cont.)

9: Greenish blue stone 4.06 ct, labelled 'apatite' (a), and showing inclusions visible with the eye (b).

when appropriately orientated under the polariscope (i.e. the dark arms of the interference cross did not extend to the middle circle/disc).

And now for the other blue stone, which was a lot smaller, only 4.06 ct, and this too had a tone that lay between blue and green. It was labelled 'apatite' (**9a**). When it was turned to eliminate reflections from the table facet, inclusions could be seen with the naked eye (**9b**). Examining them with a loupe, their disposition suggested similarities with the dotted 'silk', seen in heat-treated sapphires (**10**). The more or less straight zones/bands in **10** were, on extra magnification, resolved into rows of gas bubbles (**11**).Elsewhere in the stone, a larger bubble is located at the end of a long tail (**12**).





10: Greenish-blue stone 4.06 ct, with inclusions resembling apatite showing 'dotted-silk'. Magnification 10x.
11: Greenish-blue stone 4.06 ct. Higher magnification enables identification of the inclusions as lines of gas bubbles. Magnification 40x.

About the author

For many years Grenville Millington ran his own gem and jewellery business and taught gemmology and retail jewellery at the Birmingham School of Jewellery.

Hands-on Gemmology

Some days are stone (cont.)

An OPL diffraction grating spectroscope revealed a fuzzy spectrum, with two thicker and one thinner absorption bands ('thick, thick, thin', with red on the left). Under the Chelsea Colour Filter the stone was red/pink colour. RI measurements gave values of 1.761–1.770, so the stone was not apatite but sapphire. The inclusions, spectrum and behaviour under the Chelsea Colour Filter all indicate synthetic sapphire coloured by cobalt.

The last stone in the parcel was brilliant red. It looked like a synthetic ruby, but it was bigger than any synthetic ruby that I have seen. It was a whopping 34.50 ct — here pictured next to a 6.5 mm round cubic zirconia (**13**). This red stone had RIs consistent with ruby and a very intense ruby spectrum; the interior of the stone is shown in photo **14**.

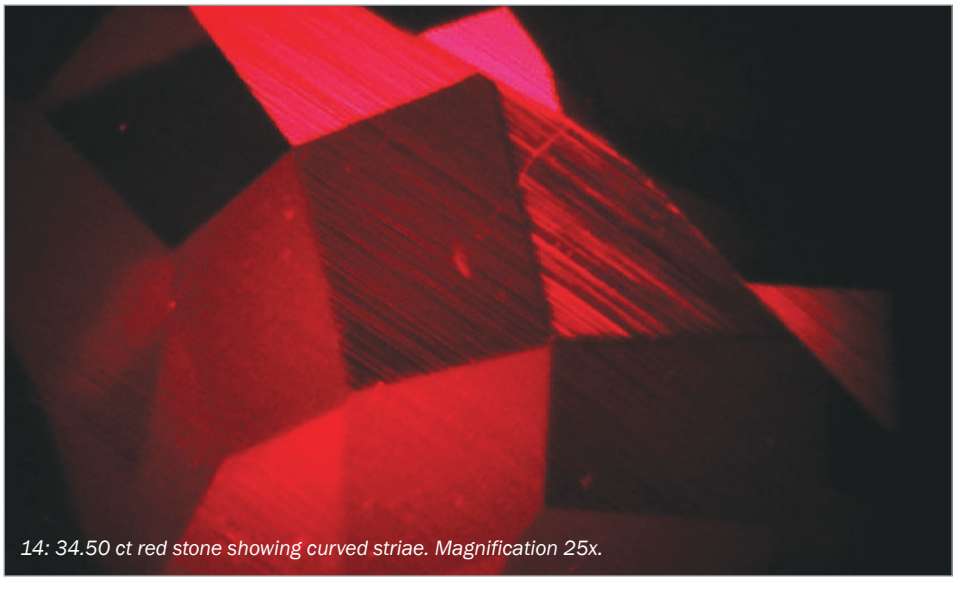
13: Bright red stone of 34.50 ct next to a 6.5 mm cubic zirconia.

12: Greenish-blue stone 4.06 ct, labelled 'apatite'. Possible internal bubble with comet's tail. Magnification 70x.

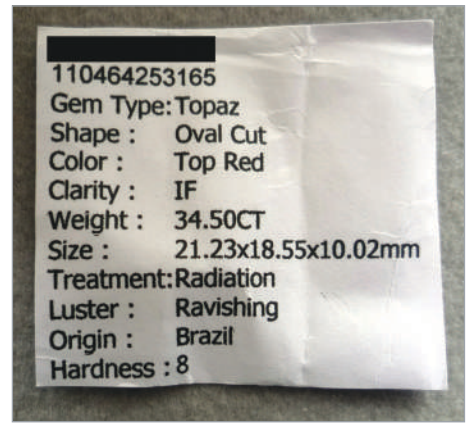
So, why have I included a straightforward synthetic ruby in this report? The reason is the highly misleading label that accompanied it in its polythene bag (**15**). Did you all manage to guess that the synthetic ruby was supposed to be a Brazilian ravishing, irradiated topaz, with a hardness of 8? The source of the parcel is unknown to me, but the blue 'apatite' had 'eBay' written in the corner of its packet; no such information accompanied the others, but a similar source is probable.

We may decry the descriptions foisted upon innocent purchasers by some internet sales but they can be entertaining (provided you are a gemmologist)!

At the end of the examinations one of John Denver's songs came to mind: "Some days are diamond, some days are stone!" Here, "some days are synthetic" seems more appropriate! Yet, once we take value out of the equation, all gems are equal to the gemmologist, and even lowly examples can prove to be of interest for a variety of reasons.



14: 34.50 ct red stone showing curved striae. Magnification 25x.



15: Label accompanying the 34.50 ct synthetic ruby.

Branch News

Branching out

In preparation for the 60th anniversary celebrations of the Midlands Branch, James Riley discusses the inception and history of the branch.

Sixty years ago the Council of the Gemmological Association of Great Britain came to the conclusion that it needed to be represented at a local level, as well as at a national level. A quick read of contemporaneous editions of *The Journal of Gemmology* show that there were a relatively large number of talks being given by members around the country, and it was felt that there was a need to make these more accessible. On 19 May 1952 it was declared that local branches could be established, followed by approval of Branch rules on 26 August, which remain virtually unchanged to this day. The only thing that has changed is that, at the time, branches were not to hold on to any monies that were raised in the name of the Association, and in return they received a set annual grant to offset expenses. The result of this was a race as to who would be the first branch, with a Midlands meeting held on 30 September 1952, a West of Scotland meeting on 9 October and an East of Scotland meeting on 22 October. Thus were born Gem-A branches.

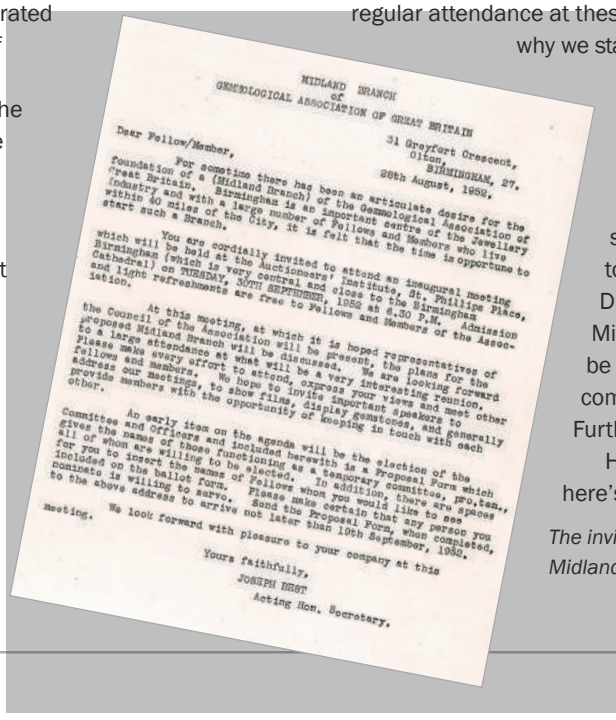
This autumn we are celebrating the 60th birthday of the Midlands branch — the brain child of Norman Harper, a council member, and who went on to become a stalwart of the branch and the Association. It was no coincidence that the first meeting was held in Birmingham. The flags were out as a large number of Fellows and members met at the Auctioneers Institute, Birmingham, and which the President, Chairman and Secretary of the Association attended. Having just celebrated his 80th birthday it shows the dedication of the President Dr G.F. Herbert Smith that he attended, also travelling to Scotland to be the West of Scotland's first speaker. Among the members of the first committee was Oscar Fahy, a well-known Hockley gem dealer, who is also notable for being in the first group to pass the Diploma in 1913 (the first and only candidate in the Midlands), thus providing a direct link back to the roots of the Association.

The first official Midlands event was held at the Imperial Hotel in Birmingham on 13 February 1953 and featured a talk by Basil Anderson entitled 'Gem Testing without Instruments' (*The Journal of Gemmology, 1953,* **4**(2)). This talk is still as relevant today as it was then and makes for interesting reading. The tenet of the talk was that even after a two year course an individual still had not 'done it', i.e. had not 'done gemmology' and that experience is key to gem testing, and questioned what would they do when faced with an unknown stone without their instruments. Does this sound familiar to those of you working at the sharp end?

Mrs Sarah Riley recalls the early years of the branch – her father W.A. Peplow FGA having attended the first meeting: "I joined the family retail firm on 1 January 1954. The following autumn, encouraged by my father, I started attending the preliminary classes in Vittoria Street. It wasn't until March 1955 that I went to a Midlands Branch meeting with my father – I suspect that the class were encouraged to attend. Whether this means I took him or he took me is a moot point. The meetings were held at the Imperial Hotel in Temple Street and there were at least 30 or 40 people present. It was obviously well supported by both the manufacturing and retail trade. The chairman was Trevor Solomon and the Secretary Doug King of Nathans. Bert Shipton and Bernard Lowe were regular attenders, as were Norman and Stanley Harper and Arthur Conway, who all worked for W.A. Perry. Arthur Conway was the instructor for the preliminary course and Norman Harper for the second year – what a joy that was. One of the outings was to Chatsworth House which may have been before it was open to the general public – it was certainly very different to how it is today. Our regular attendance at these meetings was the main reason why we started Norman's new Diamond course in 1962."

It is gratifying to see that the Midlands Branch is still among the most active and well supported of Gem-A's branches. The jewellery school in Birmingham still continues to teach Gem-A courses under the Directorship of our newest trustee, Miranda Wells. The branch will be hosting a celebration weekend commencing on 30 November. Further details available opposite.

Happy Birthday Midlands Branch – here's to the next 60 years!



MIDLAND BRANCH
of
GEMMOLOGICAL ASSOCIATION OF GREAT BRITAIN

31 Greyfort Crescent,
Olton,
BIRMINGHAM, 27.
28th August, 1952.

Dear Fellow/Member,

For sometime there has been an articulate desire for the foundation of a (Midland Branch) of the Gemmological Association of Great Britain. Birmingham is an important centre of the Jewellery industry and with a large number of Fellows and Members who live within 40 miles of the City, it is felt that the time is opportune to start such a Branch.

