Gems & Jewellery

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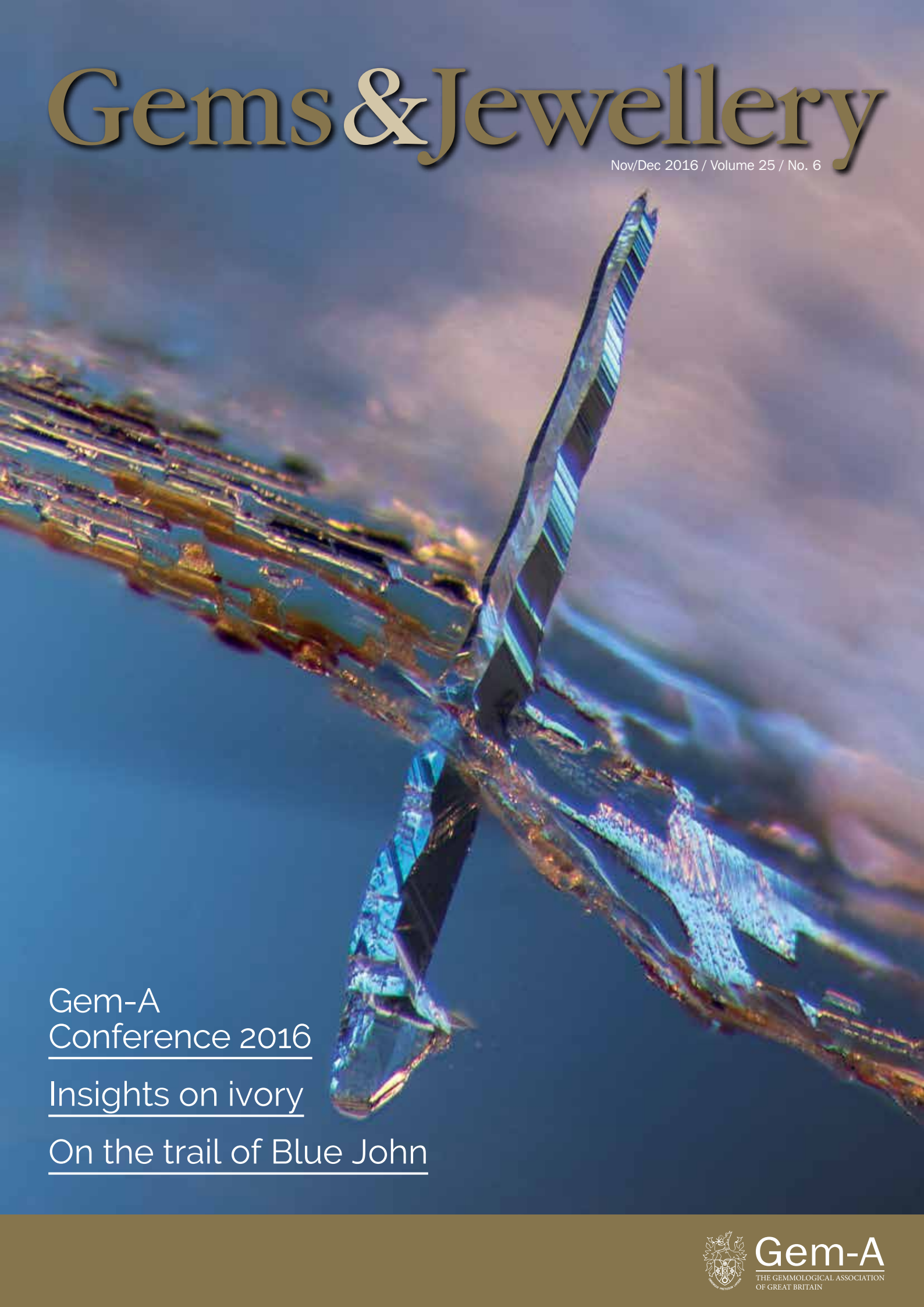

Gem-A Conference 2016

Insights on ivory

On the trail of Blue John

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Nov/Dec 2016

A burning question

Maggie Campbell Pedersen FGA ABIPP looks at recent changes to ivory laws and reports on the recent CITES meeting.

Gem-A Conference

We round-up the speakers, seminars and guests at this year's Gem-A Conference, plus highlights from the Graduation Ceremony.

On the trail of Blue John

Sarah Steele FGA DGA reports on the popularity – and mysteries – surrounding Derbyshire Blue John.

Goldsmiths' Fair

Gem-A's Membership Secretary Kim Foxwell BA MA FGA DGA reports on some of the most eye-catching and technically impressive pieces on display at this year's Goldsmiths' Fair.

Cover Picture

Photography competition winner: Billie Hughes FGA — *'Scuse me while I pierce the sky'*. An elongated negative crystal cuts through a fingerprint in this untreated Sri Lankan sapphire. Darkfield and diffused fibre optic illumination.

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The Gemmological Association of Great Britain (Gem-A)

21 Ely Place, London EC1N 6TD

t: +44 (0)20 7404 3334

f: +44 (0)20 7404 8843

e: editor@gem-a.com

w: www.gem-a.com

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Editor: Sarah Jordan

Deputy Editor: Angharad Kolator Baldwin

Advisory Board
Mary Burland, Belinda Morris

Design and Production
Zest Design +44 (0)20 7864 1504

Editorial and Advertising

For editorial enquiries, mediapack and advertising rates please contact the editor: sarah@gem-a.com.

Creetown Gem Rock Museum — FOR SALE

Smith & Clough Business Associates are delighted to be handling the sale of what is regarded as one of Dumfries and Galloway's finest tourist attractions, the Creetown Gem Rock Museum located on the north side of the Solway Firth, 7 miles from Newton Stewart, in Creetown.

Graeme Smith who is handling the sale commented "Our clients purchased the old school building in 1981 to turn what was a hobby into a thriving business and house their exquisite private collection of minerals, gem stones, crystals and fossils. Over the years the building has been extensively refurbished and developed into an excellent family business and museum, which has become renowned throughout the UK. Offering extensive display halls, the Crystal Cave allows visitors to explore the minerals and crystals in a realistic setting, Professor's Study with its 'Fire and Stones' audio-visual presentation, Exhibition Workshop allowing visitors to watch as gems are cut polished and faceted into beautiful pieces of jewellery, Prospectors' Pantry Tearoom providing a good selection of teas, coffees, home baking and a menu to suit all tastes and finally the Gift Shop which offers one of the best selections of gemstone jewellery in Scotland. The property also has extensive personal living space, comprising a large living room, dining room, kitchen, utility room, four double bedrooms and family bathroom."

Having been a Fellow of the Gemmological Association since 1985, Tim Stephenson and his family have spent a lot of time travelling the globe to build up an unrivalled private collection of gems, fossils and crystals all of which are included within the sale price. A full exhibit breakdown will be given upon request to assist with any valuation. As well as the museum the Prospectors' Pantry Tearoom is open to the public without coming into the museum and offers an additional income with huge potential to grow further by way of a 'pop up' restaurant during the summer evenings.

Graeme Smith finished by saying "the business has been placed on the market due to retirement and offers an exceptional opportunity within the Gemmological community to acquire one of the finest businesses of its type in the UK. Offering many income streams under one roof including catering, retail, geology, jewellery design and marketing (online shop) so could appeal to varying types of buyers within the gem market."

For further information contact Graeme Smith at Smith & Clough Business Associates on 0141 404 0087 ■

CEO Comment

The start of November marked our annual Gem-A Conference and what a weekend it was. It was not just the excellent range of speakers who impressed me – you can find out more about them on pp.14-17 – but also the quality of conversations that were taking place over the course of the weekend. It is always made abundantly clear at our annual event just how broad the gemmology arena really is; from Dr Michael Wise of the prestigious Smithsonian Museum musing on the 'Hiddenite Emerald Deposits of North Carolina', to acclaimed gemstone photographer Danny Sanchez GG revealing his talent for photomicrography of inclusions.

I am also particularly pleased to say that we welcomed more students than ever before to this year's Gem-A Conference, thanks in large part to a special student rate for the event. I firmly believe that our students are the lifeblood of the Association and we hope to continue to nurture these relationships in the months and years to come.

The Conference weekend got off to a fantastic start at the Royal Institute of British Architects in Central London, with Gemfields' Chief Executive Officer Ian Harebottle discussing the importance of gemstones in a jewellery design context. It is important to note the skill with which Gemfields has branded its ruby and emerald mining business; turning what could be a purely operational stance into something with visual flair and creativity that seeks to promote gemstones as covetable assets, not just the colourful trinkets at the centre of pieces of jewellery.

The Diamond Producers' Association is also on this path with its 'Real is Rare. Real is a Diamond' advertising campaign pp.6. Although targeted specifically at a youthful customer, it will be intriguing to see how this platform performs in the UK, especially as it is currently gaining momentum in the United States.

> I firmly believe that our students are the lifeblood of the Association and we hope to continue to nurture these relationships in the months and years to come.

This year's Gem-A conference also featured a talk by award-winning gem cutter, John Dyer, who shared his expertise on the science and artistry of transforming rough material into precision gems. Praise must also go to Bill Larson of Pala International, not only for rounding up the weekend's seminars with his insightful talk on 'Gemstone and Gem Mining in San Diego County California', but also for being awarded an Honorary Fellowship Diploma. This award is in recognition of Bill's continued contribution to the field of gemmology. He cares deeply about sharing his passion and knowledge and has always made it his priority to excite and educate — his avocation is certainly his vocation. Congratulations Bill.

Of course, the core of Gem-A is our education, and we were thrilled to host our annual Graduation Ceremony on Monday 7 November at the Royal College of Surgeons. More than 600 students from across the globe passed the Gemmology Diploma or Diamond Diploma examinations in 2016, with more than 50 earning a Distinction for their efforts. Some particularly accomplished students were also granted special commendations this year, which we are pleased to share with you on pp.17.

Elsewhere in this issue Maggie Campbell Pedersen FGA ABIPP discusses the complexities of ivory, while Sarah Steele FGA DGA takes us on a journey to Treak Cliff Cavern in Castleton, Derbyshire, to discover more about Blue John.

As this is the last issue of *Gems&Jewellery* 2016, I would like to wish all of our members a very Merry Christmas and a happy and prosperous New Year. We look forward to seeing you in 2017.

Best wishes,

Alan Hart FGA DGA
Chief Executive Officer ■

Gem News

SYNTHETIC SCREENER LAUNCHED BY DE BEERS

The International Institute of Diamond Grading & Research (IIDGR), part of The De Beers Group of Companies, unveiled the latest addition to its suite of synthetic detection technology at the Hong Kong Jewellery & Gem Fair in September.

The PhosView™ is a compact, self-contained screening device designed to allow parcels of polished stones to be quickly and accurately analysed to determine if they contain potential High Pressure High Temperature (HPHT) synthetics.

During analysis, colourless and near-colourless stones in the 0.003 ct (one third of a point, or 0.9 mm) to one carat size range are viewed on a screen while being subjected to UV light. Any phosphorescing stones are revealed and may be manually separated out for further analysis using built-in manipulator arms. The machine is designed to screen loose diamonds as well as some jewellery pieces.

BURMA SANCTIONS PROGRAMME TERMINATED

On 7 October 2016 President Obama signed an Executive Order terminating the national emergency with respect to Burma. This revoked the Burmese Executive Orders and waived other statutory blocking and financial sanctions on Burma. As a result, the economic and financial sanctions administered by The Office of Foreign Assets Control of the US Department of the Treasury (OFAC) are no longer in effect.

Among the impacts of this move, which sees the back of the Tom Lantos Block Burmese JADE (Junta's Anti-Democratic Efforts) Act of 2008, is that the ban on the importation into the US of Burmese-origin jadeite and rubies, and any jewellery containing them, has been revoked.

GIA DISCOVERS UNDISCLOSED 5 CT SYNTHETIC DIAMOND

The Gemological Institute of America (GIA) has reported the "largest" Chemical Vapour Deposition (CVD) synthetic diamond it has examined to date. The 5.19 ct cushion modified brilliant, with a J-equivalent colour and a VS2-equivalent clarity, was submitted for grading without prior notification of its lab-grown origin. The stone contained natural-looking internal inclusions, such as needles and clouds, leading the GIA's Hong Kong laboratory to suggest it could have been mistakenly identified as natural following microscopic examination.

NAJ PLANS FOR MADE IN BRITAIN MARK

The National Association of Jewellers (NAJ) has taken a "very definite and positive position" on the issue of the UK Assay Offices hallmarking overseas and is "pursuing the idea of a 'Made in Britain' mark" according to a statement on its website.

