Gems & Jewellery

Summer 2017 / Volume 26 / No. 2

EMERALD PATERNITY TESTING

AMMOLITE MINING IN ALBERTA

GEMSTONE SOURCING WITH COLUMBIA GEM HOUSE

PEARL TREATMENTS IN FOCUS

Gem-A
THE GEMMOLOGICAL ASSOCIATION OF GREAT BRITAIN

A Story in Every Gemstone

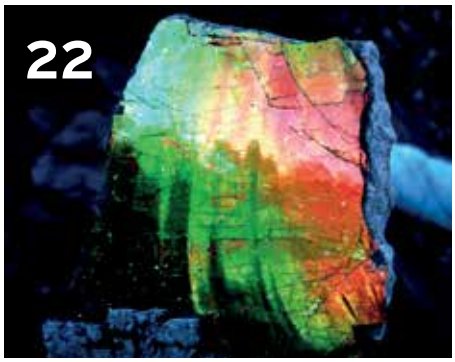
Passion, Protection, Prosperity
Responsibly sourced Mozambican rubies by Gemfields
www.gemfields.co.uk

GEMFIELDS

Gems&Jewellery
SUMMER 2017

NATURE'S SLEEPING BEAUTY

Gems&Jewellery discovers how a booming Chinese market, the art of Feng Shui and adventurous jewellery designers are supporting the mining of ammolite.



COMPLETE TRACEABILITY

We speak to Columbia Gem House president, Eric Braunwart, to discuss American gemstones, traceability, ethical sourcing and the millennial consumer.

THE LIMITS OF LUSTRE

In an extract from her latest book, Renée Newman GG shares her knowledge of pearl treatments and what to look out for.

COVER PICTURE

Thin-film inclusion in a Brazilian topaz crystal. Oblique plus transmitted illumination. Area photographed approximately 1.50 x 2.00 mm. Image courtesy of Anthony de Goutière GG.

Published by
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

Registered charity no. 1109555
Copyright 2016 ISSN 1746-8043
Gem-A is a company limited by guarantee, registered in England, number 01945780

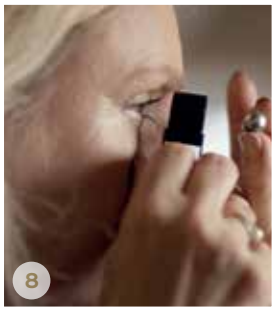
Editor: Sarah Jordan

Deputy Editor:
Angharad Kolator Baldwin

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

Editorial and Advertising
For editorial enquiries, mediapack and advertising rates please contact editor@gem-a.com.

Any opinions expressed in *Gems&Jewellery* are understood to be the views of the contributors and are not necessarily those of the publishers.



Gems&Jewellery – Summer 2017 featured contributors

1. RICHARD HUGHES

Richard W. Hughes FGA is one of the world's foremost experts on ruby and sapphire. The author of several books and over 160 articles, his latest book, *Ruby & Sapphire: A Gemologist's Guide (2017)*, is arguably the most comprehensive volume ever devoted to a single gem species. Richard resides in Bangkok, Thailand, where he operates Lotus Gemology with his wife, Wimon, and daughter, Billie.

2. ALAN HODGKINSON

Alan Hodgkinson is president of the SGA and Honorary Life Member of the SGA, Gem-A and the Canadian Gemmological Association, and is well-known international gemmologist and lecturer. He has spent the last 50 years sharing his enthusiasm about gemstones with others and applying lateral thinking to practical gemstone identification. Alan has been awarded many honours for his services to gemmology and gemmological education. His extremely popular book, *Gem Testing Techniques*, was released in 2015.

3. CARMEN GARCIA-CARBALLIDO

Carmen Garcia-Carballido FGA DGA L. Geology Msc EurGeol started her career as a geologist, completing a five-year degree in geological sciences at Oviedo University in her native Spain. Following a move to Scotland in 1995, Garcia-Carballido earned an MSc in Integrated Petroleum Geoscience from the University of Aberdeen.

4. LOUISE TIPPEY

Louise Tippey is president of the British Pearl Association (BPA) and takes overall responsibility for the day-to-day running of the Association. Louise is also founder and CEO of jewellery brand, Pearls By Fleur — specialising in the retail of contemporary pearl jewellery. Previously Louise ran a successful personal stylist consultancy, with a little black book of high society clients.

5. KATE FLITCROFT

Kate Flitcroft FGA is a gemmologist, auctioneer and silver specialist. Kate was awarded Gem-A's Anderson Medal and is a 10-year veteran of Christie's. She holds a BA (cum laude) in Architecture and History and an MLitt (distinction) in Art History. Her current area of research is sixteenth and seventeenth century carved gem materials.

6. BELINDA MORRIS

Belinda Morris is editor of *The Jeweller* magazine, having previously written on fashion for a number of titles including the *FT How To spend It*, *The Independent*, *The European*, *Red magazine*, *Wedding Day* and *FHM*, where she was fashion editor. She has also worked as a trend forecaster and is a lover of colour and gemstones.

7. RENÉE NEWMAN

Renée Newman GG worked for the Josam Diamond Trading Corporation before becoming a full-time author of gem books. The first edition of her *Pearl Buying Guide* was written in 1992. Since then she has written twelve other books, which are used worldwide as sales training tools, class texts and references for jewellery professionals.

8. CHRISSIE DOUGLAS

Chrissie is the owner and creative director of Coleman Douglas Pearls, the flourishing international pearl jewellery brand headquartered in Knightsbridge. All jewellery is designed and hand-crafted in its London studio.

9. RUI GALOPIM DE CARVALHO

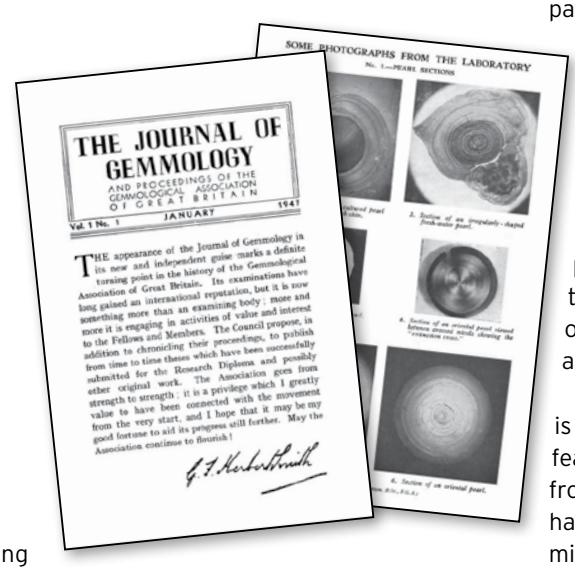
Rui Galopim de Carvalho FGA DGA is editor of *Portugal Gemas*, associate editor of *The Journal of Gemmology*, Portuguese delegate at CIBJO and consultant to the Portuguese National Essay Office. He is also a lecturer and author of the history of gem materials in Portuguese jewellery.

Straight from the heart

Opinion and comment from CEO, Alan Hart FGA DGA

The hectic Tucson shows are behind us and the Gem-A Conference is months away, but that does not mean things are any quieter here at Gem-A HQ. As usual, the team is busy teaching, creating magazines, developing our Online Distance Learning programmes and innovating online. Speaking of the latter, we are thrilled to announce that every single edition of our prestigious *Journal of Gemmology* is now available to read online via the Gem-A digital archive. This was certainly a massive undertaking and involved digitising hundreds of editions of the magazine, dating all the way back to our debut issue in 1947. In case you are wondering, the first *Journal of Gemmology* was overseen by Gem-A President Dr. G.F. Herbert Smith MA USc, who noted in the introduction: "The Association goes from strength to strength; it is a privilege which I greatly value to have been connected with the movement from the very start, and I hope that it may be my good fortune to aid its progress still further. May the Association continue to flourish!" The issue also contained some rather fantastic headlines for articles, including 'All PEARLS are not what they seem!', 'Science or empiricism?' and 'Some aspects of fraud'... you will just have to read the article online to unravel the mystery.

We are also pleased to welcome some new faces to Gem-A this season. Firstly, Bill Scott has joined us as chief operating officer, taking up his post at the very end of May. Bill is a fellow of the Institute of Chartered Accountants and has experience in both financial and higher education fields, making him a perfect fit for Gem-A. We are also thrilled to welcome two new gemmology tutors, Angharad Guy FGA and Lily Faber FGA.


THE JOURNAL OF GEMMOLOGY
AND PROCEEDINGS OF THE GEMMOLOGICAL ASSOCIATION OF GREAT BRITAIN
Vol. 1 No. 1 JANUARY 1947

THE appearance of the Journal of Gemmology is its new and independent guise marks a definite turning point in the history of the Gemmological Association of Great Britain. Its examinations have long gained an international reputation, but it is now something more than an examining body; more and more it is engaging in activities of value and interest to the Fellows and Members. The Council propose, in addition to chronicling their proceedings, to publish from time to time theses which have been successfully submitted for the Research Diploma and possibly other original work. The Association goes from strength to strength; it is a privilege which I greatly value to have been connected with the movement from the very start, and I hope that it may be my good fortune to aid its progress still further. May the Association continue to flourish!

G. F. Herbert Smith

SOME PHOTOGRAPHS FROM THE LABORATORY

The first Journal of Gemmology *from 1947.*

We are always proud when talented gemmologists, who started their careers at Gem-A, return to teach the next generation of students. I think you will agree that there is a lot of talent within the Gem-A community.

In March I attended the Hong Kong show, to look at our continued co-operations and development in China. Whilst there I also attended a fabulous design and prize giving event by the Tanzanite Foundation, and an excellent seminar event by the Gemmological Association of Hong Kong (GAHK). Following the show, our small HK team and I travelled to Taiwan to meet many of the students, and ATC managers. Receiving constructive feedback for Gem-A development there. There is lots to bring back and digest, but I was delighted to see how evident their passion, hard work and success has been.

I would also like to thank them for being the most gracious of hosts.

Although I confidently declared the Gem-A Conference to be months away at the start of this letter, I must now admit that time does fly and it will soon be upon us! Keep your eyes peeled for news and updates about this year's event, which will take place on Saturday 4 and Sunday 5 November at etc.venues County Hall in London.

This summer's issue of *Gems&Jewellery* is once again packed with fantastic features and insightful contributions from Gem-A members and friends. We have turned our attention to issues of mining this season, including a look at ammolite mining in Alberta, Canada, and an eye-catching image of sapphire miners in Illakaka, Madagascar, taken by Richard Hughes FGA. Other areas of focus include pearl treatments, the annual AGS Conclave, the Scottish Gemmological Association Conference and another great student project. We also have two engaging interviews with Columbia Gem House president Eric Braunwart, and De Beers Group CEO, Bruce Cleaver.

We hope you enjoy the issue and have a fantastic summer.

Best wishes,
Alan Hart FGA DGA

The Apollo Blue diamond at 14.54 ct and the Artemis Pink at 16.00 ct on display at Sotheby's. Image courtesy of Alan Hart.

Gem-A News

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

Gem-A hand-held diffraction grating spectroscope. Image by Henry Mesa.

GEMMOLOGICAL INSTRUMENTS

Samantha Lloyd FGA EG, Gem-A Instruments manager, outlines her must-have for all gemmologists this season... the spectroscope.

Ever wondered what the difference is between seeing a spectrum with a prism spectroscope and a diffraction spectroscope?