You are cordially invited to attend an inaugural meeting which will be held at the Auctioneers' Institute, St. Phillips Place, Birmingham (which is very central and close to the Birmingham Cathedral) on TUESDAY, 30TH SEPTEMBER, 1952 at 6.30 P.M. Admission and light refreshments are free to Fellows and Members of the Association.

At this meeting, at which it is hoped representatives of the Council of the Association will be present, the plans for the proposed Midland Branch will be discussed. We are looking forward to a large attendance at what will be a very interesting reunion. Please make every effort to attend, express your views and meet other Fellows and address our members. We hope to invite important speakers to provide our meetings, to show films, display gemstones, and generally other members with the opportunity of keeping in touch with each

An early item on the agenda will be the election of the Committee and Officers and included herewith is a Proposal Form which gives the names of those functioning as a temporary committee, all of whom are willing to be elected. In addition, there are spaces for you to insert the names of Fellows whom you would like to see included on the ballot form. Please make certain that any person you nominate is willing to serve. Send the Proposal Form, when completed, to the above address to arrive not later than 10th September, 1952.

We look forward with pleasure to your company at this meeting.

Yours faithfully,

JOSEPH HIRST
Acting Hon. Secretary.

The invitation to the inaugural meeting of the Midlands Branch.

Gem-A Midlands Branch

Diamond Anniversary Celebrations

60 years of Midlands Branch

The Midlands Branch will be hosting a weekend of events to celebrate 60 years since its inauguration.

Friday 30 November

DIAMOND LECTURE *with* **John Benjamin FGA DGA**

To be held at Fellows & Sons Auctioneers, Hockley, Birmingham

Saturday 1 December

CELEBRATION DINNER

To be held at Menzies Strathallan Hotel, Edgbaston, Birmingham

Sunday 2 December

DIAMOND ANNIVERSARY CONFERENCE

With

David Callaghan FGA, Professor Alan Collins BSc PhD, Davina Dryland BSc, Alan Hodgkinson FGA DGA, Evelyne Stern FGA DGA and Stephen Whittaker

To be held at Menzies Strathallan Hotel, Edgbaston, Birmingham

For more information or to book for any event please contact Paul Phillips on 02476 758940 or at phillipsp10@sky.com

Gem-A Calendar

November

3

GEM-A CONFERENCE 2012: COLOUR ASSESSMENT OF GEMSTONES
A half-day seminar with Richard Drucker GG
Gem-A Headquarters, London
Richard will discuss the various colour grading systems that are available and how they apply to real world colour grading. The afternoon session for this event is now fully booked.

4

GEM-A CONFERENCE 2012
Hotel Russell, Bloomsbury, London
This year's Conference promises to be better

than ever. With a range of exciting and exclusive events on the days surrounding the Conference, be sure to book early to guarantee your place. See pages 2–3 for further information.

5

GEM-A CONFERENCE 2012: IS IT REAL? IDENTIFYING AMBER
A half-day seminar with Maggie Campbell Pedersen FGA
Gem-A Headquarters, London
This seminar is now fully booked.

GEM-A CONFERENCE 2012: ALL THINGS BRIGHT AND BEAUTIFUL: A HISTORY OF GEMS AND GEM SETTING
A half-day seminar with Dr Jack Ogden FGA
Goldsmiths' Hall, London
Jack will look at the history of gem use over the last 5000 years, tracing the developments of cutting and setting techniques, as well as the history of the gem trade.

GEM-A CONFERENCE 2012: GEM-A GRADUATION CEREMONY AND PRESENTATION OF AWARDS
The Gem-A Graduation Ceremony and Presentation of Awards will be held at the prestigious Goldsmiths' Hall, London. Graduates and their guests will be invited to attend. Gaetano Cavalire, President of CIBJO, World Jewellery Federation, will present the awards and give the address. For more information contact events@gem-a.com.

6

GEM-A CONFERENCE 2012: NATURAL HISTORY MUSEUM TOUR
Natural History Museum, London
Alan Hart FGA, Collections Leader at the Natural History Museum, will take delegates on a tour of the Mineral Gallery.

GEM-A CONFERENCE 2012: PRIVATE VIEWING OF THE CROWN JEWELS
Tower of London, London
This event is now fully booked.

GEM-A CONFERENCE 2012: GEM DEALING: CHALLENGE YOURSELF
Gem-A Headquarters, London
This specialist evening will test your capabilities in gem-dealing, and give you hints and tips to help you excel in the art. With staff from G.F. Williams and Co. Ltd.

23

CAREER SERVICE
Gem-A Headquarters, London
Topic to be announced.

23

INVESTIGATING RUBY, SAPPHIRE AND EMERALD
A one-day gem workshop
Gem-A Headquarters, London

A workshop covering all aspects of these beautiful and important gemstones. The workshop will cover how to identify natural ruby, sapphire and emerald, followed by their treatments (including lead glass filling of ruby), simulants and synthetics.

30

GEM-A MIDLANDS BRANCH DIAMOND ANNIVERSARY CELEBRATIONS: DIAMOND LECTURE WITH JOHN BENJAMIN FGA DGA
Fellows & Sons Auctioneers, Hockley, Birmingham
John's talk will track the history of diamonds, including mining, recovery, fashioning, design and jewellery, as well as dealing with some the more famous diamonds. To book contact Midlands Branch chairman Paul Phillips at phillipsp10@sky.com or on 02476 758940.

Gem-A Calendar

December

1

GEM-A MIDLANDS BRANCH DIAMOND ANNIVERSARY: CELEBRATION DINNER

Menzies Strathallan Hotel, Hagley Road, Birmingham

The celebration will consist of a wine reception followed by a three course dinner. To book contact Midlands Branch chairman Paul Phillips at phillipsp10@sky.com or on 02476 758940.

2

GEM-A MIDLANDS BRANCH DIAMOND ANNIVERSARY: 60TH ANNIVERSARY CONFERENCE

Menzies Strathallan Hotel, Hagley Road, Birmingham

The Conference will feature talks from Gem-A Vice Presidents David Callaghan FGA and Professor Alan Collins, as well as Scottish Gemmological Association President Alan Hodgkinson FGA DGA, Davina Dryland and Evelyne Stern FGA DGA. To book contact Midlands Branch chairman Paul Phillips at phillipsp10@sky.com or on 02476 758940.

3

GEM CENTRAL: IMITATION, SIMULANT OR NATURAL?

Gem-A Headquarters, London

Participants will test their knowledge in a prize competition with Andrew Fellows FGA DGA.

January 2013

21

CAREER SERVICE

Gem-A Headquarters, London

Steven Jordan FGA DGA will be on hand to give guidance on a career in appraisals.

February

5–10

AGTA GEMFAIR TUCSON

Tucson, USA

Join us at Booth 29. Members of the Gem-A team will be available to answer your queries.

To book for the Gem-A Conference or for more information on our workshops and events email **events@gem-a.com** or call **+44 (0)207 404 3334**

Gem-A member and student services

Career service

Open to all graduates, Gem-A students and members (free of charge for Gem-A members and current students), the Gem-A Career Service enourages networking amongst peers through a range of informative talks and discussions.

Gem Central

Gem Central is a regular practical gemmology evening for Gem-A members and students, giving participants the opportunity to investigate and explore a variety of gem materials. Gem Central attendees can make use of our educational resources, work individually or in group projects, and at their chosen level. There are no examinations.

Visit our website at www.gem-a.com for more details.

In the news

James Riley rounds up the latest news and views from Gem-A.

News

Gem-A is pleased to announce a new benefit for its members: we have recently signed an affiliation agreement with The Naval Club to enable our members to have use of its facilities.

The Naval Club or RNVR Officers Association is situated in the heart of Mayfair in London's West End. It has 27 letting bedrooms, dining and bar facilities, as well as meeting and conference rooms. Its prime objective is to serve the traditions of the Royal Navy and anyone with a maritime interest, although in recent years it has become a haven for like-minded professionals who want to escape the hurly burly and who want something slightly more personal than the average London hotel.

Gem-A Members will be able to avail themselves of the accommodation facilities up to four times a year with single rooms starting from £122.50, which includes VAT, breakfast and a modest non-member surcharge. Reduced rates at the weekend mean that this figure comes down to less than £85.00 — ideal for members attending our conference at the beginning of November. The dining room and bar are available at all times and members may book a meeting room if desired. As with any London club there is a dress code of no jeans, t-shirts or trainers, and mobile phones are not to be used in public areas. The club has free Wi-Fi facilities and a computer room enabling you to check emails.

I hope members will enjoy this new opportunity and make full use of it. If anyone has any other ideas that they would like to see applied to Membership please do not hesitate to contact me or a member of the Board of Trustees. For more information on the Naval Club and its facilities please visit www.navalclub.co.uk.

Dining room at The Naval Club.
Photo: courtesy of The Naval Club.

Views

It's been a busy couple of months at Gem-A with the usual autumn round of shows and conferences. At the end of August I visited Carlsbad, California — the headquarters of the GIA. Their site is (as one would expect) an amazing facility and truly eye opening, from the range and diversity of stones submitted to the lab, to the mouth watering library created by Dona Dirlam over the last 30 years. The visit has encouraged me to ensure that the Gem-A library is revamped at the earliest opportunity to make it accessible to members.

International Jewellery London 2012

For me, IJL was more disappointing this year than ever. The lack of really fine jewellery and gemstones is saddening when, albeit small, we have a significant retail, manufacturing and wholesale business in the UK. If you remove the Hong Kong pavilion and the inexpensive silver jewellery there is not a lot left. Hats off to those individuals that do make the effort both to exhibit and to visit — it is still true that we have much to be proud of. Something has to change however or this event will cease to exist. It's an expensive show to exhibit at, costing more per sq ft for Gem-A than Hong Kong or Las Vegas — where would you rather spend your money? Those retailers who are part of buying groups which decide to have their buying meeting a fortnight earlier need to consider if that's what they really want. It was suggested recently that these buying meetings might actually be better than IJL itself. If both suppliers and retailers prefer not to go then undoubtedly that will become the case. However, it is only at major international exhibitions (which IJL is — just about) that one gets the opportunity to see new designs and what different suppliers have to offer. It's the 'chicken and the egg' situation. The more business that is channelled away from a show the poorer quality the show will be as suppliers stay away.

Ethics were on the agenda at IJL where a seminar was held giving an update on the latest issues. Gem-A has committed to this project along with the National Association

Gem-A News and Views

of Goldsmiths (NAG) and the British Jewellers' Association (BJA), and, while it's easy for us all to give ourselves a pat on the back, what we need to know are the issues which you, our members, want tackling. We talk about gold, mining practices and disclosure, but I do detect apathy in our trade to many of these very serious issues. We all have a duty to promote best practices in our trade, but given that there seems to be little appetite for change do we just sit back and wait for the train smash which is inevitably going to happen? There were numerous stands at IJL exhibiting gemstones with poor or zero disclosure as to treatments, origin and even the stone's identity. Sometimes the seller simply didn't know what the stone was, while other times they didn't care! Even the show organizers were not particularly bothered about a pamphlet produced by us last year highlighting what to look out for when buying stones. I'm ashamed to say that I have to include some Gem-A members here as well, as there were descriptions that I saw which were just plain wrong and misleading. To say "that's what everybody calls it" is not reason enough to continue to perpetrate the lie, hence I saw advertised 'green amber', which is not amber, and 'Paraíba tourmaline' which was not from the Paraíba area, or Brazil, and doesn't even exhibit the electric blue hue associated with it. The piece I saw did have copper in it though — allegedly! Things will only change when buyers want them to, so it's our job to protect the end consumer by educating them. We can all do our bit.

