

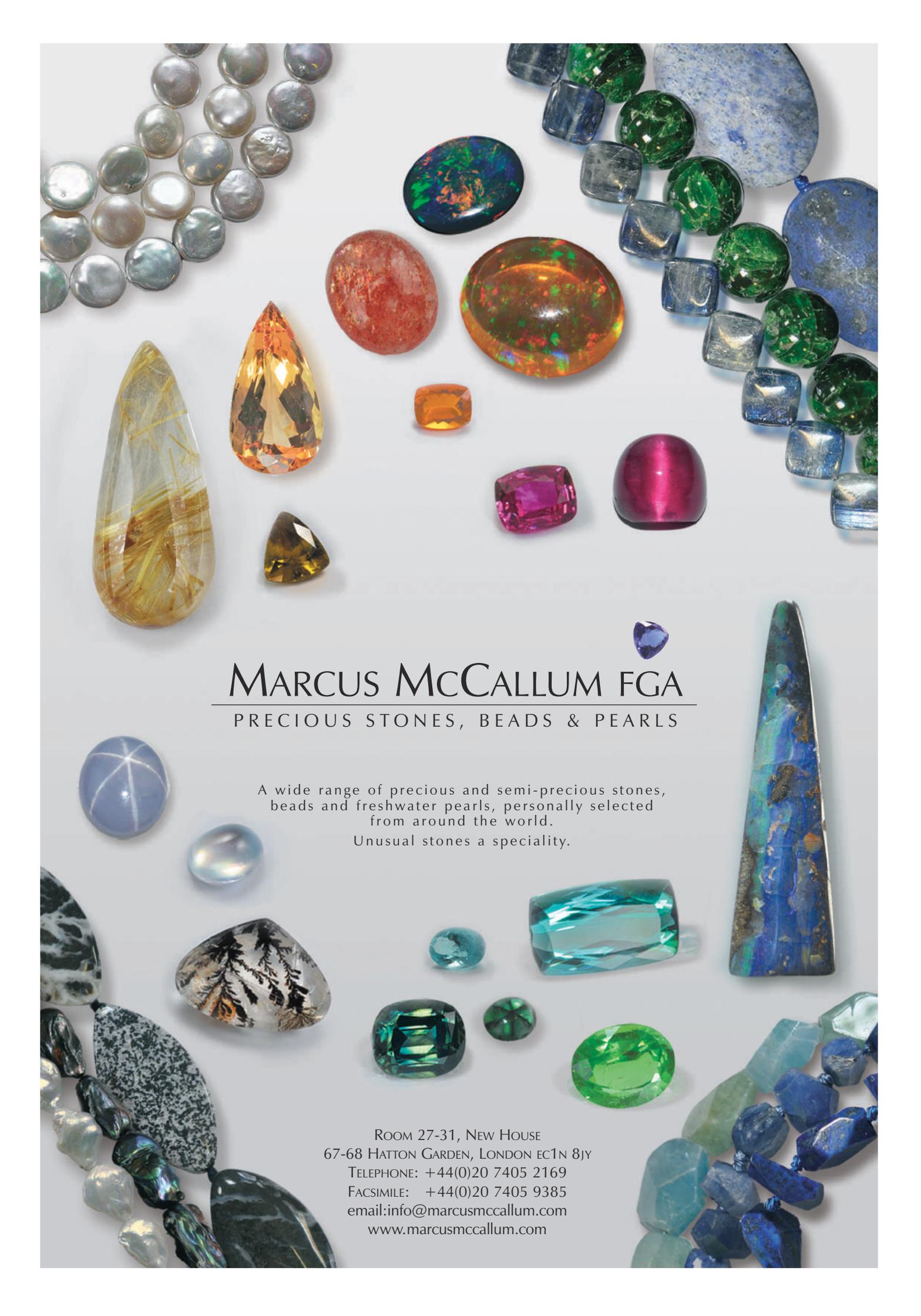
Gems & Jewellery

Spring 2012 / Volume 21 / No. 1

Gem crystal
surface features

Spherical
cultured pearls

Aquamarine-
coloured glass



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Gems&Jewellery

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Winds of change

This year is turning in to a busy one for Gem-A. As reported in Gem-A News and Views (page 40), we have a lease renewal on our Greville Street premises which will lead to a thorough refurbishment – something which those of you who know the building will agree is much needed. This will provide an excellent opportunity to reinvigorate both our onsite teaching facilities and the services we can offer members. How can we afford this you may ask, when only a very few years ago the Association was in poor health financially? The fact is that over the last few years we have run a very tight ship knowing we had these costs looming. We have focused on what we are good at and the things which are the core aspects of our business. This has led to the ceasing of loss-making operations, such as the laboratory, and an increase in students and thus revenue from our education, though it must be qualified that this increase is from overseas rather than the UK. Consequently we are investing in overseas shows and events to support our teaching centres and maintain our revenue stream whilst taking steps to protect teaching in our own backyard.

Jack mentioned last month about the thorny issues of nomenclature. Harry Levy continues the theme this month (see Around the Trade page 8) and I am pleased to say that at the recent CIBJO congress in Vicenza logical progress was made. Attending these meetings always sounds like fun but in reality there are often heavyweight discussions. You may well ask what is the relevance? CIBJO this year coincided with the World Diamond Congress and the Fiera Di Vicenza and thus the movers and shakers from many aspects of the world of jewellery and gemmology were present. This gives a global perspective on all issues and enables different cultures and markets to understand each other's problems. Together with the NAG and BJA, Gem-A represents the interests of British jewellers and gemmologists. In fact Gem-A is almost unique in being able to represent a global membership. A seat at the top table does not come cheap but it means that you have a voice in the direction of the issues affecting our trade. Further details will appear in the next issue.

From politics to photographs – look out for Anthony de Goutière's stunning photomicrographs (see front cover and pages 3–7), and why not think about entering our own photographic competition? See page 13 for more information.

James Riley
Chief Operations Officer

Cover Picture

Photomicrograph of colourless beryl weighing 456 grams, by Anthony de Goutière. Anthony says: "I first liked this photomicrograph in a landscape mode then decided that the pink areas resembled tulips and rotated the scene to portrait." For more stunning photomicrographs see Anthony's article 'Surface features on gem crystal specimens', page 3.



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Gem-A Conference 2012

Sunday 4 November 2012
The Hotel Russell, Bloomsbury



The 2012 Conference will be held at the magnificent Hotel Russell and will be followed by an evening dinner/dance. With a range of events on the days surrounding the Conference, be sure to book early to guarantee your place.

The programme will include talks from:

HANCO ZWAAN FGA
New emeralds from Brazil

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

BEAR WILLIAMS
The Bear Facts: Advanced instruments for the smaller lab

DR LORE KIEFERT FGA
West African corundum: Gems from Guinea, Sierra Leone and Liberia

And also:

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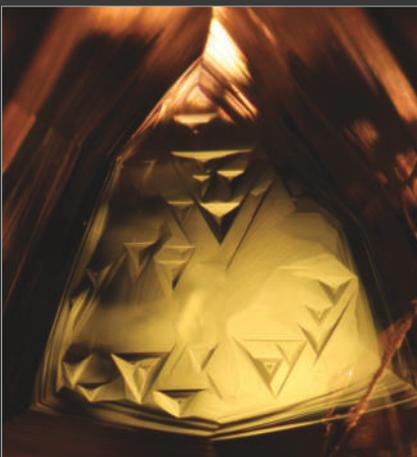
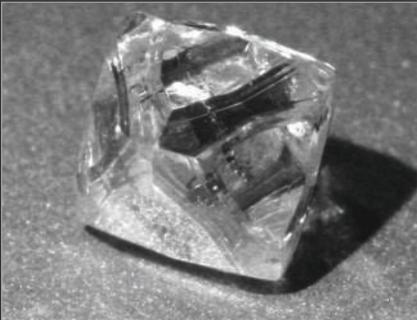
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www.gem-a.com/news-events/gem-a-conference-2012.aspx,
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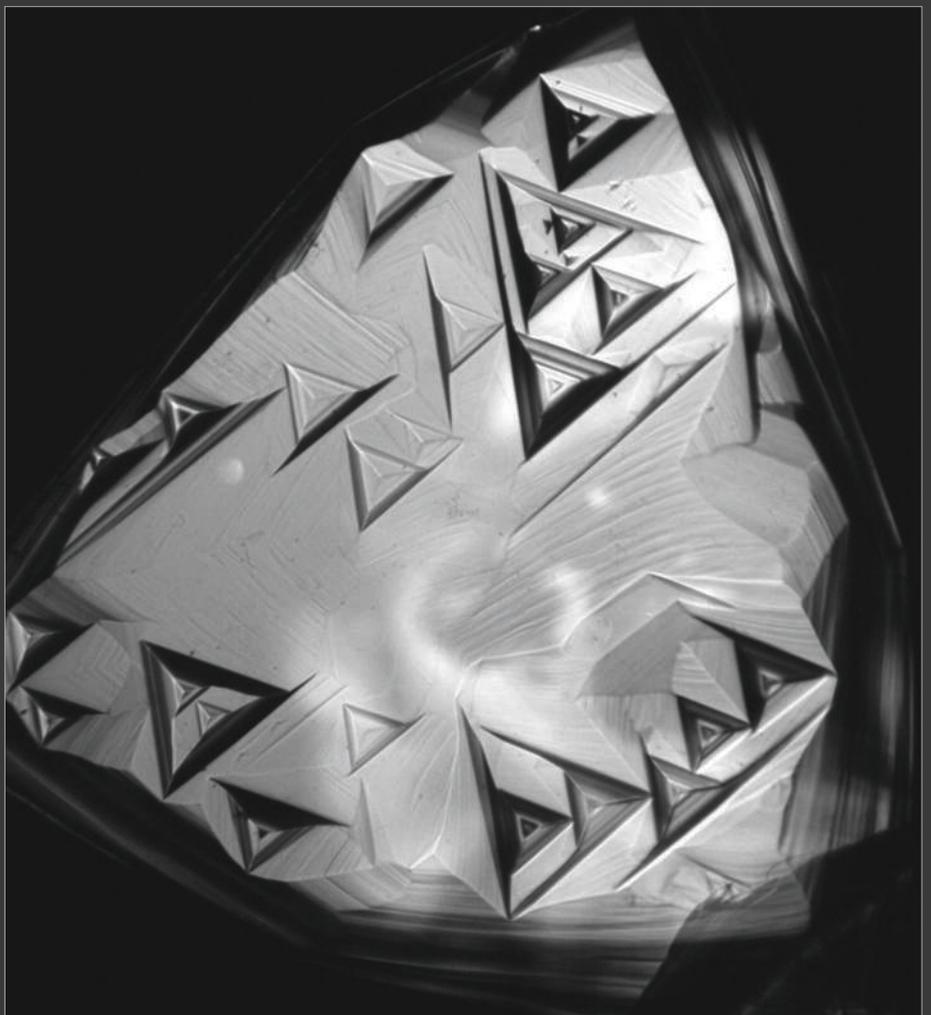
Surface features on gem crystal specimens

Anthony de Goutière shares remarkable photomicrographs of surface features on gem crystals.

Over the last few years I've put together a collection of scenes I've observed and photographed on uncut crystal specimens. Shown here are some of my favourite photomicrographs. The areas photographed in all of these samples averaged approximately 2 x 3 mm. Two fibreoptic pin-point illuminators were used for lighting while varying the intensity of the light sources created the different colour and tonal effects.

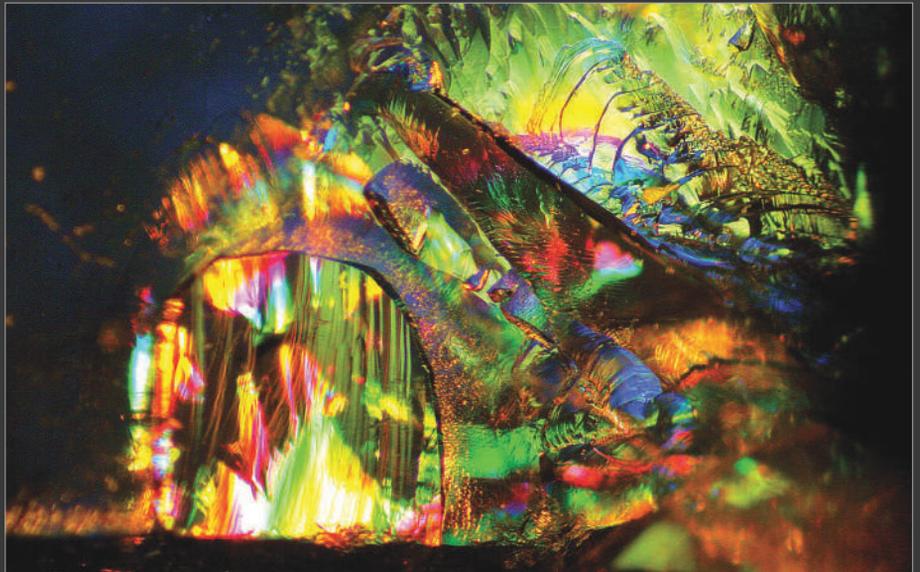
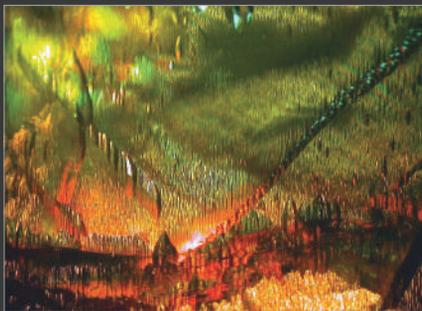


A nicely proportioned diamond octahedron weighing 1.39 ct (top left), displaying clusters of trigons on several of the crystal faces. The most striking and photogenic cluster is shown on the right with trigons within trigons, with the same face using lower-intensity illumination (above, lower).



Through the Microscope

Surface features on gem crystal specimens (cont.)



A cleaved section of topaz weighing 3.36 grams, cleaved from a larger crystal. One side of the slice is a termination with etching that is almost invisible to the naked eye (above). Under the microscope I found this scene (left) that once again was enhanced by interference colours from a thin film deeper inside the specimen.