Absorption within coloured gemstones can be an essential clue to their identity, particularly when testing set gems that cannot be identified by other means of instrumentation. But what happens when you do not see the spectrum you had hoped to see?

Most gemmologists will use a diffraction grating spectroscope as their go-to; beautifully compact tools with a high intensity of diffracted light, which split the light at a perfectly equal distance for each wavelength. These spectroscopes can normally provide you with the answers you need for most coloured gems.

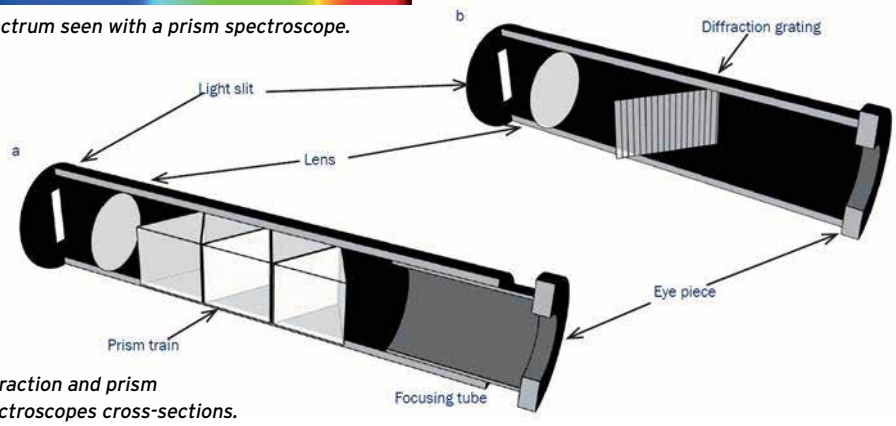
But let us say you are looking for the spectroscope to help you decide whether you have a ruby or a red spinel, where the main difference in the spectrum is those little lines in the blue for ruby, and you cannot see those little lines in the blue...

This is where a prism spectroscope eases that challenge of finding very small dark absorption lines within the very small dark blue end of the spectrum. Due to the way the prism naturally disperses the light, blue wavelengths of higher energy are spread further through a prism, giving you a much wider area of blue to work with and making absorption in the blue that much easier to spot.

Gem-A Instruments stocks a range of spectroscopes and spectroscopy reference books. See the Gem-A Instruments catalogue online or email instruments@gem-a.com for further information. ■

Spectrum seen with a diffraction grating spectroscope.

Spectrum seen with a prism spectroscope.



Diffraction and prism spectroscopes cross-sections.

NEW ADDITIONS TO THE GEM-A TEAM

There have been a few staff changes at Gem-A over the last two months. Desislava Krecheva (left) joined Gem-A as education ATC administrator, replacing Priya Amrit, to whom we wish every success in her future endeavours.

We are also excited to announce the growth of our in-house team of tutors: Lily Faber FGA (centre) and Angharad Guy FGA (right) joined us at the beginning of May as gemmological tutors and Gem-A's newest member of staff, William 'Bill' Scott, started with us at the end of May. Bill joins us in the newly created role of chief operations officer.

Images by Henry Mesa.

ALAN HART DISCUSSES CROWN JEWELS AT SINKANKAS SYMPOSIUM

Gem-A CEO Alan Hart FGA DGA discussed sapphires in the Crown Jewels at the Fourteenth Annual Sinkankas Symposium on 8 April. The one-day event at the Gemological Institute of America's headquarters in Carlsbad, California, featured presentations by noted gem-specialists, including Richard Hughes FGA, Dr. John Emmett, Nathan Renfro FGA GG and Lisbet Thoresen. This year's symposium was themed around sapphires, with talks covering faceting, carving, mineralogy, and crystallography.

Image courtesy of Robert Weldon.

Organised by Roger Merk for 13-years (2003-2015), the Sinkankas Symposium is co-sponsored by the Gemological Society of San Diego and GIA, which has provided the Symposium venue every year. Bill Larson FGA (Hons) has been a supporter and speaker at the event since its inception.

UK JEWELLERY AWARDS 2017 WINNERS TO BE UNVEILED ON 29 JUNE!

2017 marks the 25th anniversary of the UK Jewellery Awards — an event that celebrates the best in jewellery brands, retailers, suppliers and designers. Hosted by *Retail Jeweller* magazine, the Awards will take place at the Hilton Hotel on Park Lane, London. If you would like to attend, please visit *awards.retail-jeweller.com*

25th Retail Jeweller UK JEWELLERY AWARDS
29 June 2017 | London Hilton, Park Lane
in association with CLOGAU

CLAIRE MITCHELL HOSTS SPECTROSCOPE WORKSHOP AT MEDITERRANEAN GEMMOLOGICAL AND JEWELLERY CONFERENCE

Gem-A teaching manager Claire Mitchell FGA DGA RJ DIP hosted a half-day, pre-conference workshop at this year's Mediterranean Gemmological and Jewellery Conference in Syracuse, Italy. Claire's talk, titled *The Use of Handheld Spectroscope in Testing of Gems and Coloured Diamonds*, guided participants through the correct techniques for successful absorption spectra observation, as well as associated problems and pitfalls. The hands-on workshop also covered a verity of handheld spectroscope models, best practices and correct illumination, using both coloured gemstones and some coloured diamonds.

The Conference was hosted at the Hotel Minareto from 12-14 May, and included lectures by Alan Bronstein, Dr. Katrien de Corte, Kym Hughes and Dr. Sergei Terentev.

Are you looking for an exciting new challenge?

Apply now for upcoming FEEG Diploma exams in 2017

The Federation for European Education in Gemmology (FEEG) was set up in 1995 by several gemmology institutions to create a pan-European gemmology qualification that would be recognised by all bodies and institutions across Europe.

The FEEG Diploma is built from the collective knowledge of Europe's top gemmological training centres, and challenges trained gemmologists' theoretical and practical knowledge of over 100 stones, from the everyday gems to the lesser known minerals. As a founding member of the FEEG Diploma, graduates of Gem-A's Gemmology Diploma are eligible to apply for the exam.

FEEG
FEDERATION FOR EUROPEAN EDUCATION IN GEMMOLOGY

Exam Location:
Gem-A headquarters

Qualification:
EG (European Gemmologist)

Entry Requirements:
Gem-A Gemmology Diploma

Assessment:
One theory paper
One practical paper

Examination Fee:
£300.00

2017 Exam Dates:
4 July 2017
10 October 2017

Optional Study Day:
3 July 2017 – £90
9 October 2017 – £90

Visit **feeg-education.com**
or email **education@gem-a.com**
to apply today

Sapphire miners at Ilakaka, Madagascar

Richard Hughes FGA recalls the origins of this incredible image from his new book, *Ruby & Sapphire: A Gemologist's Guide*, aimed at working gemmologists, appraisers and students.

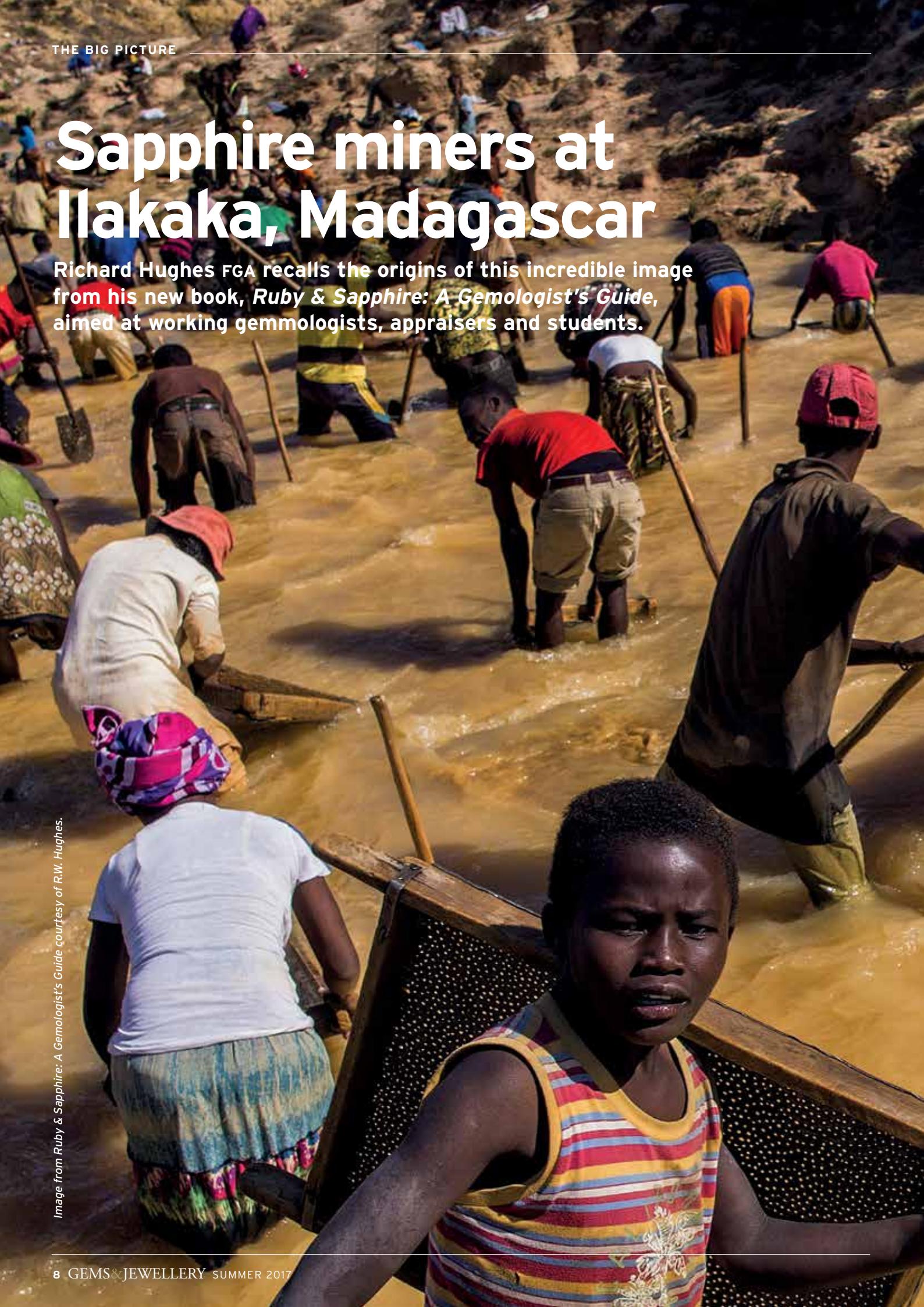


Image from Ruby & Sapphire: A Gemologist's Guide courtesy of R.W. Hughes.

"We drove south from Ilakaka for about an hour on the tarmac road to Tulear, then turned south east on a track that led to a major mining village next to a river.

Crossing the river, we again continued on a dirt track that led through the spectacular scenery that makes up southern Madagascar, with wide vistas punctuated by mesas and buttes against blue skies that seem to be unique to this land.

Occasionally we would see people walking with bundles on their heads, supplies and mining implements, but just where they were going we had no clue. Finally, after some two hours of travel, we saw a series of pickup trucks parked on the horizon. As we approached, we heard the distant sounds of Malagasy music.

Arriving at the line of trucks, we looked down and found thousands of people in a river washing for sapphire, while large speakers set up on trucks next to the river provided a surreal soundtrack to a scene that was one of the most incredible I've ever witnessed. Magic, pure magic. Madagascar is uncanny in the way she offers up these moments."