The move follows industry and press discussions concerning "UK Assay Offices using their UK Assay Office (town) marks when hallmarking items in their overseas 'sub offices'…There is already no differentiation between hallmarks on items manufactured in the UK and those manufactured elsewhere. This was lost in 1999, since when tens of millions of foreign made items have had to be marked with a UK Assay Office (town) mark."

The 'Made in Britain' Hallmark suggested by the NAJ would be a voluntarily additional mark applied by the Assay Offices and affirmed by the British Hallmark Council. It would follow a set of criteria yet to be agreed upon under a legal licensing agreement determining the standard and specifications to qualify as 'Made in Britain'.

DIAMOND PRODUCERS ASSOCIATION UNVEILS 'REAL IS RARE' VIDEO CAMPAIGN

A new communications strategy by the Diamond Producers Association has launched with the aim of encouraging young 'Millennial' customers to purchase diamonds. 'Real is Rare. Real is a Diamond' is being described as an advertising platform that reinforces diamonds as a symbol of sincere emotion and commitment. The debut video campaign, which can be found on YouTube, is a stylish take on romance with subtle references to diamonds and diamond jewellery. This new campaign is the first diamond category-specific marketing activity to launch in five years.

WORLD'S LARGEST NEW DIAMOND MINE OPENS FOR BUSINESS

The Gahcho Kué mine in the Northwest Territories of Canada officially opened for business in September, making it the largest new diamond mine to open globally since 2003. The mine is a joint venture with The De Beers Group of Companies and Mountain Province Diamonds and is expected to produce approximately 54 million carats of rough diamonds over its lifetime. ■

'THE CONSTELLATION' BOUGHT BY DE GRISOGONO

September saw high jewellery and watch brand de Grisogono acquire the rights to 'The Constellation' — the world's most expensive rough diamond. Measuring more than 6 cm in width and weighing 813 ct, the diamond was found by the Canadian company Lucara Diamond at its Karowe mine in Botswana, in November 2015. The gem was purchased for US$63 million (£51.7m) following a competitive bidding process.

Gem-A News

A round-up of the latest news from Gem-A.

ROUGH DIAMONDS PROVE A HIT IN GEM-A WORKSHOP

This year saw the return of the *Rough Diamond Workshop* by Dennis Terry. This active workshop focused the attendees on valuing rough diamonds and then calculating the potential profit of having the stones fashioned offering an insight in to all the considerations of a rough diamond buyer. Dennis Terry is an independent rough and polished diamond consultant and is currently a Rough Diamond Valuator for the UK Government Diamond Office on the Kimberly Process Certification Scheme.

Gem-A also had a popular run of its principal autumn workshops with *Understanding Diamond Grading*, *Understanding Gemstones* and *Understanding Practical Gemmology*, which aim to inspire our future gemmologists. Are you interesting in attending one of our workshops?
Apply online or contact our team on **education@gem-a.com**.

GEM-A GETS JTV SEAL OF APPROVAL IN TENNESSEE

Gem-A held a successful week of tutoring at Jewelry Television in Knoxville, Tennessee, in October, helping students from across the United States enhance their gemmology testing skills. Gem-A North American Manager, Eric Fritz FGA DGA, shared his expertise on pearls with a selection of students and JTV staff via an informative seminar on natural saltwater pearls. This enjoyable presentation gave attendees the opportunity to get 'hands on' with many varieties of pearls and their shells, including Melo, Conch, Abalone and Tridacna.

Students participated from all over the USA as far afield as Washington DC and Texas and from a wide range of industry backgrounds and experiences. The success

of the week highlighted the importance of lab classes for instilling confidence among students, especially with using equipment.

Foundation student Richard Murray, who attended the lab classes in Knoxville, says: "The ODL Foundation lab class provided the perfect catalyst for tethering the gemological theory provided in the course reading materials to a practical application of this knowledge. The student to instructor ratio was absolutely superb, giving each student ample time to learn from noted experts in the field. This hands on experience was enriched by the strong atmosphere of collegiality among the attendees."

Students and tutors also enjoyed a guided tour around the new JTV facilities, which include a state of the art stock processing warehouse and studios. Gem-A would like to thank JTV for their continued support in providing one of four teaching facilities for our students based in the USA.

ANGHARAD KOLATOR BALDWIN AND SARAH JORDAN JOIN GEM-A TEAM

We are pleased to welcome Angharad Kolator Baldwin to Gem-A in the newly created role of Editorial and Digital Assistant. Angharad will support the production process of *Gems&Jewellery* and *The Journal of Gemmology*, while also helping to create digital content for the Gem-A News & Blogs section of the website. Journalist Sarah Jordan has also joined the Association in a freelance capacity as Editor of *Gems&Jewellery* while Georgina Brown is on maternity leave.

ANDREW FELLOWS TAKES ON NEW ROLE IN BIRMINGHAM

Andrew Fellows FGA DGA CDG has left Gem-A after five and a half years in order to pursue a new role in Birmingham. Andrew started his career at Gem-A as an IT Implementation Manager before taking on the role of Tuition Manager for the Association's Online Distant Learning courses in 2013. He can now be found lecturing in Gemmology at Birmingham City University's School of Jewellery.

Share your news with Gem-A by contacting **editor@gem-a.com** ■

OBITUARIES

Sheila Greatwood
18.01.1946
- 27.09.2016

Sheila Greatwood with her famous Tandem that she rode with her husband John.

It is with deep regret that we announce the sudden death of Sheila Greatwood FGA DGA, of Mitcham, Surrey, on 27 September. Sheila had been a Gem-A Foundation in Gemmology examiner since 2003. A full obituary will be published in *The Journal of Gemmology*, Volume 35, No. 4, 2016.

James A. Fiebig
03.10.1956 - 22.10.2016

We are sad to announce that James 'Jim' Arthur Fiebig passed away on 22 October in Cape Carteret, North Carolina. He was passionate about the beauty of coloured gemstones around the world, travelling to Brazil, Tanzania, Kenya, Zanzibar and South Africa to name a few. Jim also led trips for Gem-A members to Madagascar to discover the gemstone opportunities on the island.

James A. Fiebig in Madagascar from the Gem-A archives.

Events

GEM-A EVENTS

Gem Central
Whether you are a student in gemmology who wants more practical work, a gem and mineral enthusiast who would like the opportunity to handle other collections, or a member of the jewellery trade who is keen on examining some of the new synthetic treated stones on the market, Gem Central evenings are for you.

Gem Central is a regular practical gemmology evening for Gem-A members and students, giving attendees the opportunity to investigate and explore a variety of gem materials.

For more information about our upcoming Gem Central events, please contact us via events@gem-a.com.

Price: Free for Gem-A members and students; £10 for non-members

Gem Central with John Benjamin
17 January 2017, 18:00–20:15
Gem-A Headquarters, 21 Ely Place, London
Join John Benjamin, long standing contributor to the Antiques Roadshow, as he takes us through a history of jewellery from Elizabeth I to Queen Victoria and Jewellery of the 21st century. A fascinating lecture to start the year!

OTHER EVENTS

Gem-A Midlands Branch — Treatments and imitations of gemstones
24 February 2017, From 18.30
Fellows Auctioneers, Birmingham
Gwyn Green will visit the Midlands Branch to discuss treatments and imitations of gemstones.

Gem-A Midlands Branch — Suffragette Jewellery
28 April 2017, From 18.30
Fellows Auctioneers, Birmingham
Elizabeth Goring will discuss Suffragette Jewellery at the Midlands Branch.

For more information please contact the Gem-A Midlands Branch Chairman, Georgina Southam via georgekettle@hotmail.com.

Price: £4 for Students; £6 for Gem-A members; £8 for non-members

INTERNATIONAL EVENTS

Gem-A will be exhibiting at the following international shows:

International Jewellery Tokyo (IJT)
23–26 January 2017
Stand TBC
Tokyo, Japan
The largest jewellery trade show in Japan, come and visit our booth selling gemmological instruments and take a look at our upcoming courses. Members will be able to renew their membership. Gem-A tutor Julia Griffith FGA DGA EG will lead a seminar on *Gemstones: The Colours You Can't See* on 25 January.

The 47th Annual Conference of the National Association of Jewelry Appraisers (NAJA)
29–30 January 2017
Tucson, Arizona, USA
Our North American Manager, Eric Fritz FGA DGA, will be joined by Claire Mitchell FDA DGA for the 47th Annual Conference of the NAJA.

AGTA Gemfair
31 January–5 February 2017
Booth 29
Tucson, Arizona, USA
Gem-A will be returning to the AGTA GemFair Tucson to our usual spot. Gem-A will exhibit its range of educational and training courses, instruments, membership services and publications.

AGA Tucson Conference
1 February 2017
Tucson, Arizona, USA
Claire Mitchell FGA DGA will lead a hands-on workshop entitled *Separating Similar Looking Stones* as part of the Accredited Gemologists Association Tucson Conference.

Gem-A's Big Gem Bash
2 February 2017, 18:00–20:00
Scottish Rite Cathedral,
Tucson, Arizona, USA
Gem-A's Big Gem Bash returns for a third year! A hugely popular night in the Tucson calendar, friends gather together from all over the globe to celebrate gemmology in beautiful surroundings. Supported by JIBNA, this is an event not to be missed. Save the date — booking will open on Eventbrite in December.

Tucson Gem and Mineral Show
9–12 February 2017
Booth 320–322
Tucson, Arizona, USA
We return to the Tucson Gem and Mineral Show. This year you will find us on the main floor.

EDUCATIONAL WORKSHOP

Understanding Practical Gemmology
3 March 2017
Gem-A Headquarters, 21 Ely Place, London
This one-day workshop focusses heavily on the practical aspects of gemmology and covers the effective use of readily available instruments and testers. The 10x lens, polariscope, spectroscope and refractometer are all covered in depth; under the expert guidance of our tutors you will quickly learn the basic principles and techniques needed to use them efficiently. Previous practical experience is not required. By the end of the workshop you will be able to correctly use the equipment and be able to appreciate their value in testing. This is the ideal 'taster' class for those considering studying our full Foundation or Diploma in Gemmology courses, but it is also equally suited to those embarking on gem-testing in a retail or valuation environment, or simply those in need of a refresher. All gemmological equipment is provided within the workshop, and is also available to buy from our shop.

For more information please contact the Education Department via education@gem-a.com.

Price: £120 for Gem-A members, students and NAJ members; £150 for non-members

Gem Empathy Award

Susan Blackler's winning 'Supernova' design.

Every year at Interntaional Jewellery London (IJL), Gem-A presents one exhibitor with the Gem Empathy Award. Previously, the judges would search for a single piece or a collection of jewellery that made captivating use of one or more gemstones. For IJL 2016 we decided to open the competition up to new and emerging designers who may not have had the chance to work with such an incredible stone. We asked IJL exhibitors featured in the Design Gallery to produce a design based around a 10.46 ct fantasy-cut Heliodor sourced from award-winning gem cutter John Dyer. We were overwhelmed by the standard of the designs and would like to thank everyone that participated. The winning design, 'Supernova', chosen by the four judges (pictured below), was created by Susan Blackler from Sonkai Ltd. The futuristic design captured the imagination of the judges and Susan is now working to create the piece to be displayed at a Gem-A event over the next year. ■

L-R: Gem-A CEO Alan Hart, Gem-A teaching manager Claire Mitchell, Susan Blackler of Sonkai Ltd and IJL marketing manager Sarah Kitley-Spencer.

Alan Hart, Gem-A CEO

"This year's Gem Empathy competition encouraged designers to place John Dyer's expertly-cut gemstone at the heart of their designs, and I felt that Susan Blackler's 'Supernova' cuff embodied the brief perfectly. Her design is eye-catching, unusual and in-keeping with the spirit of the fantasy cut Heliodor. I look forward to presenting Susan's cuff to the wider Gem-A membership over the coming months."

Sam Willoughby, Event Director, IJL

"'Supernova', the winning design created by IJL Design Gallery exhibitor, Sonkai, cleverly meets the brief with the innovative use of mixed materials and an inspired setting focusing attention on the beautiful 'Star Brite' fantasy cut Heliodor. We were confident that the Design Gallery exhibitors would showcase outstanding contemporary collections and Sonkai's design is truly exceptional — congratulations."

Claire Mitchell, Teaching Manager, Gem-A

"All of the entries for this year's Gem Empathy award were outstanding, which made the competition a delightful challenge to judge. For me Susan Blackler's entry, 'Supernova', really stood out displaying contrast and dramatic effect with a combined style and elegance which drew my eye immediately. Accentuating the central Heliodor in a pleasing bold yet detailed design. An outstanding piece which I very much look forward to seeing next year."

Chris Sellors, Founder C W Sellors

"With such a wide range of submissions, it was an extremely difficult task to choose a winning design. With a passion for gemstones myself, it was wonderful to see each individual designer's imagination inspired by a wonderfully cut gemstone. Congratulations to all those who entered and keep up the fantastic work."