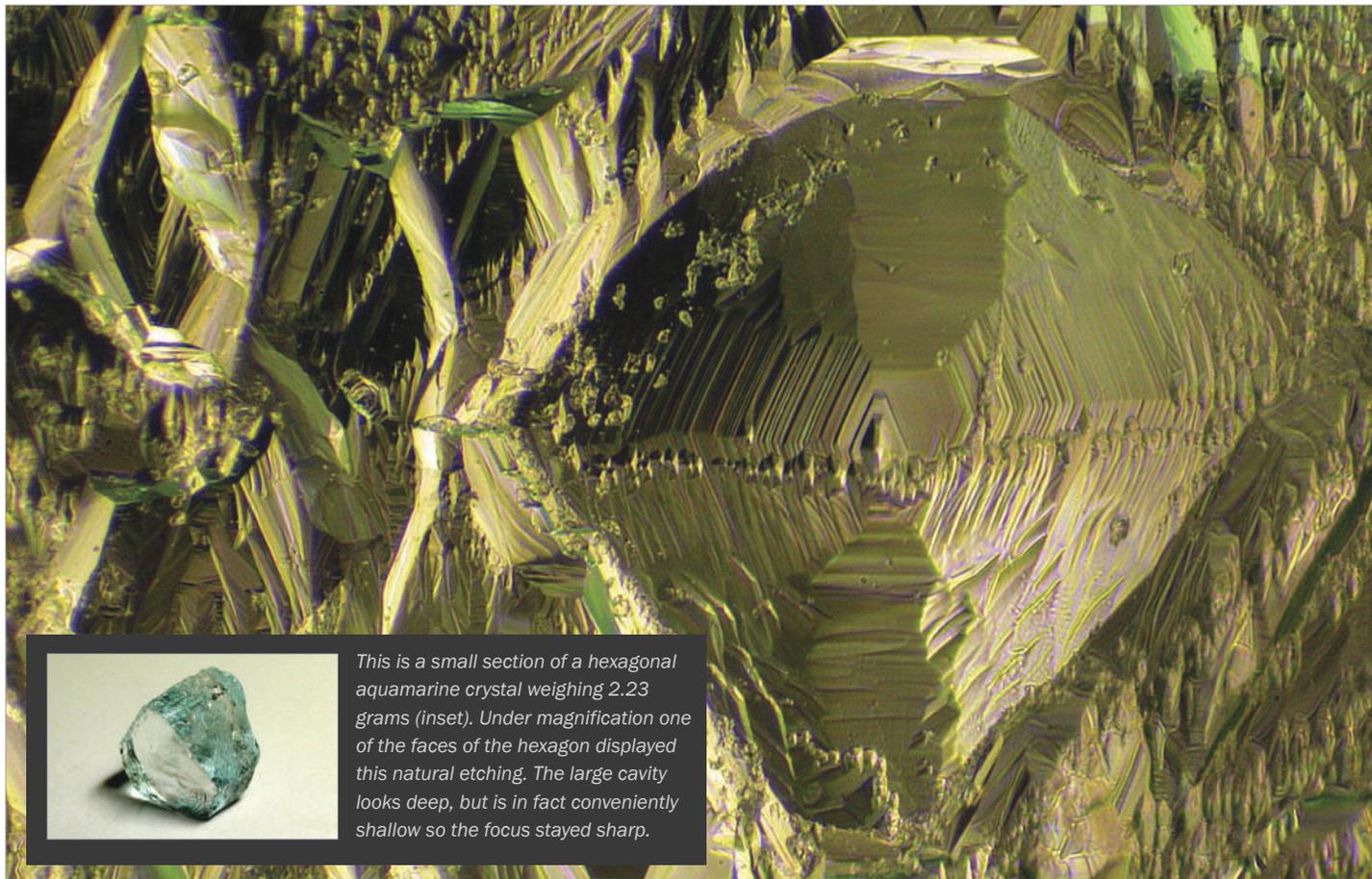


A slab-shaped colourless topaz crystal (below) weighing 20.74 grams, possibly cleaved off a larger specimen. I located this unusual scene (left) on the cleavage surface. It's unusual in that the tiny bubbles that appear to be rising from the 'clutching hands' are actually all half bubbles and could be the remnants of a liquid that had found its way into a parting plane.

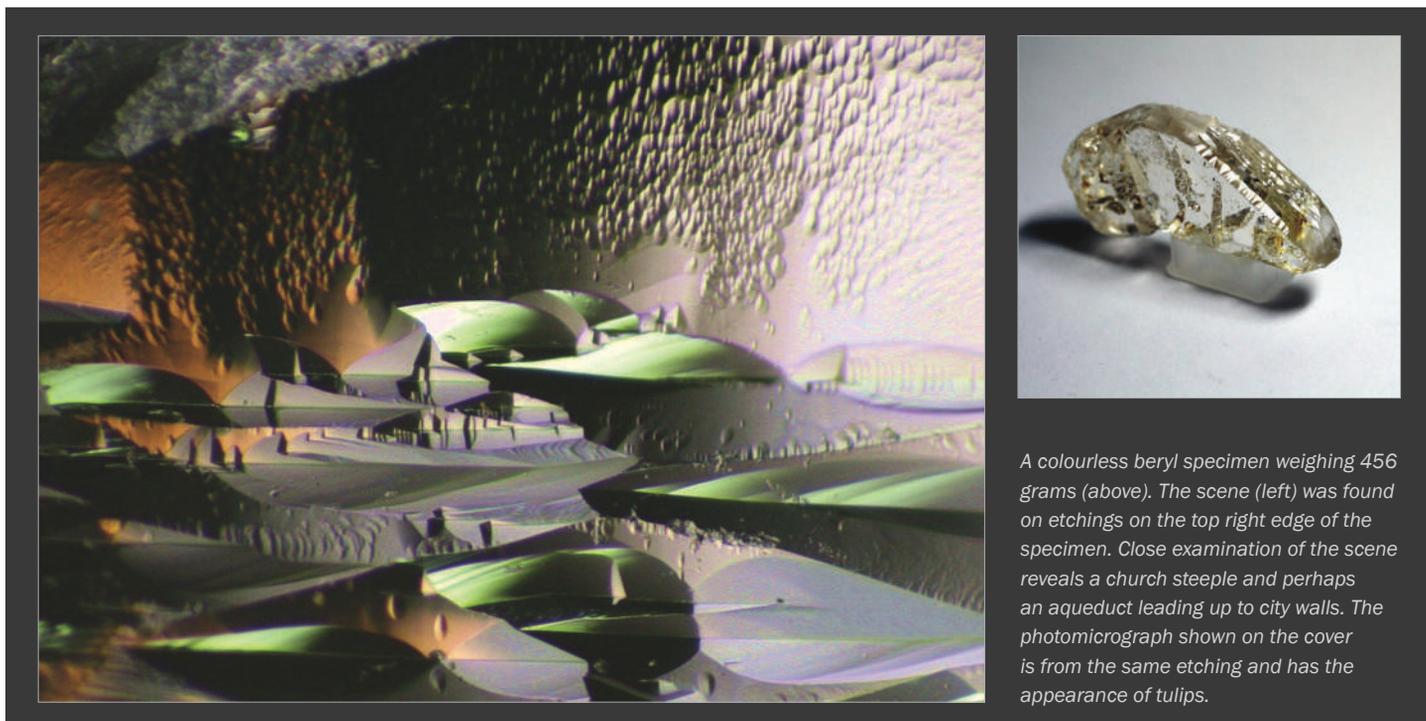


Through the Microscope

Surface features on gem crystal specimens (cont.)



This is a small section of a hexagonal aquamarine crystal weighing 2.23 grams (inset). Under magnification one of the faces of the hexagon displayed this natural etching. The large cavity looks deep, but is in fact conveniently shallow so the focus stayed sharp.



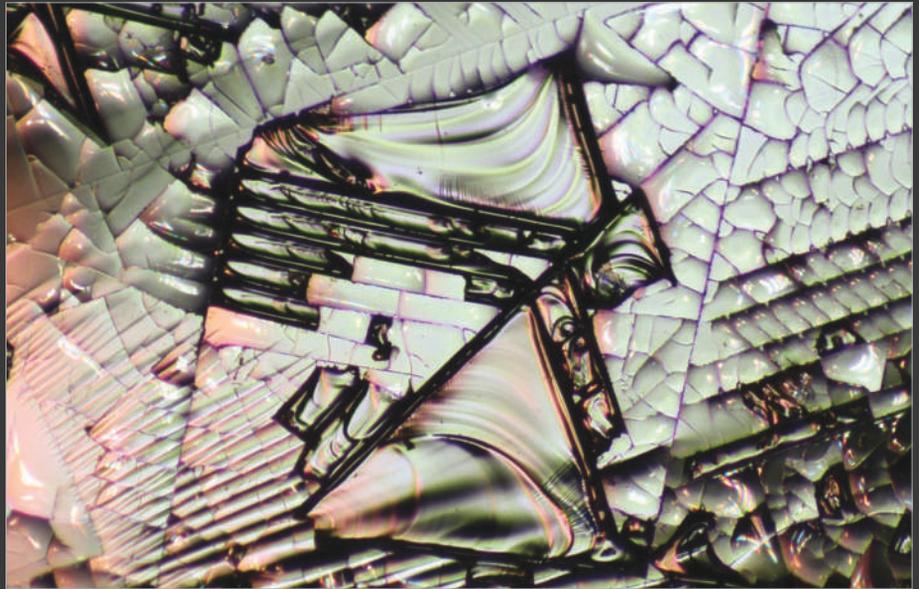
A colourless beryl specimen weighing 456 grams (above). The scene (left) was found on etchings on the top right edge of the specimen. Close examination of the scene reveals a church steeple and perhaps an aqueduct leading up to city walls. The photomicrograph shown on the cover is from the same etching and has the appearance of tulips.

Through the Microscope

Surface features on gem crystal specimens (cont.)



Black tourmaline (schorl) crystal weighing 7.24 grams. I didn't think it was a very exciting specimen to look at until I noticed a faint pattern on the termination. Under the microscope the two scenes on the right came to life.



Through the Microscope

Surface features on gem crystal specimens (cont.)



A zultanite (diaspore) crystal weighing 221.81 ct. In one area of the crystal I found a fracture surface that was beautifully enhanced by a thin film inclusion displaying vivid interference colours (right).



Acknowledgements

The zultanite specimen was kindly loaned to me by Rudi Wobito, the distributor of zultanite in Canada, for a previous article I wrote for *The Canadian Gemmologist*, Winter 2009. The diamond octahedron belongs to de Goutière Jewellers Ltd, Victoria BC. The remainder of the specimens are from my private collection.

About the Author

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

Around the Trade

The name game



Harry Levy FGA
discusses how to refer to
manmade stones.

The question of what to call manmade stones has plagued the trade for many years. At its root is the fact that only people involved with the trade in stones of natural origins have been the legislators for terminology, and have regarded manmade stones as something that should not be promoted and should not be part of the jewellery industry. This, arguably, is a legitimate position to hold and explains much of the history of manmade stone disclosure.

For comparison, look at the description of gold in various countries. Traditionally, gold purity is measured and described in carats (not the measure of weight). In the UK nothing below 9 carat (9 parts of pure gold in 24) can be called gold; in Germany this limit is 8 carat, in the USA 10 carat, and in France 18 carat. In recent years, with so much international trade, these limits find less and less application.

So with gem descriptions, synthetics cannot be called gemstones or gems, but merely stones. That they need to be referred to at all is a fact of life — they are set in jewellery offered to the public.

Initially, the international organization CIBJO divided stones into two categories, those of natural origin and those made by man, which it called 'Artificial stone'. This turned out to be too large a category as it included too many types of stones. So these were further divided into synthetic stones having all the physical and chemical characteristics of a natural counterpart, and 'imitations' which had some or none of these characteristics, they merely looked like the stones they were imitating. This has been a position that the trade has held onto tenaciously for many years.

The question of terminology has risen again with the increasing

presence of synthetic diamonds, especially white (colourless) ones. At the time of writing, white stones have still not penetrated the market in any commercial quantities but yellow synthetic diamonds, and some other colours, are now on the market. I suppose one important reason that the trade feared synthetic stones was their effect on the jewellery industry. Some thought that they would push out natural stones, with consumers preferring to buy jewellery with synthetic stones on the basis of colour, purity and price. Historically this has not happened. There are many reasons for this, most importantly because there have been enough natural stones to satisfy demand. New mines and sources have continued to be found, and lower quality natural stones can now be treated to improve both colour and clarity and thus keep prices down.

I must mention cultured pearls here, although they deserve a whole article on their own. The belief that they pushed out natural pearls and replaced them because of appearance and price is wrong. The harvesting of natural formed pearls has declined because the pearl fields have been overfished and pollution has killed off many of the pearl producing oysters.

The advent of synthetic stones came with production of spinels and corundums in all colours via the flame-fusion process of Verneuil. Next came flux-grown and hydrothermal crystals of Chatham, Kashan, Ramura and many others. In the market place the Verneuil stones were too cheap and the hydrothermal ones too expensive. It was then that confusion in terminology of stones really started to have an effect in the trade.

The legislators (the defenders of the natural gem industry) saw the confusion as a war between synthetic stones and natural stones. To the synthetic stone producers it was an internal war between flame-fusion and hydrothermally produced stones. How much anger, time, energy, frustration, ill-will and fighting could have been avoided had the trade understood this. I will refer to the producers of hydrothermal stones as the crystal-growers.

The crystal-growers claimed that their products were far superior

The Kimberley Process (KP)

The KP continues to right itself. In January the Chairmanship moved to America and Gillian Milovanovic, the new chairman, is set to introduce changes. The KP reached a crisis a couple of years ago with the new finds of diamonds in Marange in Zimbabwe. The non-governmental organizations (NGOs) claimed that under the regime of Mr Mugabe human rights abuses were conducted against artisan miners, as they were pushed out of the diamond fields by the military. It was alleged that the Zimbabwean government was using the proceeds from these diamonds for its own benefit.

Under the then existing KP rules there was little that could be done to prevent Zimbabwe from exporting stones. The KP had been designed to protect governments from insurgents, with little or no regulation to prevent human rights abuses by incumbent governments. KP meetings did not sort this out, Marange diamonds continued to appear on the world markets, and in frustration Global Witness, one of the leading NGOs in the KP, quit the organization. The Americans have announced that they will revise the KP to overcome its problems and this process will be announced in Vicenza in May at the World Diamond Club (WDC) Conference.

to those produced by the Verneuil process. The latter did not have the crystal habits of natural equivalents. Hydrothermal stones can have similar crystal forms and habits as those grown by nature. However, they took longer to produce than Verneuil stones, were far more expensive to make, and were marketed at much higher prices, selling for many hundreds of dollars whereas Verneuil stones sold for cents. The crystal growers thus objected to their stones being classified under the single term 'synthetic' which equated them with Verneuil stones.

Chatham for one decided to unilaterally call his manmade stones 'cultured'. All hell broke out in the gem trade. Chatham was barred from exhibiting his stones at gem fairs, he took legal action and the fight went on for several years. The trade attacked the use of the term 'cultured' for something that was not a pearl, and eventually, under the US Federal Trade Commission (FTC) a compromise was reached, whereby he could call his product 'laboratory-grown' and 'laboratory-created'. Chatham agreed because he did not want to be restricted to the single term 'synthetic', but to me there is nothing magical in these new terms; I do not think they sell any more or any less stones.

This fight has persisted to the present day; the legislators eventually gave way, only last year, to permit the use of 'laboratory-grown' and 'laboratory-created' as alternatives to the term 'synthetic'. This was forced on them by pressure from the diamond industry who realized that the trade could not arbitrarily ban words in common usage, and that alternative terms must always be available. The trade has banned the use of the term 'cultured' for coloured stones and diamonds, but the FTC has ruled that it can be used if further qualified by 'synthetic', 'laboratory-grown', etc. The conservatives are again sharpening their knives to nullify this position, as someone said during the debates "We are not here to promote synthetic stones." Such people still see themselves as defenders of the natural gemstone trade.