NAG's 25th Annual Valuer's Conference

Congratulations to the NAG on the 25th Annual Valuer's Conference at Loughborough (see page 38 for Miles Hoare's report on the conference). For those of you who have never been, the conference is not just for valuers, anyone with an interest in gems or jewellery will gain something from it even if it's only the opportunity to meet like-minded individuals. The Valuations Committee has evolved into the Institute of Registered Valuers — truly custodians of this important part of our trade. For those of you interested, Sandra Page, who runs the Institute, will be at the Gem-A Conference in November representing the IRV — supporters of our conference. I also want to say a quick word about Jonathan Lambert, the outgoing chairman of the IRV and winner of the David Wilkins Award, who received a standing ovation at the end of the conference. He is a remarkable man and a great ambassador for our trade.

Visitors at the 2012 IJL exhibition. Image courtesy of IJL


Jonathan Lambert addressing IRVs at Loughborough.

Gem-A Conference

I look forward to seeing as many of you as possible at our conference on Sunday 4 November (see pages 2-3 for more information) — we have a really great set of speakers this year. I also urge you to come to our Graduation Ceremony and Presentation of Awards at Goldsmiths' Hall on Monday 5 November to meet our new graduates. At Gem-A we are constantly trying to assist our graduates and members in the job market — never more so than now in these troubled economic times.

Gem-A News and Views

In the news (cont.)

Some of you may be aware of the Careers Service evenings held at our Greville Street premises, where guest speakers give an insight into different areas of the trade. Thanks go to our two most recent speakers, Keith Penton FGA DGA from Christie's and Guy Clutterbuck from Childers Gem Merchants (CGM), who both gave highly informative and entertaining presentations.

Membership

And finally, the membership rates for 2013 are out. With Individual Membership from £100 (£90 if paying by direct debit) and Corporate Membership from £225 (£215 if paying by direct debit), I feel that these rates represent value for money, given the access to up-to-date information which is available. There is one small change this year; we are no longer offering an early bird discount. To replace this however there is a discount of £10 available to those of you in the UK who wish to pay by direct debit. Processing individual cheques and credit card details is not only time consuming but also costs the Association in banking charges. For those of you who don't already pay by direct debit a form is available from Carlos Witkowski, our Membership Administrator. In addition to the above, from 2013 the names of all FGA and DGA members will be posted on the website, unless you tick the box on your membership form to say you don't want to be included. This will be done to promote members all over the world, and will enable the public to quickly and easily find out if someone is an FGA or DGA. This has been brought about by enquiries from all over the world seeking to root out people falsely claiming membership. Late in 2013 we will also publish the names of every graduate of Gem-A to coincide with 100 years of the first Diploma. This will at least show that someone has passed the exam, even if they have chosen not to use the initials.

During production we learned of the death of Keith Wallis FGA. Our thoughts and condolences go to Keith's family. A full obituary will be published in the Winter issue of *Gems & Jewellery*.

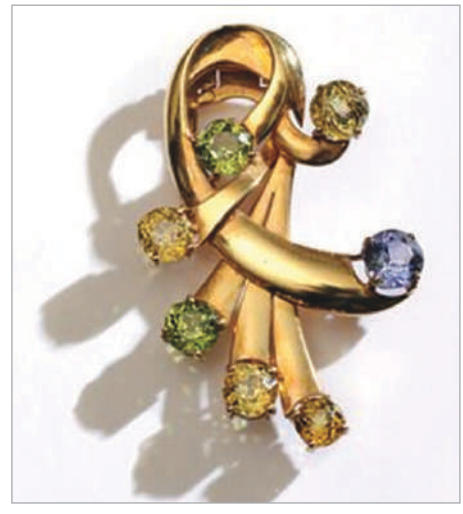
A gemmologist's brooch

Louise Dennis FGA DGA records the sale of a gem-set brooch made by B.J.Tully.

The name B.J. Tully will be well known to most gemmologists — he was the renowned and respected gemmologist who designed the Tully refractometer in 1925, a table instrument used to test the refractive index of gemstones. Tully was the first Director of Examinations for The Gemmological Association of Great Britain, and it was in his honour that the Association later introduced the Tully Medal, a prize awarded to outstanding candidates in their Gemmology Diploma exam.

It is less well known that Tully was also a jeweller with premises in Bond Street, London. As we might expect he was fond of unusual gemstones. Shown here is a brooch of stylized scroll design, claw set with graduated circular mixed-cut sphenes and green garnets, accented with a circular mixed-cut benitoite. It is set in gold, but is unhallmarked. The brooch is in a fitted case with the legend 'B.J. Tully, Gem Specialist, 10A New Bond St W.1'. It most likely dates from the late 1920s to 1930s.

The brooch was offered for sale at Bonhams auction house in Oxford on the 17 July 2012, where it sold for £562 (inclusive of buyer's premium).



Around the Trade

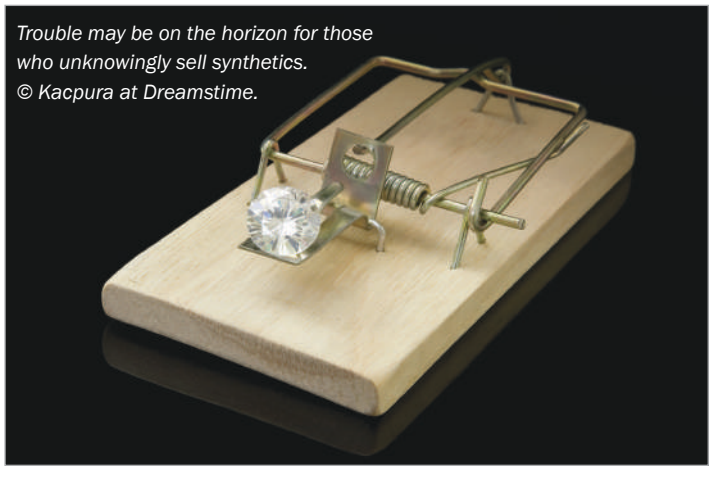
Synthetic diamonds

Harry Levy discusses the availability of synthetic diamonds in the market place.

If one has read the trade press in recent months, one would think that the market is flooded with synthetic diamonds. Hundreds of stones have been sent to labratories with no disclosure, presumably to see if these laboratories can detect them. Reports imply that there are thousands of stones in the market, and that there are millions of carats produced and distributed, but as a dealer I find I still cannot easily buy synthetic white diamonds.

Searching the internet one finds very few outlets for buying such stones. Those that do give prices indicate that they are slightly cheaper than an equivalent natural stone; a natural treated diamond can often be cheaper than a similar synthetic, and some actually state that the supply of white synthetic diamonds is limited. I have yet to hear of anyone selling a parcel of melee or smaller white synthetic diamonds.

Synthetic diamonds can be produced by the CVD process, colour improved by HPHT, and easily cut from the platelets thus grown, so theoretically they should be readily available. But from my limited research and talks with insiders in the trade, it appears that producing white synthetic diamonds is expensive. They can be produced routinely up to about one carat sizes, but until they can make three carat plus sizes, it is not commercially viable to market these stones. The initial producers of larger stones, half a carat and up, could produce them in various shades of yellow and brown, but not white. They can produce pale blue and pink stones, in colours closer to natural diamonds than those made by irradiating natural stones, which tend to be much darker. But again prices are high for what they are: man-made stones. For example a one-carat blue synthetic diamond can be bought for about $10,000, compared to about $200,000 for the natural equivalent — seemingly a bargain, but still expensive for a synthetic.



Trouble may be on the horizon for those who unknowingly sell synthetics.
© Kacpura at Dreamstime.

Much more readily available are synthetic yellow diamonds of sizes over one carat, but these are being offered at prices about 15% below an equivalent natural stone, a margin that is not sufficient to attract too many stones on the market. However, there is some concern with the smaller yellow diamonds in round and square cuts. In the past, natural small yellows have been popular, especially with the traditional jewellers of Bond Street (London), Place Vendôme (Paris) and Fifth Avenue (New York). The problem now is that since yellow stones can be produced by treating natural diamonds with irradiation and heat, they are being mixed with synthetic diamonds. Few (if any) manufacturers can now guarantee that all the stones being supplied are natural, since it is too expensive and time consuming to test each stone in a laboratory, and they have stopped using such stones. Here we have a clear case of the negative effect caused by the introduction of synthetics.

Let us get back to white synthetic diamonds. The few hundred stones sent to the laboratories were mostly under half a carat, and as I have stated they appear to have been a test run to determine detectability. Laboratories claim that they can detect synthetics, but detection needs advanced equipment and well trained staff. According to a recent GIA report, '2012: The Year Synthetic Diamonds Made Their Mark', diamonds grown by the CVD process showed a distinctive graining and had slight colour, but recent improvements in production have removed this graining and removed (improved) the colour, thus making detection difficult. Difficulty in detection will bring in business to the laboratories but cause havoc among those traders with little or no gemmological knowledge and who rely totally on the information provided by their suppliers. This is a vicious regress. At some stage in the distribution chain someone will know the true nature of a stone and integrity of the product will be maintained if this knowledge is passed on, but if there is a point at which there is no disclosure, then those further down the chain will have no idea what they are buying or selling, and more tragically will not even know that they don't know.

Above I referred to the claim that there could be thousands of synthetics in the market, but this may just be guesswork and based on the perception that manufacturers of jewellery are using very small stones, some or many of which are synthetic, and selling these with no disclosure. As to the production figures of synthetic diamonds in the millions of carats, this is probably true, but

includes large quantities of industrial, non gem quality, diamonds. The industrial arm of De Beers and other companies have been producing these for years, with the bulk being diamond powder or grit and the remainder finding more and more uses in industry.

This raises a question involving the Kimberley Process (KP). Should diamond grit and powder be subjected to Kimberley Certification? If one looks at the origins of the KP, it was designed to prevent 'rebels' from using rough diamond sales to purchase arms. It is difficult to imagine that such people will be looking for diamond grit, it takes a large mining organization to separate out sub-mm diamonds from other grit. But the KP authorities did not set limits as to the size of diamonds being regulated. This matter has come up for discussion at diamond conferences and congresses, as it affects those dealing in rough diamonds, many of whom handle both gem and industrial qualities. As far as I am aware no size limits for diamonds to be considered liable to KP protocol have yet been agreed.

There have been and still are attempts to move diamonds avoiding the KP, and there are a few who actually deal in 'conflict diamonds'. But much of the movement of undeclared rough diamonds is for fiscal reasons, to avoid paying taxes and duties, and to hide and move wealth. There is also a small number who want to avoid the paperwork and the cumbersome process of moving stones through the KP. This involves presenting the rough diamonds to the KP authorities and showing a provenance that they are 'conflict-free' — this all costs money and time. This has been alleviated to some extent in the UK where the Diamond Office has set up a fast-track system for known dealers who are required to belong to the London Diamond Bourse. It makes use of the implicit enforcement power of the Bourse which is responsible for monitoring its members, and has draconian authority to expel members who contravene the rules — such exclusion applies world-wide through allied Bourses and is a powerful antidote to questionable trading.