***Ruby & Sapphire: A Gemologist's Guide* by Richard W. Hughes with Wimon Manorotkul and E. Billie Hughes, RRP £220, Gem-A Instruments.**

This impressive work contains more than 1,000 photos, maps and illustrations and 3,500 references, making it one of the most comprehensive books ever written on a single precious stone. It is the ideal companion guide to Hughes' *Ruby & Sapphire: A Collector's Guide*, available for £125 through Gem-A Instruments.

Fossicking in the Outback

Carmen Garcia-Carballido FGA DGA L. Geology MSc. EurGeol **travelled to the Southern Hemisphere to find out more about the opals and sapphires of eastern Australia.**

To test the skills acquired in two years training as a gemmologist with Gem-A, my husband planned a three week field trip to the sapphire and opal fields of eastern Australia. We flew from Aberdeen to Sydney, hired a motorhome and headed into the outback of New South Wales (NSW) and Queensland (**1**).

However, cyclone Debbie making landfall on the coast put paid to our plan to visit a gem dealer in Yepoon and check out the Marlborough Chrysoprase. To keep safe we stayed inland, driving 4,500 km in 13 days and camping at a different site every night.

Two days from Sydney, our first gemfield was Glenn Innes where we tried fossicking for the first time. A petrol station sold us a 'bucket of dirt' and rented sieves for AUS $20. Washing the dirt off, we found our first sapphires and zircons. We admired Robert Cook's collection of locally mined parti-colour sapphires that he cuts in his shop at the Visitor Information Centre. After some purchases, my husband had to drag me out of Robert's shop.

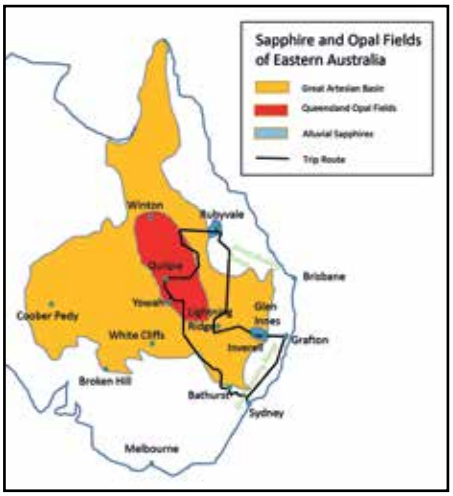
2: Rough untreated sapphires from Jack Wilson's mine. L-R 10.21 ct and 6.54 ct.

60 km west at Inverell, we met Jack Wilson, who owns a longstanding sapphire mine and his wife Dallas, who designs lovely jewellery with blue sapphires from his mine. I bought some untreated rough blue sapphires (**2**) with the idea of learning to cut them myself. Jack explained the host rock (i.e. the primary deposit where the sapphires formed) has not been identified. These sapphires are found in secondary, alluvial deposits.

After a long drive west, roads littered with dead kangaroos took us to Lightening Ridge, famous for its black opals. The town in the desert appeared empty. Tourists do not arrive until Easter. Only emus stay all year round. We camped in a site by the artesian baths, a wonderful way to relax and learn about the immense subterranean artesian system that probably played a role in the development of the opal fields. We visited an underground opal mine and were allowed to fossick for opals on the 'mullock heaps' of old spoil outside the mine. My husband found a small sample but I was not so lucky.

Next day we headed northwards. I was disappointed I could not buy any black opals in Lightning Ridge because the shops were shut, but a few kilometres before crossing into Queensland, a roadside sign led to the house, shop and workshop of Greg Armstrong. An opal miner, cutter and stone setter. Greg laid out his collection of white and black opal (**3**) and when we mentioned we were learning lapidary, he gave us a bag of 'potch' opal to practice cutting at home.

Over the state boundary, we headed north for St. George, Roma, where the oil and gas industry's mega coal bed methane (CBM) project produces gas from extensive Permian and Jurassic coal deposits to supply the energy needs of c. 90% of the homes in Queensland, and the location of the famous Carnarvon Gorge.



1: Map of Australia showing key sapphire and opal locations and the field trip itinerary. Image by Peter Scott-Wilson.

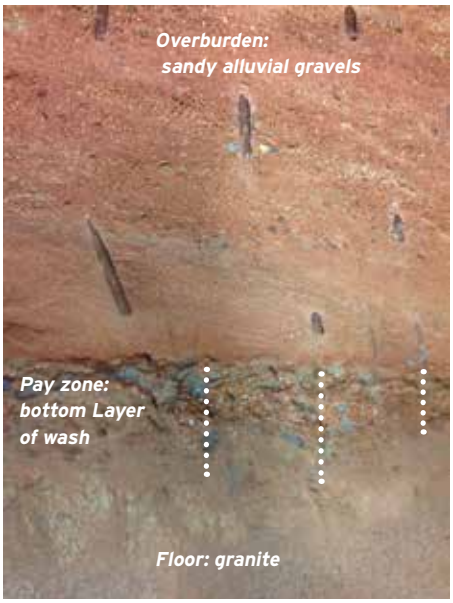
We drove inland to central Queensland to The Gemfields area, which includes the localities of Anakie, Rubyvale, Sapphire and Emerald, where green gemstones initially taken for emeralds were found in about 1880, when drilling for water, ahead of railway construction. Green and yellow sapphires and zircons have been mined in this area since the 1880s.

At the Sapphire Caravan Park we watched wallabies and lorikeets being fed. Taking Jack Wilson's advice, we looked for Peter and Eileen Brown at the Rubyvale Gem Gallery, but as they were on holiday, the shop manager showed us Peter's amazing fancy cuts on parti-colour sapphires (**4**). The shop

3: Lightning Ridge white and black opals mined and cut by Greg Armstrong.

is a gemmologist's paradise. Alicia Pray was cutting beautiful black star sapphire cabochons from the Desperado mine, and we bought a bag of 'wash' from the mine to fossick back home in Scotland.

Alan, a lively Stranraer émigré, took us round an underground sapphire mine in Rubyvale. Prospectors first dug one metre diameter vertical shafts through 'shin cracker' overburden (sandy gravels). The bottom layer of wash sits uncomfortably over eroded granite. When miners hit the granite at a depth of 15 m or so, they dug horizontal tunnels to follow the alluvial pay zone where sapphires, zircons, garnets and occasionally diamonds concentrate (**5**). Miners knew if they found a block of quartz in the wash, and sapphires were present, they were likely to aggregate



5: Geological section c. 15 m below the surface inside the Walk-in Miners Heritage Sapphire Mine at Rubyvale. The alluvial sapphires concentrate within narrow 'wash zones' (average 15-20 cm as marked by dotted lines) above the 'granite floor' and below several metres of sandy alluvial gravels. Elongated features are pickaxe marks.

upstream of such 'Billy boulders'. This helped them to orientate their tunnels.

From The Gemfields in Queensland, we drove westwards to Barcaldine ahead of cyclone Debbie's rainclouds. Here we decided to head south towards the Quilpie opal fields. As the land became more arid, the soil turned red, the gum trees thinned out and the grass grew sparse. Intrepid wildlife competed with massive 'road trains' for the driver's attention on the empty roads between

4: Coloured sapphires collected over a period of 40 years in The Gemfields of Queensland by Peter Brown of the Rubyvale Gem Gallery.

the gem locations. We passed trucks hauling three trailers, sometimes four.

Arriving in Quilpie, everywhere we went we were presented with useful information, friendly advice and ideas for things to see, and a chance to cool down from the 35 °C heat of early autumn in the outback. In Quilpie, they told us St. Finbarr's Catholic Church was worth a look. Its altar, font and lectern have impressive panels of boulder opal donated in 1976 by local miner Des Burton, the father of the boulder opal industry. I was quite literally on my knees in adoration.

The only shop open in Quilpie sells everything. There I found the last copy of Greg Pardey's *Black Opal: A Comprehensive Guide to Cutting* on its shelves and read it cover to cover before we got back to the UK. Walking back to the motorhome on our way out of town, we noticed that the Opal Hunter shop had opened too. Asking if I could buy some rough opal to cut back home, shop owner Eddy Lunney told me he would need to get to know me before knowing what he wanted to sell me. Induction into opal heaven started with a tour of the shop, the lapidary workshop and the yard with part of his huge stock of boulders from his opal mine. By teatime he had given me a masterclass in boulder opal cutting and polishing. I absolutely loved it! The dark blue and purple colours he brings out of the transparent opal (known as crystal) are gorgeous. It was really hard to leave Quilpie the next morning.

We noticed a change in the weather. The temperature had dropped to 20 °C as we drove to Yowah. In this famous opal location, we found Scott Shorten, shopkeeper, opal mine tour guide and librarian. After lunch, with his shopkeeper hat on, he showed us round the Yowah Opal Centre. Yowah opal is found inside nodules. Nine out of ten nodules are empty, so it is always exciting to crack open one, using a hammer or even better sawing through it, to see whether there is any opal inside. Scott sold us some good samples.

Before flying home, Matthew Morin FGA FCGmA senior sales consultant at Altmann + Cherny, a jewellers on Sydney's Pitt Street, showed me how beautiful opals are used in modern jewellery (**6**). The shop also hosts The Olympic Australis, the largest and most valuable piece of opal ever found. It is a white opal from Coober Pedy, which weighs 17,000 ct, measuring 28 cm long by 11.5 cm high. For more information visit *altmanncherny.com.au/famous*

ACKNOWLEDGMENTS

Carmen Garcia-Carballido would like to thank her husband, Peter Scott-Wilson, for organising the wonderful tour. Eddy and Lynda Lunney for their hospitality at Quilpie. Jack and Dallas Wilson, Robert Cook, Greg Armstrong, Scott Shorten, the staff at Rubyvale Gem Gallery and Matthew Morin for generously giving their time to discuss Australian gemstones. ■

6: Carmen meeting Matthew Morin at Sydney jewellers Altmann + Cherny. Matthew is also the president of, and a gemmology tutor at the NSW division of the GAA (The Gemmological Association of Australia). Carmen is modelling a Koroit boulder opal pendant on white gold from the shop. Image by Peter Scott-Wilson.

All images by Carmen Garcia-Carballido, unless otherwise stated.

STIRLING SUCCESS

Alan Hodgkinson FGA DGA summarises the 22nd annual Scottish Gemmological Conference (SGA), highlighting its move to the historic setting of Stirling and its stimulating programme of speakers.

The Stirling Court hotel, situated on the Stirling University campus, was tailor-made for conferences. Its leafy surrounds are overlooked by the Ochil Hills, which made for an ideal setting for a weekend of gemmology lectures, workshops and networking with friends old and new. Plus, there was a spirited and energetic ceilidh that went on into the 'wee sma hours'.

With a packed schedule from 28-30 April, here are some of the highlights from this year's successful SGA Conference...

DAVID CALLAGHAN FGA ON ANDREW GRIMA

Friday night's opening speaker brought to life Andrew Grima, who he knew personally through a close acquaintance. Grima was a designer extraordinaire, but not a practising craftsman. He broke all the rules in his approach to design, as was the case with his shop façade in Jermyn Street, Mayfair, with the front looking as if it has been barricaded with any old iron and stone slabs found on a waste tip. His designs won many awards, nationally and internationally, and the inspiration came from anything as extreme as the shavings from a pencil sharpener to sunlight on rippled waters. For the most part the designs were positive and forceful with the use of deeply textured gold, while gemstones and diamonds were relegated to a support role.