The clearest term to use is 'manmade', but this has gender problems, covers many stones that are not synthetics and, as one wit said in our debates, it is not sexy enough to sell stones, and thus not wanted by producers of synthetic stones.

Other groups that have complicated any attempt at a simple classification are: 1) the large group of imitation stones and simulants (including glass, pastes, faux stones, plastics and much more) has not caused nearly as much controversy as those discussed above, and 2) CZ, moissanite, GGG, strontium titanate and many others, fall into yet another category of manmade stones which are crystalline but have no commercial counterparts in nature.

An ironic aspect of how things have developed is that the producers of synthetic stones, especially synthetic diamonds, now demand protection and differentiation from producers of simulants. They claim that these are now being sold as a type of synthetic diamond.

I hope my fellow legislators will see this broader picture, and will try to establish fair terminology and concern for all sections of the trade.



Chatham rubies: synthetic, cultured, manmade or laboratory grown?

Rough diamonds

In recent times, there have been some profound changes in the distribution of rough diamonds, but most of the trade seems to be keeping mum about this. For many years 95% of the world rough was distributed through De Beers. This caused friction with the Americans who accused De Beers of being a monopoly and of being inconsistent with antitrust legislation. They were barred from the USA.

Currently, De Beers' share of the market has dropped to below 35%, the other main players now being Alrosa (Russia), Rio Tinto (Argyle, Australia), BHP Billiton (Canada), and other smaller groups. The traditional method of selling rough was through sight-holders, and De Beers still operates this system, but the others sell through tenders. This means that there are fluctuations in the price of rough, the price being set by the buyers and not the sellers. The price of rough ultimately affects the price of polished goods. This will make price lists, such as those produced by Rapaport, much more difficult to make. The present system of using grading reports and discounts on the 'Rap' price will become much more difficult and there will be greater variations in prices. It could bring back a greater profitability for traders, but would mean they would have to become much more professional and selective in their buying. At present prices are very stable on the international market. Let us see what happens with changes in the KP, variable rough prices, and with a greater quantity of white manmade diamonds on the market. We live in interesting times.

Contact the author

If you wish to contact Harry about any of the issues raised here please email harrylevy1@btinternet.com.

Gem News from Gary Roskin

Gary Roskin FGA reports on some of his favourite gems from this year's Baselworld show.

This is the third year that I have covered the gem hall for the *Baselworld Daily News*, the daily newspaper given out to attendees of Basel, the largest watch and jewellery show in the world. While there are gems everywhere in the show, Hall 3, or the Hall of Elements, is reserved primarily for loose diamonds, coloured stones and pearls. There is a congregation of antique and estate dealers who bring some of the finest gem-set jewellery, also covered in the newspaper.

The challenge every year is to find the stand with newsworthy gems, to take pictures of them and then quickly write up the report in the editorial office so that it appears in the following morning's paper. It can be quite a race, but is truly exciting when everything falls into place.

The first day is usually about getting a feel for what's in the Hall. You move quickly through the aisles, passing windows of gems, trying to remember who has that special something to come back for. In this

manner I came across a very nice display of Mozambique tourmalines from Groh & Ripp, Idar-Oberstein. They were large, colourful, and all unheated, ranging from shocking vivid teal (very slightly greenish-blue), to olive (very slightly brownish-green), to lilac (light purple) and to peach (a very slightly pinkish-orange colour). Also from Idar-Oberstein were Wild & Petsch, Henn, Constantin Wild, Paul Wild and Ekkehard Schneider, who had the lion's share of the tourmaline material, with different variations on a colour theme, but all large and unheated. As you might suspect, heating the material may yield a Paraiba-like vivid blue, but these natural colours are, according to the suppliers, even more rare and exciting.

Speaking of rare, it wasn't hard to find exceptional rare gems. Siegelson displayed a 30 ct Golconda 'D' colour diamond, while Pluczenik showed a matched pair of flawless 'D' colour round brilliants, weighing 15 ct each. Hahn showed a 75 ct cushion oval, medium-light, nice and even orange-pink padparadscha, mounted in a ring with a surround of diamonds. Known for their cultured pearls, they also showed me a 20 mm round, nice lustre, dark grey Tahitian pearl.

Natural pearls are available with several exhibitors — mainly estate dealers — but one company, Vishrut, from Mumbai, had the most spectacular inventory. Everywhere you looked there were multi-strand 18–20 inch cream to white, nice lustre, near-round 10 mm to 4.5 mm graduated necklaces, with fabulous diamond clasps. Of course, when I asked the price, 'million' was in the reply almost each and every time.

What's fun about covering Hall 3 is the variety of large fine quality gems, from the



One of the many natural pearl necklaces on display from Vishrut, Mumbai.

Gary Roskin's outstanding gems from Basel



Top left: A magnificently cut 28 ct heated pink topaz and a beautiful 15 ct blue spinel — both rather pricey — from Nomad's, Bangkok.

Top right: A 3 ct Fancy Vivid Pink, from Swissdiam, Geneva.

Bottom left: A cute little dalmatian made from dalmatian stone, sitting in a green peridot lawn. From Ruppenthal, Idar-Oberstein.

Bottom right: 8 ct natural blue spinels, from Edigem, Lucerne. Can you see the hexagonal included crystal that reaches the surface in the cushion?

Gems and Minerals

Gem news from Gary Roskin (cont.)

Gary Roskin's outstanding gems from Basel (cont.)



Above: A 4 ct Fancy Vivid Blue, Swissdiam, Geneva. Left: Matching hot vivid reddish-pink unheated spinels (over 15 ct t.w.), with a mandarin and mint garnet. From Yavorsky, Bangkok. All photos Gary Roskin.

seemingly plentiful 8 to 10 ct blue spinels, to the 2 and 3 ct demantoids. Fancy coloured diamonds were easy to find, including several 1 ct Fancy Intense Oranges. If you're looking for something larger there was also the 75 ct Fancy Intense Yellow briolette from Marc Lazar.

Baselworld is truly a gem lover's delight — there's something to look at everywhere you go. We may not be able to afford it, but no one says you have to buy in order to enjoy!

Right: A fabulous gem display from Groh & Ripp, Idar-Oberstein, showing off the sizes and colours of unheated tourmalines from Mozambique.

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.



Gem-A Photographic Competition

All Gem-A members are invited to participate. Once again there are four categories in which an image may be submitted:

1 Natural

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

2 Treated

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

3 Synthetic

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

4 Melange

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

To enter

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

Closing date: 29 June 2012

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

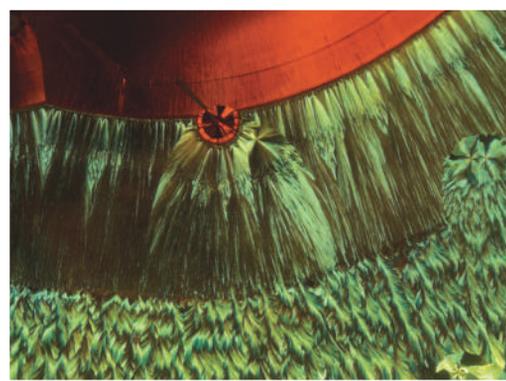


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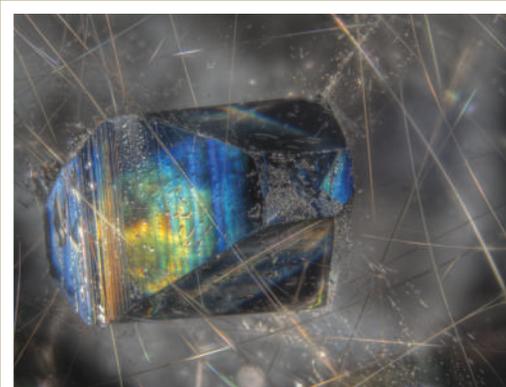
THE GEMMOLOGICAL ASSOCIATION
OF GREAT BRITAIN

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2011 Photographic Competition winners



Overall winner and winner of Natural category:
Fibrous hematite and goethite aggregates in quartz from Minas Gerais. © Michael Hügi.



Winner of Treated category:
Blue anatase crystal and rutile fibres in quartz from Minas Gerais. © Michael Hügi.



Winner of Melange category:
Cut cultured pearls in round slices. © Keiko Kon and Gem Science Academy of Gemology, Tokyo.

Rough grading system for Zambian emeralds

Following their Gem Discovery Specialist Evening, Adrian Banks of Gemfields PLC discusses the company's pioneering emerald grading system, and gives a few pointers on what they look for.

Deep green emerald is one of the most prized coloured gemstones on Earth. Its quality varies however, and so London-based Gemfields, who produce approximately 20% of the world's emerald supply at its Kagem Mine, Kafubu District, Zambia, has developed a system for grading the rough.

Zambian emeralds are renowned for their rich, deep colour and superior quality. The Kagem Mine covers an area of approximately 43 km² and has been an important producer of emeralds since the early 1980s. The mine was acquired by Gemfields in 2008, with the democratically-elected Government of the Republic of Zambia as its partner. From this mine Gemfields maintain a reliable and consistent emerald supply, which is conflict-free and responsibly sourced.

The emerald rough is offered to the market by way of closed tenders, which the world's top gem houses and emerald lapidaries are invited to attend four times a year. Schedules are made up of the graded rough and, after viewing the samples, the participants submit their closed bids. The

schedules are then sold to the highest bidder who exceeds the undisclosed, pre-set reserve prices.

The most valuable of the beryl group, emeralds are not easily categorized by conventional standards due to their unique characteristics. The emeralds are graded using four basic parameters: colour, clarity, cut and carat weight. In coloured gemstone grading, colour is normally the most important quality. In emerald grading a fine emerald must possess a pure green hue, as well as good clarity, to be considered a top gem.

Most gemstones are prized specifically when they have good clarity, meaning that there are no visible cracks or inclusions in the stone. Emeralds, however, are in a class of their own — they are what are sometimes classified as 'type III' stones, that is, almost always included. Emeralds are the only major gemstone expected to have natural visible inclusions. Some buyers covet the fissures, or 'jardins' (from the French for 'garden'), that are a hallmark of many natural emeralds. These fissures tell a story of the gem's



Above left: Sorting the rough stones for grading.

Above right: An extremely fine 144 gram Zambian emerald crystal. Photos Gemfields.

Gemfields' guide to grading emeralds

Recovery/cut

Even for a skilled gem cutter, cutting emeralds presents a special challenge, firstly because of the value of the rough crystals and secondly because of their frequent inclusions. During grading the yield of each piece is carefully considered, as this drastically impacts the cost of the finished gem. It is often impossible to fashion a visually appealing gem from a single piece of emerald rough as it has to be sliced into a number of pieces due to inclusions and cracks.



Colour

Colour is divided into three components: hue, saturation and tone. Physically, Zambian emeralds range in colour from a rich saturated green to a vibrant green with slight bluish undertones. The emerald derives its beautiful green colour from the presence of chromium and vanadium. The primary hue is green, with yellow and blue as common secondary hues. 'Emerald saturation' is the brightness or vividness of the colour, and refers to the degree to which the hue is hidden by brown or grey. Colours with a minimum amount of brown or grey are described as 'vivid' or 'strong'. Only gems that are medium to dark in tone are considered emerald; light-toned gems are known instead by the species name beryl.

Size

Rough emeralds are weighed in grams, and once cut and polished are weighed in carats. Zambian emeralds vary from points of a gram to in excess of one kilogram in some exceptional cases. It is not uncommon to mine stones of several hundred grams but these are generally of lower quality. Gemfields sort the rough emeralds into six sizes using calibrated millimetre sizing sieves. Size 1 is the smallest at 4–11 mm, while the largest is 6, consisting of emeralds larger than 31 mm.

Clarity

The higher the clarity, the more brilliance and 'liveliness' is exuded by the emerald. Clarity is one of the most significant factors in emerald quality. An emerald with good colour, cut and carat weight needs good clarity to bring life and fire to it. Without this the stone will appear opaque to the eye. Hazy to opaque rough will therefore be fashioned into cabochon cuts or beads whilst transparent rough will almost always be cut into faceted gems.



(Left) 'A' grade Zambian emerald. Note the saturation of colour and the size and clarity of the stones, compared with 'M' grade stones (right), the lowest grade of emerald. Photos Gemfields.

geological journey, giving it a unique identity.

When grading rough emeralds into one of over 200 grades, one has to imagine what cut and polished gems can be obtained from the rough when it goes through the cutting and polishing process.

No two emeralds will ever be the same, but grading the rough material permits its separation into groups with similar characteristics, allowing cutters to

manufacture quantities with comparable quality. Such uniformity was difficult to achieve prior to the introduction of the Gemfields grading system and has revolutionized emerald production.

For more information about Gemfields visit www.gemfields.co.uk.

About the author

Adrian is Head of Global Sales for Gemfields and is responsible for managing their entire rough materials supply chain, including grading, quality assurance, trading and sales. Adrian is passionate about coloured gemstones and has been involved in the industry for 13 years.

The magic circle

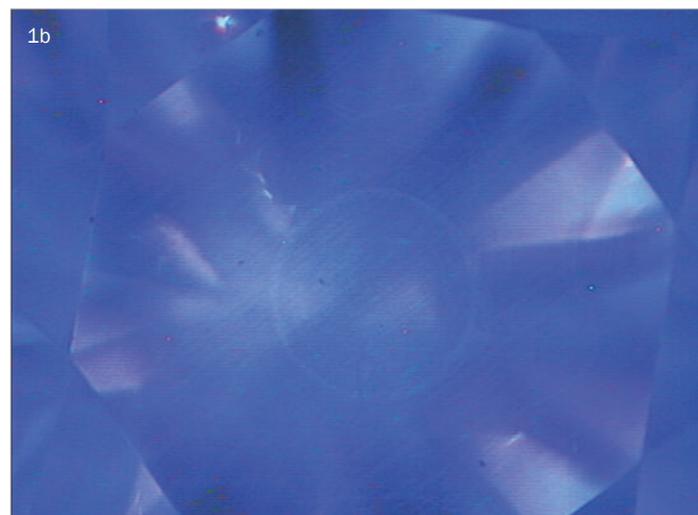
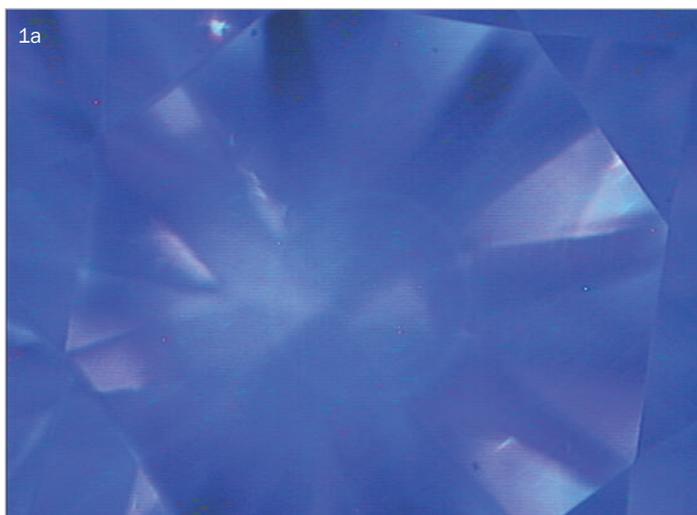
Alethea Inns, of the American Gem Society (AGS) Laboratory, discusses an unusual diamond that was submitted for testing.