Some amusing methods have been used to avoid the KP restrictions, for example, drilling a small hole in the stone and mounting it as a pendant has enabled a wearer going through Customs to claim that it was a piece of jewellery. Another ruse was to polish a small facet on a rough stone, a process commonly used on rough stones to open a window through the rough surface and see the inclusions inside the stone. The jargon used by the Revenue and Customs to distinguish between rough and polished goods is to call them 'worked on', and some thought that by polishing a single facet the stone could be classified as 'worked on' and thus not subject to the KP. This loophole was quickly quashed by the authorities however.

The situation with synthetic colourless or white diamonds is still in its early days. It could prove catastrophic to the natural diamond industry. As with the small yellow diamonds, it could become another case of the fake driving out the real. (I use these words cautiously as synthetic diamond is still diamond and not glass or another imitation — the 'fake' usage refers to promoting confusion with natural diamond). To remove this threat, the solution is disclosure at every point in the chain with severe penalties for those who do not. But I am troubled at the prospect of many who may sell synthetics not knowing what they are selling and who, shortly after, may find themselves out of the business as a result of a mis-selling scandal.

Reference

Shor, R., 2012. *The year synthetic diamonds made their mark.* Gemological Institute of America.

IJL 2012

James Riley reports on this year's show.

The first weekend in September must mean it's the Earls Court show, or IJL as it is formally known. With change in the mind of the organizers, it won't be at Earls Court much longer — next year looks set to be the last before its redevelopment.

Like it or not this is the best that the UK has to offer in the sense that there is very little opportunity to see suppliers and manufacturers under one roof unless you are part of a buying group — even then the choice is limited. The irony of this show is that the international attendees take it far more seriously than us Brits. It truly is representative of the cross section of what UK jewellers sell, and, while one might bemoan the preponderance of silver pieces and relatively low value items, there is a vast array of merchandise here which is more accessible than some of the larger shows like Hong Kong or even Vicenza, simply because it's manageable.

On the gem front there were the usual suspects well known to the UK trade and business appeared to be brisk, but by and large this was not a busy show. An interesting stand had reconstituted stones which made for compelling discussions regarding disclosure, although in fairness the company was very clear and open about the processes undertaken. A cynic might note the price points in comparison to synthetic stones and question whether there was any difference — does 'natural reconstituted' sound better than 'synthetic'? The call on that one is down to you.

The sad thing for me is that right opposite was Sico with a really beautiful collection of stones. Virtually all were certificated

Eager attendees at the event's opening
All photos courtesy of IJL 2012.

Shows and Exhibitions

Left to right: Sarah Kitley, with Diane, Rebecca and Chris Sellors of C.W. Sellors, and James Riley.

Gem Empathy Award

Every year we present the Gem Empathy Award to the exhibitor that, in our opinion, uses stones imaginatively and to show their finest qualities. An additional factor is the exhibitor's knowledge of the material used, its origins, the exhibitor's policies on disclosure and, I suspect, as time goes on we will be looking at the ethical side, including environmental sustainability.

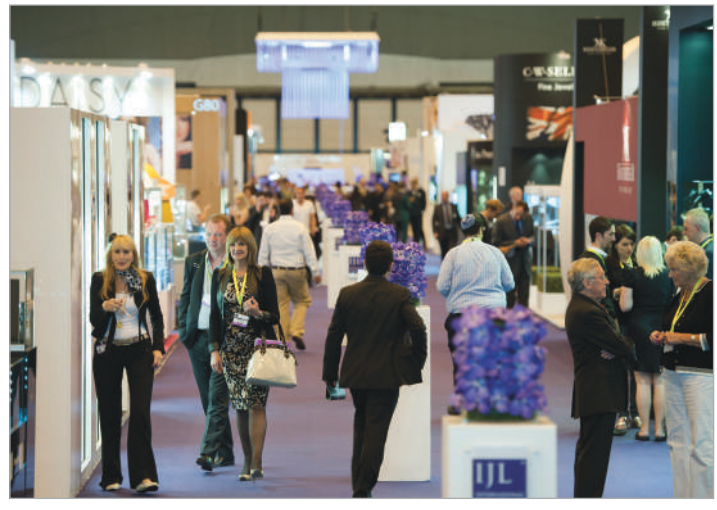
This year's winner was W. Hamond of Whitby, part of C.W. Sellors. Chris Sellors took over Hamond some years ago, rescuing the brand and reinvigorating the use of Whitby jet. Chris has won the Award before and every year comes out with new and exciting materials in his jewellery. This year, for example, he had fossilized coral from Barbados. This material was fossilized millions of years ago and is gradually exposed as the island continues to rise out of the sea a few millimetres every year. Erosion by the sea breaks off pieces of this coral which are then slowly eroded away. What better example of an environmentally friendly source? No digging or mining, and no lasting effect on the area.

Which brings me back to Hamonds. Jet, long associated with mourning jewellery, can be an attractive stone in a modern design. Visitors to the stand were shown an example of the type of tree that jet originated from. Better still, we know exactly where the material is from, it's not treated and, again, because it is exposed by erosion, there's no environmental damage. Best of all, it's British.

'Natural, no heat' with country of origin. Many of these stones were thousands of pounds per carat compared with less than £100 per carat at other stands, and for stones which appeared to be much larger. IJL really needs to sort out this sort of thing.

Visitors had a wide range of seminars to choose from, including Gem-A's Claire Mitchell and Andrew Fellows on treatments, and Jack Ogden on selling gems. Martin Rapaport was his usual vibrant self and this is without all the other seminars on ethics and marketing.

The Gem-A stand at IJL.



Attendees walking the aisles.

The Boulevard Bar.

Shows and Exhibitions

Dr Jack Ogden FGA reports on the 2012 September Hong Kong Jewellery and Gem Fair.

Hong Kong 2012

The September Hong Kong show is billed as the largest jewellery show in the world, with this year's show featuring 3500 exhibitors from 48 countries. In comparison the JCK Las Vegas show in June 2012 had 2500 exhibitors, while International Jewellery London (IJL) in September (see page 32) had a mere 600. The Hong Kong show is spread over two venues: the Asia World Expo (19–23 September), featuring loose gems, diamonds, pearls, equipment and packaging, and the Hong Kong Convention and Exhibition Centre (21–25 September), featuring finished jewellery. Exhibitor numbers are not the sole criterion for assessing a show's impact, however. The success of a jewellery show is measured by the business generated and the relevance of its peripheral events and meetings. Shows are an essential opportunity to learn and discuss as well as to buy and sell.

Ferry leaving Wanchai after the final day of the show. The Convention and Exhibition Centre is on the left (the building with blue-green horizontal lights). Photo Jack Ogden

Jade and opal

For Gem-A the first event of the show was the Gemstone Industry and Laboratory Conference (GILC) held on 18 September. The GILC, organized by the International Colored Stone Association (ICA), is an invite-only event which discusses significant issues in the gem world behind closed doors, so that delegates may speak openly and frankly without fear of being quoted. GILC meetings are usually held twice a year, in Tucson and in Hong Kong, and Gem-A has been an active participant for several years. This year topics included the fei cui testing standard in Hong Kong and nomenclatures for Ethiopian opal.

Jade expands

I can report what is in the public domain about these two issues discussed at GILC. As every gemmology student soon learns, 'jade' is a term that covers two distinct minerals: jadeite and nephrite. Nowadays two more come under the jade umbrella: omphacite and kosmochlor. As testing methods have become more sophisticated it has been realized that the material sold as jadeite in the past can in fact be intimate mixtures of jadeite and two other similar pyroxenes — omphacite and kosmochlor. How might this be recognized in a way that is gemmologically sound but not detrimental to the highly important jade market? The ingenious solution was to redefine the Chinese term 'fei cui' (pronounced 'fay choy'), the term traditionally used in China for jadeite, to cover any 'granular to fibrous polycrystalline aggregate' composed solely or principally of jadeite, omphacite and kosmochlor, or any combination of these. Incidentally, and very relevant to other current discussions about gem nomenclature, according to the Hong Kong fei cui definitions, the word 'natural' may not be used as a descriptive for fei cui if it has been subjected to any treatment or process which altered its crystalline structure or its original colour. The fei cui definition has been agreed by China and Hong Kong, and Gem-A is happy to formally recognize this definition to ensure harmony of descriptions across Asia — highly important markets for Gem-A education. The definitions will be incorporated in Gem-A course materials when these are next updated.

Shows and Exhibitions

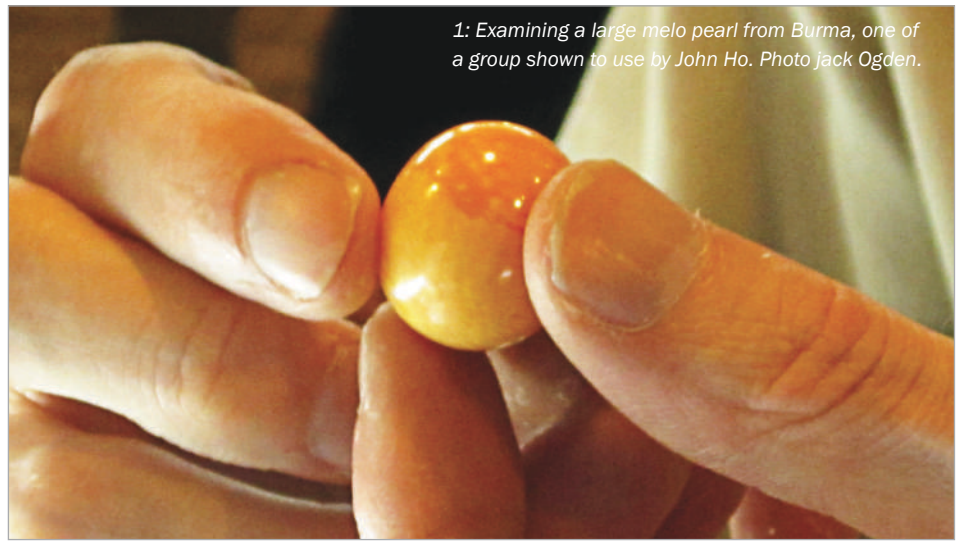
Absorbing topic

A huge quantity of opal from Ethiopia has come into the world market in recent years. The initial material was often unstable, but the more recent opal can be highly stable, although it is hydrophane, that is, it absorbs water or other liquids (hence the relative ease with which some of it can be dyed). Hydrophaneity also means that these opals can absorb oil from the skin, cosmetics, and even vary with humidity. The degree to which Ethiopian opal is hydrophane varies considerably and this has led to much discussion at GILC meetings and other gem forums. The current recommendation is that Ethiopian opal can be classified as precious opal with the term 'hydrophane' added. Most importantly, when sold it should be accompanied by special care information; it should be kept away from cleaning agents, perfumes, oils and any liquids; that sudden or extreme temperature change should be avoided; and that steam and ultrasonic cleaners should not be used. It is Gem-A's opinion that these special care recommendations should be passed on to the trade — retailers especially — as soon as possible.

Showtime for Gem-A

Gem-A has been a Hong Kong exhibitor for many years, and this year at the September show we were back in our favourite position, on the main boulevard along the side of the Premier Halls at the Hong Kong Convention and Exhibition Centre. To put it simply, this year was perhaps our best year ever. Interest in our courses across Asia and from many other parts of the world was extremely high and the representative selection of books and equipment we shipped across from the UK all but sold out before the show was half over. Increasingly the more savvy members of the gem and jewellery trade (and those wishing to enter it) see value in the depth of background information provided in our courses. We teach people to understand and not just to recognize — a crucial skill in a world of new gems and increasingly sophisticated treatments and synthetics.