A burning question

Organics expert Maggie Campbell Pedersen FGA ABIPP takes a look at the recent changes to ivory laws in the US and reports on the recent CITES meeting held in South Africa.

1: Modern Manaia, carved in bone.

Ivory is much in the news at present, so an update on the situation seems to be in order. Firstly though (and with some embarrassment as it is one of my first tasks as President of Gem-A), I must correct two mistakes I made in the recent article I wrote about paua shell (*Gems&Jewellery*, July/August 2016, pp.10–12).

Firstly, the small Maori carving in bone with paua shell eyes (shown again in **1**), was referred to as a *'Hei-tiki'*. It has been pointed out to me that a *hei-tiki* has a human form. A carving representing a mythological figure (usually based on bird forms) is called a *'Manaia'*. Secondly, a mistake that fortunately few people noticed – possibly because the correct implication was obvious – I wrote that "[The Maoris] now carve ivory instead of bone". It should of course have been the other way round. Nowadays, the Maoris carve bone mostly to sell as jewellery for the tourist trade, often with paua shell inlaid eyes.

There is a slight twist to the tale, however, as in New Zealand marine mammals come under the jurisdiction of the Department of Conservation, which has entered into agreements with *iwi* (Maori tribes) around the country, giving them guardianship of the stranded whales. The whale teeth are commonly taken and carved as decoration or ornaments by the local *iwi*. Additionally, the Inuit in various countries have been allowed to catch a small quota of whales and walruses annually and use the ivory from this quota, and from strandings. Today the American Inuit are – thus far – exempt from the new stringent ivory laws in the United States.

The subject of ivory is very emotive and the laws governing the sale of ivory are a minefield. The world's largest conservation organisation, the Convention on International Trade of Endangered Species of Wild Flora and Fauna (CITES), have just held their biennial Council of Parties meeting in South Africa, where ivory was high on the agenda. Namibia and Zimbabwe both have good elephant stocks and wished to get permission to sell their large ivory stockpiles. However, when put to the vote, this permission was denied. CITES members went even further at this meeting and unanimously agreed that domestic

2: Modern Chinese carving in mammoth ivory.

markets, which are contributing to poaching or illegal trade, should take all necessary legislative, regulatory and enforcement measures to close their domestic markets in raw and worked ivory as a matter of urgency. Such a statement is highly unusual, as CITES bans cover only international trade, demonstrating the severity of the present situation. Unfortunately, CITES has no power to enforce it.

It is important to note that the CITES laws cover the entire animal rather than just a part of it. Ivory from other species (e.g. walrus or hippo) will be covered by different bans. Furthermore, all the talk of late has been almost exclusively about African elephant ivory and the plight of the African elephants. The Asian elephants – which are just as endangered as the African ones – are forgotten. It is impossible to differentiate with absolute certainty the African ivory from the Asian ivory without DNA testing. It is therefore imperative that laws are made to cover ivory from all elephants. Failure to do so will leave loopholes in the new laws. To overcome such problems it would seem that many countries are contemplating adopting a total ban on any type of ivory, regardless of its provenance. As all the ivory-bearing animals are in fact endangered to some degree, this would not be a bad thing. It begs the question, however: what about ivory from the already-extinct mammoth (**2**)?

The constant changes in the ivory laws make it difficult to keep up. In the United States the laws are especially bewildering because they are interpreted and implemented state by state. The new law of a near-total ban on any product

containing African elephant ivory was made final in early summer 2016. Exemptions are in place for a few items such as some antiques and inlay, not totalling more than 200 g on certain musical instruments or firearms. Subsequently, most states are now considering banning all forms of ivory, including mammoth, and complete bans are already in place in New Jersey, California and Hawaii. In some areas a more lenient approach is being advocated, permitting some trade, change of ownership or movement of material depending on its age, size and provenance. In June, Eric Fritz FGA DGA gave a very interesting Gem Central talk on the subject, concluding that the laws are too complicated in their present form, and suggested that in a few years time the final outcome will be a total ban on all types of ivory across the whole of the United States.

In the UK 'new' laws have been announced that no ivory can be sold unless it can be proved it was carved before 1947. This date was chosen because this was the time of the atomic bomb testing, when large amounts of carbon-14 (C14) entered the atmosphere. Thus, ivory from an elephant that died after 1947 will have a much higher C14 reading than one that died before then. The same applies to all materials from protected species e.g. tortoiseshell and rhino horn.

In fact this law is not new and has been in operation for many years, but from now on the plan is to tighten it up, so that expert opinion as to the date of a piece will no longer suffice, and documentation will be required.

3: Shibayama style dish, 6 cm diameter, inlaid with mother-of-pearl and other materials. Made in Japan, mid nineteenth century.

C14 dating is expensive, slightly destructive, and will only tell when the animal died, not when the carving was made. By law any carvings made after 1947 cannot be sold, even if the ivory is old, or indeed is from an old item which has been reworked. C14 testing cannot identify this. It remains to be seen how the law will be enforced in future, especially as documentation is not difficult to forge — as has been seen since the last CITES endorsed auctions of stockpiled ivory in 2008.

CITES monitors elephant populations through two programs: the Elephant Trade Information System (ETIS) and Monitoring the Illegal Killing of Elephants (MIKE). These have indicated that the sharp upward trends in poaching, which started in 2006, have started to level off with continental levels of illegal killing of elephants stabilising or slightly decreasing. Encouraging though this sounds, it is not the full picture. In southern Africa, elephant poaching is uncommon and the elephant populations are if anything, too large for the areas. So the costly process of relocating elephants is undertaken. In east and west Africa very few elephants remain and levels of poaching are still far too high for the elephant populations to remain stable. The animals still face extinction, unless something is done soon. When considering the animals, rather than ivory, conservationists on the ground agree that there is not one simple solution for the whole of Africa. With regards to ivory, there is a good argument for legalising the entire trade and selling the stockpiles of ivory cheaply rather than burning them, thus bringing down the value to a point where poaching is no longer worth-while. Or perhaps a world-wide total ban on ivory sales is the only answer — in reality, can this be enforced?

Personally I have no problem with ivory being worthless in monetary terms, but I do have a problem with the idea that all ivory, including old collections, should be burned. In my opinion that would be purging several thousands of years of world history, and destroying some exquisite works of art in the process, without bringing any animals back. The work of such people as Shibayama (**3**), the Japanese craftsman, can be admired for its creativity and workmanship, without thought for its value. Not only this, but as a colleague recently said to me: "If we destroy it all, the animals would truly have died for nothing".

We must wait and see whether the recent CITES meetings will give the world the final push to ban ivory sales altogether. But even if that is the case, people will still have to be able to identify ivory. I sometimes come under fire for writing or talking about it, but I do not believe that we will help the situation by ignoring it — quite the contrary. We have a much better chance of helping if we address the problem. Now more than ever we gemmologists, jewellers, auctioneers or antiques dealers need to know what we are dealing with and how to recognise it. The same goes, of course, for other materials from protected species, such as rhino horn or tortoiseshell. I would like to think that the knowledge we have can help to enforce any laws that may be implemented and protect the remaining animals (**4**). I am very proud that Gem-A can play its part in that education. Meanwhile we must wait and see how the laws are changed and enforced, and whether they will work. ■

4: Maggie with Thangmo, a young Asian elephant in a sanctuary in Thailand.

All photos by Maggie Campbell Pedersen.

A balancing act

Justine Carmody FGA is Gem-A's new chairman of the Council — a key role that she combines with demanding positions at Garrard and Stephen Webster. We speak to her about her very impressive career trajectory.

What can you tell us about your roles at British fine jewellery brands Garrard and Stephen Webster?
I am the production and development director for both Stephen Webster and Garrard, which each have their own separate design teams. As a production team we work closely to realise their designs and manage the production process from start to finish. Specifically, this requires sourcing stones and the right materials, choosing the best workshops and craftsmen, and working with my team to ensure we get the best price and quality.

When did you first join the jewellery industry and what led you to want to do this?
I loved making things as a child — especially *Airfix* models. My father was an engineer so he taught me technical drawing and encouraged me to apply to Sir John Cass on the pre-apprentice course and I was lucky to be accepted…being the only girl on the course with five boys. We spent all week at the bench, and alongside jewellery we also studied design and silversmithing. I also stayed on in the evenings for engraving and enamelling classes. It was a great environment and we had really excellent tutors. I absolutely loved it.

Campaign image by British fine jewellery brand Stephen Webster

Gem-A's new chairman of the Council, Justine Carmody FGA

What has been your career path up until this point? Your time as a jewellery buyer at Mappin & Webb and as the commercial director at Theo Fennell must have been very interesting?
I was extremely lucky that a new jewellery business called Theo Fennell was looking for an apprentice, as back then (over 30 years ago) there were very few girls at the bench and even fewer were offered apprenticeships. I studied for my diploma in the evenings back at Sir John Cass and after my apprenticeship Theo gave me the opportunity to work alongside him managing the stock and client bespoke production, including the stone purchasing. I had an amazing 12 years with Theo before I moved to Mappin & Webb as the group jewellery buyer.

Mappin & Webb at that time was part of the Asprey group, which also included Garrard and Hamilton & Inches. I was incredibly fortunate as the group's jewellery teams would regularly meet and as the junior member I learnt an enormous amount from my peers, including Mappin's managing director Judith Pilkington, who very patiently taught me how the business worked.

After seven years I returned to Theo Fennell as the buying, merchandise and production director, as, by then, Theo had also established an additional concession business in branded jewellery and watches running over 40 brands within Harrods. After three years I was appointed commercial director.

I was then offered the opportunity by Brown Thomas, Dublin's premium department store, to head up their new jewellery and watch

division and work with them on the launch of the store's new luxury hall. It was great, a totally new experience — working in the buying office of a department store and adapting to a faster paced seasonal buying culture.

I returned to London to join Asprey as jewellery and watch director. After five years I moved to my current role with Stephen Webster and Garrard, where I am incredibly privileged to be working with not only the oldest jewellery brand in the world, but also one of the most high profile figureheads in fine jewellery. I head up a brilliant production team, including managing the buying of all the stones, and we work closely with both brands on realising their amazing designs.

What would you say are your key skills today? Have you added to them as your career has progressed or have you simply enhanced existing skills?

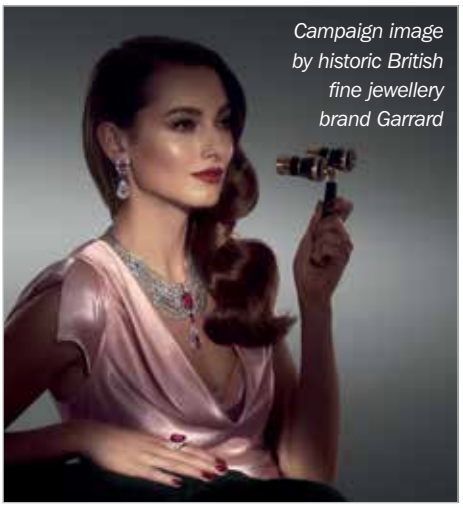
My main skill today is probably the experience I have gained having worked with some of our industry's most talented people and brands. I have both a commercial background as well as a production background working closely with design teams. This has allowed me to understand and embrace the creative process whilst having a commercial eye and making sure it all makes business sense. Having worked for a number of years in this industry, I also think I am good at recognising and understanding current customer demands and trends and therefore consistently sensing what is relevant to the modern day consumer.

What changes have you effected at Garrard and/or Stephen Webster in the 18 months since you joined?

The beauty of working across two brands allows me to streamline processes and consolidate where possible, therefore enabling greater efficiencies and reducing costs.

In terms of branding and brand development, would you say that the major British luxury houses lag behind their European counterparts? What has been your experience of working in this, arguably, rarefied world?

No, I do not think that major British luxury houses lag behind their counterparts. There are many British brands that are successful globally. We have some of the leading



Campaign image by historic British fine jewellery brand Garrard

colleges in the world across jewellery, fashion and design; we have brilliant apprenticeship schemes and we really nurture the creative industries. Where I do think that Britain stands out is in its passion for independent creative entrepreneurs, Stephen Webster and Theo Fennell, being perfect examples. Alongside this, British jewellery houses, such as Garrard, have an enviable history of creating some of the world's most famous historical pieces.

You designed a collection while at Asprey — how involved are you in the design process today?

My role here is all about realising the designs of the design teams by bringing to life their vision and buying and sourcing the best materials. Because of this I work incredibly closely and collaboratively with the creative directors and their teams.

When and why did you decide to study for Gem-A's Diploma and how has it helped or complemented your career?