Alan Hodgkinson's workshop with L-R: Sarah Steele, Kathryn Bonnano and Glynis Hunt. Image by Barbara Kolator.

Barbara Kolator using a spectroscope. Image by Anita Beardwood.

KEN SCARRATT FGA DGA ON PEARLS

Saturday morning was opened by keynote speaker, Ken Scarratt, who discussed natural marine pearls and their focal point in Bahrain in the Persian Gulf. His expertise more than qualified him to become a consultant to Mumtalakat (the Sovereign Wealth Fund for Bahrain), followed by the establishment of a contemporary world-calibre laboratory. Some years before, Scarratt was involved in setting up the original gem and pearl laboratories in Bahrain and other Persian Gulf States.

DR DAVID FISHER ON SYNTHETIC DIAMONDS

Dr David Fisher, principal scientist at the DeBeers Technologies Research Centre in Maidenhead, put synthetic diamonds under the microscope. His presentation covered the two methods of diamond synthesis: high pressure high temperature (HPHT), and chemical vapour deposition (CFD). The latter grown by the carbon atoms travelling through a plasma of methane gas and attaching to a diamond seed plate. Highlighting the diversity in the area of synthetic diamonds, Dr Fisher highlighted how a 92 x 92 mm square synthetic diamond plate has been grown in Germany, in contrast to the now large scale production of tiny synthetic faceted brilliants down to 0.9 mm (0.3 points) that are infiltrating parcels of diamonds. This has called for new and more sophisticated methods of detection.

STUART ROBERTSON ON THE GEMSTONE MARKET

This talk offered an insight into gem data and prices gleaned from Gem World and the Gem Guide — the brainchild of Richard Drucker GG (hons) FGA. This privileged information can be accessed by enrolling with the Gem Guide, which looks at the range of gemstones encountered by the jewellery valuer. Prices are updated regularly by a team of agents, who study prices through a range of gem cutters, dealers, importers and agents across the world. Robertson showed how trends, fashion and economics interplay in the gem market, as certain gemstones peak and trough with little correlation to others.

ALAN HODGKINSON FGA DGA ON ZIRCONS

Zircon owes its mystique to an extensive range of optical and physical properties. Historically, such behaviour defied any obvious explanation. However, the lower physical and optical properties were the by-product of the total or partial disintegration of the tetragonal zirconium silicate; such a breakdown of identity was due to radiation levels of thorium and uranium within the host crystal. At its extreme, the zircon had completely lost its crystal structure and become the two amorphous forms of silica and zirconia. For this, Gem-A founder Basil Anderson felt the name pseudozircon more appropriate. In between the property extremes were those zircons which had suffered a partial breakdown, described as metamict.

VINCENT PARDIEU ON BLUE SAPPHIRE IN MADAGASCAR

As a consultant field gemmologist, delegates were enthralled by Vincent Pardieu's photos of mouth-watering gems, often balanced on mud-encrusted hands at mine sites. We were whisked around the world's newer gem locations, including Madagascar where magnificent blue sapphires have appeared. These caused a real wobble in the laboratory world, as some were certificated as Kashmir stones. The sheer size of some of the sapphires stunned the gem world, with crystals up to 150 ct producing faceted gems of 20-40 ct. Collectively these recent finds put Madagascar firmly in the world's gemmological focus, with miners flocking to these opencast sites. Automated machinery was prohibited to ensure the miners were given some degree of income assurance, and for a few, unimagined wealth. ■

Rebecaa Tucker at CW Sellors stall. Image by Barbara Kolator.

SGA Conference 2017 VIPs. Image courtesy of SGA.

"MANY DELEGATES, WHETHER SCOTTISH BORN OR SCOTTISH BY CHOICE, WORE THEIR KILTS AND TARTANS!"

Gem-A education co-ordinator, Anita Beardwood FCGmA, explains why the SGA Conference is a pleasing blend of gemmology, culture and workshops...

For many, early May Bank Holiday means the first BBQ or country walk of the season, but for the inveterate gemmologist it means the Scottish Gemmological Conference! Delegates attending this year's conference in Stirling came from near and far away places such as Norway, Australia, Canada, America and Thailand. Seasoned gemmologists and students were all warmly welcomed.

The conference kicks off on Friday evening with a welcome reception, a speaker and a late dinner buffet. David Callaghan was the Friday evening speaker and delighted delegates with his talk about Andrew Grima, the jeweller but also as a personal friend. After his presentation, David was honoured to receive the Catriona McInnes Award and, in a surprise twist, the medal was also awarded to SGA president, Alan Hodgkinson.

After a hearty breakfast, speakers continued throughout the day with lively discussions taking place at every coffee and lunch break. After a day of continued learning the delegates looked forward to the Saturday evening dinner and ceilidh. Many delegates, whether Scottish born or Scottish by choice, wore their kilts and tartans. Many were later seen at the bar continuing their convivial discussions of the day.

Sunday afternoon was dedicated to workshops and many were fully booked. One would think that, after such a full weekend, delegates would be looking forward to going home, but the promise of a traditional offsite evening meal at the River House restaurant was far too alluring. Monday morning brought around fond farewells for those not attending the tour of Stirling Castle. The SGA Conference has always been exemplary and this year was no exception. I for one am already looking forward to SGA Conference 2018.

L-R: Charlotte Hodgkinson, Alan Hodgkinson and David Callaghan. Image courtesy of SGA.

Conclave 2017 American Gem Society – 'You had me at the App'

Gem-A marketing and events manager, Elaine Ruddie DGA discusses her impression of this year's American Gem Society (AGS) Conclave.

Image courtesy of AGS.

I have been to a number of jewellery events and conferences throughout my career, but nothing I have previously been to compares to the AGS Conclave. It was not just because it was in Hollywood – although that did not hurt – there is something about AGS and its members: the energy, the enthusiasm, the keenness to learn and share knowledge, which sets them apart. Of course Gem-A's North American manager Eric Fritz FGA has been saying this for years, but as they say 'seeing is believing'.

The American Gem Society is the USA's leading non-profit jewellery trade association established in 1934 by a small group of jewellers, one of whom was GIA's founding father Robert M. Shipley. The group formed to protect the jewellery buying public from fraud and false advertising and this deep-rooted ethos of consumer protection has remained at the heart of the organisation to this day. There is a rigorous process for AGS membership and only one out of 20 jewellers meets the qualifications, even then they have to supply references and be approved by a panel of peers.

SO WHY ARE GEM-A ATTENDING THIS EVENT?

AGS have approximately 3,400 jewellers, retailers, suppliers and affiliate members. They promote the highest standards amongst their members, and education is an integral part of their mission. In that, we are aligned. Gem-A's mission is to advance the understanding of gemmological knowledge and we pride ourselves on providing the highest level of gemmological training around the world. AGS support us in our goals as we do in theirs.

Keynote speaker Jay Leno.

SO BACK TO THAT BIT ABOUT HOLLYWOOD...

Pipped as the "the jewelry industries premier education and networking event", AGS Conclave attracted over 700 delegates to Lowes Hollywood Hotel for four days of networking and workshops. Yes, I said 700 delegates! This is not just a meeting; it is a take-over. As a conference organiser I can appreciate the amount of planning, co-ordinating, blood, sweat and tears that goes into creating a successful event and AGS Conclave was seamless. My first impression came from the app, which I downloaded as soon as I could. It allowed me to plan out my days, schedule my workshops and research the speakers and the other delegates before I even landed in LA. When an event has its own app you know it means business.

The keynote speakers at any event are a big deal; they are the names that draw us in with inspiring tales of determination and courage. Comedian Jay Leno kicked off the opening lunch with a series of quips and tales from his career. Most impressive was when he auctioned a private tour of his garage, the Jay Leno Garage is home to around 300 classic cars, supercars, restoration projects and road tests and, instead of just giving the tour to one bidder at US $5,000, he offered six bidders the chance to tour the garage, raising US $30,000 for the charity — Jewelers for Children.

Author and presenter Scott McKain provided the breakfast keynote on day two and told the audience to obsess over making it easier for customers to do business with their companies. He also shared a great story about Taxi Terry, the taxi driver who provides the ultimate customer experience.

On Friday the breakfast keynote was delivered by boxing legend Sugar Ray Leonard. It was maybe a bit early for some of the close-up boxing videos clips, but his message was one of celebrating success and failure and he received a standing ovation for a very inspiring presentation.

On Saturday morning, composer Kai Knight led the closing keynote. He used

Standing ovation for keynote speaker Sugar Ray.

musical metaphors, which we can relate to in our own lives, organisations and roles and challenged us to think about whether we are writing new music or just playing the same notes from the past.

AGS Conclave had no shortage of incredible keynote speakers but one name I did not know beforehand was Joel Zeff or the 'Emcee' as he is known. The first line of his biography states "Joel creates energy" and he does exactly that. A very loud, brash energy, which no-one is safe from. Joel had me crying tears of laughter from start to finish. He was the AGS Conclave host and for anyone who was there I just have to say #puppiesatconclave.

#puppiesatconclave

Then, there were the workshops. I should start by congratulating Eric Fritz and Claire Mitchell FGA DGA RJ DIP, who led an incredible (and exhausting) nine workshops over the course of the event. I only heard positive feedback from attendees, who were delighted to report they had finally seen a spectrum or that they might consider studying with us because Eric and Claire made it seem achievable to pass our course. So, where earlier I said 'seeing is believing', this is true of Gem-A workshops — giving workshops allows people to see they can do it for themselves, inspiring them, giving them confidence and encouraging them to delve deeper into the world of gemmology. It is so important that Gem-A continue to attend events and provide these workshops, it is the best and most direct way to connect and spread the Gem-A message.


Specimens on show at the Gem-A organics workshop.

WHEN AN EVENT HAS ITS OWN APP YOU KNOW IT MEANS BUSINESS.

Claire and Eric were not the only Gem-A representatives in action at Conclave, there were a number of FGA members and business partners providing workshops and sharing their knowledge: Gem-A tutor Starla Turner FGA taught delegates about identifying diamond ring styles through the 1900-1950s with co-presenter Suzanne Martinez. Mona Miller FGA led a number of insightful lectures on appraising; Branko Delajin FGA DGA shared his knowledge on synthetic diamonds; Shelly Sergent (Somewhere in the Rainbow); Chris Smith FGA (AGL lab) and Richard Drucker GG hons FGA (Gemworld International) were also highlights at Conclave.

At any one time there were around 10 workshops to choose between and topics covered a wide variety of subject matters from gemmology, appraising, jewellery history, digital marketing, networking, new technologies and more. Each workshop provided a takeaway — I did not just walk out of the sessions with detailed notes and the speaker's business card, I left with knowledge. It may seem a simple thing to say and some readers may be thinking they always leave with knowledge, but I challenge you to think about this the next time you attend an event. It is very rare to feel each session provided you with tools useful to the everyday.

So what is my main takeaway from AGS Conclave? It is that everyone there is committed to education. Education is key. See you next year in Nashville. ■

All images by Elaine Ruddie, unless otherwise stated.


Abbie Crabtree painting a diamond portrait.


Tahitian shell exterior.