The Gem-A booth in Hong Kong is always a magnet for our past and current students, and their enthusiasm for us and our education (and the associated photo opportunities) is always elating. We are also in a perfect position to talk with visitors and other exhibitors about their feedback on the show, and to look at the interesting gems that are inevitably produced from pockets and handbags. Among such pieces were the large melo pearl (**1**) and a 111 ct Burmese peridot (**2**) shown to us by our good friend John Ho.



1: Examining a large melo pearl from Burma, one of a group shown to use by John Ho. Photo jack Ogden.

The show was full of amazing gems and spectacular jewellery. Having a booth, especially when it is as busy as it was this year, makes it difficult to visit other exhibitors, but we did make time to examine the extraordinary bi-coloured tanzanite (**3**) at the booth of New York-based Intercolor — the remarkable specimen that Hayley Henning discussed at her talk at Gem-A on 28 August. We also rather liked the huge green sphene shown to us by ICA vice president Charles Abouchar of Geneva. Also spectacular was a 137.60 ct tsavorite.

2: A 111 ct peridot from Burma, shown to us by John Ho. Photo Jack Ogden.

Far pavilions

Many countries have their own pavilions at one or another of the venues, showcasing the gem or jewellery dealers from those countries. The UK was not represented sadly, even though the high regard in which UK jewellery design is held in Asia suggests that it might be time to reconsider a greater involvement for the UK. Indeed, among the handful of UK-based companies that were exhibiting was Henn of London, situated in the rarified surroundings of the Grand Hall — the exhibition hall with the crème de la crème of jewellery. Ingo Henn FGA reported that the show had been a great success. The trade associations of some countries had large booths displaying samples of prize-winning jewellery designs. Thus the Japan Jewellery Association showed winning designs from their Jewelry Design Awards 2012, while India's Gem and Jewellery Export Promotion Council showcased some of the work of Indian designers (**4**).

China dollars

In recent years China has been seen as the alpha male of the global jewellery industry; a primary production centre and with a rapidly expanding home market with some very big retail players. The slowdown in China's economic growth as widely reported in the

Shows and Exhibitions

Hong Kong 2012 (cont.)

3: A spectacular bi-coloured tanzanite crystal. Copyright Intercolor, www.intercolorusa.com. Used with permission.

world's press has been anxiously watched by the gem and jewellery trade. As one observer said to me, if China's appetite for jewellery lessens, we are all in trouble. Having talked to many in the industry from China, Hong Kong and elsewhere during the show, I think it fair to say that Chinese domestic demand might level off slightly, but a significant fall seems unlikely. Just how the trade will be constituted, however, is unclear. China's close political relationships with several source countries, especially those in Africa, is undoubtedly helping their sourcing of gems and other raw materials (at favourable prices), but will this cut out or redirect some of the more traditional routes to market? Other major trade shows may be impacted. Hong Kong, however, seems likely to retain its importance as its location and favourable tax/trade regime makes it an ideal gateway to the mainland market. As a sign of the times, the ICA, with whom Gem-A has a close relationship, has now officially relocated from New York to Hong Kong and has signed a letter of intention with the Chinese province of Hunan to help establish a national manufacturing and training centre for coloured gemstones and jewellery in its capital Changsha. Online diamond sales have also started to take off in China — it will be interesting to see how that affects the market.

Diamonds

Talking of diamonds, there was the usual vast diamond hall at the Asia World Expo venue featuring acres of diamonds, many from Indian companies. It is said that 11 out of every 12 diamonds on the world market today has been cut in India. India also claims to export one billion cut diamonds in a year – it seemed as if all were on display in Hong Kong. Reports were that diamond sales were slow, but that is based on a very informal poll. Worries about diamonds (small synthetics in particular) was a recurring theme, with many coming to the Gem-A booth hoping to be able to purchase a simple 'machine' to detect them. Sadly no such wonder tool exists or is likely to, at least in the near future anyway. Much talked about before the show (including on Gem-A's MailTalk) was the Hong Kong launch of Diamond Services Ltd's Diamapen, described as "an affordable and reliable tool to detect and separate synthetic diamonds". The Diamapen turned out to be a blue laser, used much as described in *Gems & Jewellery* (Summer 2010). Laboratories that had tested the tool reckoned that it could be a useful guide, but not the panacea some supposed — there were safety issues that might make its use in a day-to-day retail environment problematic.

But people are working on new ways to type diamonds — a useful guide in detecting what diamonds need further laboratory testing. One such tool being developed in China, and now in prototype, detects the tell-tale absorption lines in type 1a diamonds and responds audibly to allow quick use with large numbers of small diamonds — something like De Beers' DiamondSure™, but with a more robust tip. Incidentally, as of September 2012, De Beers equipment including DiamondSure™ is no longer distributed by GIA Instruments UK Ltd.

Overview

Apart from the above, reports on the success of the show varied according to who was asked. For some it was a great show, while for others it was disappointing. The September Hong Kong Jewellery and Gem Fair is the barometer for the state of the global trade, but this year seems to have provided no clear impression. If there were any trends it was that good quality coloured gems were doing well, beads were selling (still), but Chinese freshwater cultured pearls were very slow as at the February Hong Kong Show. Perhaps the simplest summing up is that quality was selling, whether in terms of design or gems.

4: A modern interpretation of a traditional Indian style, from the exhibition of Indian design. Photo Jack Ogden, courtesy of the Gem and Jewellery Export Promotion Council (GJEPC).

NEW Gem-A Workshops
Spring 2013

Our **NEW** range of workshops, held at our London headquarters, are designed to cater for all abilities — from our 'Understanding' workshops for beginners to our 'Investigating' and 'Advanced' options for intermediate and advanced levels. For more information or to book visit **www.gem-a.com**, call **020 7404 3334**, or email **events@gem-a.com**.

Understanding gemstones
Friday 22 February 2013

Covering all aspects of the most popular gems, you will learn about origin and lore, as well as the more practical aspects of their physical properties, including advice on care and caution. Tutor-guided practical sessions throughout the day will enable participants to become competent in the use of stone tongs and 10× lens.

Price Gem-A/NAG members and Gem-A students: £80
Non-members: £100

Understanding practical gemmology
Friday 8 March 2013

A workshop focusing on the practical aspects of gemmology, covering the effective use of all the readily available instruments and testers that you are likely to need. You will quickly learn the basic principles and techniques needed to use practical tools efficiently, under the guidance of our expert tutors.

Price Gem-A/NAG members and Gem-A students: £80
Non-members: £100

Understanding diamond simulants
Friday 22 March 2013

An important practical workshop for those considering entering the diamond market. Using basic observation techniques and readily available instruments such as diamond and combination testers, you will be taught to separate diamonds from all other imitations quickly and effectively.

Price Gem-A/NAG members and Gem-A students: £80
Non-members: £100

Investigating gemstone treatments
Friday 19 April 2013

This one-day workshop focuses on the common treatments currently present within the gemstone industry and their detection, using readily available instruments and techniques. Suitable for those of intermediate gemmological ability.

Price Gem-A/NAG members and Gem-A students: £80
Non-members: £100

Understanding gems

Gem-A
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Recent Events

Miles Hoare reports on the Institute of Registered Valuers' Annual Loughborough Conference

Delegates enjoying Eric Knowles' talk on 'Confessions of an Auctioneer'. All photos © Miles Hoare.

All that glitters is not gold

Silver was the order of the day at the National Association of Goldsmiths' (NAG) Institute of Registered Valuers' (IRV) Loughborough Conference. The event, hosted at Loughborough University from the 22–24 September 2012, celebrated the 25th anniversary of the Institute with a stunning Silver Jubilee theme. With talks from well-known TV personalities and experts in the field, over 190 delegates descended onto the campus to pay tribute to the continued success and longevity of the Institute, whilst reflecting on the invaluable role the conference plays in the field of valuing.

In similar fashion to previous years, the conference blended a number of key speakers with informative workshops (many hosted by FGAs and DGAs) and evening networking and social events. With this year's theme firmly set on 'silver', the conference invited speakers such as the Queen's former Remembrancer Robert Turner, who discussed 'Silver Pennies and the Trial of the Pyx'; David Evans and his talk on 'Silver and the English'; Grant MacDonald's 'Every Cloud Has a Silver Lining'; and Alastair Dickenson's musings on 'Silver Guilt', as well as featuring presentations by Eric Knowles ('Confessions of an Auctioneer') and Stephen Kennedy, who discussed his investigations into pearls and gemstones. Amongst all the silver, there was still a lot of room for discussions about gems, diamonds, and everything else in between. Also included in the packed schedule were the elections for the IRV Forum, the presentation of the David Wilkins Award, and a long-awaited update on the IRV's new Certificate of Appraisal Theory (CAT).

A silver celebration

From the outset, the silver theme to the Loughborough Conference was more than apparent. After a meet and greet lunch courtesy of event organizers Imago, the show kicked off with a welcoming address from IRV Chairman Jonathan Lambert who jovially announced the opening to the IRV's silver anniversary conference. This was followed by elections to the IRV Forum before the three key speakers were invited to the podium by David Callaghan.

First to the podium was Robert Turner, formerly Master Turner, the Queen's Remembrancer (or the Senior Master of the Queen's Bench). Turner's speech entranced the audience with the personal and private tales of 12 years presiding over the Trial of the Pyx. For those of you unaware, the trial is the procedure testing the size, weight and chemical composition of new coins issued by the Royal Mint. Turner stated: "The Deputy Master of the Mint must, throughout the year, randomly select several thousand sample

Recent Events

coins and place them aside for the Trial. These must be in a certain fixed proportion to the number of coins produced. For example, for every 5000 bimetallic coins issued, one must be set aside." Turner described his role as Queen's Rememberancer, noting the history of the Trial and the process involved — all with the help of a balsawood replica of Westminster Abbey (the word 'replica' is applied loosely) and a number of beautifully crafted dolls (courtesy of his granddaughter). Turner explained: "As Queen's Rememberancer, it was my responsibility to ensure that the trial is held in accordance with the law, and to deliver the final verdict to Her Majesty's Treasury." He went on to describe the real meaning of the 'pyx' (the name given to the chest in which the coins were presented to the jury), the politics of the trial and all the pageantry that went with it.

Silver, coinage and the hallmarking process continued on the agenda with Welshman David Evans' talk on 'Silver and the English'. Introduced by Callaghan as a man "To whom this trade owes a great deal of gratitude", David Evans spent 18 years as the Head of the London Assay Office taking responsibility for the continuation of a 700 year tradition of hallmarking. Evans' presentation focused on the history of silver and the lineage of English monarchs. Starting at 1AD and romping through Roman, Celtic, Norman and Saxon migration, Evans detailed the history of the Sterling and its origin in Prussian coinage made from 925 East Stirling Silver. He also commented: "Edward III thought it would be good to apply a similar process to the Pyx to objects of silver. In 1327 he brought in an act to give Goldsmiths' Hall permission to test objects made of silver." However, the most exciting part of Evans' presentation was when he went on to detail the inception and evolution of the maker's mark, leopard's head, the establishment of assay offices and the subsequent fight to keep hallmarking alive.