I can honestly say that passing my diploma is one of my biggest achievements, as I do not believe anyone achieves it without putting in a huge amount of study and hard work, tackling what at times is a very complex subject. Finishing a day's work and then travelling across London twice a week for evening classes and revising at weekends is a very big ask. I know that when I see FGA on a business card or a CV, that the person must have a real passion for the subject — you would not put yourself through two years of challenging, but fascinating, study and hard work otherwise.

What prompted you to join Gem-A's Council and what do you feel you bring to it and the Association in general? What encouraged you to accept the role of chairman and what are your hopes for Gem-A going forward?

I had previously spent some time on the education committee of the then National Association of Goldsmiths and that is how I became interested in the educational side of the jewellery trade. I was asked if I would stand for election and I was delighted to do so, I hope that my experiences to date will add something to the mix of the Council. As the chair is a revolving position I am really delighted that my turn is coinciding with the appointment of our new CEO Alan Hart. My role is to support him with his many objectives and to feed back to my fellow Council members. And as you would expect, our objective is the continued success and quality of our teaching and courses, both at home and with our international partners.

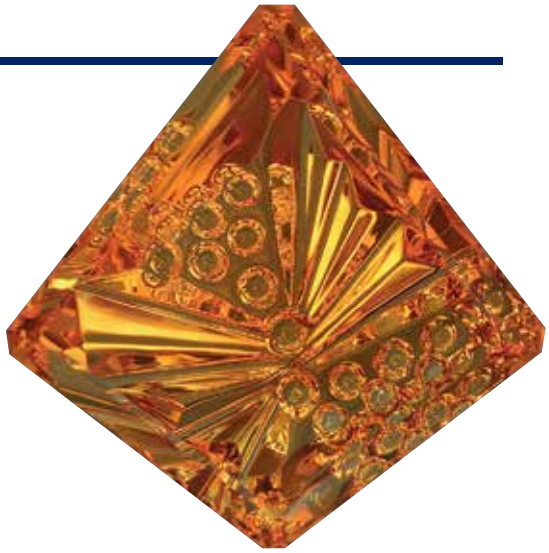
What are your interests outside of the jewellery industry and Gem-A?

I am a member of my local choir, which I love even though I am a pretty poor singer. We have performed in some amazing venues including the Royal Albert Hall and Royal Festival Hall, and I do love art galleries and holidays! ■

Magnipheasant Pavé Open Feather ring by Stephen Webster

London calling

The annual Gem-A Conference took place in November, welcoming a range of impressive speakers, global delegates and Gem-A students to the Royal Institute of British Architects (RIBA) in Central London. Here, Sarah Jordan rounds-up the highlights of the event.



Citrine in a Dreamscape™ cut by John Dyer & Co. Photograph by David Dyer.

It could be argued that nothing wakes up a lecture theatre filled with gemmologists early on a Saturday morning like a talk by Gemfields' Chief Executive Officer, Ian Harebottle.

His opening talk analysed the crucial importance of design when it comes to drawing out the beauty – and perceived value – of gemstones. Harebottle's comments that precious gemstones and indeed finished jewellery, are "trapped in a sector that has shown little, if any, meaningful growth and development over the past 500 years," may have raised a few eyebrows, but it was hard to dismiss the ethos of his talk — we are all responsible for ensuring the future success of the luxury gem and jewellery sector in one way or another. Other points struck a particular chord with the jewellers and gem dealers in the room, notably the fact that pieces become "recyclable when the value is only placed on the gem". His thought-provoking points were interjected with pictures of Gemfields' mining activities in Zambia and Mozambique, which are the source of the company's mission to introduce more colour to the average jewellery consumer's life.

Perhaps the greatest strength of the Gem-A Conference is its sheer variety of speakers — something which was emphasised the moment Harebottle stepped down from the podium and Jim Clanin stood up to speak. With 40 years' experience in mining, Clanin emphasised the importance of choosing the right techniques for different types of gem deposits. It is safe to say you could sense his optimism as he spoke about "revolutionary" AutoStem Rock Breaking Cartridges, which are a non-detonating, affordable and far safer alternative to the potentially damaging effects of explosives.

Dr David Fisher of the De Beers Technologies Research Centre took on the challenge of the pre-lunch session, but his engaging and entertaining talk had nothing to fear from hungry bellies. Diamond treatments have always been relevant for the gemmological community, but conversations among consumers are certainly peaking thanks to the media coverage of synthetic and lab-grown diamonds. Dr Fisher skilfully rounded up the different types of diamond treatments before delving into the issues surrounding detection and testing approaches. His reminder that treatments can still be applied to synthetics was certainly food for thought, as was the ensuing debate on the pros and cons of publishing research on treatment detection.

If there was one thing that united all the Conference attendees (aside, we hope, from a love of gemmology) it was the awed reaction to John Dyer's exceptional cutting skills. Having won more than 50 cutting awards in 14 years, John was the ideal choice to discuss the art and science of the discipline, revealing images that Alan Hodgkinson FGA DGA described as "mouth-watering". Of course, he could not resist sharing his not-so-successful moments with the audience too, including a 90.84 ct imperial topaz crystal that was sadly whittled down to just 1.22 cts.

The day was expertly concluded by Robert Weldon GG, Manager of Photography and Visual Communications at GIA, Carlsbad, California.

Danny Sanchez GG

Emerald crystal (23 mm maximum height) and 3.92 ct faceted gem are both from Chivor, Colombia. Gem and mineral courtesy Bill Larson. Photo by Robert Weldon/GIA.


Conference delegates

Helen Molesworth FGA

His talk introduced us to Peter W. Rainier, who was the manager of the Chivor emerald mine in Colombia in the 1930s. The greenish blue colour of these emeralds was highlighted through striking photographs, many of which felt like the behind-the-scenes shots of an *Indiana Jones*-style adventure film.

Shortly after Weldon's talk, guests swapped the lecture theatre for the dining hall for the annual Conference Evening Dinner. As always, this was a way to discuss the day's events and catch up with friends old and new, while also discovering the winners of the raffle. Attendees agreed that it was a fitting end to a busy day.

"John Dyer's talk on gemstone cutting was fascinating. Most gemstones we see we cut in very standard patterns, but John has geared up a whole world of possibilities for beautiful individual gemstones beyond imagination."
Gillian Woodrow FGA DGA

THE FIVE SENSES IN GEMMOLOGY CHALLENGE


Lizzie Gleave explains the Five Senses challenge.

Gem-A Collection Curator and Gemmology Tutor, Lizzie Gleave, designed a competition that tested the skills and senses of Conference attendees. The challenge, held in the RIBA Gallery, encouraged everyone to identify particular gem materials using just sight, sound, smell, touch and taste — a back to basics approach that got many students talking.

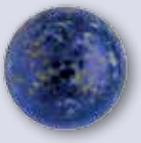
Here are some of the questions asked at the event and the correct answers:

Can you identify this emerald-cut just by touching its surface?
Answer: Topaz
This particular gemstone has a greasier surface feel than other stones.

Can you identify the yellow material in these bags using only sound?
Answer: Amber and Copal
Amber sounds dull whereas copal sounds higher, not dissimilar to Lego bricks rattling together.

Can you identify these pink crystals using only sound?
Answer: Kunzite
Participants were tasked with recognising the distinct clinking sound created by spodumene crystals.

Which of these blue stones will produce a bad egg smell if subjected to the acid test?
Answer: Lapis Lazuli
The presence of sulphur is responsible for this tell-tale odour.



The second day was opened by Helen Molesworth FGA, who managed to explore the history of gemstones from antiquity to the present in just one hour. Her whistle-stop guided tour, from Ptah-Hotep in 2,500 BC to the discovery of the Cheapside Hoard in 1912, was only enhanced by a wider discussion on why we wear gemstones. These "Style, Status, Superstition and Symbolism" factors were all discussed in interesting detail.

Dr Michael Wise of the Smithsonian Museum arrived on stage to jokingly rebuff Molesworth's map of significant gemstone deposits, which did not include an 'X marks the spot' on North Carolina. His ensuing talk on the Hiddenite North Carolina emerald occurrence was part history lesson, part geology lecture and part adventurers' tale, with Dr Wise pointing to the 2003 discovery of a 1,869 ct crystal as a particular highlight of the area.

The gathered audience was not necessarily prepared for the next speaker, who presented images so impressive that an audible gasp could be heard above the background music. Danny Sanchez GG has seemingly perfected the art of photomicrography, turning his attention to the myriad forms of inclusions within


Conference Dinner

"Superb weekend! I met amazing friendly people, willing to share knowledge with those who are like-minded. I would go every weekend if I could! Can't wait for next year to go back and learn more."
Charlie Bexfield, Gem-A in-house foundation student.

specimens. Sanchez, who is based in Los Angeles, also divulged his tricks of the trade, from lighting techniques to digital 'stacking' of images to create depth. Robert Weldon summarised the talk nicely when he commented: "From one photographer to another…that was magnificent."

The penultimate Sunday session was led by Gem-A's own Pat Daly FGA, who discussed identification techniques and the vital traits required by a gemmologist, specifically "patience, time and persistence". Finally, Bill Larson, Chief Executive Officer of Pala International, Inc., took on the final session of the Conference, wowing the audience with images of his own personal collection and specimens he has encountered in his career. His tales of mining in San Diego and discovering 'blue cap' tourmalines, morganites and kunzites, were layered with the wider history of the area, including the 90 tons of San Diegan tourmaline purportedly delivered to Empress Dowager Cixi of China during her lifetime.

This year's Conference provided a welcome influx of inspiration, not just for global delegates and guests but for the Gem-A students ready to start their careers in gemmology. We look forward to welcoming a new line-up of speakers and even more guests at next year's event.

ACKNOWLEDGMENTS

Gem-A would like to thank our Platinum Sponsors, JTV, our Silver Sponsors AGL, CGA, EGM, Gemfields, GemWorld and Marcus McCallum, and our Bronze Sponsors The Rock Hound and AGA, for their generous support of the conference. ■

Attendees of the Visual Optics workshop with Alan Hodgkinson FGA DGA

WORKSHOPS AND WONDER

In addition to the information rich weekend at RIBA, Gem-A hosted a series of workshops and private viewing experiences. Angharad Kolator Baldwin reports…

On Monday 7 November, following the busy Conference weekend, a number of interactive workshops were hosted at Gem-A headquarters.

Richard Drucker GG hons FGA, President of GemWorld International, Inc., hosted morning and afternoon workshops on coloured stone grading and pricing, while Michael Hügi FGA, President of the Scientific Commission of the Swiss Gemmological Society in Switzerland, presented a popular workshop on inclusions.

Gemmology great Alan Hodgkinson FGA DGA also shared his wisdom with a workshop on visual optics. Gem-A ODL and Secondary Tutor, Barbara Kolator FGA DGA, who attended the session, commented: "This workshop brought theoretical concepts to life. An illuminating session, it was fascinating to be able to measure dispersion and to see spectra from both the ordinary and extraordinary ray. It made me want to look at stones again just using my eyes and allowed the gemmologist to measure things that we do not normally have the means to."

Alan Hodgkinson FGA DGA

On the following day, groups were taken to see the mineral collection at the Natural History Museum (NHM) with Gem-A CEO Alan Hart, and the Crown Jewels in the Jewel House at the Tower of London.

Gem-A CEO Alan Hart FGA DGA

I was fortunate enough to attend the bustling NHM trip and it was a fascinating experience. The chance to see a blood red proustite mineral was particularly exciting, as was a Russian imperial topaz from the nineteenth century stored carefully in a specially-crafted paper container to prevent sun fading. This was an opportunity to gaze in wonder at the wealth of minerals not on public display, which is around 94 percent of the whole collection. Mike Rumsey, Collections Manager of Minerals and Meteorites, said he often comes across minerals in drawers that he has never seen before. The trip ended with a brief glimpse at the range of meteorites the NHM houses, including a fragment of the moon that visitors could hold and marvel at.

Specimens at the Natural History Museum

Class of 2016

The Gem-A Graduation Ceremony took place at The Royal College of Surgeons (RCS) and was a wonderful opportunity for graduates to celebrate their outstanding achievements with friends and family.

Gem-A graduates 2016

From the moment you walked through the doors of Lincoln's Inn Fields – where the RCS is based – down the corridor decked with portraits and into the the grandiose oak-panelled Edward Lumley hall, it was clear this was a special occasion.

This year, 613 students from around the world passed the Gemmology Diploma or Diamond Diploma examinations. Approximately 10% of the graduates passed with distinction, an incredible feat and testament to the hard work of the students and first-rate tutors at Gem-A. Graduates originated from 25 countries around the world, including Myanmar, French Guiana and Madagascar, demonstrating the truly multinational success of the Association.