Head online and Google:

American Gem Society

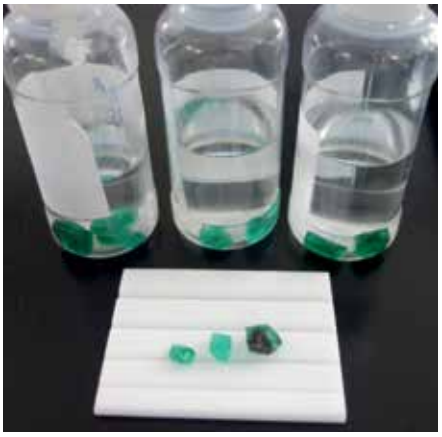
Jay Leno's Garage — for car fanatics

Taxi Terry — customer service lessons

Joel Zeff — although maybe you had to be there...

Proof of Provenance

In March this year, Gübelin Gem Lab in partnership with Gemfields announced the release of an innovative Emerald Paternity Test. Using customisable DNA-based nanoparticles, this futuristic technology enables emeralds to carry information pertaining to where and when they were mined, and by whom.



Rough emerald crystals immersed in liquid containing DNA-based nanoparticles.

Founded in 1923, the Gübelin Gem Lab was established to ascertain the authenticity of gemstones used in jewellery. Today the Gübelin name is trusted worldwide using pioneering science and technology to carry out gemstone analysis for many in the trade.

The Emerald Paternity Test, hailed by Gübelin Gem Lab to be a "true game-changer for the coloured gemstone industry" is intended to bring "more transparency into the gemstone industry". In order to test the viability of the new technology in the field, Gübelin Gem Lab approached Gemfields, an organisation that specialises in the responsible sourcing of gemstones.

The Emerald Paternity Test involves applying customised DNA-based nanoparticles to rough emerald crystals. Developed to resist removal by procedures such as cleaning, cutting, polishing and setting, the DNA can be recovered and deciphered at any stage of the supply chain to reveal the emerald's paternity. The nanoscale of the particles means they do not affect the properties of the emerald and they are 'invisible' to optical microscopes. This new technology provides proof of provenance and reassures the end consumer.

Daniel Nyfeler, managing director of Gübelin Gem Lab since 2003, speaks to *Gems&Jewellery* deputy editor, Angharad Kolator Baldwin, on this cutting edge technology.

Who is your target audience for the Emerald Paternity Test?
Primarily mining companies both big corporate, and small and artisanal miners and mining cooperatives, but also governments, jewellery brands and other stakeholders in the industry.

Once the DNA has been applied to the gemstones, can the DNA be extracted and tested multiple times?
According to the lab and field tests we have done so far, the test can only be done once. However, we can re-enter the same type of particles after having done the test, basically 're-loading' the stone for a possible later paternity test.

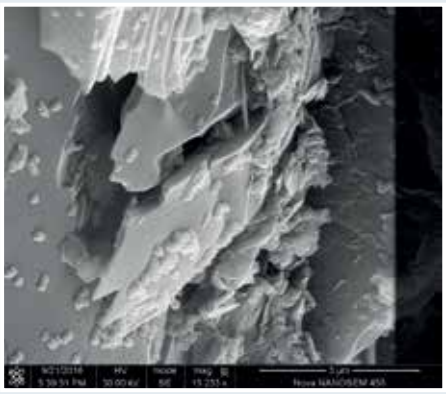
What will distinguish the DNA of one mine from the DNA of another?
The DNA sequence is unique for each company, as in a specific sequence of the DNA-building constituents (GATC) is assigned to each company. Clients can get several types of unique DNA for example to describe different mining locations or get a new DNA every year to monitor production.

What mechanisms are in place to prevent one mine using DNA samples from another mine?
We foresee a combination of checks and controls, ranging from a Code of Conduct, to an external auditing procedure. Finally, we will monitor and publish all accredited users of the technology, so that end consumers and brands can see which mining companies are authorised users of the technology and work in compliance with the rules.

You mentioned this technology would be beneficial to cooperatives of small and artisanal miners; will the cost of administrating this technology not be preventive to these mines?
We think that the technology will be quickly embraced by large companies, who can also easily afford it. To avoid small and artisanal miners getting side-lined, we aim to find ways to make the technology accessible and affordable for them. We are currently trying to contact governments and NGOs for this purpose.

If a retailer wishes to check the paternity of a stone, is it affordable for them to do so?
The cost for single test is a few hundred Swiss francs. The costs are rather high at this time, because it is done in a research lab, and not on an industrial basis. We are trying to bring down this cost to encourage more tests to be done. However, we believe that in the long-run, once people have trust in the technology, they will not consider it necessary to check all stones, but just a small fraction. To know that there is the option to test should be sufficient in the long run, with no need to always actually do the test.

To learn more visit **provenanceproof.com** ■



Scanning electron micrograph of an emerald with DNA nanoparticles applied.

Images courtesy of Gübelin Gem Lab.

"The performance of coloured stones was more impressive than expected"

Jessica Han FGA, Gem-A's China Ambassador, discusses the dynamic gemstone and jewellery market in China.

China, a mysterious land with unique geological advantages and a distinguished market identity, always attracts attention from international jewellery traders. The market demand from China is excellent but the uncertainty of how the market behaves is troubling. However, by taking a closer look at the market and with a little help from the statistics, it is possible to see a promising and prospective market emerging.

According to statistics released by the Gems and Jewelry Trade Association of China (GAC) in 2016, total market sales reached nearly US $100 billion. Comparing this figure to 2006, the Chinese market size has tripled in just 10 years.

This is not only due to the reform and opening-up policy, material price fluctuation and expansion of sales channels; it is also influenced by the change in consumer behaviour and trade trends. In 30 years, the Chinese market has been through three phases from the 'Yellow Era' (gold) to the 'White Era' (platinum and diamond) to the 'Colourful Era' (gemstones). Now it is a mature market that favours product uniqueness, is sensitive to the value of materials, and cherishes good design.

Diamond imports through the Shanghai Diamond Exchange (SDE) were more than 1.83 million carats, a 26% increase from the previous year. Pearl production reached 800 tons; at least half of these pearls were consumed domestically and had a retail value of around US $2.25 billion.

The performance of coloured stones was more impressive than expected, with the total sales value for rough stones reaching at least US $3 billion. Costume jewellery and high-tech jewellery were also worth more than US $3 billion.

With the rapid growth of the Chinese economy and with increased governmental guidance there will be a significant growth in the size of the Chinese middle class. This group of people have the strongest purchasing power. Until 2020, there will be a very high percentage of the population concentrated in age ranging from 20 to 29. This to-be-wedded purchasing power should not go unrecognised.

Meanwhile, the Chinese Central and Provincial Governments have been working on a trade-friendly policy to regulate and support the trade, creating a positive attitude. I think it is safe to predict that the Chinese jewellery market will continue to grow. ■

Accredited Gemologists Association

Join some of the world's leading gemologists and gem/jewelry professionals in a non-profit, peer society, dedicated to upholding the highest standards of ethical practice.

AGA Membership Benefits

- Superlative continuing education - access to cutting edge research - valuable networking opportunity
- Emphasis on trade transparency and consumer advocacy
- The industry's first Certified Gemological Laboratory Program
- Discounted registration fees for annual conferences during the Tucson and Las Vegas trade shows

AGA Membership Supports

- AGA Educational Scholarship and Research Grants
- AGA's *Antonio C. Bonanno Award for Excellence in Gemology*

www.accreditedgemologists.org

From archive to exhibition

The Smithsonian's National Museum of Natural History has delved into its vaults to present hundreds of rarely displayed objects as part of a fascinating new exhibition. Here, we explore six gemmological specimens that will now be available to view...

Celebrating 145 million artifacts is no mean feat, but this is exactly what the Smithsonian's National Museum of Natural History is doing for its *Objects of Wonder* exhibition, which opened in March 2017.

Awe-inspiring artefacts and specimens, normally hidden away in the Museum's archives, have been put on display, with the aim of highlighting how scientists use Smithsonian collections to explore nature and human culture.

For those with a passion for gemmology, *Objects of Wonder* will feature some staggering specimens, each with their own unique stories to tell. There will also be some fascinating organic artefacts on display, including exotic wood, tiger cowries and deep sea corals.

To give you a taste of what to expect, *Gems&Jewellery* selects six specimens from the exhibition that will delight even the most experienced gemmologist...

HONEYCOMB QUARTZ

This mineral structure is the remains of a naturally-forming rock called a septarian concretion. Concretions form when minerals bind together sand, clay, or silt. When a concretion's surface fractures, new minerals fill in the honeycomb-like cracks. If the concretion is less resistant to weathering than the minerals, it erodes away, leaving only the walls that once divided the rock. The specimen glitters faintly because water seeped through cracks in the concretion, depositing silica in the form of quartz. The quartz crystals formed walls called septa that divided the rock. When the rest of the rock eroded away, only the sparkling quartz remained.

CALCITE ON QUARTZ

White calcite emerges like an Art Deco tower from this amethyst quartz geode – a fascinating example of the geometries of the natural world. Though Brazil is famous for its amethyst geodes, this large quartz with multiple generations of calcite growth is a rare find. Usually the Smithsonian's National Museum of Natural History collects objects to answer specific scientific questions or to document what is typical of a region or culture, but sometimes, as in this case, it acquires items because they are unusual or extraordinary.

'BLUE FLAME' LAPIS LAZULI

Lapis lazuli has been an important source of blue pigment in many cultures. The deep, vivid shade of blue that painters call 'ultramarine' was originally made by crushing lapis lazuli and mixing it with binding agents. Weighing more than 250 pounds, this gem-quality 'Blue Flame' lapis lazuli was mined from Afghanistan's Hindu Kush mountains and is among the largest examples of its kind.

> Usually the Museum collects objects to answer specific scientific questions or to document what is typical of a region or culture...

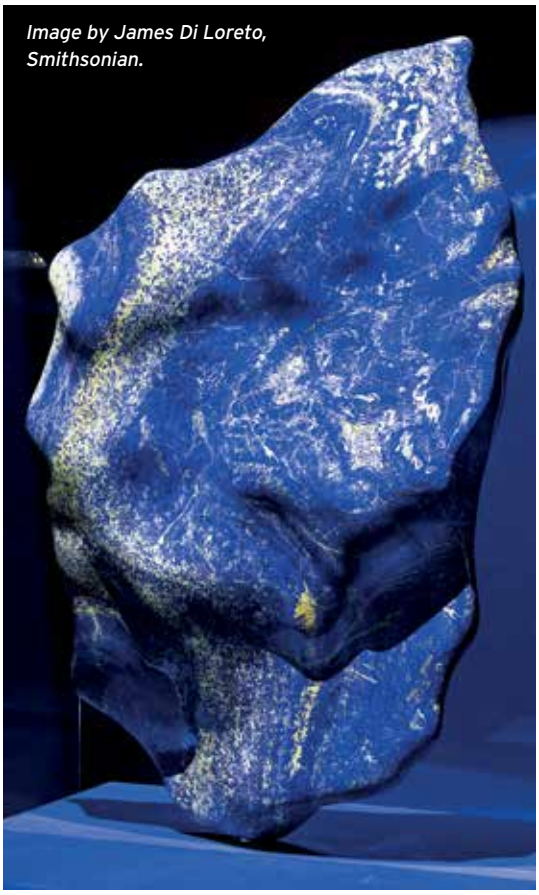


Image by James Di Loreto, Smithsonian.