The main presentations of the first day were rounded off by Grant MacDonald, who assured us with his aptly-named talk that 'Every Cloud Has a Silver Lining'. Prime Warden of the Worshipful Company of Goldsmiths, MacDonald is, as Callaghan notes in his address, one of those figures that has "largely gone unsung". In previous years, you would never have known who the craftsman and designers really were. However, MacDonald unveiled an illustrated story of his life and times as a designer, silversmith and craftsman. Beginning in his humble university days at the Central School of Art and John Cass College before opening his own workshop in June 1969, MacDonald noted the challenges and the highlights of going it alone.

All eyes down in Alan Hodgkinson's practical class.

Some of the IRVs attending the conference, elected back in 1987 and 1988. (Back row, left to right) Robert Bolton, Georgina Deer, Peter Buckie, J Louise Butterworth, Anne Gill and D John Sayer. (Front row, left to right): D John Harrold, Roy Huddlestone, Terence Watts, Chris Miles and Charles Perry.

Sunday and Monday saw lectures from Erick Knowles, Alastair Dickenson and Stephen Kennedy. Knowles had the audience roaring with laughter while regaling his 'Confessions of an Antiques Dealer', a speech covering his 31 years as a dealer and presenter on the well-loved BBC programme Antiques Roadshow. Knowles' presentation focused on his love of antiques, beginning with his first job for a firm of antique shippers in the early 1970s. He came to the fore in 1976 when he joined Bonhams, the London auctioneers, working first as a porter in the ceramics department, before becoming head of the department in 1981. Listening to Knowles describe his approach to valuing, restoring and appraising antiquities, it's recognizable that he is one of those rare individuals who is able to share his considerable knowledge in a way that is exciting and easy for anyone to understand.

Alastair Dickenson delineated his life's work in his talk entitled 'Silver Guilt'. Dickenson has been in the silver business for over 35 years. He outlined how he started his career at one of London's major auction houses in 1971, before being appointed Head of Antique Silver at Asprey in 1983, eventually becoming Director of the Antiques Department in 1994. In 1996 he started up his own

Recent Events

All that glitters is not gold (cont.)

business in Jermyn Street, together with his former Asprey assistant Melanie Cuchet, who has now worked with him for over 20 years. Dickenson detailed his winning technique which has seen his company make some of the highest prices ever paid at auction for English silver in the UK, with the Rockingham wine cistern selling for a hammer price of £1.3 million.

Stephen Kennedy, well-respected Gem and Pearl Laboratory specialist, was the final featured speaker of the weekend. Although his talk strayed far from the silver-based theme, his knowledge and passion are always in demand. Kennedy's talk outlined the various types of cultured pearl and gemstone testing, offering tips and advice to help in the identification process. He detailed advances in gem testing, treatments and identification processes from a laboratory perspective, and gave hints on what valuers should be looking out for when checking certain stones or putting a price on certain items.

The remainder of the weekend consisted of 21 on-going workshops from various experts covering a plethora of subjects, from silver to synthetic diamonds, and ranging from basic to advanced levels. Gem-A CEO James Riley opened up an enlightening debate about diamond pricing (old cuts in particular), and the various diamond grading systems and lab interpretations. Commenting on his talk, James said: "I had some really vibrant individuals attending and we had a lively discussion about the merits of different pricing methods on old cuts. It was a pleasure to be back at Loughborough."

In memory of Brian Dunn delegates signed a book of remembrance and attended the Sunday dinner in their Hawaiian best!

Beautiful opal and diamond necklace shared by Fellows.

A number of FGAs and DGAs also provided their expertise during the weekend covering topics such as cut grading, spectroscopes, identifying pearls, distinguishing synthetic diamonds and gem testing. Gem-A's Claire Mitchell gave a practical session, discussing various gem treatments and explaining what valuers should be looking out for when applying value to certain stones, as well as exploring the pitfalls many buyers face when sourcing stones.

Silver service

The conference was not all work and no play, however. The evening events followed familiar form with a special black-tie Gala Dinner on the Saturday night, during which Margaret Wilkins presented the David Wilkins Trophy to this year's winner, IRV Chairman Jonathan Lambert. This was swiftly followed by a Presentation of Awards Ceremony to present certificates to those MIRVs (Member IRVs) who have achieved FIRV (Fellow IRV) status since last year's conference. Alongside dinner a raffle was held in aid of Motor Neurone Disease for NAG member Simon Cupitt who was sadly diagnosed with the disease late last year.

Sunday night was a glorious celebration of Brian Dunn who sadly passed away in December 2011. Everyone attending the dinner on Sunday gave a great effort in wearing their brightest, most colourful (and in some cases almost sickening!) shirts, in memory of Brian's trademark over-the-top fashion-sense.

In all the weekend concluded with a great sense of the IRV's 25 years of tireless work in the field of valuing. With more delegates than ever before, and many of them looking to advance in the trade, the conference showed the best of the Institute and its continued support for valuers across Britain. James Riley said of the conference: "The 25th anniversary conference at Loughborough was a tour de force by the IRV. Many congratulations go to the Committee, the incomparable Sandra Page and my very good friend Jonathan Lambert for carrying off the David Wilkins Awards."

The IRV conference always marks a date in the calendar when valuers can come together and bash out the issues that matter, whilst also socializing with friends and colleagues in the process. In this spirit we'd like to give warm salutations to the IRV in its twenty-fifth year and hope that long may it prosper.

Faith in opals

Jack Ogden visits Lightning Ridge in Australia, known for its colourful stones and equally colourful characters.

Lightning Ridge is one of the best known opal mining areas in Australia. Situated in New South Wales, just south of the Queensland Border, opals have been mined here for more than 100 years. The town will soon become the site for the Australian Opal Centre, an ambitious project to establish an opal museum and education centre. Lightning Ridge is also home to another opal project, one of the most unlikely gem research laboratories in the world: Len Cram's shed, which I was able to visit on my recent trip to the area. I am grateful for his hospitality and kindness, and his willingness to talk about his work.

Len is a well known opal expert, with a suite of highly respected publications on opal and its mining history under his belt. His passion for opal is matched only by his religious beliefs, for he is an ardent Christian and Creationist. Thus there was a clash — how could the slow formation of opal (forming over millions of years according to most authorities) be squared with his Creationist beliefs? Len's quest has been to prove that his beloved opal can be formed faster than traditionally assumed, forming rapidly in the sediments laid down by Noah's flood. To the astonishment of many geologists and gemmologists, he appears to have succeeded.

Len puts the earthy material that covers the extensive opal fields of the region in a jar with water and a suitable (and secret) electrolyte. He explains that the process is simply one of ion exchange. Within just a few days layers of gel-like opal start to form, exhibiting the play of colour typical of opal. Within months seams up to a centimetre thick have formed. A problem remains however, as he has not yet found a way to fully dry out and thus solidify his opal gel without it cracking.

Jars containing Len Cram's 'home-grown' opal, exhibiting play-of-colour. Photo Jack Ogden.

Time will be major factor here, but Len is sure that this doesn't involve millions of years.

Len's research on opal formation began way back in the early 1960s, but success only started to come in the mid-1970s. Since then he has continued to fascinate visitors to his simple Lightning Ridge workshop. His shed full of shelves covered in glass jars of all sizes, most with contents revealing flashes of opal's characteristic play-of-colour, gives us clues about the formation of natural opal and other silicate materials that form via gel-like stages. Len is also certain that his work proves that opal colour is the result of structure, not trace impurities.

Will Len's discoveries mark the introduction of huge quantities of synthetic opal on the market? No — at least, that is his ardent hope. He has no wish to shake the commercial foundations of the Australian opal business and his secrets will go with him to the grave. Of course, others may follow in his footsteps — what one discovers, so can another. Regardless of individual beliefs or faith it is hard not to respect Len's aims and his wishes. Commercialization, riches and even fame were not factors; he simply set out to reconcile opal formation with his faith.

Colourful smile

This opal-set denture belonged to Lightning Ridge entrepreneur, opal-miner and abattoir owner Harold Hodges. Something of a colourful character, Harold also opened a museum and was the first to bring trams to the town. He wore these teeth in the 1960s before he tired of the attention they brought him, and they were then cemented in the wall of the Diggers' Rest Hotel. They were retrieved by his wife, and, when he died in 1983, she passed them to a friend who donated them to the Australian Opal Centre in 2009 where they are now on display. Photo Jenni Brammall.

Journal Files

The Journal of Gemmology

Summary of two articles to be published in *The Journal of Gemmology.*

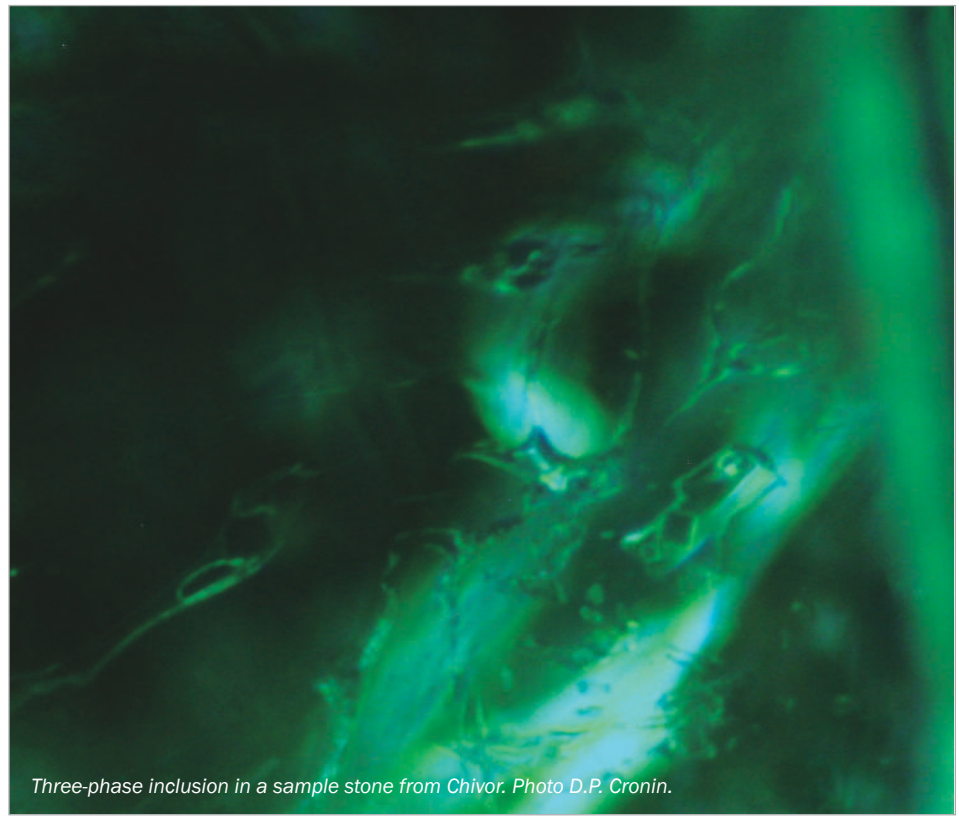
Emerald origins

A summary by Jack Ogden of the paper 'Determining the geographical origins of natural emeralds through nondestructive chemical fingerprinting' by D.P. Cronin and A.M. Rendle.

Determining the origin of emeralds is an increasingly important function of gemmological laboratories. Origin can affect pricing and may also be significant in other ways, especially with growing interest in establishing chains of custody. Initially gem origin determinations were based simply on colour and subsequently on the nature of inclusions. With the more recent development of sensitive and largely non-destructive analytical methods, the trace elements present in certain gems have been used to distinguish between different origins.