Recently elected Gem-A President Maggie Campbell Pedersen FGA ABIPP fondly remembered her own graduation and reminded students that "Gem-A does not accept mediocre knowledge. It pursues excellence". Congratulating graduates on their perseverance and stating "now the fun begins", she presented the diplomas to the graduates, while Gem-A Gemmology and Diamond Tutor Julia Griffith FGA DGA announced the graduate names with accuracy and poise.

Special prizes were presented by Richard Lake FGA DGA, Chair of Examiners for Gem-A. The Anderson Medal recognising the best overall Foundation candidate was awarded to Kate Flitcroft, who commented "the Anderson Medal is an honour to receive. I feel closer now to Gem-A's wonderful fellowship of gemmologists".

Héloise Collin-Randoux marked her calibre as an exceptional student, picking up the Christie's Prize for Gemmology (best overall Gemmology Diploma candidate), the Anderson Bank Prize (best theory papers in the Gemmology Diploma examination) and the Tully Medal (only awarded to those of an exceptionally high standard), last awarded in 2013.

The Read Practical Prize recognises the best practical candidate in the Gemmology Diploma and was given to Daisy Welford-Ranson, while Emma Testill picked up the Deeks Diamond Prize for the best theory Diamond Diploma examination. The Mok Diamond Practical Prize was presented by the award's namesake, Mr Dominic Mok FGA DGA, to Peter Sandberg, who was deemed the best practical candidate of the year in the Diamond Diploma. Finally, Rachel Bailey took the last award of the evening – the Bruton Medal – awarded to the best overall Diamond Diploma candidate.

Jack Cunningham, Sustainability Manager at Gemfields, sponsors of this year's graduation, followed the prize presentations with some inspiring words of his own. He discussed company responsibility, the challenges ahead in the industry, the importance of promoting transparency and the triumph of life-long learning.

After the ceremony a drinks reception was hosted in the original nineteenth century Surgeons' Library where attendees could pose with their newly-purchased graduation Barnett Bears. Graduates and guests could also wander around the Hunterian Museum and ogle the pickled organic objects while enjoying a refreshing glass of bubbly.

Providing education for those that wish to pursue knowledge and creating gemmologists is what Gem-A is all about. There is no better way to demonstrate and celebrate this than our annual Graduation Ceremony. Congratulations to all that have passed their examinations, past and present. ■

The drinks reception following the presentation ceremony was hosted in the original nineteenth century Surgeons' Library.

Valuable time

Gem-A was the Diamond Sponsor of the 2016 Loughborough Institute of Registered Valuers Conference — an event that gets bigger and better every year.

Now in its twenty-eighth year, the eagerly-awaited Institute of Registered Valuers (IRV) Conference attracted a record 212 people – a third IRV members and 35 first-timers – including 40 guest speakers, four from the USA. Alongside Gem-A, sponsors included AnchorCert Academy, T H March (Gold), Crown of Light Diamonds, the Guild of Valuers & Jewellers and Quantum Leap (Silver).

The Conference is particularly valued for its packed workshop programme and new this year was the Gemstone Market, where delegates could examine as well as purchase stones of different qualities. As always Gem-A set up its popular stand selling an array of books and instruments.

Stephen Whittaker, managing director of Fellows Auctioneers, kicked off the presentations with 'Plus Ca Change' — an overview of the sales world. He highlighted the influence of the economy, higher premiums and new bidding platforms. He predicted online auction shops, fewer auctioneers, more transparency and higher charges in the future.

John Benjamin, independent jewellery valuer, author, historian and contributor to the BBC's *Antiques Roadshow*, talked about the life and work of designer goldsmith and silversmith, Henry George Murphy, whose Marylebone-based Falcon Studio was at the heart of the Arts & Crafts movement. The IRV's past chairman, David Callaghan, introduced us to Dr Kevin Coates, an artist and goldsmith with 40-years' experience, who gave a very rare presentation. He introduced delegates to his personal and thought-provoking pieces. Coates uses a mixed media approach to his work including the carving of gemstones; relishing the challenges that this can throw up.

Two highly informative addresses closed the Conference. For Charles Carmona's GG ASA *Animation as an Aid to Estimation of the Weight of Gemstones* you needed your 'thinking head' on. The gemmologist, appraiser and president of Guild Laboratories Inc. gave detailed examples of why his guide (*The Complete Handbook for Gemstone Weight Estimation*) is such a valuable tool. Also running a workshop Richard Drucker GG hons FGA, publisher of the *GemGuide* talked about Valuing the Difficult, which highlighted lab-grown and treated diamonds as well as treated sapphire and tourmaline. He reminded delegates that prices are often not affected when such treatments are not detected or disclosed.

Richard Drucker GG hons FGA

Charles Carmona GG ASA

Saturday night's masked dinner was followed by an auction of a copy of Graff's book on diamonds — generously donated by past guest speaker, Joanna Hardy, one of the book's contributors. When Stephen Whittaker of Fellows' makeshift gavel came down, it was Chris Sellors of C W Sellors whose winning bid of £300 boosted the funds of the National Association of Jewellers Centenary Trust.

For a flavour of just a few of the many workshops open to delegates, we asked attendees to report back…

Kerry Gregory, FGA DGA: Chasing Rainbows: The Practical Use Of The Spectroscope

To some the spectroscope may be regarded as a complicated instrument, requiring a degree of patience and skill. To Kerry [vice-chair of Gem-A's Board of Trustees and manager of gemstones and the specialist jewellery department at H&T Pawnbrokers] it is essential in her day-to-day work to quickly identify mounted and loose stones.

Unlike a microscope or refractometer, a spectroscope is small and portable, inexpensive and does not involve toxic liquids. Kerry explained that it can be used on all types of gem material, whether faceted, polished beads or rough crystals; even giving a spectrum from a sweet wrapper!

If an absorption spectrum is clearly seen, it may be diagnostic for some gemstones.

Zircon is typified by a series of dark bands including a diagnostic line in the red at 653 nm, attributed to uranium. All chemical elements

present in gemstones produce distinctive absorption spectra.

Light is usually transmitted through the base of the stone when the spectroscope is in direct contact with the stone surface. The spectrum is viewed with the violet section on the left (400 nm) and the red section on the right (700 nm). Observations are recorded as a series of lines representing the absorption bands. While it can produce some fairly distinctive results, they are not always diagnostic. It is important to remember that not all gemstones have a visible spectrum and some are difficult to interpret, particularly if the stone is pale in colour.

Kerry Gregory, FGA DGA: Crossed Polars workshop

The polariscope, a relatively quick and easy means of practical gem testing, is often overlooked. Kerry explained that this portable instrument should be used before the refractometer, to quickly determine whether a gemstone is singly or doubly refractive. It divides gemstones into three main groups by showing how they interact with light and can be used on mounted or loose material.

Used not only to differentiate between single and double refraction, the polariscope can also show distinctive features, some diagnostic. Glass typically shows two parallel lines, which writhe like snakes as it is rotated. This is a quick and often conclusive method of identification, eliminating further testing.

A workshop in progress hosted by Tammy Cohen and Tatiana Conte.

The discussion included the responsibilities of assessing gemstones and the importance of impartiality. When faced with a coloured stone with certification, it is vital to assess the stone independently, before even looking at the certificate.

Kerry Gregory FGA DGA

Some singly refractive materials exhibit a tabby marking known as 'anomalous extinction', seen in synthetic spinel and some garnet. The polariscope is also useful for determining whether a stone is uniaxial – hexagonal, trigonal or tetragonal crystal groups – or biaxial – orthorhomic, monoclinic or triclinic crystal structure. Particularly significant when determining whether a stone is a blue topaz or an aquamarine, as the two vary greatly in value!

Both reports by Hannah McWhirter MIRV PJDip PJGemDip PJValDip FGA DGA, senior sales associate, Thurlow Champness, Bury St Edmunds

Tracy Jukes FGA: Gem Market update

Tracy's highly informed workshops are a must for all at Loughborough.

A consummate professional, gem trader, and educator, she's appreciated for her straight talking demeanour and character, founded on her knowledge as a gemmologist and further endorsed by a degree in mineralogy and geology. Add to this more than 30-years' experience in the coloured gem trade, and for the last 14 years' experience running her own highly respected company E Jewels.

Travelling the world sourcing gemstones and trading in the UK to dealers and retailers, Tracy's wealth of experience qualifies her to talk with authority on coloured gemstones, including pricing, what's 'in' and the plethora of treatments that may be encountered, with the consequential effect on price.

The discussion included the responsibilities of assessing gemstones and the importance of impartiality. When faced with a coloured stone with certification, it is vital to assess the stone independently, before even looking at the certificate. It follows thereafter that you assess the credentials of the laboratory or vendor in question. A brilliant workshop!

Report by Jackie Sanders FIRV FGA DGA, independent valuer, Towcester ■

The Journal of Gemmology

Guy Lalous ACAM EG summarises an article from Volume 35 Number 3 of The Journal of Gemmology.

A Natural Diamond with a Characteristic IR Absorption Feature*

Summary of 'A Diamond with a Transient 2804 cm^{-1} Absorption Peak' by Jianjun Li, Chengxing Fan, Shuxiang Chen and Guihua Li.

The first step when a parcel of melee diamonds undergoes screening at The National Gold & Diamond Testing Center (NGDTC) in Shandong is to separate for further testing those specimens showing greenish blue phosphorescence as nearly all High Pressure High Temperature (HPHT) synthetics from China and Russia show this phosphorescence.

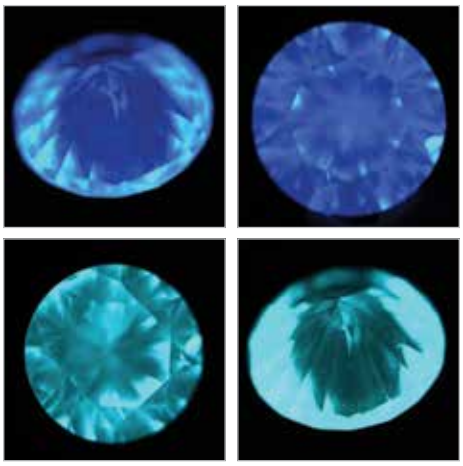
NGDTC recently tested a 0.08 ct colourless diamond. The DiamondSure indicated the sample was a type II diamond and referred it for further testing. The DiamondPLus showed 'Pass' when the sample was tested in liquid nitrogen, confirming it was an untreated natural diamond. In the DiamondView *(left)*, the sample showed vivid blue fluorescence and strong phosphorescence in slightly greenish blue, but no strain pattern was visible.

The UV-Vis-NIR absorption spectrum showed a strong 225 nm feature caused by the diamond energy bandgap at 5.47 eV. There was no 270 nm absorption related to single nitrogen. The absence of significant extrinsic absorption in the visible and ultraviolet regions suggested that the diamond is type IIa.

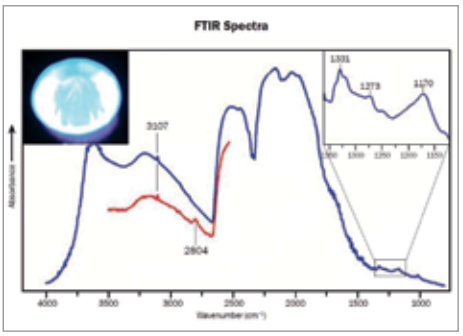
FTIR spectroscopy *(right)* showed a sharp, weak band at 3107 cm^{-1} related to hydrogen and weak absorption bands at 1330/1331, 1273 and 1170 cm^{-1}. The absorption feature at 1273 cm^{-1} correlates to nearest-neighbour substitutional pairs of nitrogen (A centres), and the 1170 cm^{-1} band is attributed to nitrogen aggregates (B centres). These spectral characteristics confirmed that the diamond is natural in origin. The 1331 cm^{-1} peak is mostly related to B-centres and/or might also indicate the diamond contains the positively charged state of the single-substitutional nitrogen centre (N_S^+). The sample may therefore be classified as near type IIa with a low IaAB component.

The most relevant feature detected was a ~2804 cm^{-1} transient absorption feature related to neutral substitutional boron. This absorption was measured after the sample was excited using the DiamondView and was only recorded while the diamond phosphoresced.

UV radiation inducing a characteristic IR absorption feature during phosphorescence in diamond has not been reported in the literature so far. The specimen provides evidence that charge transfer (from negative to neutral) at boron acceptors is directly linked to phosphorescence in diamond. ■



In the DiamondView, the 0.08 ct diamond displays vivid blue fluorescence (top) and strong slightly greenish blue phosphorescence (below). Images by Jianjun Li.



FTIR spectroscopy shows that the diamond is near type IIa with a 3107 cm^{-1} feature due to hydrogen; the weak bands at 1331, 1273 and 1170 cm^{-1} (see inset) indicate the diamond also contains A and B centres. After the sample was excited using the DiamondView, it displayed strong greenish blue phosphorescence, and the resulting spectrum (red trace) shows an absorption peak at ~2804 cm^{-1} related to neutral substitutional boron.