MOGUL EMERALD NECKLACE

This necklace was mined in Colombia by the Spanish in the mid-1600s then shipped to Europe and eventually India. In India, the specimen was carved for the Moghul rulers around 1700, originally attached to a cloak or turban and later put in a diamond setting. It then went to Paris where it was embellished with a diamond and platinum ornament in the 1920s. In the 1930s a New Jersey woman purchased it as a brooch and later added the platinum and diamond chain. In 2006, the necklace was given as a bequest to the Smithsonian's National Gem and Mineral Collection. ■

DON'T MISS

BLUE OPAL

Opals owe their flashy colours to microscopic silica spheres that make up the mineral's structure. The spheres act like prisms, splitting and bending light. The size of the spheres affects the colours you see: smaller spheres scatter blue and violet light waves.

BERYL AQUAMARINE

Trace impurities of iron in the crystal structure lend this beryl aquamarine its blue tint. If you replaced the iron with chromium, you would get a vivid green beryl.

All images by Ken Larson, Smithsonian, unless otherwise stated.

The Objects of Wonder exhibition will remain on view at the Smithsonian's National Museum of Natural History in Washington, D.C. until 2019.

Calculating with Carbon

Louise Tippey, president of the British Pearl Association, explains why the Swiss Gemmological Institute's radiocarbon dating service for pearls is a huge step forward.

Natural pearls recovered from the Cirebon shipwreck in Indonesia dating back to the tenth century, which were identified using the ^{14}C pearl method developed by SSEF and ETH Zurich. Image courtesy of SSEF.

Pearls are one of nature's most precious posessions. Iconic, unique and beautiful, these organic gems have captivated jewellery connisseurs for centuries all over the world. Pearls and pearl jewellery have played an important role in the social, cultural and fashionable changes within our society.

Since the late 1940s, traditional radiocarbon methods for determining the age of an object have made a significant impact on archaeology, anthropology, science and art.

Earlier this year the world leading Swiss Gemmological Institute (SSEF), in partnership with the ETH Laboratory of Ion Beam Physics in Zurich, became the frst global gemmological laboratotory to offer age dating of pearls using radioactive carbon-14 (^{14}C) or radiocarbon as a unique commercial service.

Dr. Michael S. Krzemnicki, director of SSEF, announced "we are honoured to be able to offer this new sevice to the international pearl trade. It is an opportunity to document the provenance of unique and iconic natural pearls as well as further protecting the natural pearl trade".

For radiocarbon dating to be possible, the object must have contained organic material. Combined with the technical excellence of scientists, this highly sophisticated method involves measuring the ratio of radioactive carbon to the normal carbon in the nacre. This results in an accurate date of the pearl. However, with all scientific testing there may be minor limitations due to the age of the sample and sampling size.

Discovering the age and origin of pearls is now becoming more meaningful for the pearl and jewellery trade, for both old natural pearls and modern cultured pearls.

This will be a dependable and invaluable tool to help discover details about natural and cultured pearls (and pearl jewellery) and our historical past that would otherwise have been left uncovered.

The introduction of cultured pearls at the beginning of the twentieth century made natural pearls and pearl jewellery highly prized and highly sought after. As a result, pearls have become target gems for fraud and forgery. Additionally, as cultivation techniques have become more sophisticated, and pearls are produced in larger quantities, we need to be even more vigilant. Age dating will always be a challenge, but now this service serves to protect the industry from such attemepts to deceive a buyer.

Commenting on the value of radiocarbon dating as a service, leading jewellery historian Beatriz Chadour-Sampson notes: "It is an amazing breakthrough, to have found a method of dating pearls. On historic jewels pearls have often been replaced, and a date could indicate when a jewel was adapted. With pearl necklaces this information would be fundamental, without jewelled components it is impossible to assess how long these have been handed down within a family. The scientific method of dating pearls is exciting news and will undoubtedly be a great asset to the jewellery historian, collector or dealer."

> **This is a huge step forward that allows us to strengthen and protect the future of the global pearl industry.**

This is a huge step forward that allows us to strengthen and protect the future of the global pearl industry. Furthermore, it can be applied consistently throughout the world and consistency in science is everything. It goes without saying that we need to make the most of this service.

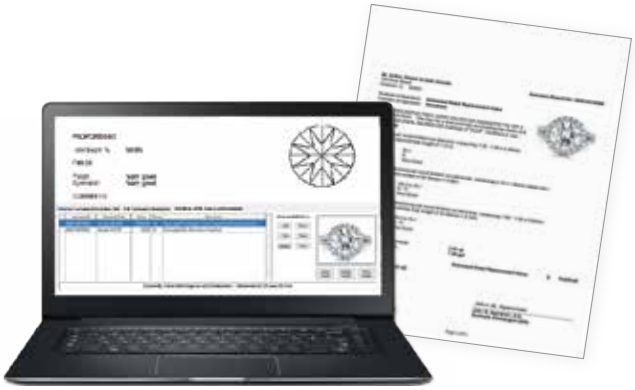
The development is not only significant for the pearl industry, but for all of history. Now, we can rightly credit the past and contemplate future scientific pearl research and development. ■

GEMWORLD
RESEARCH, PRICING, EDUCATION

Pricing The World's Most Precious Gems

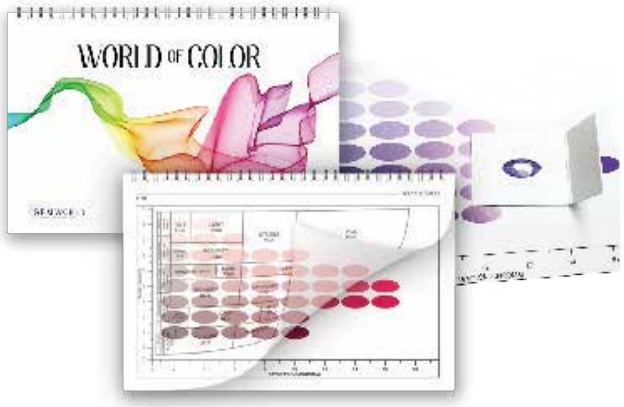
SUBSCRIBE TO "THE GEMGUIDE PRICING"

The Industry leader since 1982 for Gem Pricing & Market Information



GEMGUIDE APPRAISAL SOFTWARE

Fast, Easy, Profitable



COLOR COMMUNICATION SYSTEM

Based on Munsell
Includes Grading Charts

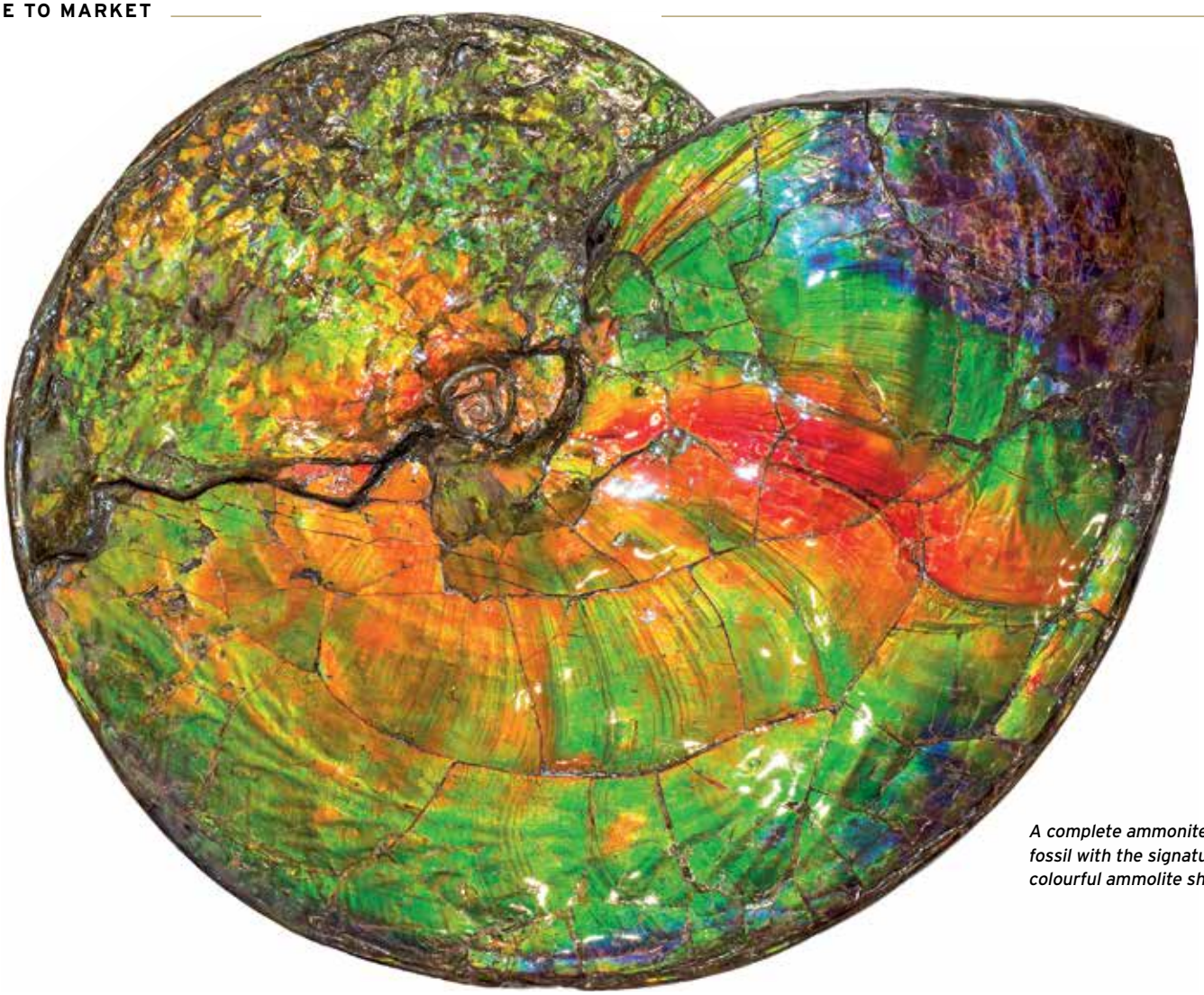
GemGuide Takes the Guesswork Out of Pricing Your Diamonds and Gems

GEMWORLD INTERNATIONAL, INC.

2640 Patriot Blvd, Suite 240
Glenview, Illinois 60026

+1.847.657.0555
www.**gemguide**.com

LIKE US



A complete ammonite fossil with the signature colourful ammolite shell.

Nature's sleeping beauty

KORITE is at the forefront of ammolite mining and production, with plans now in place to expand its operation in Canada. Sarah Jordan speaks to president, Jay Maull, to discover how a booming Chinese market, Feng Shui and adventurous jewellery designers are supporting this fascinating gemstone.

The buzzing, cosmopolitan city of Calgary, in Alberta, Canada, may be more famous for its skyscrapers and its role in Canada's oil industry, but dig a little deeper and you will discover the city plays a unique role in the global gem industry.

This area of Canada – Southern Alberta's Bearpaw Formation – produces more than 90% of the world's ammolite; a gemstone composed of aragonite and derived from fossilised ammonite shells that are more than 70-million-years old. The company behind this production – Korite – is at the forefront of mining, producing, finishing and promoting ammolite across the world, with its jewellery and home décor items now available in more than 28 countries.

Korite has been devoted to ammolite for 35-years and its efforts have certainly paid off. Earlier this year, it was announced that the company's mining activities will expand by eight acres, taking total production up, by around two million carats, by the end of 2017. This shift has largely been caused by increased awareness of and demand for ammolite, which was only certified as an official gemstone by the World Jewellery Confederation (CIBJO) in 1981. Its vibrant, colourful appearance and reputation as nature's rare 'sleeping beauty' has all added to its unusual mystique.