As part of the standard synthetic and treatments screening process for stones submitted to the AGS Laboratory, a diamond with an unusual fluorescent circular feature visible on the table facet was noticed by gemmologists. The 1.19 ct faint pinkish brown type IIa diamond displayed a fluorescent circular feature centred on the table of the stone (**1a**) during the short wave fluorescence/phosphorescence imaging on a DiamondView instrument.

The initial reaction by gemmologists was that it could be caused by residue on the surface of the table, so the stone was again cleaned and then re-examined; however, the strange circular feature remained. We then examined the table under high powered magnification in reflected light to ensure that nothing on the surface of the table could be contributing to the circular fluorescence pattern (**2**). With the exception of polishing lines, no other features were observed on the table.

Considered next was the possibility that the fluorescence circle was located just underneath the surface of the table facet. DiamondView imaging confirmed that the feature was beneath the surface of the stone, as it resolves when the focus is moved from the surface of the table (in focus in **1a**) into the diamond (**1b**).

Then the possibility that the circular feature was an artefact of light or a consequence in some way of the mounting apparatus had to be considered. When the diamond was tilted in the DiamondView apparatus, the circle stays in place, dispelling the idea that the circular feature is an artefact of stray light or a reflection.



1a: The fluorescent circular feature is visible centred in the table of the diamond. Slip planes and dislocations cutting through the table of the stone are also visible. Magnification 40 \times .

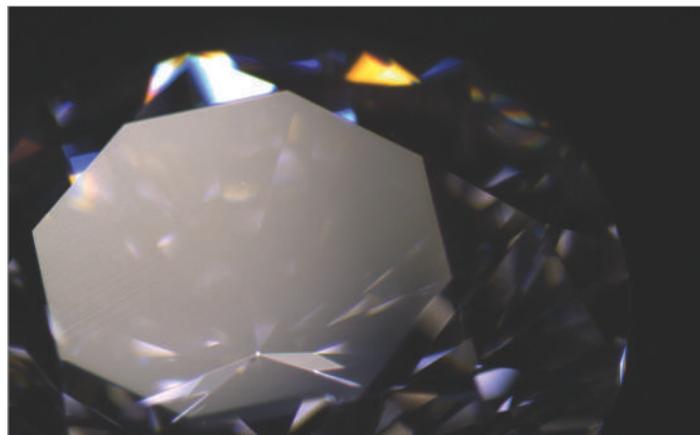
1b: The fluorescent circular feature resolves when the focus is extended beneath the surface of the diamond (note the table facet is now out of focus). Magnification 40 \times . Photos: Alethea Inns.

The diamond was mounted girdle-to-girdle in the DiamondView instrument, and the phenomenon is not a result of any stone mount or suction cup that other models of DiamondView currently use. Furthermore, under regular darkfield lighting and crossed polars, very fine tatami strain of low order was visible, but this did not show any circular pattern which could have been linked to the fluorescence.

Despite the circular feature, the combination of the photoluminescence (PL) spectrum, blue fluorescence and phosphorescence, and growth features in the DiamondView image that are typical of natural type IIa pink/brown diamonds, indicated that the stone is natural and untreated.

Having eliminated all possibilities that the fluorescent circular feature was a result of a surface remnant, a light artefact, or the mounting/stone holder, we forwarded our findings to multiple gemmological experts for their comments, but no causes for this circular feature were suggested. As the evidence stands now, the cause of the fluorescent circular feature is unknown, but is most likely a sub-surface remnant of the polishing or bruting process, in which the stone was anchored by the table, with any associated surface evidence removed by later polishing the table.

In the meantime, research is ongoing. Any suggestions regarding the cause of this phenomenon are welcome.



2: The table facet in reflected light shows no features which could relate to the fluorescence circle. Magnification 35 \times . Photo: Jennifer Tobiasson.

About AGS

Founded in 1996, AGS Laboratories are providers of diamond grading reports. They became the first major lab to offer diamond grading reports with a Cut Grade for fancy shapes. Contact Alethea Inns at ainns@agslab.com for more information.

EXPERIENCED GEMMOLOGISTS

Gem scientist (analyst/consultant) wanted

Consultant, part-time or full-time position.
Applications for internships with BGI also welcome.

Gem/crystal analysts with a BSc or PhD in physics, molecular spectroscopy experience or FGA/GIA (GG) qualified gemmologists are invited to apply for the above position at the British Gemmological Institute (BGI) gem laboratory in London. Spectroscopy experience with UV-Vis NIR, FTIR, EDXRF, PL, Raman and SEM is ideal, as is experience in determining coloured gem origins. Fancy or coloured stone experience would also be useful. Competent computing skills a must. Mineralogists or crystallographers may also apply.

The BGI, now in its fourteenth year, is one of the leading laboratories on rare gems, having developed a precision diamond grading system directly linked to official GIA master stones from Lazare Kaplan in New York. You will be working in a friendly, varied and challenging environment.

Part-time consultants welcome, hours to suit. Pay or salary negotiable. Contact BGI Laboratory with references and full CV or resume only; email: bgi@bgiuk.com

Synthetic green sapphire



1: A step cut 'emerald' set in a ring. Magnification 10 \times .

Tay Thy Sun, Wouter Vansteelant and Loke Hui Ying investigate synthetic green sapphire imitating Colombian emerald.

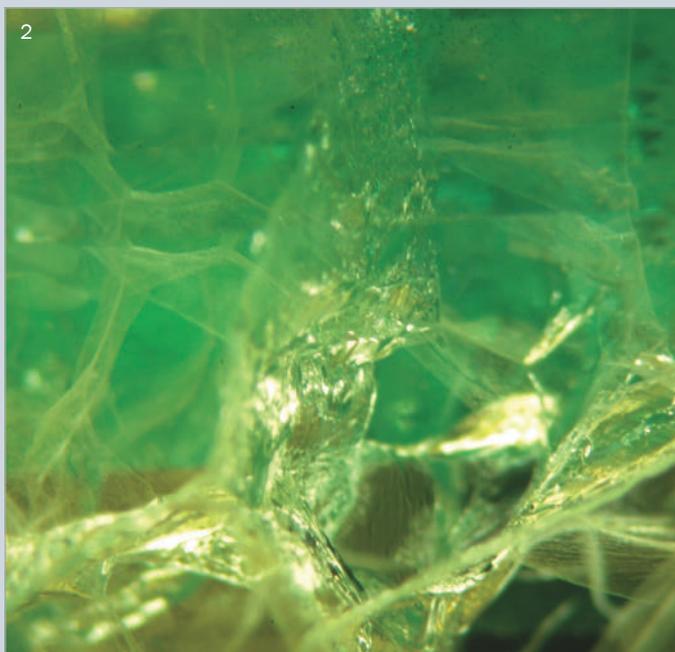
A green step-cut gemstone set in a ladies' ring that looked like emerald was brought to our laboratory for examination (1). Our first impression was that it looked unusually bright for emerald, having an electric lime green colour. The customer claimed that it was bought as 'Colombian' emerald.

Routine testing found that the 'emerald' had an RI reading of 1.770 – 1.762, certainly belonging to the corundum species. Under microscopic observation, it displayed wispy veil-like inclusions (2) with very tiny white and bluish gas bubbles (3) in cluster formation. Very faint blue curved colour banding could also be observed (4), although due to the size of the stone, the curve is not obvious.

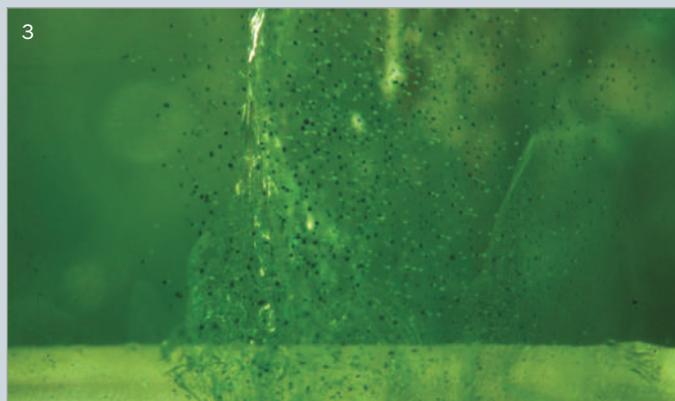
Conclusion

The green stone which the client claimed was an emerald was in fact a synthetic green sapphire. The gemmological properties proved that this surprisingly bright green gemstone was a synthetic green sapphire of flame fusion origin, with induced fissures with wispy veil inclusions.

Reprinted with kind permission from Far East Gemological Institute (Singapore) and HRD Antwerp (Belgium). All photos © Tay Thy Sun.



2: Wispy veil-like inclusions with some 'healed' fissures, looking very much like liquid fingerprint inclusions. Magnification 20 \times .



3: Besides the wispy 'veil' inclusions, there are clusters of white and blue gas bubbles. Magnification 30 \times .



4: Very faint blue curved colour banding runs in the same direction as the step cut facet of this stone. Magnification 25 \times .

Gem-A Annual General Meeting and Pimms Party

followed by

Ethiopian opals by Dr Emmanuel Fritsch

Wednesday 11 July 2012

Tudor Room, Imperial Hotel, Russell Square



Ethiopian opals by Dr Emmanuel Fritsch

In this presentation Dr Fritsch will discuss the opals from the Wollo province of Ethiopia, a deposit which promises to be the source of opal for the twenty-first century and which is causing quite a stir in the gem trade. Dr Fritsch will discuss the unusual dimensions and geological nature of the gems, and will assess their unique properties, focusing particularly on their behaviour in relation to treatment and durability, and thus highlighting the poorly documented question of the destabilization of opals.

Dr Fritsch is Professor of Physics at Nantes University. Having obtained his PhD in Geophysics and Internal Geodynamics from Paris VII University in 1985, he then joined the Gemological Institute of America (GIA), becoming manager of GIA Research from 1993 to 1995. Today Dr Fritsch is in charge of gemmological education and teaches the DUG diploma. Dr Fritsch's recent studies include gem opals and pigments in pearls, nacre and corals. He is currently writing a book on rough diamond morphology and has written over 280 publications, including over 150 scientific articles.

AGM

The Agenda, Annual Report and Accounts, and other AGM documents will be available to download from our website at www.gem-a.com/membership/agm-2012.aspx from 13 June.

Current Gem-A members and registered students may attend the AGM but only paid-up members may vote. The evening is free of charge for paid-up Gem-A members and £10.00 for Gem-A students. Please note that guests of members and students will not be admitted to the AGM, but may attend the Pimms Party and talk at £10.00 per head, payable on arrival.

Programme of evening

17:30	Registration
18:00	Meeting
18:30	Pimms Party
19:00	'Ethiopian opals' by Dr Emmanuel Fritsch
19:45	Questions
20:00	Close

If you wish to attend either the talk or the AGM please advise us by **Monday 2 July** at the latest, by emailing membership@gem-a.com or calling the Membership Department on +44 (0)20 7404 3334.

Instruments

Diamonds can give moissanite results on testers

Alan Clark FGA DGA, manager of Gem-A's subsidiary company Gemmological Instruments Ltd, warns that some diamond testers can give incorrect results.

Up until now the use of moissanite testers that use electrical conductivity as the means to distinguish between colourless diamonds and synthetic moissanite has been taken as being near enough foolproof by most of the general retail trade. However, it has now been proven that, albeit rarely, there are colourless diamonds that do conduct electrical current which could give the wrong result if using any moissanite tester.

It is known to those who have studied the Gem-A Diamond Diploma and comparable courses that there are different types of diamond. Type IIb diamonds, normally considered blue/grey in colour, will give a moissanite reading on a tester. This is due to the presence of boron instead of nitrogen which allows an electrical current to pass through the diamond. Type IIb diamonds can also have a mixture of nitrogen and boron in the same diamond (although rare) and an electrical current can be passed through the diamond giving a synthetic moissanite result from a tester, although this depends on the ratio of each element. Such a stone was discussed on MailTalk several months ago, where a 'D' colour diamond was tested and given a report by the GIA. The diamond was found to be a type IIb diamond which conducted electrical current and gave a moissanite reading on a tester.

Over the years Gem-A has also had reports from customers who have found (although rarely) that a certified colourless diamond had been tested with a moissanite tester and registered the diamond as moissanite. Such occurrences were put down to a faulty tester or poor testing technique, but now it appears that this is not the reason in all instances.

Type IIb colourless, grey and blue diamonds are rare, but there is now a need in light of the above to undertake and examine stones that come in for testing more closely than just using a tester. Type IIb diamonds will give a moissanite reading on testers, therefore examination with a 10× loupe or microscope should be carried out for inclusions and doubling of the back facets on a faceted stone, which conclusively proves the stone is not a diamond.



Gem-A has an A3-sized poster with photos and descriptions of synthetic moissanite and diamond available free of charge. To obtain a copy please visit our offices at 27 Greville Street, London EC1N 8TN. We are sorry but we cannot send posters by mail.

Treated synthetic moissanite

Synthetic moissanite normally has a colour of J–L on the diamond grading scale. Recently Serenity Technologies has introduced a proprietary and permanent colour upgrade technique which, they say, can improve the colour grade of moissanite by up to four grades on GIA's near-colourless spectrum. This is available exclusively from Charles & Colvard under the new brand Forever Brilliant™. Serenity's enhancement technologies have also been applied to create pink, red, yellow, blue, chocolate and orange synthetic moissanite, also available from Charles & Colvard.

Gem-A Career Service

What's fair? Ethical challenges for the gemstone industry

Tuesday 19 June 2012, 18:00 – 20:00

Fairtrade Foundation, Tower Hill, London

Ethics is a growing issue within the industry. Three specialists in the field will discuss the influence of Fairtrade policies and the implementation of an ethical supply chain within the gemstone industry, while considering the reality of everyday business factors.

Speakers include:

- **Gemma Cartwright, Fairtrade Foundation**

'The Fairtrade movement: the growth of ethical awareness among consumers and industry from coffee to gold.'

- **Jack Ogden, Gem-A CEO**

'The gemstone market today: ethical issues and does the trade care?'

- **Greg Valerio, one of the founders of the Alliance for Responsible Mining (ARM), co-founder of Fair Jewelry Action, and CRED founder**

'Implementation of ethical supply chain in the gem and jewellery industry.'

To attend

This talk is free. For more information or to book please phone 020 7404 3334 or email events@gem-a.com.