* A summary of an article published in *The Journal of Gemmology*, **35**(3), 2016, 248-252.

The Canadian Gemmological Association

Setting the standard in Canadian gemmology since 1958!

CGA

Main office– Toronto

55 Queen St E unit 105, Lower Concourse

Tel: 647-466-2436, fax:866-757-9603

info@canadiangemmological.com

Photo courtesy of Custom Gem Cutting Ltd.

Snowflake design by Wobito Brothers

Canada

On the trail of Blue John

Sarah Steele FGA DGA returns to Treak Cliff Cavern in Castleton, Derbyshire, to report on the popularity – and mysteries – surrounding Derbyshire Blue John.

I was recently asked to examine a table in the collection at Castle Howard in North Yorkshire. It was listed in the archives as a mahogany centre table constructed of brass, mahogany and amethyst in the style of Molitor, dating to the first half of the nineteenth century. However, a more recent evaluation by a well-known auction house suggested it was in fact Derbyshire Blue John. If correct, this would influence the valuation considerably.

Although superficially the table appeared very similar to famous Blue John examples I have seen previously, upon examination the table in question was indeed amethyst. The crystal structure in cross section could clearly be seen to be trigonal and lacking the fibrous growth patterns and distinctive blue-purple colouration of Blue John. It did, however, get me thinking about Blue John as a decorative material. Having worked it as a gemstone frequently over the years myself, I can vouch for it being a tricky gem to cut; a reasonable analogy would be trying to polish table salt. I decided to head to the Treak Cliff Cavern in Castleton to meet the people literally on the cutting edge of this iconic British gemstone.

THE FORMATION, AGE AND ORIGIN OF THE MINERALISATION

What makes Derbyshire Blue John unique is partly its restricted geological occurrence. It is found primarily on one side of one hill, close to the picturesque village of Castleton.

1: Historic pieces of Blue John on display in Blue John Gems in Castleton.

Occurring in hydrothermal veins, Blue John is a polycrystalline intergrowth of the mineral fluorite, which often exhibits a fibrous growth texture. Its beauty as a gemstone derives from its distinctive banding and unique colouration when viewed perpendicular to the nodular surfaces, a feature which has been exploited for some 300 years (**1**).

In the Castleton region the limestone is generally believed to represent a Carboniferous apron-reef – a marginal facies between a basin and a shelf – where the angle of the sea floor is changing. It is generally poorly fossiliferous with some coral bands, but in Treak Cliff Cavern highly fossiliferous strata does occur. Sedimentation was periodically interrupted by phases of extrusive volcanic activity. These strata form part of the Southern Pennine Orefield, and have been described as exhibiting 'Pennine-style mineralisation' (Dunham 1983, Colman & Cooper 2000). This is a fracture hosted vein and hydrothermal replacement type mineralisation, which commenced in early Permian to Triassic periods and continued into the late Jurassic. The origin of the mineral veins is by the expulsion of mineralising fluids from adjacent shale basins into the limestone massif. The fluids dissolved minerals such as lead, fluorine, zinc and barium from clay minerals and secondary alteration products from mud rocks (possibly the Carboniferous shales). These were subsequently transferred up the dip via faults and other bedding discontinuities, where they met cooler, sulphur-bearing, more oxygenated meteoric waters and where reactions then occurred in the fracture zones. This gave rise to the lead veins, worked for example at the Odin mine and the coloured fluorite deposits known as Blue John. All in all, over 100 other minerals have also been identified in the region.

The study of inclusions within Blue John, like fluorite elsewhere in the Peak District, suggest a crystallisation from a highly saline fluid at temperatures of 90–120 °C or perhaps a little higher.

HABIT AND FORM

Blue John is a variety of fluorite; it occurs in spheroidal nodular masses with a radiating crystalline structure. It contains blue bands of varying intensity and number, arranged concentrically parallel to the nodular surface and between these are colourless, yellow or pale-blue bands (**2**). The nodular

The study of inclusions within Blue John, like fluorite elsewhere in the Peak District, suggest a crystallisation from a highly saline fluid at temperatures of 90–120 °C or perhaps a little higher.

2: Radiating fibrous growth patterns and colour banding typical of Blue John.

surfaces are made up of large numbers of interpenetrating cubic crystals; the length of crystal edges on such surfaces is most commonly less than 5 mm, but may occasionally be as much as 50 mm. Crystal faces other than those of the simple cube have not been found in Blue John, although the associated yellow fluorite sometimes exhibits cubes with bevelled edges. Vicinal faces (small facets that modify normal crystal faces) are not seen. But large blue fluorite crystals frequently show stepped and pitted surfaces, sometimes with markedly concave faces. Octahedral cleavage is well developed. The growth of the radiating crystals is parallel to the diagonal of the cube. Fracture surfaces of the nodular masses are usually in the same direction and exhibit greatly elongated octahedral cleavage planes, with striations indicating complementary octahedral cleavages.

CAUSE OF COLOURATION

Despite much investigation and speculation over the years, the origin of the blue colour

3: The idyllic location of Treak Cliff Cavern.

of Blue John remains uncertain. The colour has been variously ascribed to organic impurities, inorganic impurities and colour centres. In the case of organic impurities, it was suggested that hydrocarbons may be incorporated as inclusions within the crystals, which could produce a purple-blue colour. However, Braithwaite et al. (1973) made a detailed comparison of chemical and physical properties of colourless and purple zones in fluorite, from Blue John Cavern and many other locations in the Pennines and elsewhere. They found no hydrocarbons, nor any significant differences in the trace-element contents of colourless and purple zones.

Likewise, microscopic analysis has failed to find any inorganic cause for example impurities such as potassium permanganate. It is now thought that the colour may be a physical phenomenon due to crystal lattice dislocation. Microscopic examinations of sections of Blue John show the colour to be distributed in irregular patches and sometimes in conifer-like patterns, along cleavage planes within growth zones.

The banding along growth zones suggests that the colour depends on growth conditions. The similarity in trace element distribution between purple and colourless zones suggests that impurity concentrations are unimportant, in which case physical rather than chemical conditions control the colour. The results of additive colouring experiments suggest that defect concentration is of primary importance in colouration.

This may suggest that the blue bands represent zones of radiation damage formed during temporary deposition of radioactive species during crystal growth.

Colour zoning is probably due to changes in defect concentration with growth: perhaps due to variations in growth rates with a faster growth rate producing more defects.

If the regular arrangement of atoms in the fluorite molecules is disturbed or dislocated, then this may yield the blue colour in Blue John. The cause of these dislocations is unknown. One possibility is that it is due to colloidal calcium, i.e. excess of calcium atoms needed to form fluorite and the subsequent trapping of calcium in lattice defects. The excess calcium could have been liberated from the crystal structure by irradiation of the fluorite host by uranium-bearing phosphates in nearby strata at Castleton. Blue John is directly associated with the boulder bed of Treak Cliff with its high concentration of uraniferous cellophane (a phosphatic material). Colloidal particles produce colour by absorption and by scattering, the latter becoming more and more important as particle size increases above 30 nm. Blue John can be decolourised by heating at low temperatures in an oven for a few hours (thermal bleaching), a phenomenon apparently caused by heat realigning the lattice dislocations. Irradiating the discoloured Blue John in a nuclear reactor can bring the colour back. This may suggest that the blue bands represent zones of radiation damage, formed during temporary deposition of radioactive species during crystal growth.

I discovered at the mine that certain pieces of Blue John appear to be UV unstable. Blocks buried a few feet into the subsoil on the hillside show a pink discolouration on the side nearest the sun. They have also seen a similar phenomenon in vases in windowsills. Despite extensive scientific investigation, it seems that there is still no consensus. However, lattice damage with or without colloidal calcium seems the most likely explanation.

ORIGIN OF THE NAME

The origins of the name ‘Blue John’ is shrouded in mystery, but it first appeared in archives in 1766 when landowner Lady Mazarine was recorded as leasing “ye mine of Blue John”. We do know that British neoclassical architect and interior designer Robert Adam was incorporating Blue John into his fireplaces by 1760, but it is not known under what name it was marketed. Before that time, it was referred to as ‘Derbyshire Drop’ or ‘Derbyshire Spar’ and was also known as ‘Radix Amethysti’.

The term ‘Blue John’ is believed to be either a corruption of the French *bleu et jaune* (blue and yellow) or a mistake by early miners who in the dark mine environment mistook the mineral sphalerite ‘Black Jack’. Upon discovering their mistake in daylight amended the name to ‘Blue John’. There is however, little evidence to support these claims — the jury is still out.

TREAK CLIFF CAVERN

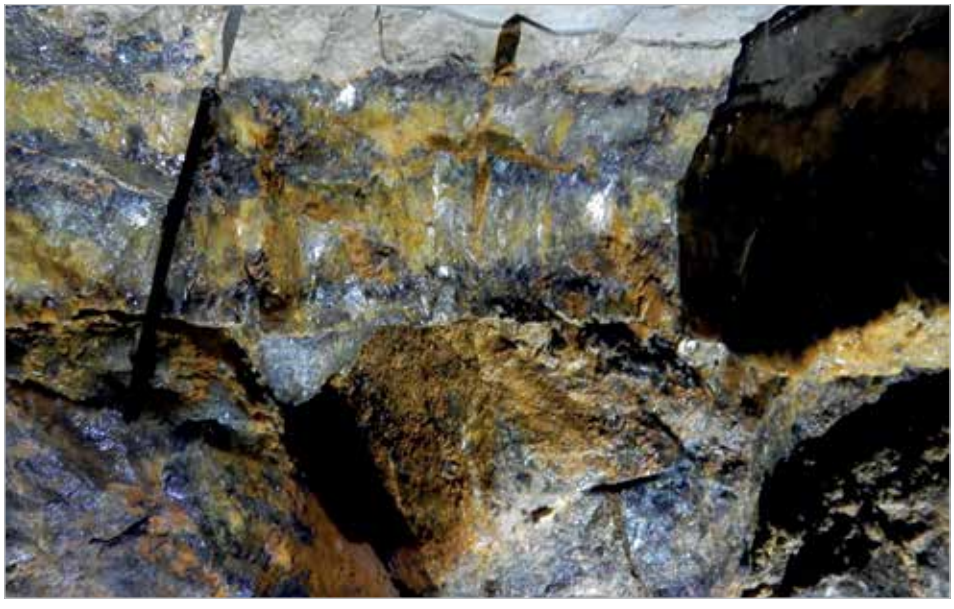
Treak Cliff Hill has two main caverns open to the public, the Treak Cliff Cavern (**3**), which lies part way up the steep eastern face and the Blue John Cavern which is situated on the northwest of the hill. They are largely waterworn caverns, but they had been enlarged considerably by mining to extract Blue John from the walls.

I had last visited Treak Cliff Cavern five years ago, so I was keen to retrace my

steps and see if trade in Blue John was still buoyant. On arrival I was impressed to see that the reception area of the Cavern had undergone quite a transformation since my previous visit.

The new visitors' shop is bright and airy and the jewellery is beautifully displayed alongside samples of the various veins of Blue John and historic pieces. I was met by my guide Tom Goodison and we headed through the doorway to the cavern — a police callbox looking like Dr Who's Tardis and suggesting the start of an adventure! Tom explained to me that the Caverns consist of two 'series'. The Old Series consisting of old mine workings from the eighteenth century and the New Series being a row of breathtakingly beautiful stalactite rich natural caverns, discovered by chance during mining exploration in 1926 and opened to the public as a show cave in 1935. Almost immediately however, Tom stops and directs his torch to perhaps the mine's most exciting new feature — the Ridley Vein (**4**). Discovered in 2014 by the cavern manager Gary Ridley, this new vein of Blue John is literally 5–8 cm from the visitor handrail. It is apparent that many 1000s of people had passed by this spot over the last 80 years oblivious to its existence; its beautiful deep blue bands are separated by a swirl of yellow. Tom explains that no more Ridley Vein will be extracted from the exposure near to the visitor path, but there are areas less visible, which are likely to be exploited in future.

4: Ridley Vein with its distinct yellow swirl.



Blue John is loosely defined on its colour banding, traditionally there is said to be 14 'veins' probably introduced as a sales gimmick with such enigmatic names as Old Tor Vein, Millers Vein, Bull Beef Vein and Organ Room Vein. In reality there are many other sub-veins associated with these primary named varieties. The Ridley as a new primary vein is therefore, a very exciting discovery.

MINING AND EXTRACTION

We continued on into the Witches Cave, so named due to the shadow thrown by the cave roof when the lights are on. Tom explained that most of the current extraction occurs in passages off this cavern. At present the majority of Blue John is extracted from the Cliff Blue Vein and work is restricted to February and March when the visitor numbers are smaller. The mine extracts approximately 650 kg per year, incredibly small quantities in comparison to other gemstone mines.