In the present study, energy dispersive X-ray spectroscopy (EDX) was used to assess the compositional differences between emeralds from six different mines; three mining sites in Colombia (Muzo, Guali and Cosquez), two Brazilian mines (Campos Verdes and Carnaíba) and the Chantete mine in Zambia.

The processes that link geochemical interactions to trace element presence in gems are still poorly understood. The present study was instigated when it was found that although the chemical composition of emeralds from the Muzo



Three-phase inclusion in a sample stone from Chivor. Photo D.P. Cronin.

Journal Files

The 36 emerald samples were mounted on aluminium studs etched with numbered pie-shaped sectors for identification for SEM-EDX analysis. Each stud held samples from a particular mine (a) Cosquez, Colombia, (b) Muzo, Colombia, (c) Guali, Colombia, (d,e) Chantete, Zambia, (f) Campo Verdes, Brazil, and (g) Carnaìba, Brazil. Photo by D. P. Cronin.

and Cosquez mining localities in Colombia (just a few kilometres apart) are distinctively different, there is consistency within individual mines. In order to determine whether the variation in trace elements present in emerald were sufficient to distinguish between mining areas, the research was widened to include emeralds from Brazilian and Zambian mines.

The distinctive green colour of emeralds is most characteristically due to chromium or chromium and vanadium, although nickel and iron also play a part. In addition to these primary and secondary causes of colour other trace elements can reflect the localised geology. For the study six individual samples were randomly selected from each of the six emerald-producing mines. Twenty-four elements were looked for in the analysis and it was found that among these there was sufficient and statistically valid variation to allow natural emeralds originating from any one of the mining sites to be distinguishable from emeralds originating from any of the remaining five. The most useful determining elements were found to be vanadium, nickel and magnesium.

The study has shown how chemical composition can differentiate between emeralds from six mining sites of gemmological importance, but the compositions of a wider range of historical and modern emeralds awaits further research. Due to the fact that the three most important elements in establishing origin were found to be vanadium, nickel (both primary colour-causing elements) and magnesium, which also affects colour in emeralds, the researchers believe that high-resolution visible absorption spectroscopy might be employed in future analysis in place of EDX.

J.O.

* A summary of an article appearing in *The Journal of Gemmology*, 2012, **33** (1–4), 1–13: D.P. Cronin and A.M. Rendle, 'Determining the geographical origins of natural emeralds through nondestructive chemical fingerprinting'.

Journal Files

New spinel from Vietnam

A summary by Jack Ogden of the paper 'Orangey-red to orangey-pink gem spinels from a new deposit at Lang Chap (Tan Huong-Truc Lau), Vietnam' by A.-K. Malsy, S. Karampelas, D. Schwarz, L. Klemm, T. Armbruster and D.A. Tuan.

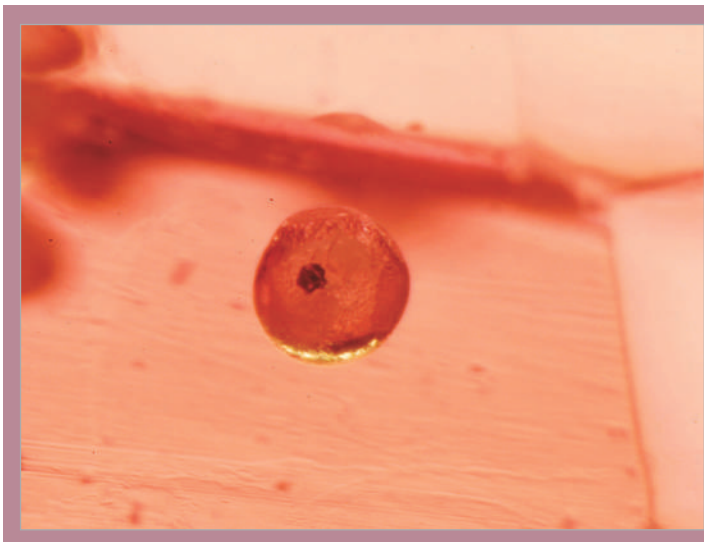
Spinels have become increasingly popular within the last ten years, with most on the market now coming from Sri Lanka, Myanmar, Vietnam, Madagascar, Tajikistan and Tanzania. Recently some orangey-red to orangey-pink spinels from a newly discovered alluvial deposit at Lang Chap in Northern Vietnam have reached the market. The mining is small scale and operated by locals using primitive equipment, and from time to time spinels of excellent red colour are produced. There were rumours that some Lang Chap spinels were misleadingly identified as spinels from Myanmar and so the present study was instigated to study their chemical and spectroscopic characteristics and how these differed from similarly coloured spinels from Myanmar (Mogok and Namya), Vietnam (Luc Yen: Koan Thong-An Phu) and Tajikistan (Kuh-i-Lal). In addition to this the effects of heat treatment on a sample of Lang Chap spinel were investigated.

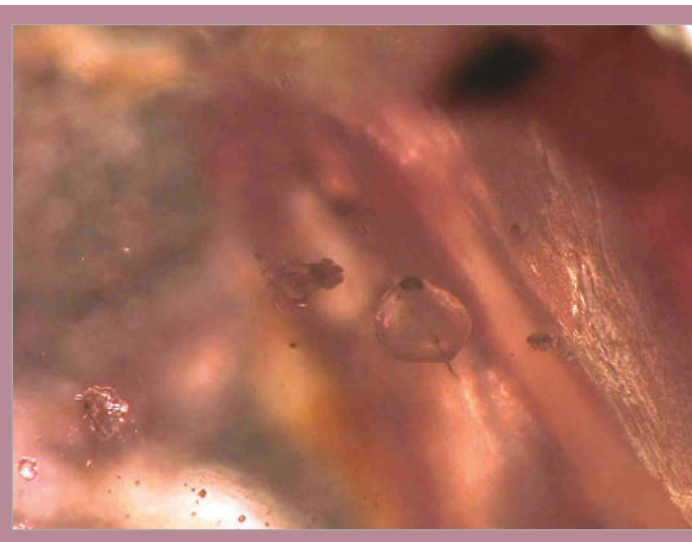
The study was a collaboration between the Vietnam National University (Hanoi), Vietphuong/VPGemstones Co. Ltd. (Vietnamese mining company), and the Gübelin Gem Lab (GGL, Lucerne, Switzerland). Standard gemmological instruments were used to observe longwave (LWUV) and shortwave (SWUV) UV fluorescence, to measure refractive indices (RIs) and birefringence, and determine specific gravity. Internal structures and inclusions were studied with various gemmological microscopes. Advanced examination included Ultra Violet Visible Near Infrared (UV-Vis-NIR) spectrometry, Raman spectroscopy, photoluminescence (PL), and laser ablation inductively coupled plasma mass spectrometry (LA-ICP-MS).

The researchers found that with a gemmological microscope the internal features of the spinel from Vietnam can look very similar to those in spinel from Burma. Similarly, trace elements in the Lang Chap spinel can distinguish it from that of the Luc Yen deposits and from Tajikistan, but there is overlap with spinel from Myanmar (Mogok and Namya). The conclusion was that there was indeed potential for the Lang

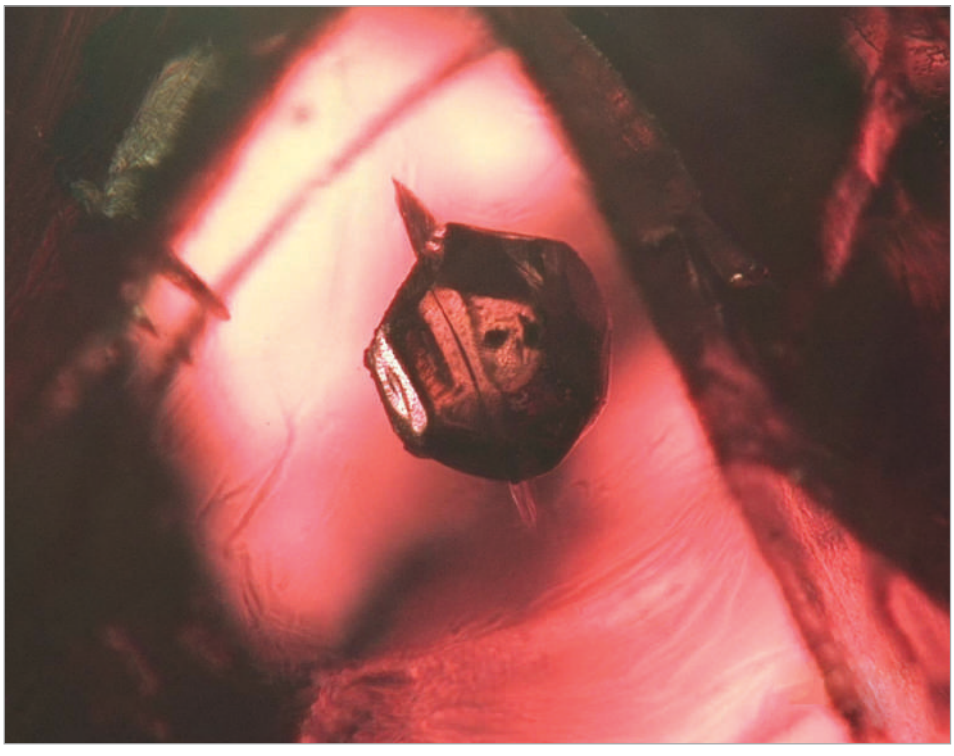
Spinels from the new Lang Chap mine in Vietnam, varying in colour from orangey-red to orangey-pink. The two faceted stones at the front weigh 0.4 and 1.3 ct and represent typical colours of spinels from this mine.

Journal Files





Left: A typical 'belly button' inclusion in a spinel from Mogok, Myanmar. The central rounded crystal is apatite with small black graphite. Field of view width about 0.3 mm. Right: Rounded to nearly spherical calcite inclusion with an 'attached' black graphite platelet shown in a Lang Chap spinel. Field of view width about 1.5 mm.



Chondrodite inclusion in a Lang Chap spinel with well-developed crystal faces and accompanied by a perfectly equatorial tension disc. Field of view width approx. 1.3 mm.

Chap spinels to be confused with those from Myanmar and only sometimes after careful examination of inclusion features and trace element chemistry can they be differentiated.

One sample was cut in two and one half heated up to 850°C and kept at this temperature for 56 hours. This heat was found to reduce the orange colour component of the spinel. The direct cause for this change is not yet fully understood, but heat treatment can be detected using Raman and PL spectroscopy.

J.O.

* A summary of an article appearing in *The Journal of Gemmology*, 2012, **33**(1–4), 19–27: A.-K. Malsy, S. Karampelas, D. Schwarz, L. Klemm, T. Armbruster, D.A. Tuan, 'Orangey-red to orangey-pink gem spinels from a new deposit at Lang Chap (Tan Huong-Truc Lau), Vietnam'.