Location

Fairtrade Foundation Office

3rd Floor, Ibex House, 42–47 Minories, London EC3N 1DY



Gem-A
THE GEMMOLOGICAL ASSOCIATION
OF GREAT BRITAIN



The Gem-A Career Service has been developed to support our graduates, current students and members. Once a month a professional speaker from the gem trade industry gives an insight into the area of the industry in which they are working and tips on how to find a job. Open to all Gem-A graduates, students and members, the Gem-A Career Service is free and encourages networking between gemmologists. For more information on upcoming events please call 020 7404 3334 or email events@gem-a.com.

Gem-A Calendar

June

10

**PRACTICAL CATCH UP DAY
Gem-A South West Branch**

BRLSI, Queen Square, Bristol

A friendly and informal afternoon giving you the opportunity to test a wide range of stones with the help of experienced gemmologists. Price £10 for members and current Gem-A students and £15 for non-members, including refreshments. For more information or to book contact Eve Symes at eve@vidan.co.uk, or Kerry Gregory at kerry@gemmologyrocks.com



19

WHAT'S FAIR? ETHICAL CHALLENGES FOR THE GEMSTONE INDUSTRY

Gem-A Career Service

3rd Floor, Ibex House, 42-47 Minories, London EC3N 1DY

For more information see page 21.

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SGA AGM AND TALES OF A RECENT TRIP TO RUSSIA

Scottish Gemmological Association

To be held at The British Geological Survey, Edinburgh, 19:00

The AGM will be followed by several short talks by SGA members on their personal views and experiences of the recent field trip to the Urals in Russia.

Doors open at 18:30. AGM commences at 19:00. Talks start at approximately 19:30.

Free for SGA members, guests £5.

July

3

**WORKING IN THE DIAMOND INDUSTRY
Gem-A Career Service**

Gem-A Headquarters, 18:00-19:00

James Riley will offer an insight into the various employment opportunities that exist in the diamond industry. James has a wealth of experience behind him. He spent many years in the retail trade, from an independent family jewellers to a Bond Street company, in the pawnbroking industry, and also running a successful diamond merchants. For more information about this event or to book please contact events@gem-a.com or on 020 7404 3334.



11

GEM-A AGM AND PIMMS PARTY, FOLLOWED BY 'ETHIOPIAN OPALS', A TALK BY DR EMMANUEL FRITSCH

Imperial Hotel, Bloomsbury, London WC1 5BB, 17:30-20:00.

See page 19 for more information.

For the latest information on Gem-A events

September

2-5

INTERNATIONAL JEWELLERY LONDON (IJL)

Earls Court 2, London.

Come and visit Gem-A at **Stand J60**.

Members of staff will be on hand to answer your queries, assist with shop purchases and to discuss our education and membership services. See page 38 for further information.

7

UNDERSTANDING GEMSTONES*

A one-day gem workshop

Gem-A Headquarters, London

14

UNDERSTANDING PRACTICAL GEMMOLOGY*

A one-day gem workshop

Gem-A headquarters, London

21-25

HONG KONG JEWELLERY & GEM FAIR

Hong Kong Convention & Exhibition Centre

One of the world's biggest gem fairs, the Hong Kong Jewellery & Gem Fair is the place to be.

Come and visit us at **Booth CEC3M046**.

22-24

NAG'S INSTITUTE OF REGISTERED VALUERS CONFERENCE 2012

Loughborough University of Technology, Leicestershire.

Join the Institute in celebrating its Silver Jubilee at the NAG's annual IRV conference.

The usual line up of renowned guest speakers will be in attendance, offering presentations and workshops over two and a half days. For full details contact Sandra Page on 029 2081 3615 or email irv@jewellers-online.org.

28

UNDERSTANDING DIAMOND GRADING*

A one-day gem workshop

Gem-A Headquarters, London

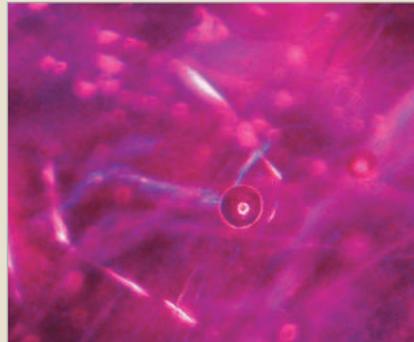
October

5

GEMSTONE TREATMENTS*

A one-day gem workshop

Gem-A headquarters, London



Lead glass-filled ruby displaying blue colour flash and gas bubbles — just one of the stones you will be examining on this exciting day.

19

UNDERSTANDING DIAMOND SIMULANTS*

A one-day gem workshop

Gem-A headquarters, London

26-28

THE MUNICH SHOW

World of Minerals, Gems, Jewellery and Fossils. Visit Gem-A's booth — more details to follow.

November

4

GEM-A CONFERENCE 2012

The Gem-A Conference will again be held at the magnificent Hotel Russell, Bloomsbury. This year's speakers include Thomas Hainschwang, Richard Hughes, Lore Kiefert, Jerry Sisk, Joanna Whalley, Bear Williams and Hanco Zwaan. See page 2 for more information.



5

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. For more information contact education@gem-a.com.

*For details of Gem-A workshops go to www.gem-a.com or email events@gem-a.com

go to www.gem-a.com or email events@gem-a.com

The Rainbow of Africa

Keith Wallis FGA visits 'The Rainbow of Africa', a museum in Kent featuring a specialized collection of gems and minerals.



To make a new discovery is always a pleasure, particularly if it is in relation to gemstones. In this case it is not just one gem in question, but well over three hundred. The 'Rainbow of Africa' is a specialized collection of minerals and gems, originally begun by the curator's father, during their many years in Africa, the 'hidden continent', whilst employed in the oil business. In their free time the father and son travelled around the country at every opportunity to widen their search, visiting many of the mines and sites in the region. Realizing that the wealth of coloured stones had been rather overlooked by the fame of the diamonds and gold, they concentrated their collection on the 'rainbow' of fabulous gemstones to be found. Help was given to them over the years by other enthusiasts who collected stones from many regions. The development of Madagascar became a prominent source. Sadly the curator's father died in 1971, but the son continued the collection with the valued support of friends.

Eventually in 1995 the family returned to England and the problem of what to do with the collection arose. The formation of a museum was the obvious answer, but its location became a problem. After much searching, a house with a secure basement bunker was found in Kent. Several months were then spent building display cabinets, each incorporating sophisticated lighting systems. Space was also given for a small cinema, so that visitors could sit and watch videos relative to the collection. The final result of their labours was a museum that any gemmologist or geologist would be proud of.

When I arrived on my first visit, the warmth of my welcome was



Three samples of gems featured in the museum, including (top left) blue topaz from Zimbabwe weighing 141.50 ct, (below left) morganite from Mozambique weighing 114.48 ct and (below right) aquamarine from Zambia weighing 26.47 ct. Photos courtesy of Warren Taylor.



Several displays in the museum. Photos Keith Wallis.



appropriate to that of Africa. My host, the owner and curator, who was rightly proud of the collection, accompanied me around the twenty or so display cabinets which, in many cases, are dedicated to different families of stones. A striking collection of garnets — a speciality of Africa — caught my eye, their colours truly sparkling under the excellent lighting system, with the spessartine and tsavorite particularly competing with each other in their beauty. Each cabinet was a joy to peruse, exhibiting the wide range of gems that the continent produces. Many rare stones are on display, including rhodizite, sapphirine, londonite, celestite, hambergite, taaffeite, phosgenite and scheelite, to name but a few. In many cases stones had been collected as rough and subsequently faceted by some of the best cutters available. However, some gems are retained in the rough to illustrate the form in which they are usually discovered.

Although the museum specializes in coloured stones, diamonds are not entirely forgotten, and replicas of several of the most important and historic stones are displayed.

To appeal to geologists there is also a collection of minerals, while a display case near the entrance shows examples of colour change stones under different lighting conditions. Careful consideration is given to portraying the presentation in an interesting and absorbing manner.

Admittedly this is not a large museum of gemstones, but I can assure you that as far as presentation is concerned it excels itself. A descriptive booklet and guide are presented to you on arrival and a wealth of documents are readily available to the visitor, which detail the collection and table the properties of the gems, as well as containing further technical details and superb photographs.

It is impossible not to appreciate the work and dedication that has been put into the design and the thought that is needed to create an environment for anyone who truly loves gemstones. There are no admission fees for visiting the museum, although the museum helps support a charity called 'Christian Community Services of Mount Kenya East' from voluntary donations raised from visitors.

About the museum

As this is a private museum, any requests to visit should be made by email only to warren.taylor@euramark.co.uk.

Organics

Never smile at a crocodile

Maggie Campbell Pedersen FGA looks at crocodile teeth in Australia.

Never smile at a crocodile. For starters, he has a bigger smile than you have, and a lot more teeth (although these attributes were not mentioned in the song from the film Peter Pan). Crocodiles have over 60 teeth in their jaws at any given time. The teeth are constantly being shed and replaced by new ones, and this process continues throughout the animal's life.

Crocodiles are every bit as dangerous as they are made out to be. In parts of Australia it can be risky to walk along a river bank, or even the beach at the ocean's edge, because although you might not see any crocodiles, they may well be watching you, and you might be within a lunge's reach.

As the animals are so dangerous, it is surprising to learn that crocodile teeth are 'hollow' for most of their length, regardless of their size. That is to say, the teeth consist of a hard, outer material which is made up of dentine covered with a very thin layer of enamel, and containing a large pulp cavity



Three young crocodile teeth showing size.

in the centre. Before a tooth is shed, the replacement tooth is already growing in the pulp cavity. Unusually for reptile teeth, crocodile teeth grow in sockets in the jaw bone. Less than half the tooth protrudes from the socket.

Not surprisingly, 'croc' teeth have been used to denote status among hunters – think of Crocodile Dundee's hat-band for example! Such hat-bands are now for sale in the northern parts of Australia as



Adult crocodile in Queensland, Australia.



Crocodile teeth showing large pulp cavity.

souvenirs, along with simple jewellery in the form of tooth pendants or necklaces. Crocodile skins are also available, but, like the teeth, they originate from young animals aged about three to five years that have been farmed, and neither teeth nor skins are very large. All wild crocodiles are protected in Australia following years of being hunted for their skins, during which period they neared extinction. Their numbers are now healthy again, and many people would like to see the hunting ban lifted – this is as much for the safety of the human population as for the animals' skins.

There are many different species of crocodile worldwide, and most of them are protected and listed on CITES Appendix I or II. It is therefore imperative that anyone wishing to import crocodile products should first check their provenance and also obtain the necessary documentation, as customs officials may also be lying in wait to pounce, just like the crocodiles ...



*Right: Crocodile tooth necklace.
All photos by Maggie Campbell Pedersen.*



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(A non-profit making organisation)

Interested in cutting gemstones
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UKFCG
P.O. Box 2480
Stoke-on-Trent
ST7 2WT



Website: <http://www.ukfcg.org>

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Organics

Spherical cultured pearls: the early days

When spherical cultured pearls first arrived on the London market in 1921 prices were high, the trade was worried and detection methods elusive. Jack Ogden discusses the birth of spherical cultured pearls.

One hundred years ago, in September 1912, *The Times* noted that “The Japanese culture pearl industry was now an old-established one ... and Japanese culture pearls were well-known objects in European jewellery.” This was by no means the first time that the British press had mentioned cultured pearls – ‘culture pearls’ as they were known then. Mikimoto pearls had been mentioned specifically as early as 1901, when examples of his cultured pearls were presented to King Edward VII at his coronation that year. The origin of cultured pearls, of course, lay centuries earlier in the pearl-coated Buddhas and other objects produced in Chinese freshwater mussels, and in European attempts to produce spherical pearls the same way. Most famous among the latter is the work of the eighteenth-century Swedish zoologist Carl Linnaeus – examples of his cultured pearls still exist in the Linnaean Society collections in London – but even the Brits got involved when Dr Hunter tried to produce cultured pearls in a pond in

Earls Court, London (reported in *Gems & Jewellery*, June 2008). It would seem that the remaining examples of Hunter’s pearls were destroyed during bombing in WW2. In 1859 Charles Dickens mentioned Chinese pearls were produced “by introducing small shot and sand between the mantle of the animal and its shell”. He added that “Mr Gaskoine has a specimen consisting of two strings of pearls ...”, possibly the earliest cultured pearl necklet recorded in Europe.

Mikimoto’s early cultured pearls, produced with internal beads (‘nuclei’) that ranged from mercury injected with a syringe to small natural pearls and mother-of-pearl, had a major drawback: they were not spherical, they were blister pearls which had to be cut from the shell and then backed by the addition of small pieces of shaped mother of pearl “which were usable in rings and brooches where it was only necessary to show the completed side”. It is worth remembering that not all pearls set in Edwardian jewellery are necessarily natural.



The Yaguruma (Wheels of Arrows) sash clip is the most important personal ornament of the initial years of the Shōwa Period. The brooch base is made from platinum while one 8.75 mm pearl is mounted at the centre of the piece, surrounded on each side by 20 pearls of approximately 3.5 – 4.5 mm. Diamonds and calibre-cut sapphires and emeralds are also set in the centre. Mikimoto Pearl Island, Pearl Museum.

As late as 1916 *The New York Times* noted that cultured pearls always had a flattened side and were thus no use in necklaces, but that same year things began to change. Following the resolving of family and patent disputes, Mikimoto started using an improved production technique and the first truly spherical cultured pearls came onto the world market in 1921. Now the London pearl trade really had to sit up and take notice.

On 5 May 1916 the London Chamber of Commerce held a meeting behind closed doors at which they decided, according to the *London Times*, that "So far as expert opinion is concerned there is no comparison whatsoever between the genuine pearl and the Japanese cultured specimen. The Japanese article is merely mother-of-pearl coated with nacre. In no case is the colour of the Japanese cultured pearl similar to that of the real stone. Most of the cultured pearls are yellowish green." This statement seems more intended to reassure the pearl-buying public than reflect reality, and *The Times* noted that "The introduction of the 'cultured' variety into the market must sooner or later have a considerable effect on the market price of the genuine article." The formal statement issued by the London Chamber of Commerce was that they had "decided unanimously that, on account of the insertion of foreign matter placed in the oyster from which such 'cultured pearl'

is artificially produced, it would be false representation to sell them as pearls, without the distinctive description of 'cultured', and that the trade and public be informed to that effect." *The Times* also reported that the French Chambre Syndicale of Diamond, Pearl and Precious Stones, Dealers and Lapidaries of Paris had concluded that "The Japanese pearls are false pearls."

The Times followed up their article a couple of days later saying that jewellers were saying that there was no problem in detecting cultured pearls and that, in any case, most cultured pearls didn't exceed 6 grains and only very exceptionally reached 8 grains. As with the current synthetic diamond debate, the potential for errors lay, they said, with "smaller jewellers, who with limited knowledge have to depend upon those who supply them". Nevertheless that same day the *Manchester Guardian*, as it was then, carried a quote about the new cultured pearls by the manager of artificial pearl sellers Ciro, stating that "Experts say they cannot be deceived; I do not know about that, but the general public can be ... detection is impossible except to the expert." Not surprisingly *The Times* noted that "Dealers would welcome the discovery of a test which would enable the layman as well as the expert to distinguish between a 'cultured pearl' and the true pearl." The identification debates continued until 1921. When one jeweller said that, although beautiful, "any expert could ... tell that they were not the genuine thing", the importer of Mikimoto pearls disagreed. There were even rumours that there had been a delegation to the Board of Trade to prohibit their imports "until some new safeguard for dealers and the public had been devised".