Tom had explained that the Ridley Vein was discovered when Gary was testing a new diamond tipped chainsaw. However, the extraction method usually used at the mine is 'plug and feather'. Blue John being a soft

... it is also a licensed wedding venue, having had seven subterranean ceremonies since 2010.

5: 16 tonne Blue John pillar.

mineral and often heavily fractured requires a gentle extraction method to prevent further damage to the gem material. First, holes approximately 20 mm in diameter are drilled around the edges of the Blue John and into these holes sections of wooden dowel (Treak Cliff use broom handles) are inserted. The wood gradually absorbs moisture and swells, hopefully splitting the blocks to allow extraction. If necessary chisels are hammered into the wood to speed up the process; as the wood absorbs the majority of the impact the Blue John is left undamaged. Tom also points out what is probably the most expensive piece of Blue John in the mine, the 16 tonne pillar (**5**), which supports the roof with an estimated value of £1,000,000.

We could not resist a quick look at the New Series caverns whilst we were underground. Although there is little if any Blue John present in these caves, their stalactite formations alone are well worth a visit. In the furthermost Dream Cavern, I was surprised to see that the mine was making the most of the damp environment. Tom explained that it takes three weeks for ground water to percolate through the 50 m of limestone above our heads, but in this time it is purified to drinking standards. The water is collected in huge containers and then can be used by the mine. He also added that this is not the only non-Blue John related business venture operating at the mine; it is also a licensed wedding venue, having had seven subterranean ceremonies since 2010.

MANUFACTURE

As a gemmologist but also lapidary, the only thing I find more exciting than seeing gemstones in situ in the mine is having a look around another lapidary's workshop. So I was very grateful that Treak Cliff had agreed for me to spend some time with their cutters in their workshop. The current workshop is at the back of the visitor centre and as I was lead through the tin roofed passages I was unprepared for what lay ahead.

Having visited many lapidary works over the years I can honestly say that Treak Cliff probably has the best view I have ever seen — with an uninterrupted vista of the hills that sweep down the valley to Castleton itself. I was introduced to John Turner (**6**) who, having cut his first stone at 11 years old, is now a fulltime lapidary at the mine. John is from established Blue John stock, his grandfather Peter Harrison having initially leased the mine before eventually buying it in the mid-1980s, had run the mine for 45 years. Sadly Peter passed away recently, but his cap is still hanging

6: John Turner at the polishing motor.

on the wall and there was a feeling he was watching over proceedings.

Talking to John it became clear that for him, as with many other lapidaries I speak to, this career is very much a vocation. It requires passion and dedication and despite trying his hand at other jobs his heart now lies well and truly with cutting Blue John.

I confessed to John that I had worked a fair bit of Blue John over the years, but found it tricky to deal with due to it being fibrous in nature and often heavily fractured. It is an intergrowth of crystals and I find that I am always, in part at least, trying to polish along a cleavage direction. My Blue John samples are offcuts I had purchased from a bowl turner many years ago, so I had always believed them to have been well resined. John explained that the resin had perhaps not fully penetrated the crystals. Blue John must be resined in order to be polished successfully. So although technically a treatment, it should always be expected that Blue John jewellery has been resined. It gives stability,

7: Vacuum oven containing the epoxy resin bath.

improved durability and also fills any fractures in the material.

Treak Cliff resin their own material in the workshop. John explained the process involves the Blue John being sliced into sections of no more than 125 mm thickness and then being submerged in a bath of epoxy resin in a vacuum oven (**7**). It is heated to 90 °C for 24 hours and to a pressure of 6900 kPa. After these temperatures and pressures are achieved, the air is then extracted from the oven and the vacuum literally pulls the epoxy through the fluorite. The process is almost instantaneous. The Blue John is returned to atmospheric pressure and removed from the resin bath and it is then baked in an oven overnight to make sure it is super hardened.

Once cooled, the Blue John is sliced into suitable thicknesses for jewellery purposes

8: Freshly cut Blue John slices.

or larger chunks for bowl turning. The saw John was using was much coarser than I would have expected; a testament to his resining ability, as I am sure my Blue John would have crumbled to pieces on this machine. We spent the next few minutes cooing as slice after slice of freshly cut material was held up against the light to reveal its beauty (**8**), knowing that we were the first people ever to see this exact pattern of colour.

The setting method used to produce the jewellery here is familiar to me as it is the same process we use for Whitby Jet in my own workshop. Most lapidaries will describe this as a modern rub-over setting. This should not be confused with the term rub-over setting used by jewellers, in which a cabochon is held in place by pushing the metal against the stone to hold it in the mount. A lapidary rub-over method involves cutting the stone to the correct outside diameter and then gluing the stone into the mount before polishing it in situ, along with the bezel edge to give the impression of a traditional rub-over style.

The benefits of this method are that it increases the speed of the process dramatically. Soft stones that would be damaged by the slip of a bezel pusher or burnisher are easily set and we can cut the stone to the exact shape of the setting. While we talk, John works on a pair of cufflinks (**9**). The process from start to finish takes about an hour, but the majority of this time is taken up waiting for the epoxy to cure. He estimates that the workshop cuts 10,000 stones a year using this method.

While we wait for the epoxy to set I ask him about the other recent discovery at the mine — the Lost Vein. John explained that a fellow miner had told his grandad that he had found a new vein of Blue John and had covered it over for safe keeping. Before he could lead Peter to its location however, he sadly died and the vein was essentially 'lost'. Sixty-nine years later John was out mining with Gary Ridley one day — he became cold so decided to have a dig through a pile of clay to keep warm. He suddenly felt something strange and realised it was a piece of old carpet laid on top of some rotten planks of wood. He quickly removed them and was astounded to see beneath them a vein of Blue John — the 'Lost Vein'. The Lost Vein is considered to be a sub-vein of the Cliff Blue and unlike the Ridley Vein contains no yellow banding.

9: The freshly made cufflinks.

10: Specimens of the recent discoveries, Ridley Vein on the left, Lost Vein on the right.

FUTURE OUTLOOK

I ask John and his mother Vicky Turner where they see the future of the Blue John industry and I am delighted to hear they are optimistic. Businesswise they have never been busier. They have plans for a new workshop and feel that Blue John is enjoying resurgence in popularity as more consumers value a British handmade product. They said that although from time to time foreign simulants appear on the market. Blue John is unique so it is relatively easy to spot fakes.

Chinese banded fluorites for example, often have a green band unlike Blue John, and also lack the radiating fibrous growth patterns. I also notice that in their shop there are no examples of Blue John triplets (usually a composite of mother of pearl, a thin slice of Blue John with a glass or rock crystal cap). They tell me that they think the triplets give the Blue John a very false look (an observation I would agree with), so they choose only to use a solid piece of Blue John. I ask if they expect to find anymore as yet undiscovered veins in the future, I am excited to hear that it is a possibility.

The greatest two aids to their present-day mining operation are the advent of LED lighting and perhaps more unexpected, the invention of the pressure washer!

although from time to time foreign simulants appear on the market Blue John is unique so it is relatively easy to spot fakes...

The caverns are lined with accumulations of natural glacial clays and muds, which cover the walls and conceal the bedrock. A prime example of this is of course the Ridley Vein. Had the wall been washed then the vein may have been visible decades ago. Rather than heading down there with drills and saws I have visions from now on that wellies, waterproofs and pressure washers will be the miner's tools of choice. Fingers crossed for more discoveries in the future (**10**). ■

Thanks to Gary Ridley Cavern Manager, my guide Tom Goodison, John Turner and Vicky Turner for all their information.

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1: Grey moonstone and brown diamond earrings by Josef Koppmann.

All is Fair

Gem-A's Membership Secretary Kim Foxwell BA MA FGA DGA rounds up some of the most eye-catching and technically impressive pieces on display at this year's Goldsmiths' Fair.

The annual Goldsmiths' Fair is always a glamorous event, and this year was certainly no different with a wonderful selection of jewellery and silverware on display. Guest curated by British fashion model Erin O'Connor, the Fair had a mixture of familiar and new faces, established jewellers and recent graduates.

Within the mix of new and familiar, there was also the intermingling of traditional and modern, in technique, style, and materials used. Mara Irsara for example, incorporates colour into her designs using velvet flocking, an industrial material also used in wallpaper which is surprisingly hardy and, according to Mara, more difficult to cut than gold or silver.

3: Mammoth ivory clasp necklace and bracelet by Max Danger. Photo: Katrina Lawson Johnston.

2: Agate cufflinks by Sanni Falkenberg.

There were also some unusual variations on the classic stones, such as Josef Koppmann's pieces featuring different coloured moonstones accented by coloured diamonds (**1**). Curiously, the moonstones were rather evocative of banded agates, but with a far more elusive light — the sensation was both eerily ancient and beautiful.

Jade appeared amongst a few collections, but not just in green. Jo McDonald and Nicholas Yiannarakis both had black jade. Nicholas explained to me that the piece he had was called Edwards Black jade from Wyoming. Relatively unknown until recently tsavorites were also featured at a number of stands. Michael Carberry, a new exhibitor, said he had never heard of them until he went into A.E. Wards, where he was entranced by these fantastic bright green gems. Ana de Costa also had tsavorite-set pieces, including a particularly striking kinetic piece featuring the unusual combination of a Tahitian pearl and tsavorites set in 18 kt gold.

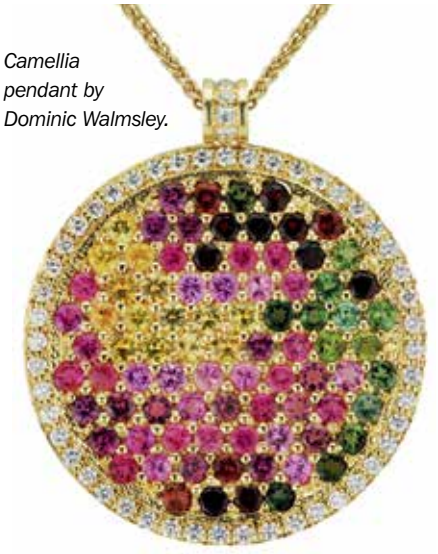
New exhibitor Ebba Goring had some choice stones amongst her woven knit collection, including 'Empress of the Sun', a wonderfully warm citrine double cabochon that she had bought from Marcus McCallum, and a Cairngorm stone. This had a singularly bright lustre and, she explained, is a type of champagne coloured quartz found in Scotland.

There were also pieces that used stones not often found in fine jewellery. Grace Girvan uses pebbles collected from beaches in Scotland with natural-looking enamel. She does not actually cut the stones, but selects them carefully and the result is surprisingly sleek — many people ask if she cuts the

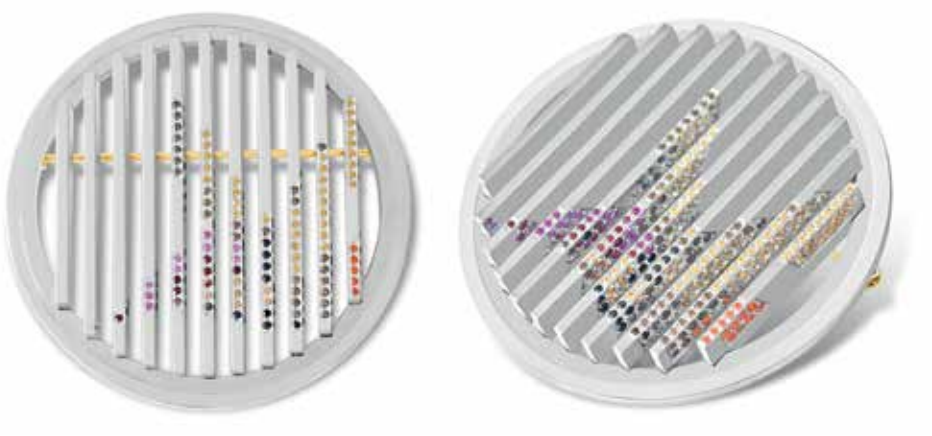
stones specially. Graeme McColm, who last year had raw haematite in his pieces, did not disappoint, again using an unconventional material: polished silicon set in 18 kt gold. With a hardness of 6.5–7.0, it is a fairly resistant material and when polished it catches the light, creating something of a stylish space-age feel. Other unusual pieces included Charmian Harris' granite earrings, Anna Jewsbury's use of Italian marbles, diamonds and gold, and Evangelos Pourgouris and Miranda Falkner's sea-sediment jasper.