Korite president Jay Maull explains: "We believe we are just on the tip of

> ...it's rare, it's precious and it's exotic. It is the rarest gemstone in the world and everywhere we go people say they've never seen anything like it

ammolite going mainstream, both in terms of jewellery and home décor. We are in discussions with several major jewellery companies to carry our products and our gemstones in their products. We are concentrating on the United States. Ammolite is being fast-tracked because of modern day communications and the internet – we can be all over the world with the product."

WHAT IS AMMOLITE?

Ammolite is derived from the fossilised shells of ammonoids – an extinct group of marine mollusc cephalopods that are closely related to today's octopuses, squid and cuttlefish. Ammonite fossils are relatively common; the name derives from their tell-tale textured spiral shape, which reminded the Ancient Greeks of the Egyptian ram-horned god, Ammon.

Despite this common occurrence, only the rarest of these fossils exhibit the preserved shell required to make ammolite gemstones. As Maull explains: "Ammonite fossils are found all over the world. It was a very prolific creature that lived for around 300 million years across the globe. In every other place where they are found the shell has been destroyed by time and not preserved. Or, if it has been preserved, it is a reddish-brown and not suitable for making gemstones. The only place in the world that we have found the shell preserved is a small pocket in Alberta."

What caused this unique preservation is not fully understood. Maull cites "many theories" including the presence of volcanic ash over the millennia. He adds: "We do find a lot of bentonite [absorbent aluminium phyllosilicate clay usually

Pieces of rough ammolite.

Inlay ring made from ammolite.

Living room interiors displaying Feng Shui with an ammonite fossil in matrix.

formed from weathering volcanic ash in the presence of water] in the sediment, so there was a lot of volcanic activity in the area as it was forming and that may have preserved the shell. It really is an ongoing mystery."

Despite this, there is still plenty we do know about ammolite. Korite deals in four grades of jewellery-appropriate ammolite gemstones: AAA, AA, A and standard. The AAA grading refers to the broadest range of colour, vibrancy and quality, with rarer stones blending blue, indigo and violet shades with the more common red and green hues. For comparison purposes, AAA is deemed similar in quality and rarity to D-flawless diamonds.

As the ammonite shells are in a delicate, preserved state, getting them out the ground is no easy task. "It is the same as any other strip mining operation, until we get down to the pay zone," Maull explains. "We have to move the sediment very carefully because ammonites are fragile. When we do find one, all the heavy equipment stops and it becomes a hand process. There is a palaeontological aspect to it, and we have to teach our miners how to remove it without damaging it — this is a process we have perfected."

Ammonite in matrix.

LIGHT ENERGY AND FENG SHUI

With such vibrant colours, it is understandable that finished ammolite jewellery and ammonite fossil specimens are growing in popularity, especially in the Asian market. Feng Shui experts believe that ammolite has absorbed a substantial amount of the earth's positive energies, also known as *qi* (ch-ee). One form of this is light energy, which is evident in the multitude of colours in ammolite. According to Feng Shui, our brain interprets light energy as colour, so these colours and their specific wavelengths can be used to balance our lives. Ammolite is recognised as the 'Seven Colour Prosperity Stone' due to its seven distinct colours; red is said to nourish love, orange promotes creativity, yellow improves wealth, green improves wisdom, blue aids health, indigo encourages peace, and violet stimulates growth and energy.

For Feng Shui masters, ammonite fossils are also special for their spiral shape, mimicking the path the universe's forces follow in space and nature. When shape and colour combine in phenomenal ammonite fossils, these natural treasures are coveted as luxury home décor objects.

Maull comments: "We have been doing business with a Feng Shui master in Hong Kong for 16 years, and there is no doubt that [Feng Shui and Korite's expansion] are linked. This is also how our growth in China came about. We just struck a deal with a large jewellery company in mainland China and their demand means we have to expand the mine to accommodate."

Mining for ammonite fossils.

THE FUTURE OF AMMOLITE

Ammolite may be a 'fringe' gemstone right now, but, according to Korite, its value has increased by 300% over the past decade alone. Consumer awareness and education, especially in western markets, will be crucial in developing the reputation of ammolite in the coming years. Retailers will also need the right knowledge to help their customers make informed decisions. For example, like pearls, ammolite reacts to acids, hairsprays and perfumes and should be stored separately from other jewellery to prevent scratching. Similar caution should be taken with ultrasonic cleaners and immersion in water.

"There are several things we market about ammolite," Maull explains, "it's rare, it's precious and it's exotic. It is the rarest gemstone in the world and everywhere we go [people say] they have never seen anything like it."

He continues: "It is very exciting, every day that we find ammolite it is like a new day, everyone loves finding it and we love working with it and taking it all over the world and showing it to people. It is very rewarding."

ETHICS AND ENVIRONMENT

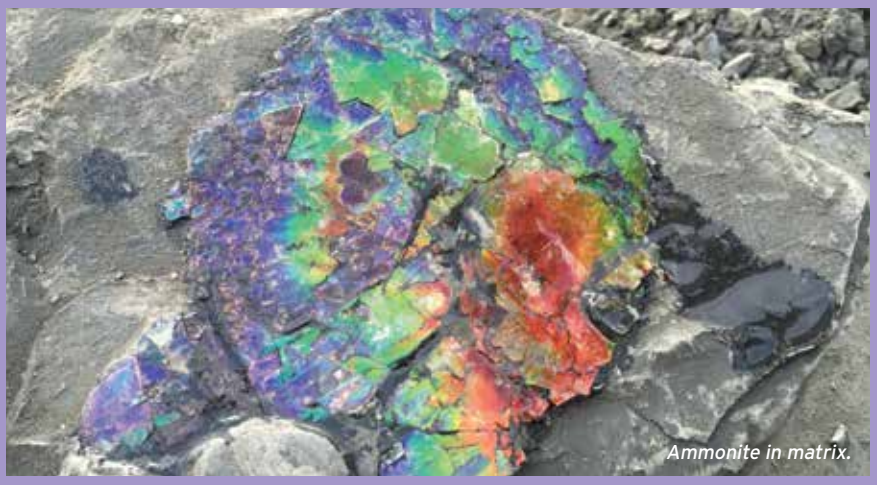
Korite places great emphasis on environmental and ethical concerns. For example, layers of soil are replaced in the order they were removed and native grasses are replanted. "The mainstay of our business is to respect the land and return it to its normal state, if we look after the land it looks after us. It has become the core of our company to extract the ammolite and leave the land as we found it. We are very proud of this, we have won environmental awards from the government of Canada, and our stewardship of the land is one of our highest priorities," Maull notes.

Since 1983, Korite has established itself as the market leading name in ammolite. Its determination to put the gemstone, and Alberta, on the gemmological map is clearly just one facet of its global ambition. With finished jewellery and stand-out specimens supported by an enviable lore, it is clear that ammolite has branded potential. This is certainly good news for Korite, especially as it expects to be mining for another 50 years. ■

Images courtesy of Korite.

AMMOLITE FACT SHEET

Mineral name:	Aragonite
Composition:	$CaCO_3$
Crystal system:	Orthorhombic
Morphology	Type 1 (fractured): Flat iridescent layers are fractured, the fractures are healed with non-iridescent material, resulting in a mosaic texture Type 2 (sheet): Flat areas have no fractures and no special features (except rare suture patterns), thickness of layers rarely exceeds 8 mm
Clarity:	Normally opaque; transparent or translucent in very thin sheets
Lustre:	Vitreous to resinous
Hardness:	3.5
Toughness:	Red ammolite is relatively tough, but blue and purple are brittle
Refractive indices:	Min. value: 1.525–1.530 Max. value: 1.665–1.670
Birefringence:	0.135–0.145
Specific gravity:	2.76–2.84
UV fluorescence:	Iridescent material inert to both long and short-wave UV; non-iridescent healed fracture material has weak yellow fluorescence, stronger to long-wave UV
Parting:	Parting along flat layers most common in rough type 2
Inclusions:	Pyrite, organic matter; these only occur between ammolite layers and cannot be seen from the surface of polished stones
Durability:	Solids should be handled carefully because of softness and susceptibility to chemicals, household products, and excessive heat; triplets (with quartz or synthetic spinel caps) are stable under normal conditions
May be confused with:	Opal, fire agate, labradorite, and various modern (e.g. abalone) or other fossilised (e.g. lumachelle) shell materials



Ammonite in matrix.

"One of the most notorious examples of incorrect terminology has been the words 'green amber'"

Gem-A president Maggie Campbell Pedersen FGA ABIPP discusses the problems encountered with terminology.

Does tortoiseshell come from a tortoise? The answer is no. 'Tortoiseshell' refers to the keratinous outer covering of a marine turtle shell, most commonly derived from hawksbill turtles. Yet the word 'tortoiseshell' has been widely used for a long time, and is so much part of the English vocabulary it would be hard to correct. It is worth noting the words 'turtle shell' can refer to the whole shell of the animal, i.e. the keratinous outer layer and the bony shell underneath, whereas 'tortoiseshell' is understood to refer only to the keratinous layer.

Correct terminology is an age-old problem. Sometimes this is due to an incorrect identification, or a mistranslation. Most commonly, however, the name is chosen because it is deemed more attractive and sells the product.

An example is 'Bakelite', a phenol formaldehyde resin used in jewellery. True Bakelite is a closely related form of the resin, but it is more correct to describe the material used for jewellery as 'cast phenolic resin' – but this is unlikely to resonate with the public.

In the organics world one of the most notorious examples of incorrect terminology has been the words 'green amber'. They have long been used to describe Baltic amber which has been backed with a black substance to appear green, or for fluorescing Mexican or Dominican amber which also appears green, though in each case the body of the amber remains a golden colour. This has been regarded as acceptable because the original material is amber.

It was no longer regarded as acceptable when the term 'green amber' was used to describe copal, which had been put through a series of treatments in an autoclave, turning the body of the material green and altering its properties to render it artificially mature. At the same time some Baltic amber was being similarly treated and turned green, meaning some of the material was in fact natural amber and not copal. It was suggested that we should use the words 'greened amber' to at least alert the public to the fact that the colour was not natural, and the resin had been treated.

Today we have a new material to contend with, Ethiopian green amber. This material is still undergoing testing, but so far it would seem it is naturally a pale green colour, altered from a golden colour by natural processes. Unfortunately, visually the Ethiopian material bears a strong resemblance to the autoclave-treated copal, so the problems ahead may not only be those of terminology! ■

Workshops galore at AGS Conclave

North America manager Eric Fritz FGA expands on the recent American Gem Society (AGS) Conclave in Hollywood describing the success of the Gem-A workshops.

Gem-A continues to build a presence 'across the pond'. Recent workshops at the AGS Conclave in Hollywood, California were well attended and included courses in basic gemmology, an introduction to advanced gem testing and an organics course on coral. The AGS Conclave is the premiere event in the industry. Gem-A is proud to have conducted nine workshops in three days, more than any other group. AGS remains a strong collaborator and supporter of our efforts to provide the practical knowledge the retail gem market needs to survive in a changing world.

Claire Mitchell FGA DGA RJ DIP led with a workshop on hand held spectroscopy. This is the most popular workshop Gem-A offers as many people struggle with spectrums... at least before attending the workshop. It is very satisfying to see the smiles of students when they actually 'see' spectrums.