Dr Henry Lyssen Jameson, the technical adviser to the Ministry of Agriculture and Fisheries, noted that there was "no real difference between the culture pearl and the real pearl except in the centre, and it was impossible for him by any known process to



Simple X-ray equipment to allow jewellers to test pearls. From a 1931 advert in *Gemmologist* magazine.

distinguish them without cutting them open". This was not good enough for the trade, and so conventional gemmological tests were tried. Specific gravity discrimination was attempted using a solution of acetylene tetrabromide and bromoform, but was described as a "debatable test". In June 1921 the National Association of Goldsmiths (NAG) held their annual conference in Leicester and here (and presumably to a room full of relieved jewellers) it was announced that cultured pearls could be distinguished from natural by using ultraviolet light under which "the culture pearls become mustard yellow".

The public were naturally intrigued by the whole discussion, and in time for Christmas 1921 Harrods stated in *The Times* that "In view of the enormous interest that is being aroused in Japanese Cultured Pearls, Harrods announce they have in their possession two Necklaces of Cultured Pearls, and invite those fortunate possessors of natural pearls to bring them to Harrods



Left: The 'Cherry Blossom' sash clip. A cultured half-pearl is set in the centre of 15 ct gold and platinum. Circa 1908 - 1912, Japanese (Mikimoto). Mikimoto Pearl Island, Pearl Museum.

Organics

Spherical cultured pearls: the early days (cont.)



Now, as inexpensive Chinese freshwater cultured pearls flood the market, natural pearls are back in demand and prices are rising. Here, Chinese freshwater cultured pearl necklaces await sale at the February Hong Kong Jewellery Show. Copyright Gem-A. Photo Jack Ogden.

for comparison with Cultured Pearls, both by daylight and under ultra-violet rays.” The very day before that notice first appeared, the press had reported that the ultraviolet test was no longer thought reliable. In the same month X-ray tests had been tried for the first time although it was reported that this did not show any “striking difference between the creations of artifice and nature”. Of course, X-rays (and by 1927 the endoscope), finally became the standard tests.

In the heat of the debates and despair in 1921 it is amusing to note that in the UK it was reported that cultured pearls had caused panic in the rest of Europe among owners, buyers and wearers of pearls, and that in Paris the pearl market had been “temporarily shattered”, but nothing of the sort had happened in Britain. *The New York Times*, in turn, said there was no worry among New York dealers and the fears about cultured pearls that had been expressed in London and Paris were unwarranted; cultured pearls were easy to detect, even for the layman.

Right: *The Hana-guruma (Flower Cart)*, with its distinctive cart shape, is set with onyx, coral, rose-cut diamonds and pearls. Circa 1935. Japanese (Mikimoto). Mikimoto Pearl Island, Pearl Museum.

What were the relative values back then? Cultured pearls were not cheap to start with, but prices soon fell. In a 1921 court case concerning glass imitations being sold as cultured pearls, it was noted that while each of the imitations was worth a penny, just “one cultured pearl of the same size would be worth £75”. That was a huge amount of money in those days (in approximate terms, add a couple of zeroes to get a modern equivalent). Indeed, as *The Times* noted, there was really no difference in price between cultured and natural, and that the

price of a row of cultured pearls would range from about £1500 to £2000.

In 1922 *The New York Times* reported that cultured pearls sold for 30% less than natural. Just six years later, in a case of alleged fraud against the London pawnbrokers Attenborough, it was stated that cultured pearls had about one tenth the value of the natural material. In 1929, two cultured pearl necklets deemed “very heavy and showy, with diamond clasps” were offered for quick sale at £120, which would have been worth £2000 if natural. By 1934 Alexander Clark in London were offering a graduated, fine quality “Real Cultured Pearl Necklace” at £17.10s (although, to put this price in perspective, they were also advertising a jade and 18 ct gold ring at £3.3s, and a pair of jade, diamond, platinum and white gold ear clips for £18.10s).

As the London Chamber of Commerce stated when the spherical cultured pearls first appeared on the London market in early 1921, disclosure was essential. If only. The same year that Alexander Clark was offering his “Real Cultured Pearl Necklace”, another company was selling “genuine Oriental Pearls (Cultured)” and another stated that “We guarantee All Real Cultured Pearls sold by us to be Genuine Oriental Pearls”.

From the start the trade had complained that the appearance of spherical cultured pearls would cause confusion among the public; in the end it was largely the trade’s own poor disclosure and disclosure policing, that bred confusion.



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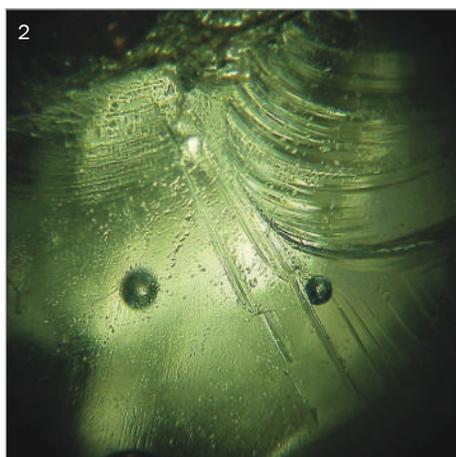
Aquamarine-coloured glass

Grenville Millington FGA investigates a mysterious aquamarine-coloured stone with devitrification inclusions.

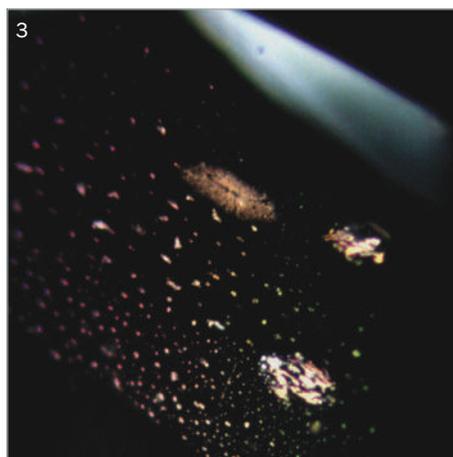


1: Blue glass of approximately 36 x 26 x 20 mm, with round gas bubbles visible with the naked eye. The two largest devitrification inclusions are at the top and towards the right-hand side.

I was sent an irregular aquamarine-coloured 'lump', that had been labelled 'a rough stone', in the hope that it was indeed aquamarine. The approximate measurements were 36 x 26 x 20 mm. It was certainly rough, with sharp, jagged edges, which were the result of numerous conchoidal fractures over all the surfaces.



2: Conchoidal surface fractures with gas bubbles beneath. Magnification 10x.



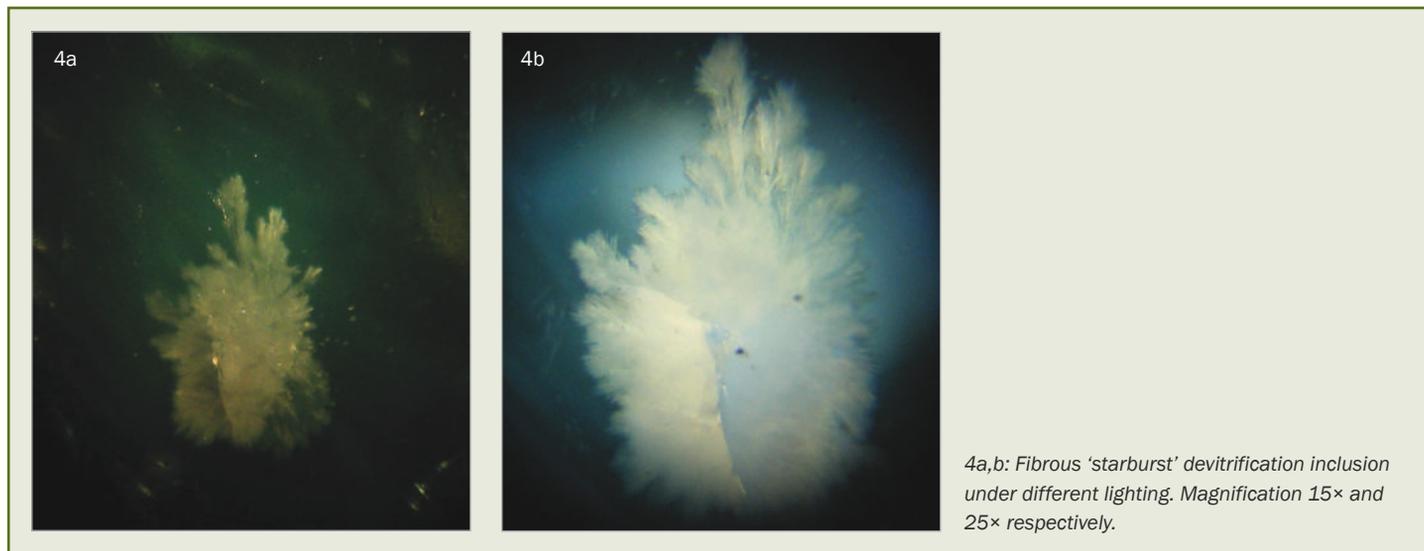
3: Snowflake-like inclusions in an aquamarine. Magnification 30x.

Those surface features plus a host of spherical gas bubbles, evident even to the unaided eye, suggested, of course, that it was not aquamarine but glass (1, 2).

But there was something else visible, namely opaque white 'floating' spots, reminiscent of dandelion seeds hanging in the breeze. A look with a 10x loupe showed these white areas to have a more snowflake-like appearance (a term applied to quite common inclusions within aquamarine; see 3) but of a more fibrous nature. The stereo microscope revealed these in more detail, although only 15 to 25x magnification was needed in most cases (4a and 4b). They had a frosty, fibrous look typical of devitrification, but were isolated areas rather than grouped in fern-like patterns across the whole of the material as we are more used to seeing in 'metajade' – a devitrification of manmade green glass.

Some of these fibrous white spots were as small as the gas bubbles, whilst others were more spectacular, like a miniature explosion caught in the microseconds after

Aquamarine-coloured glass (cont.)



detonation. One, the largest, had a globular formation with only a few emanating fibres (**5a** and **5b**). Another immediately below broke the surface; this allowed me to take a measurement which was approximately 3.5 mm across (**6a** and **6b**) and to look at the inside structure, indicated by the browner sections (**6b**).

There were several quite small clusters or groups in **7** and **8**, and others are shown in **9** and **10**.

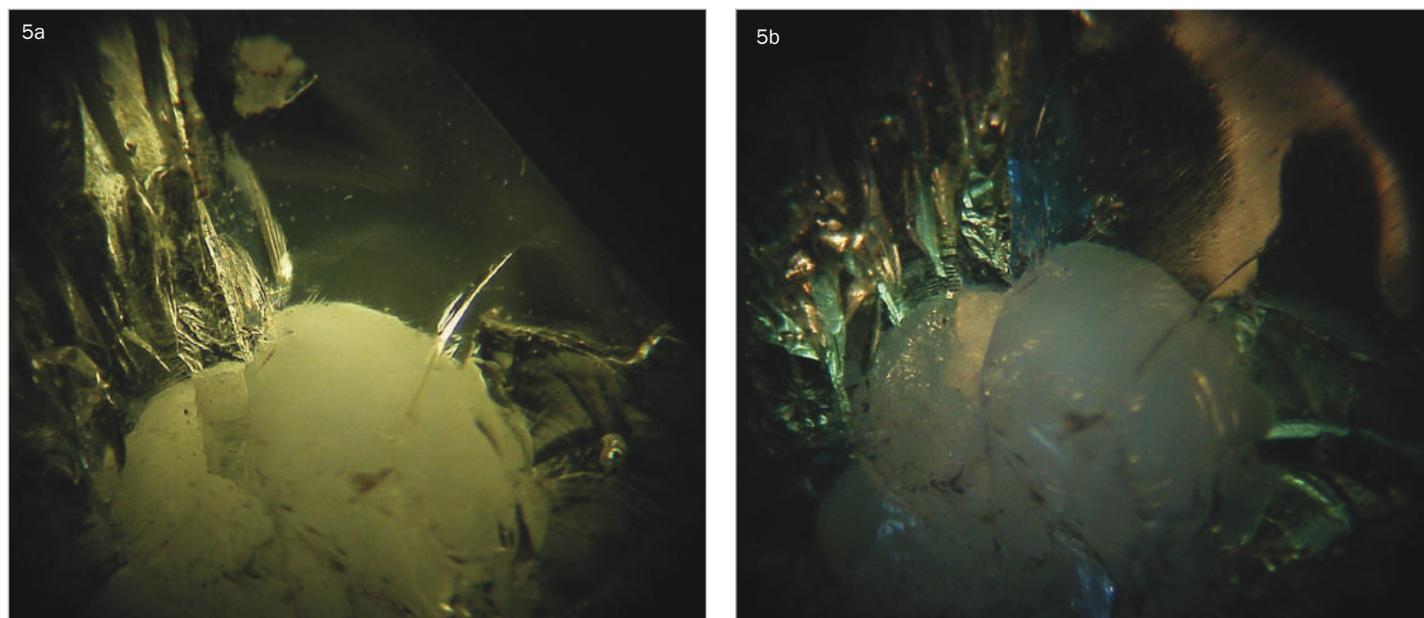
There seems to be little photographic material available online to show these

devitrification inclusions. The Gübelin/ Koivula *Photoatlas*, Volume 1, has a photo on page 438 of a radiating structure resembling the ones shown here. There, it is referred to as a 'devitrite inclusion' and given a chemical formula of $[\text{Na}_2\text{O}(3\text{CaO} \cdot 6\text{SiO}_2)]$. This is consistent with other information on the internet. Another product of devitrification can be the formation of small wollastonite (CaSiO_3) crystal groups, but X-ray diffraction or Raman spectroscopy would be needed for complete identification.

In a facsimile of a 1918 publication on

glass available online at The Internet Archive and called *Glass and Glass Manufacture* by Percival Marson, published by Sir Isaac Pitman, London, there is a passage written in a language that most of us can understand:

"Glass, if kept heated for any length of time at a temperature just short of its softening or deformation point, becomes devitrified and loses its transparency, becoming opaque and crystalline. In this state it has much of the nature of vitreous porcelain and is totally different to manipulate, being tough and viscid on



5a,b: Opaque white globular devitrification inclusion under different lighting. Magnification 10×.