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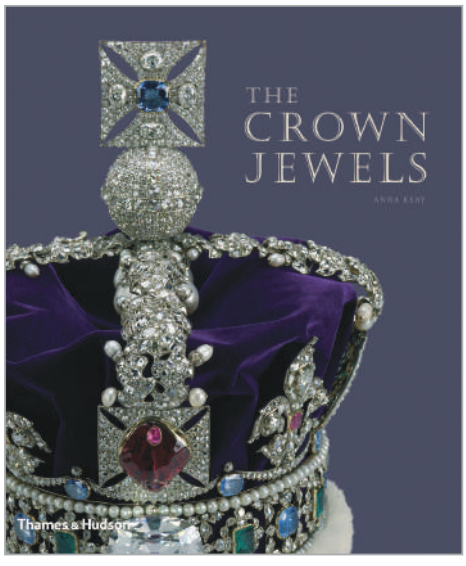
Book Shelf

The Crown Jewels



Anna Keay, 2012
Thames & Hudson
Paperback, 176 pp.
ISBN 978-0-500-28982-2
Price: £14.95

James Riley reviews *The Crown Jewels*, to coincide with the Gem-A Conference visit on Tuesday 6 November.

The Crown Jewels: The Official Illustrated History is what someone especially keen would lug away with them after a visit to the Tower of London. It is (as you would imagine) a weighty tome, bursting with colour pictures of England and Britain's beautiful heritage. Telling the 'story' of the Crown Jewels is not an easy task given that Oliver Cromwell, perhaps our greatest parliamentarian, had the Crown Jewels melted, and at various stages the royal regalia has been remodelled, pawned, or made off with by various monarchs.

The book starts with the Commonwealth, and it is a shame that only a mere 30 images are dedicated to the period before that. The first section is a bit lightweight, with little thought or penetration into the subject. For example, the book states: "Princess Blanche's (daughter of Henry IV) crown, now in Munich, is known to have been in the Tower in 1399." However, the author neglects to point out that this was the year that Henry deposed Richard II and that, given this would not have been a speedy item to make, in all likelihood the crown was probably made for one of Richard's wives — Anne of Bohemia or Isabella of France. Still, this small section does at least show the sort of thing our monarch might have worn, but I would have liked to have seen more research in this area.

The Crown Jewels as they are today are essentially those from the restoration and Charles II. Succeeding monarchs have added to and altered them but a 1670 picture of the regalia looks surprisingly familiar. From here on the description and history is first rate, with details of each incarnation of the Jewels and comparisons to its predecessors. The photographs make one take note of exceptional objects which, in the frenzy of viewing the collection, might often be missed. Certainly there will be objects which I will look out for the next time I visit.

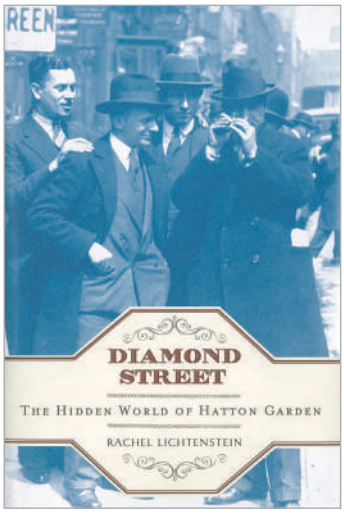
One must not forget that the Crown Jewels are a working collection. Much of it is still used on a regular and even daily basis — think of the mace in the House of Commons for a start. They are not just part of the art treasure and history of goldsmithing of this country, they are the ultimate symbol of its sovereignty and the tools by which the ceremonies of royalty and government are carried out. This book conveys that with all the history and symbolism that it entails. I would recommend this book to someone who wants to know a bit more than the basic guide about the Jewels, but is nothing compared to the Garrard one published a few years ago[1].

J.R.

1: Charlotte Gere, John Culme and William Summers, 1993. *Garrard: The crown jewellers for 150 years*, 1843-1993. Quartet Books, London

Book Shelf

Diamond Street: The Hidden World of Hatton Garden



Rachel Lichtenstein, 2012
Hamish Hamilton
Hardback, 368 pp.
ISBN 978-0-241-14287-5
Price: £20.00

Claire Mitchell and James Riley review a book giving the history of the area surrounding Gem-A's headquarters.

The Hatton Garden area has been steeped in rich history and prominent characters over the centuries, and this publication brings to life not only many of those people and places of prominence, but also many of the less prominent — those that have and others who still do make up the heart of this intriguing part of London.

Diamond Street takes a balanced look at the historical and geographical importance of the area, considering the commerce, politics and communities of the Clerkenwell, Holborn and Farringdon area, as well as focusing on the jewellery aspect of Hatton Garden. Chapters cover places of interest such as Ye Old Mitre, Bleeding Heart Yard, Ely Place, Leather Lane, the Fleet River and Saffron Hill, as well as Hatton Garden, Johnson Matthey and the London Diamond Bourse.

Lichtenstein travels between the past and the present in a style that is comfortable and friendly, without being too historically 'heavy'. Imaginable scenes are set; for example, the evocative descriptions of the old remaining workshops and their inhabitants are a delight to read.

Lichtenstein's family have worked in London's jewellery and diamond quarter for several generations, so she has been able to record places that many of us would never have the opportunity to experience for ourselves by personally interviewing a handful of the many Hatton Garden personalities.

The narrative encompasses a large area of research, including guided visits taken around the area with various experts in their fields, including a rather daring subterranean trip along the course of the Fleet River.

Because of the title I was initially envisaging that the content of the book would relate more specifically to the Hatton Garden area and the jewellery industry, however, this did not spoil my overall enjoyment of the book. I particularly enjoyed the fact that the book enabled me to understand better the cause and effect of history, i.e. that each moment or event in history can influence others, like an historically interwoven tapestry.

For someone who works every day in this area I found this book to be very informative and interesting. The area has been and still is constantly changing and evolving, and I appreciate this more now that I have a much deeper historical understanding of the area. Now when I cross Saffron Hill each day, I try to imagine the area as covered in meadows, gently sloping towards the free flowing Fleet River, with yellow crocuses in abundance — hence the name Saffron Hill, as saffron is derived from these plants.

C.M.

This book is somewhat of an enigma to me. I came across it by chance when it was recently reviewed in *The Times*. Whilst it has the makings of a fine book about the heart of the jewellery trade in Great Britain, it sadly falls somewhat short of the mark due to both a genuine lack of understanding by the author and a lack of detailed research.

As with any book of this type, my first stop was the index, but unfortunately there isn't one, immediately relegating this book out of the serious history category and into 'frothy' travel read. The introduction states that the book was compiled after five years of research, and so when looking at the acknowledgements I expected a 'who's who' of the Garden and the industry as a whole. Don't hold your breath.

What this book does do is give a narrative of the development of the Garden over the years and how it has arrived at where it is now. This is interspersed with some personal reminiscences, many relevant and which add colour to the story. However, it is riddled with historical inaccuracies and falls into the trap of making sweeping statements about firms such as De Beers, largely due to the lack of knowledge of the primary source.

No reference is made to the Society of Jewellery Historians, The Goldsmiths' Company or the Guildhall records, all of which would have enriched the book. No reference is made to the large diamond companies of the past such as Monnickendam, Backes & Strauss or Josyfon, to name a few, many of which still exist. There are no interviews with the big diamond brokers such as Bonas or Nagel to explain how the DTC operation works. The great De Beers is dismissed as usual as a cartel and monopoly (accusations which have been used for many years, but which in a book like this I would have expected to be qualified).

In short this book is a fun read and will provide most with something they didn't know about the Garden, but considering the wealth of material that was omitted it could so easily have been much, much better.

J.R.

Stone Scoop

An historical gemiscellany

Dr Jack Ogden FGA discusses several historical gem (arti)facts.

Hot property

The heat treatment of gem materials to improve colour is perhaps the most ancient of treatments. Carnelian was being heated to improve its red colour more than 4000 years ago, and Medieval Islamic comments about the heat treatment of rubies to maximize colour are well known. But not all heat treatment is intended to change colour — some gem materials can be hardened by heat. The best known examples here are steatite (talc) and its close relatives — various forms of hydrated magnesium silicate. These stones are very soft and thus easy to carve even with copper alloy tools. However, when heated they harden considerably, from a hardness of about 1 on the Mohs' scale up to as high as 6.5, depending on the degree of heating. Heating drives off the water and converts the steatite to enstatite and cristobalite. Examples of the deliberate heating of steatite and similar materials through history range back to the ubiquitous Egyptian scarab amulets, and one might even include meerschaum pipes in this long tradition, but more recent use is seldom mentioned, hence it is interesting to encounter a comment about heating talc and steatite in the 1881 *Household Cyclopedia*, which notes that: "Excellent buttons and even handsome cameos, may be made with talc or steatite, provided, after they are made, they be heated for several hours at a nearly white heat. By this strong calcination the steatite gets so hard that it strikes fire with flints, and resists the best tempered file. They may be polished by emery, tripoli, and jeweller's putty; and colored by mineral or organic matters; chloride of gold colours them purple, nitrate of silver, black; exposure to the reducing flame increases very much the brilliancy of the color." It begs the question however, where are examples? Perhaps some are masquerading as Victorian 'lava' cameos.

Chrysoberyl cat's-eye from the Cheapside Hoard. Photo Jack Ogden. © Museum of London.

Doe ray gem

One of the many fine jewels in the so-called Cheapside Hoard, a huge hoard of jewellery and gems hidden under the floor of a jeweller's shop in London around 1640 and discovered in 1912, is a ring set with a chrysoberyl cat's-eye. This is perhaps the earliest surviving example of a set cat's-eye from Britain.

Various commentators in the seventeenth century mention the gem, with Sri Lanka the usual given source. Thus the sailor Robert Knox, who was stranded on Sri Lanka around 1660 and who left a detailed account of the island, mentions it. Another reference is by that famous French traveller Jean-Baptiste Tavernier (he who first brought to Europe what later became the blue Hope diamond). The mention is in his 1677 account of the palace of the Ottoman Sultan in Constantinople (now Istanbul). Tavernier describes "A kind of Gold-Smiths Jewel Box wherein are ranked all sorts of Jewels of higher Value, as Diamonds, Rubies, Emeralds, a huge number of excellent Topazes and four of those Gems Call'd Cats-eyes, which are so beautiful, that they are not to be valued." Cat's-eye was probably the established European name by that time, but not the Ottoman, because according to a seventeenth-century account of the Ottoman court, calling somebody 'cat's-eyes' "is the greatest injury which could be done unto the honor of an honest man". Tavernier's mention of cat's-eyes among jewels of high value ties in a contemporary of his, Jean Ribeyro, who, in his description of Ceylon, observed that "Rubies are the most precious stones in that country after the cat's-eyes." What were they called in the Ottoman and Mughal worlds? An as-yet unpublished Indo-Persian document that dates to around 1525 refers to them of 'fawn' or 'doe's-eyes'.

Forever amber

It is unwise to rely on computer spellcheckers. They pick up spelling mistakes, not wrong words. In a Gem-A short course currently being edited, one sentence was supposed to say that amber may contain "insects and remains of plants". Luckily we spotted in time that it said amber may contain "insects and remains of pants". This caused some amusement in Gem-A's offices, but for some reason it did bring to mind an amber-related test described by Albertus Magnus way back in the thirteenth century: "Experience shows that if water in which it [amber] has been washed is strained and given with some scrapings [of the amber] to a virgin, after drinking it she retains it and does not urinate; but if she is not a virgin, she urinates at once. And that is the way virginity should be tested."

There will be a major exhibition of the Cheapside Hoard at the Museum of London from 18 October 2013 – 27 April 2014.

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