There were a few designer-makers who also cut their own stones. Sanni Falkenberg is a jeweller-lapidarist who uses a mixture of dyed and natural agate and plays with the juxtaposition of raw and polished. Perhaps most striking amongst her collection was a pair of cufflinks (**2**) that had no metal-work on them at all — they were simply cleverly carved and manipulated agate. Nicholas Yiannarakis, who has been learning faceting for the last 10 years, also felt it was time to break away from the traditional style, in his case meet-point faceting, and start experimenting. Rather than forcing the stone into a shape, he tries to follow the form of the crystal, focusing on optimising the rough and the optical properties of the stone. The result is like an extra special mirror cut, with a reduced number of facets on the top, but very bright strong colours.

Another designer playing with shape and materials was Donna Brennan, who layers stones in a manner she calls 'clustering', creating larger but lighter pieces. Interestingly, it was a good example of the importance of lustre in identification — two of her pieces had mother-of-pearl as the underlay, but one had lucite, and the other, quartz, over the top. The quartz was brighter, and this was important to note, as the effect was understated unless you had the comparison.



5: Camellia pendant by Dominic Walmsley.



4: Chrysolampis Mosquitus brooch by Vicky Lew.

One recent graduate, Max Danger, has taken the bold step of using mammoth ivory in one of his designs, many of which seemed to focus on endangered or extinct creatures. Rather wonderfully, the two pieces with the mammoth ivory were themselves a chain of mammoths, each individual mammoth link beautifully wrought and linked to the next by a tusk, with the ivory providing the focal point for the clasp (**3**). Instead of simply being a topical and sometimes controversial material, it was transformed here into a poignant reminder of mankind's effect on the world.

Two designer-makers were using gemstones to create pictures, although the effect for each was quite different. For Vicky Lew, it is all about capturing a fleeting moment. From one angle the colourful stones can seem almost randomly placed — only for them to suddenly animate as a picture as the piece is turned (**4**). Dominic Walmsley, however, uses a process that is a combination of the natural world and digital techniques. A picture is taken, pixelated, and the colours grabbed. The matching colours are then selected using a variety of gemstones, and the result is a fantastic piece, reminiscent of an impressionist painting (**5**).

It is always a pleasure to stop by Ingo Henn FGA, as he always has the most fantastic pieces — and the gemmological information behind them. Three new and frankly breath-taking necklaces took centre stage. Each had a centrepiece: a citrine phoenix, a chalcedony seahorse and a Santa Maria aquamarine lion. The phoenix was fabulous, carved in such a manner that it looked as though the bird was becoming more solid as it rose from a flame, with the darker colours towards the top (**6**). The Santa Maria aquamarine lion, I was informed, was one of the finest pieces Ingo had ever worked with. As well as being a stunning aquamarine in its own right, it had been carved with a beautiful precision, set with tiny yellow sapphire eyes and more unusually for Ingo's pieces, it had no enamel, instead simply focussed on the lion itself. Finally, as an extra surprise, Ingo pulled out a carving of an imperial topaz. This was incredible both in terms of the size and colour, but also in the skill that would have been needed to work it, due to the fact that topaz cleaves so very easily.

6: Citrine and enamel phoenix by Ingo Henn.

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New exhibitor Gurmit Kaur Campbell also employed the translucent effects of chalcedony in her 'Bubble Ring', using a natural blue chalcedony interlaced with diamond bands and a couple of sections of South Sea pearl. The effect was both fun and delicate, perhaps unsurprising given that the piece had been inspired by a soap bubble.

As always, the fair was a wonderful mixture of exciting and enthralling, surprising and the remarkable. A celebration of both skill and innovation, it is a pleasure to attend, whether to buy or simply see the creative dexterity of modern-day designer-makers. A fantastic 2016 show, and a tantalising preview of new possibilities. ■

Worth a thousand words...

We are pleased to share the winners of the 2016 Photo Competition, announced at the Gem-A Conference. The photos were judged by Gem-A CEO Alan Hart FGA DGA, Gem-A President Maggie Campbell Pedersen FGA ABIPP and gemstone photographer Danny Sanchez GG.

The Gem-A photo competition is an incredible opportunity for our talented students and members to showcase their photography skills, with the chance to win some superb prizes.

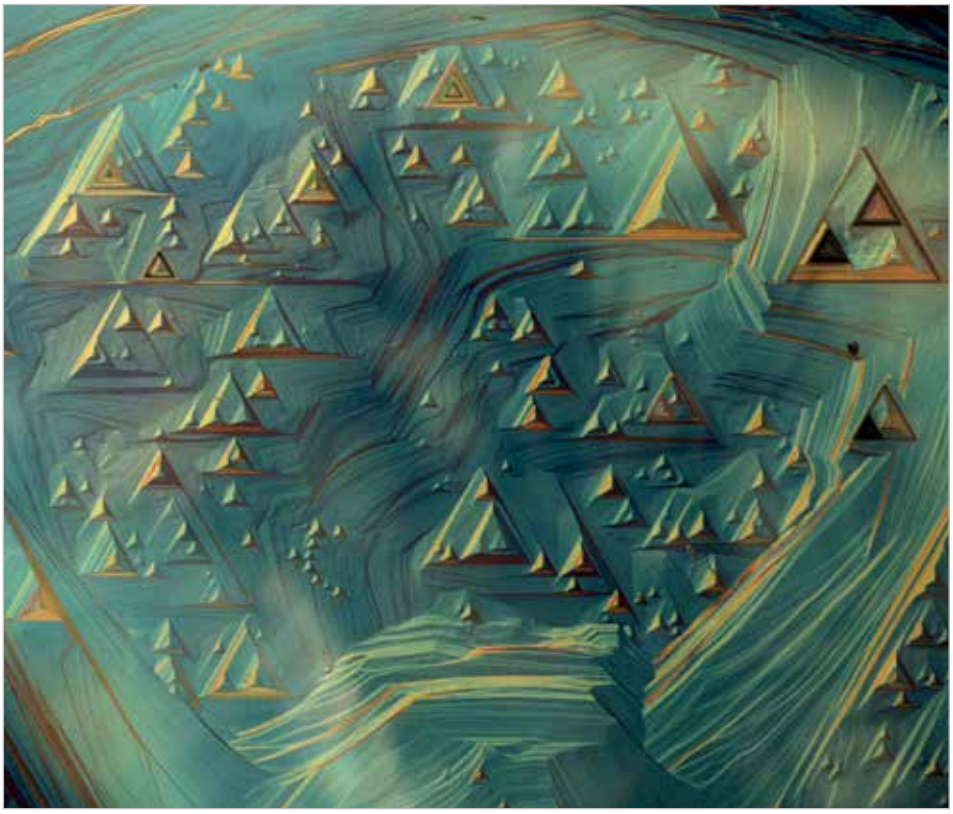
Entries by members and students were submitted under three categories, 'The Internal', 'The External' and 'The Humanity in Gems'.

Member Billie Hughes FGA and student Ziyin Sun won 'The Internal' category, member Jon Mehdi and student Anthony Shih FGA were selected as 'The External' winners, and Billie Hughes FGA secured a double whammy as the winner of the 'The Humanity in Gems' prize. From these winners an overall Member and Student Award was given.

Selected to win the Member Award was Billie Hughes FGA, for her mesmerising photograph entitled 'Scuse me while I pierce the sky' (**Front Cover**). Winning the Student Award was Ziyin Sun for his incredible entry entitled 'Trigons and growth marks on a diamond macle' (**1**). The winners will receive a year's free membership with Gem-A and a *Photoatlas of Inclusions in Gemstones* by Eduard J. Gübelin and John I. Koivula. Category winners receive an honourable mention (**2**, **3** and **4**) and all winners will receive a professionally-printed copy of their stunning photographs.

We are always interested in beautiful photographs for use in upcoming issues of *Gems&Jewellery* and on our website, so if you have a photo you would like to share please email submissions to **editor@gem-a.com**. ■

> ... the power of well-taken photomicrographs not only helps reveal the identity and treatment of gemstones, but also attracts people to enjoy their beauty and uniqueness.



*1: **Student Award, Ziyin Sun** — 'Trigons and growth marks on a diamond macle'. Field of view, 2.81 mm; imaged using episcopic differential interference contrast (DIC).*

Ziyin Sun is a staff gemmologist in the gem identification department at GIA in Carlsbad, California. His interest in taking photomicrographs was first sparked when reading *Photoatlas of Inclusions in Gemstones*. He bought his first GIA DLScope Trinocular Microscope and started practising under the guidance of Nathan Renfro, the chief editor of 'Micro-World' in the publication 'Gems & Gemology'. Ziyin believes that the power of well-taken photomicrographs not only helps reveal the identity and treatment of gemstones, but also attracts people to enjoy their beauty and uniqueness. Most importantly, it popularises gemmology and communicates with the public outside the gemmological field.

2: **Honourable Mention, Jon Mehdi** — *'Quartz crystal with liquid petroleum-filled cavities'.*

3: **Honourable Mention, Billie Hughes** FGA — *'Chasing fortune'. Miners hunt for sapphire in the Banque Suisse mine in Ilakaka, Madagascar. The mine was named for the enormous wealth of gems said to be hidden in its subterranean vaults.*

4: **Honourable Mention, Anthony Shih** FGA — *'Dominican blue amber fluorescing in sunlight'.*

Billie Hughes FGA got an early start in gemmology, travelling to mines around the world with her parents from the age of four. In 2011 she graduated from the University of California, Los Angeles (UCLA) and went on to become a Fellow of Gem-A in 2013. The next year she and her family founded Lotus Gemology, a Bangkok-based gem testing lab specialising in ruby, sapphire, and spinel. Already distinguishing herself with her photographic work published in *Terra Spinel*, the *Wall Street Journal*, and *Ruby & Sapphire: A Collector's Guide*. Her photomicrographs will also be featured in the upcoming book *Ruby & Sapphire: A Gemologist's Guide*.

History, Growth Technology and Properties of Synthetic Emeralds produced by IG Farben*

Guy Lalous ACAM EG summarises an article by Karl Schmetzer, H. Albert Gilg and Elisabeth Vaupel on synthetic emeralds that appeared in Volume 35 Number 3 of *The Journal of Gemmology*.

Several studies have been conducted on the synthetic emeralds grown by IG Farben in the past, but little has been mentioned on the growth method. It was simply assumed through the 1950s that a hydrothermal technique had been used. The present paper fills historical gaps and adds gemmological and mineralogical data about these emeralds.

The IG Farben facility in Bitterfeld, Germany, conducted work on the synthesis of emerald from 1911 to 1942. The aim of the scientists was to develop a process for cheap mass production. The process was lengthy and expensive and only small-scale production of synthetic emerald crystals was achieved. Several exploratory efforts towards restarting production after 1945 were attempted without success.

Initial experiments involving the flux method of growth performed by H. Wild in Idar-Oberstein led to collaborations with Bitterfeld scientist O. Dreibrodt in the 1910s and 1920s. In this period, problems occurred with oversaturation of the melt and spontaneous nucleation of tiny synthetic emerald crystals or aggregates.

A breakthrough was achieved in 1929 by Herman Espig, who developed the final production technique between 1930 and 1935, when two of the components of beryl, Al_2O_3 and BeO, were separated from SiO_2 powder in a platinum dish. That experiment led to the growth of larger synthetic emerald crystals. Additional developments resulted in the Al_2O_3 and BeO being placed on the bottom of a crucible with silica plates being floated on top of the molten flux. The silica

Hermann Espig was involved in experiments related to emerald synthesis. After a breakthrough in 1929 he developed the final production technique between 1930 and 1935. Photo taken in the 1950s; courtesy of K.-D. Heinrich.

was dissolved by the flux to supply the SiO_2 component for synthetic emerald growth. Next, in an attempt to avoid nucleation on the silica plates, a platinum net was placed in the crucible, with beryl seeds below the net. The net was subsequently replaced by a platinum baffle.

The synthetics in this study are classified into four types. Natural beryl seeds were used for types 1 and 2, and flat synthetic emerald plates in types 3 and 4. The properties of the various types are in line with the evolution of the growth technology. The morphology of the synthetic emerald crystals changed from prismatic to thick tabular or short prismatic. Type 4 represented the last step of the developmental process and the routine production from 1935 to 1942.

Energy Dispersive X-ray Fluorescence (EDXRF) spectra show Cr and Ni as the main colour-causing trace elements and Mo as the main component of the flux. Ni-bearing compounds were added to types 2–4. This resulted into a more yellowish green and less bluish colour.

IG Farben synthetic emeralds marketed under the tradename 'Igmerald' were the first synthetic emeralds to be produced in facetable sizes and released to the public. ■

This cluster of type 1 synthetic emerald crystals (was produced by IG Farben without the addition of a Ni-bearing compound and is from the collection of C. Weise, Munich. Photo by K. Schmetzer.

* A summary of an article published in *The Journal of Gemmology*, **35**(3), 2016, 224-246.

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