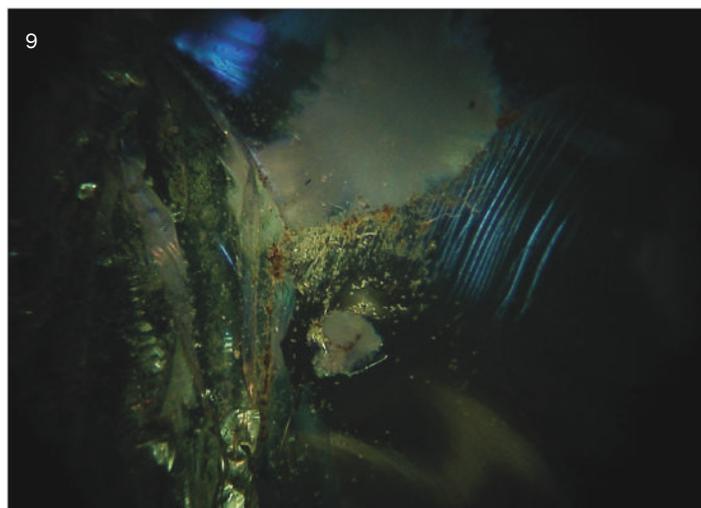
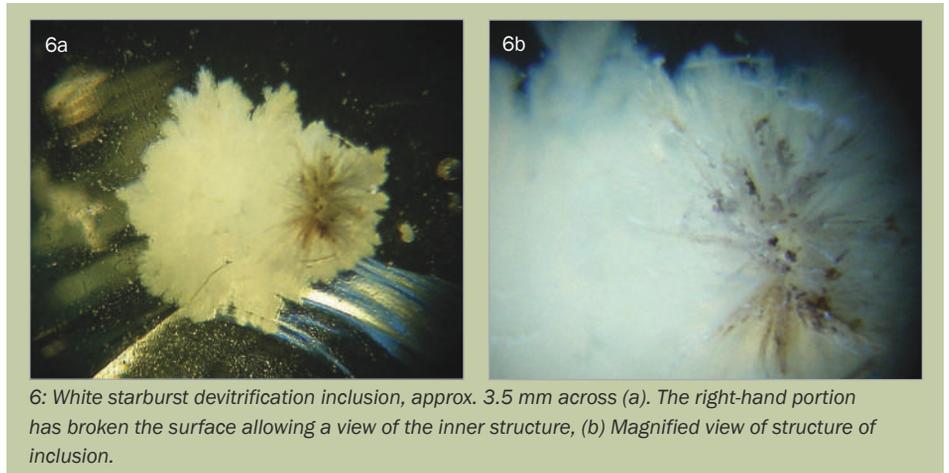
Hands-on Gemmology

Aquamarine-coloured glass (cont.)

further heating. This devitrified state may occur during glassmaking, where the metal is allowed to remain in the pot or tank furnace for a considerable time under low temperature. Small stars or crystals first develop throughout the glass and continue to grow until it becomes a stony, white, opaque, vitreous mass.”

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.

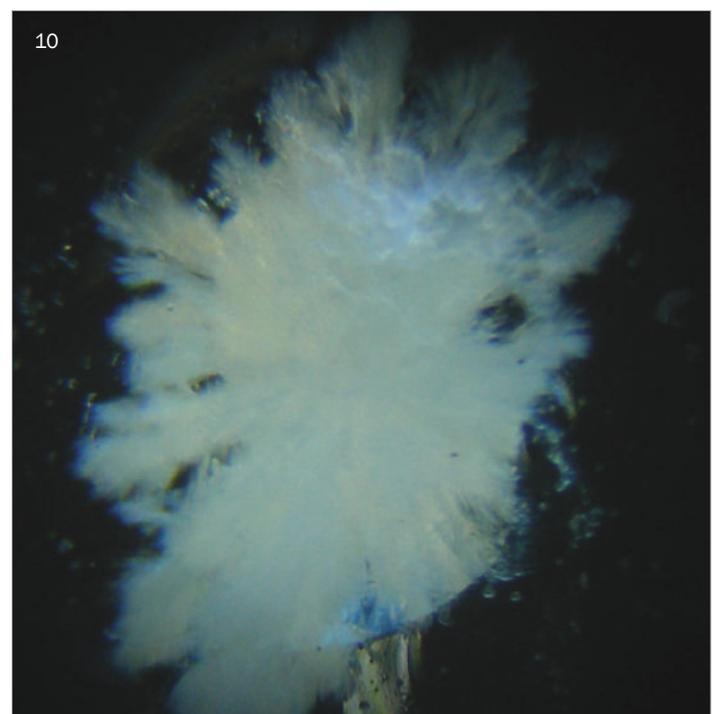


7: Cluster of small devitrification inclusions and some isolated gas bubbles. The lower left area is a surface conchoidal feature. Magnification 15 \times .

8: Clusters of small devitrification inclusions. The brown inner parts of some components are visible. See 6b. Magnification 45 \times .

9: Large and small devitrification inclusions. The rippled area to the right is a stepped, surface feature. Magnification 15 \times .

10: Devitrification starburst, showing a fern-like appearance. Magnification 30 \times .



Andrew Fellows FGA DGA reports on recent events held at Gem-A.

Gem-A meetings

Jungles, gems and camels: buying gems at the source



The mountainous region in Afghanistan where lapis lazuli is mined. Photo Guy A Clutterbuck.

The beginning of May saw the latest in the new series of Gem-A's Career Service talks, aimed at providing graduates, members and students with an insight into areas of the gem trade. Guy Clutterbuck spoke about his experiences in the aptly titled 'Jungles, gems and camels: buying gems at the source'. With many years of gem dealing from the actual sources of gemstones, Guy is ideally placed to advise on the pitfalls and hazards of this area of the trade, and he did so with gusto. Videos showing the actual mines and localities of emeralds from Zambia and lapis lazuli from Afghanistan were

presented, and each gem was shown to have its own problems and characteristics of trading.

Emeralds, rubies and sapphires from Zambia were regularly sourced from simple mining outfits by Guy, where local villagers were involved in excavating with simple hand tools — a far cry from the modern high-tech approach employed in the majority of countries today. The key feature of Guy's involvement in these mines was to ensure that the fairtrade aspects of the gem industry were maintained; by dealing and sourcing the gems direct, Guy could ensure that a large percentage of any

payment made went straight to the miners involved, instead of being eroded by numerous middlemen. This approach also allowed him to build up close business and personal relationships with the miners, giving him an almost preferential advantage over any other buyer.

Lapis lazuli from Afghanistan was also on Guy's list of materials sourced directly, and this involved travelling into remote mountainous regions. The lapis is extracted by locals through explosives and heavy manual labour — techniques that often damage the very stones they are trying to extract. It's in areas like this, miles away from the nearest offices, that Guy's unique approach pays dividends, and he has become a regular visitor to the area.

Guy ended the evening by showing samples of gemstones that he had sourced, both in rough and cut forms, and by answering questions posed by students who were considering entering into this area of the gemstone pipeline.

Mystery stone evening

Letitia Chaplin and Ken Harrington presented an interesting and engaging hands-on Gem Discovery Evening towards the end of May, involving a mystery stone.

Attendees were presented with a piece of matrix containing deposits of the mystery material, along with a small bag of what appeared to be gravel from a fish-tank — indeed, this was what it had been initially likened to by several dealers. When tested under various light sources, the mystery material changed from a bluish colour to a pinkish-red, suggesting a colour-change material, but one unlike any normally seen. It was revealed that this mystery material was in fact Brazilian alexandrite, a close relative of the well known Russian alexandrite, but with a significantly different colour change. The Brazilian alexandrite, in its rough form, shows a noticeable colour change, but it is only when it

has been cut to enhance its sparkle and lustre by an expert lapidary such as Ken Harrington (who cut all of the stones shown on the evening), that it truly comes into its own. Oval, round and square cuts were all on display, some with inclusions, but most without any discernible internal features, and with values that one could only guess at.

Alongside these were a selection of Russian alexandrites to show off their famous green to red colour change, as well as to highlight both their geological structure and the differences in colour between the two sources. If the chance arises to see this material at any point it shouldn't be missed.

Letitia and Ken's presentation was a delightfully new demonstration that encompassed all aspects of the 'mystery stone', from rough to faceted, and from the point of view of a gemmologist and a lapidary.



Above: Rough Brazilian alexandrite.
Right: Brazilian alexandrite set in a ring.
Photos Letitia Chaplin.



The Journal of
Gemmology

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

Trapiche tourmaline from Zambia*

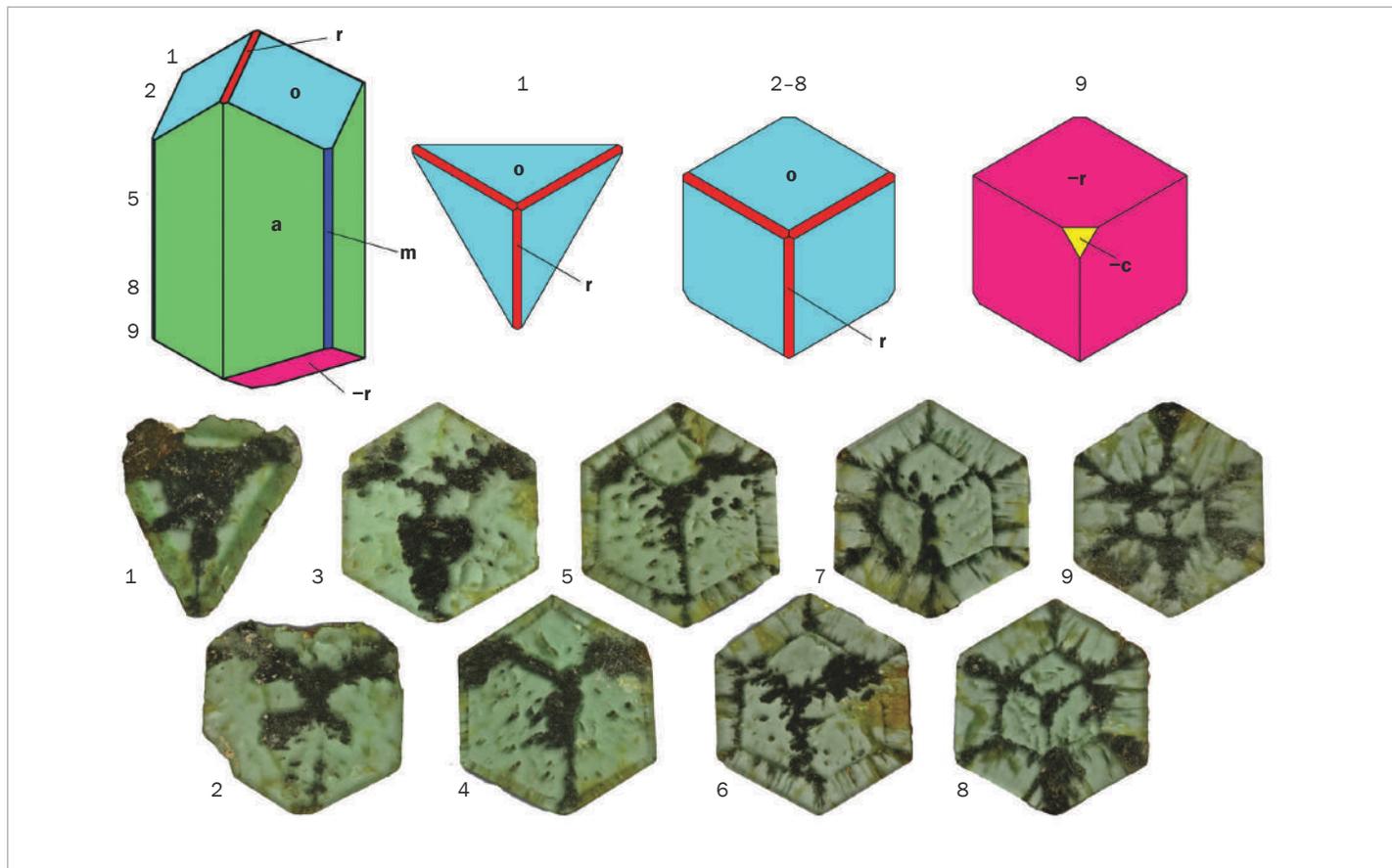
A summary by Professor Andrew Rankin of the paper 'Chemical and growth zoning in trapiche tourmaline from Zambia – a re-evaluation' by Dr Karl Schmetzer, Dr Heinz-Jürgen Bernhardt and Thomas Hainschwang FGA.

Trapiche patterns in certain gem materials consist of zones of clear and inclusion-rich growth sectors that give rise to distinctive six-rayed and three-rayed optical effects. In the gemstone and mineral trade they are most evident in cabochons and polished slices of emerald, ruby and tourmaline. Such patterns are particularly well-developed in green-coloured gem tourmalines from Zambia, and have been well described in a series of recent publications. The present article provides an in-depth re-evaluation of the nature and origin of trapiche effects based largely on new morphological, crystallographic, optical and compositional data.

Studies were carried out on a series of parallel slices, cut perpendicular to the c-axis of single tourmaline crystals displaying various morphologies. Optical and microprobe examination revealed that, in parallel-cut slices, the patterns could be divided into three sub-types according to the form and types of inclusions present. The external crystal morphologies and crystal faces of each sub-type were characterised to produce three-dimensional models to illustrate the crystallographic and growth sector controls on their distribution.



Above: Slices of trapiche tourmaline from Zambia cut perpendicular to the c-axis. View parallel to the c-axis, size of the samples about 13 × 12 mm. Photos by T. Hainschwang.



Various trapiche patterns in Zambian tourmalines, cut perpendicular to the *c*-axis (middle and lower line), in relation to different crystal forms. The approximate position of the slices within the complete crystal is given in the upper left diagram; the trigonal and hexagonal outline of the sections is also given in the upper line (middle and right). Diameter of slices 2 to 9 approx. 8 mm. Photos by T. Hainschwang, crystal drawings and artwork by K. Schmetzer.

A particular feature of the trapiche patterns in Zambian tourmalines is the more or less sharp boundary of the growth sectors with elongated voids and inclusions always extending perpendicular to the relevant growth planes. Graphite, calcite and dolomite are the dominant mineral inclusions observed in the trapiche zones. The co-existing elongate liquid inclusions and empty tubes sometimes display coatings of iron hydroxides/oxides on their internal walls.

Electron probe microanalysis (EPMA) on a series of some 2506 points across trapiche sectors and clear zones revealed some distinctive element distribution patterns in

maps of their chemical compositions. Average compositions ranged from dravite-rich to uvite-rich as a consequence of substitutions between sodium, aluminium and hydroxyl ions (dravite) and calcium and magnesium and fluoride ions (uvite) in the crystal structure. Single element plots along line traverses and two-dimensional element distribution maps showed that, at the boundaries between different growth sectors, the sodium content is higher than in the adjacent growth sectors. The green colour of the Zambian tourmalines is ascribed to traces of vanadium and chromium with mean V_2O_3 and Cr_2O_3 contents from 0.09 to 0.31 and 0.04 to 0.14 wt. %, respectively.

A two-stage model is proposed to account for the complex structural, morphological and chemical patterns observed; i) skeletal growth of dravite and, ii) subsequent layer-by-layer growth of uvite which became richer in sodium and more dravitic towards the final growth stages.

* A summary of an article published in *The Journal of Gemmology*, 2011, **32**(5–8): Dr Karl Schmetzer, Dr Heinz-Jürgen Bernhardt and Thomas Hainschwang FGA, 'Chemical and growth zoning in trapiche tourmaline from Zambia – a re-evaluation', 151–173.

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

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The winner of this year's award will receive publicity in *Gems & Jewellery* as well as a free full-page advertisement. The winner will also be offered a free place on a one-day Gem-A workshop of their choice or free attendance at the 2012 Gem-A Conference.

Our Gem-Empathy Award judges visit all IJL stands anonymously, but if you have a particular piece or range that you would like to bring to our attention in advance, let us know — contact Amandine Rongy at Gem-A (amandine@gem-a.com) giving your name and stand number.

The 2011 Gem-Empathy Award winner was Susanne Asbeck of Nomades, whose enthusiasm for gems outshone the rest of the competition.



The 2011 Gem Empathy Award winner Susanne Asbeck (third from left), with Amandine Rongy, Gem-A Marketing and Events (far left), Jack Ogden, Gem-A CEO (second from right) and Sarah Kitley, IJL Marketing Manager (far right.)

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The Basel way

James Riley, Gem-A's newly appointed COO, visits Baselworld and reports on some highlights of this year's show.

Baselworld (or simply 'Basel' as we all know it) in early March is a shock to the system, especially following hot on the heels of the Hong Kong show. A peculiar phenomenon of Basel is that the sun always seems to shine on it and this year was no exception. The show itself did not fail to disappoint, with the usual watch stands the size of small mansions. It has to be said that Basel is becoming even more of a watch show. The mighty Swatch group continues to expand and rumour has it that next year they will be given Hall 3 to themselves. There is a large building project in progress which will be a site to behold when completed — the show will be later next year, from 25 April to 2 May, to facilitate the completion of this. It is even possible that some of the watch companies currently showing in Geneva may be enticed back, making this show a true horologist's paradise.

The interest for those of us with a gemmological bent lies in Halls 2 (fine jewellery) and 3 (gemstones), with national pavilions a short walk away (that is, if you are an adept and fast walker) in Hall 6. Those of you who know me might suspect that I'm implying that this is a less than user-friendly show and you would be right.

In terms of highlights Basel always has a treat in store — something special which you might not see elsewhere. My treat was to see the Fancy Vivid Purple radiant cut diamond, a little over 0.80 ct, displayed by M Vainer Ltd. A true example showing that size doesn't matter, this stone is one of a mere handful to get a Fancy Vivid Purple grading by the GIA. The price? Undisclosed. I suspect that if you have to ask then you can't afford it. Add to this a display of natural untreated coloured diamonds and one's mouth waters as if in a sweet shop — no matter that many of these stones can be seen in Vainer's offices a mere 50 yards from Gem-A!

Another delight, though perhaps not so rare, was the sight of an exquisite Tahitian pearl of a beautiful peacock colour on the Gellner stand. Named 'Grace', after the film star Grace Kelly, the pearl measures 18.9 mm, and is reputed to be a record size for this colour of pearl.

These may seem trivial highlights to many compared to the fantastic layouts of colour on stands such as Paul Wild or Wild & Petsch, or the dazzling array of large diamonds at firms such as Dimexon or William Goldberg. For the antique hounds among you, special art deco pieces by Cartier were to be found at Thomas Farber.

GIA held a short symposium which covered subjects as diverse as the fragmentation of the diamond market, new sapphire deposits in Sri Lanka which are indistinguishable from Burmese stones, omphacite jade, naturally occurring South Sea pearls (*Pinctada maxima*) and unusual stones which have recently passed through their lab.



Gellner's exquisite 'Grace' pearl. Photo courtesy of Gellner.

Basel is special; for me it is the most enjoyable of the shows, but far from the best. The opportunities to meet people are much greater than at other places. I succeeded in meeting all three of my previous employers within 20 minutes of each other, and purely by chance. The show has changed much over the years. Gone are the days of rows of Italian and German manufacturers; it's all about suppliers from India and the Far East these days. It was good to see some British talent around — more noticeable this year than in previous years. It's not cheap to exhibit at Basel, so hats off to the Brits for getting stuck in.

Next year will see the stone suppliers move to Hall 5. Already noticeably reduced in number, this may be a significant shift in the emphasis of the show. To me Basel still remains head and shoulders above anything else Europe has to offer, but worldwide Hong Kong and Las Vegas still offer more and, given the high prices in Basel, may well represent better value in terms of travel and accommodation. Unfortunately they don't have the sausage, beer or fine Alsatian wine though.

For more news of outstanding gems at Baselworld see Gary Roskin's report on page 10.

Gem-A News and Views

In the news

New roles at Gem-A



As part of our plans for 2012 and beyond we are continuing to develop our UK and worldwide gem education. To help facilitate this, James Riley has been appointed to work alongside CEO Dr Jack Ogden as Chief Operating Officer. James is well-known to our members and to the wider UK gem and jewellery trade, having been a former Manager at Backes & Strauss, Diamond Manager at Boodles, a past member of the National Association of Goldsmiths Board and a former Gem-A Chairman.

James will take over responsibility for the day-to-day running of Gem-A and will bring his knowledge to bear on developing the UK home market for our education and services, while Jack will focus on developing Gem-A's international development, particularly our worldwide educational, academic and gem-trade interests, a role that will also allow him more time for his own research.

When asked about his new responsibilities, Jack said: "This is a perfect progression for me. I am very happy that the Board has agreed to this evolution in my role. With James working with me, it is a win-win situation for Gem-A." James is also enthusiastic about the changes, stating: "I am happy and very proud to be joining Gem-A at a time of growth and opportunity for the Association. My combination of relevant management and trade experience will complement Jack's proven skills. We will make an effective team. I am looking forward to overseeing the refurbishment of our Greville Street premises as well as pushing forward with the updates to our Diamond course and developing exciting new courses."

Anyone wishing to contact James for any reason can email him at james.riley@gem-a.com or contact him at the London office. He will be visiting branches during the rest of the year and looks forward to seeing as many of you as possible at the AGM.

Greville Street premises

We are currently in the process of renewing our lease on 27 Greville Street, and to secure our base for the foreseeable future we will be renovating the building. This will make the premises more user-friendly for staff, students and members alike. This work will take time and may cause some disruption during the summer months, and so we apologise in advance for any inconvenience caused.

Gem-A Library

One of the changes planned is to create a new library area. This will mean that members will have the facility to view and to use for research our substantial and historic book collection.

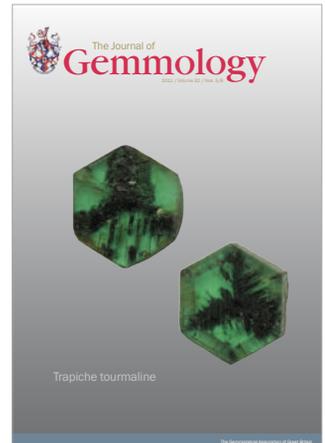
A recent review of the library has unfortunately revealed a lack of books published in recent years. Although Gem-A receives the majority of new gem and jewellery books for review, as is the accepted practice these are usually retained by the reviewer and the books do not find their way into our library. Therefore any books you would be willing to donate to the library should be very gratefully received, particularly those from any past reviewers. If we receive duplicates of books already in our collection, the best one will be retained and surplus copies will be available for sale to students or members, with any proceeds being used to fund the purchase of new or replacement books. If you wish to donate any books please contact Georgina Brown on +44 (0)20 7404 3334 or at georgina@gem-a.com



The Journal of Gemmology

Unfortunately, work responsibilities combined with health issues have meant that Elise Skalwold has had to take a step back from her position as Editor for *The Journal of Gemmology*. Gem-A very much hopes that Elise will be involved again in the future and is very grateful to her for her thoughtful and valuable input over the past months. Elise's contributions to date will help us to attain the vision we shared with her for the continued development of our publications. The current *Journal of Gemmology* is in progress and we will announce when new articles are published on our website.

The Association is very grateful to Roger Harding for stepping in as Acting Editor until other arrangements are made.



For regular updates on Gem-A events, news and developments, please see our monthly e-newsletter or visit our Facebook page at www.facebook.com/GemAofGB

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14th/15th	July	Farnham Maltings, Farnham (Gem 'n' Bead)
4th/5th	August	Kempton Park Racecourse, Kempton (Rock 'n' Gem)

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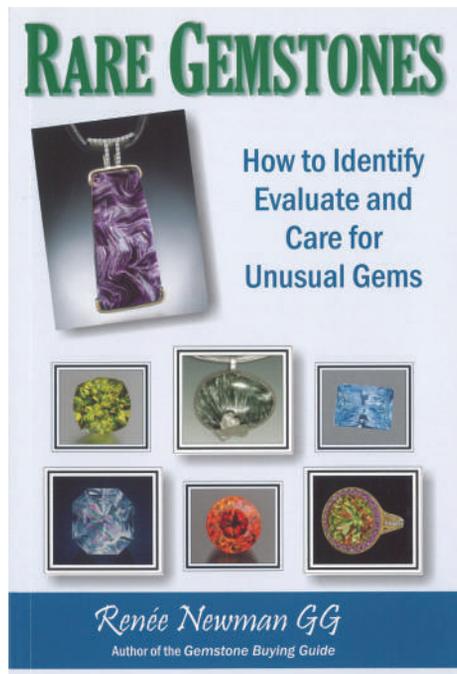
10am - 5pm Saturday • 10am - 4pm Sundays. All Shows are indoors with free parking, disabled access and refreshments

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Rare gemstones: How to identify, evaluate and care for unusual gems



Renée Newman GG, 2012
International Jewelry Publications
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Rare Gemstones is a fascinating insight into the latest and more unusual gemstones that are now finding their way into designer jewellery.

The book covers rare gems that are mounted in jewellery, as well as some that are used only very occasionally, based on the opinions and usage of a range of jewellers. From their suggestions, over 60 of the lesser-used gem materials have been selected, documented and presented in a highly visual way. Some of the stones covered have limited use due to hardness or durability factors, but these limitations are all addressed in the various sections. Where this book differs from others is in the extensive use of photographs of rough, cut and fashioned gemstones, as well as gem-set jewellery, showing that not only can these rare gemstones be used in various settings, but also that they are available today. Rough crystals and matrix are also illustrated in differing settings, including, for example, wrapped cobaltocalcite pendants and earrings, amongst others.

The variety of stones covered ranges from those familiar to most readers to the rare and unusual. Apatite, calcite, moldavite and obsidian are listed alongside the less well-known stones such as gaspéite, psilomelane and jeremejevite — stones normally reserved for small notes in more expensive texts, often without the photographs that this book makes good use of. Although not as widely known, these gemstones are given the same consideration and respect that the more 'usual' gemstones in expensive jewellery are afforded, providing valuable insight into what can be done when jewellers think outside of the box.

The information supplied on each stone is comprehensive. The author gives pronunciations of the names of stones, along with all the usual gemmological information such as chemical formula, refractive index, specific gravity and crystal system. Localities are mentioned where considered important

or noteworthy, along with historical context, showing that these 'rare gems' have been known through history, even if not utilized. Treatments are also covered, either in the initial constants area for each stone, or in the main body of text, along with the care and attention necessary to avoid damage to these more unusual gemstones. In total, the information given in this book is very well presented, easily readable and accurate, ensuring an excellent point of reference in an area all too often overlooked.

Whether a newcomer to the world of gemmology or an experienced collector, this volume has something for everyone, and is highly recommended.

A.S.F

Stone Scoop



Quantifying opinion

Dr Jack Ogden FGA ponders opinions in gem testing.

I've already indulged my historical appetites with an article about cultured pearls in this issue (see page 28), so here, apart from some pearl quotes below, I'll keep with the modern world and raise an issue that intrigues me.

Let's consider gem lab reports: with art and antiques it has often been said that, while you can often prove a supposed object to be fake, it is frequently impossible to prove one to be genuine. Experts can rarely say any more than, in their carefully considered opinion, the object is genuine. Much the same is true with gems. Any experts who claim infallibility are deluding themselves or those that depend on them.

The most honest approach is probably that taken in the analysis reports relied on by the Antique Plate Committee of the Worshipful Company of Goldsmiths in London in their deliberations as to the authenticity of antique British silver. The reports provide numerical 'probabilities' that might seem somewhat bizarre to a gem dealer. For example, based on a vast database of silver trace-element concentrations, a silver coffee pot might be stated on the report to have a 85% chance of being eighteenth century, a 12% chance of being Victorian and a 3% chance of being post-1900.

To the scientist this is not in the least bit bizarre. It is honest and realistic. But what dealer or customer would buy, at top price, a ruby accompanied by a laboratory report that said it had a 85% chance of being from Burma?

Of course, the Antique Plate Committee of the Worshipful Company of Goldsmiths doesn't tell the owner of the coffee pot that it has a 85% chance of being genuine. Instead the committee deliberates, considers their own opinions as well as the statistics, and then issues their consensus opinion that the coffee pot is genuine (or not).

As gem laboratories resort more and more to the high tech gemmological equivalents of the trace element analysis used for silver, statistics will enter more and more into the decisions they make. Databases of results and the multi-variate statistics used to digest them will produce output such as that the ruby has 85% chance of coming from Burma (and thus a 15% chance of coming from some other source or sources). Naturally, the humans in the lab collate these statistics, stir in their own opinions based on other tests, and issue an 'opinion'.

Is this sufficient or, indeed, fair? An increasing number of gem testing laboratories are attaining ISO/IEC 10275 accreditation – 'General requirements for the competence of testing and calibration laboratories'. Section 5.10.5 clearly says that "When opinions and

interpretations are included, the laboratory shall document the basis upon which the opinions and interpretations have been made."

I'm a realist, enough to know that any quantification of the uncertainty in an opinion in a gem lab report could be a kiss of death for the gem trade. But the labs, especially those with ISO 17025 accreditation, do need to be pondering all this. Labs at present take comfort in the word 'opinion'. But what if that ruby later proved not to be from Burma and the buyer established that the lab had had the statistical data from an objective test to show there was a 15% chance that it was not, but had not disclosed this? Would the "it's only an opinion" defence be weakened?

Pearls of wisdom

So round, so beautiful in every setting
So small, so smooth her sides were.
Wherever I judged gems bright
I set her apart as unique.

— *'The Pearl', an English poem, circa 1400 (possibly by the same anon author of 'Sir Gawain and the Green Knight').*

"When a beauty glides proudly among a throng of admirers, her hair clustering with pearls, she little thinks that her ornaments are products of pain and diseased action, endured by the most unpoetical of shellfish."

— *Charles Dickens, 1850*

"A pearl is essentially a pathological growth in a lowly mollusc, formed in most cases round the larva of a repulsive parasite. When this fact became known some years ago I had thought that ladies would cease to decorate their persons with jewels of so repellent an origin. Nothing of the sort took place. Even I wear a pearl tiepin."

— *From a letter to The Times in 1921 from A.E. Shipley, an eminent English zoologist commenting on the 'new' cultured pearls.*

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