The second part of the spectrum workshop bridged the gap into advanced testing, with an emphasis on Raman. Thanks to Mikko and Alberto of M & A Gemological Instruments (MAGI) for providing intensive training to Gem-A staff after Tucson in anticipation of this new workshop. Theory was covered as well as practical examples, showing how to separate similar materials with Raman.

The most exciting part was a hands on demonstration of the GemmoRaman. Separation of jade, both natural and polymer filled from nephrite brought 'oohs' and 'aahs' from the audience. Green melee was examined and a surprise in the emerald packet was actually green chalcedony, and gemmy enough to visually fool one's eyes.

Each year Gem-A introduces a new organics workshop. The course this year looked at traditional precious coral, the reds, whites and pinks used for centuries in jewellery. It also included an introduction to black coral, looking at how to separate it from other simulants. Treatments such as dyed red bamboo coral and impregnated sponge coral were identified. We will be presenting a version of the coral workshop at NAJA in Indianapolis as well as at ASA in Houston later this year.

In closing, I would like to thank all of our partners here in the USA for their generous support. We continue to work on the development of Gem-A teaching centers in North America and endeavour to carry on growing from strength to strength. ■

Gem-A INSTRUMENTS

15% OFF when you quote *Gems&Jewellery

THE IDEAL COMPANION FOR PROFESSIONAL DIAMOND GRADERS!

MAS0003 CZ Colour Comparison Set From N-Z

Complete your set with 13 more colours

- Grade fancy coloured diamonds with ease
- Hand graded for accurate colour comparisons
- Individually laser inscribed on the girdle for easy differentiation between colour grades

£323 +VAT with offer

Usual price £380+VAT

*Offer ends 23 August 2017

Postage and packaging fee applies. 20% VAT applies to UK and European countries, except companies with a valid VAT registration number. Gemmological Instruments Ltd. is a company limited by guarantee and registered in England No. 838324. Registered office: 3rd Floor, 1-4 Argyll Street, London W1F 7LD VAT Reg. No.: 995 8813 45. Gemmological Instruments Ltd. is a wholly owned subsidiary of The Gemmological Association of Great Britain (UK Registered Charity No. 1109555).

Montana Sapphire Group.

Complete traceability

Columbia Gem House president, Eric Braunwart, explores the growing popularity of American gemstones and discusses the importance of traceability, ethical sourcing and the millennial consumer with Sarah Jordan.

American company Columbia Gem House has been steadily building a mine-to-market supply chain for ethically-sourced gemstones since 1976. Its business spans mines and cutting facilities on three continents, with the manufacture of finished jewellery taking place in the United States. Its vertically-integrated business model, emphasis on corporate social responsibility practices, and impressive traceability make it one of the most thorough gemstone companies operating today.

A SMALL COMPANY WITH BIG IDEAS

Eric Braunwart, president of Columbia Gem House and the business' finished jewellery brand, Trigem Designs, is exactly the character you would expect to discover, behind the company; knowledgeable, engaged and enthusiastic, not just about his own trade, but also the wider industry. "There are great benefits and great draw backs," Braunwart admits about the vertically-integrated nature of his business, which follows gemstones from mine, to cutting facilities, to finished jewellery and through the end-consumer marketing process. "It is very unusual, we are one of the few or the only one I know of that is [vertically integrated]. It is hard to do because you have to have expertise in rough, in cutting, wholesaling, but also in jewellery manufacturing. You're also distributing to two different audiences, as people who buy loose gemstones are not the same as those who buy finished jewellery. This splits your marketing efforts, which is not a wise thing for small companies... and we're a small company."

Aside from its ambitious, 'think big' approach, Columbia Gem House is perhaps best known for its CSR policies and ethical supply chain. Braunwart admits he has developed a sixth sense for treated and sythentic gemstones sneaking into the supply chain, noting: "If we are working with rough, usually but not always we can tell synthetic from natural. It is just 40 years of gut feeling."

He continues: "We are working to sell American gemstones into China and one of the people we are working with said, 'I don't think you can compete because other places do things so much cheaper'. I said they are not cheaper if they are selling the same thing — they are cheaper if they are cheating."

When a gemstone is heat-treated, for example, Columbia Gem House has followed that particular parcel from the mine so they know exactly what they are delivering to their customers. Braunwart is bursting with gemstone horror stories, like an acquaintance with two 14 ct and 10 ct yellow sapphires that turned out to be an outright synthetic and a beryllium-diffused yellow respectively. The owner believed them to be worth US $16,000, with the real value closer to US $400. "If you are not dealing with the whole process, number one, your product integrity is really in question and, number two your CSR issues are also in question."

Braunwart believes the situation is only worsening, hinting at the rise of 'previously unheard of' testing laboratories and more sophisticated technologies making synthetics even less detectable. Although testing is crucial, Columbia Gem House believes chain of custody is the vital ingredient to banish many of these issues.

To demonstrate his point, Braunwart begins to explain a tense situation that,

Arizona Amethyst.

although starting as a negative, quickly became a positive for his company. He explains: "There is a really important, top-of-the-line jeweller we sell to and we were cutting a certain kind of stone for them. We were short, we went outside our normal supply chain, and one parcel of rough turned out to be bad. I had to call the company and explain that the problem was 'this' shipment and I think you could have as many as 87 stones – not synthetic – but they are not black spinel, they are augite, which looks like black spinel."

The jeweller tested every stone and discovered, as per Columbia Gem House's information, that 83 stones in a particular parcel were augite. "They came back and said, if you can really trace your products that well, you can have as much business as we can give you. It worked in our favour. I would say that 99.8% of suppliers can't do this," Braunwart explains.

It is not just product integrity, but product origin, that Columbia Gem House has strict rules on. With their peridot supplies, inventory is separately labelled depending on its region of origin, for example Arizona, China and Pakistan. "People say this is crazy — they all look the same and nobody can tell the difference. But if [a jeweller or brand is] telling the story of an American peridot, and they do a big promotion, if somebody decides to check and the consumer finds out it is a Chinese peridot... 10 years ago maybe there would be a letter to the editor in the newspaper and you are trashed in front of 200 people. Now, this can be put on the internet and you can be trashed by 200,000 in an hour."

Arkansas White Quartz Group.

> ...IF YOU CAN REALLY TRACE YOUR PRODUCTS THAT WELL, YOU CAN HAVE AS MUCH BUSINESS AS WE CAN GIVE YOU.

BRANDING GEMSTONES

The rise of mass forms of communication and the millennial consumer is also an area of fascination for Columbia Gem House. Despite reports from the Jewelers Board of Trade in the United States signalling that retail jewellers, manufacturers and wholesalers are closing, Braunwart argues it is the "old jewellery industry" that is shrinking, because "the new jewellery industry has never heard of the Jewelers Board of Trade". He continues: "We got more new accounts in the last two months that we have got in the last five years and they are all under 30."

American Gems Opaques.

Columbia Gem House has also turned its attention to branding, capitalising on the lack of visible branding in the gemstone industry to set its own rules. Its trademarked Nyala Ruby, from Chimwadzulu Hill in Malawi, and Tashmarine (a type of brilliant yellowish-green diopside) gemstones, allow the company to control the reputation and parameters of its offer and challenge those who attempt to use the names without permission. Braunwart comments: "Tashmarine is from a certain location, a certain mountain range and is a certain colour — it always meets these parameters. Why? Because we have a trademark and under this name we have some control. Without this branding we would not have that control."

"My generic comparison is rhodolite garnet. What I call 'Japanese rhodolite garnet' sells for US $80 per carat, but what I call the 'home shopping network' garnet sells for US $5 a carat — but they are both called rhodolite even though they don't look anything the same. The name rhodolite has been bastardised because there is nobody who can control what is sold as rhodolite garnet. I believe that branding is part of traceability and product integrity. It goes hand-in-hand with provenance."

Supporting miners and their families in Malawi.

Columbia Gem House admits that branding gemstones in this way is not an overnight fix; it has been 40 years in the making. "It is tricky and lots of people say you can't do it," Braunwart admits, "but with hard work you can and it is where our industry is going."

Branding, traceability and ethics all tie into the changing tastes of consumers, in particular idealistic, yet practical, millennials who want it all; great prices, great branding and complete fairness. Many customers under the age of 35 have come to expect a story around their products, whether a quick history or a complete branded marketing campaign. To ensure these stories are positive, Columbia Gem House pursues rigorous CSR requirements from its suppliers at all points in the chain.

MONTANA SAPPHIRES AND AMERICAN GEMSTONES

One of the biggest success stories to emerge from this year's Tucson shows was American gemstones, especially Montana sapphires. Columbia Gem House has been busy promoting more than 50 varieties of American gemstones for years, but it has seen a particular surge in recent months. Braunwart says: "For years Arizona was the prime source for

Wyoming Ruby Mine.

peridot and turquoise worldwide and nobody ever said anything about it. We always did because we thought the story was as important as the product, and now that is really coming true."

So, why are American gemstones having a moment? Braunwart believes it is, in part, due to the political climate in the United States and the nationalistic sentimentality swept in by President Trump. "Some of the people that are contacting us, some companies that are iconic American companies, don't have a lot of American products in their stores," he notes. The second reason is due to the millennial consumer, who is shopping in a completely different way to their parents' and grandparents' generations. Instead of gravitating to big advertising campaigns, the majority of under-35s are willing to be more experimental and tend to shy away from the more 'traditional' gemstone colours. "Millennials have decided they like green or teal coloured sapphires. If you go through a traditional old jewellery store, there is not one green or teal coloured sapphire. But if you go to Etsy, I would bet there are 5,000 teal or green coloured sapphires on there because [Etsy] is going to millennials and the old market is going to Baby Boomers."

Another reason for the rise in popularity of Montana sapphires is purely practical — production and marketing are both in stronger positions. In the 30-years that it has cut sapphires from the state, Columbia Gem House has found them tricky to sell, largely because of the 'unusual' colours and the necessity of heat treatment. Braunwart says: "Traditionally, 15% come out really nice blues. The rest would come out teals, greens or grey-ish or fancies, yellow, orange and very few pinks. Now two things have happened; there has been far better heat treating systems developed, of which we have the best in the world for Montana sapphires. The colours we get we're not doing anything except heat [treatments]. Secondly, 10 years ago we could sell 15-20% of the colours and now we can sell everything [...] they are all going to millennials and 80% are going into wedding rings."

THE FUTURE OF COLUMBIA GEM HOUSE

Columbia Gem House is not content to simply rest on its laurels. With numerous, potentially business-changing projects in the pipeline, Braunwart believes if some of these partnerships go ahead, other jewellery businesses will be inspired to follow suit. This domino-effect is what Columbia Gem House is crossing its fingers for, not just for itself, but for the industry as a whole. Braunwart concludes: "We have felt like we were on that tipping point a number of times in the past four or five years and it hasn't happened. But it does look like it might now... that would be great." ■

Wyoming Ruby & Iolite.

Images courtesy of Columbia Gem House.

BOOK NOW

SPACES STRICTLY LIMITED TO 20 PEOPLE

MEMBERSHIP OF THE NAJ OR GEM-A CAN HELP YOU GO FAR. **AND NOW IT CAN HELP YOU GO FURTHER**

For anyone in the jewellery industry, nothing beats seeing and handling gems in their natural state, in their country of origin.

That's why the NAJ and GEM-A are offering members of both Associations the chance to embark upon the trip of a lifetime to Sri Lanka.

The trip is a 2-week escorted tour, with exclusive opportunities to buy gems, visit mines, see gem cutters in action, attend a world heritage site and even go on a 4x4 safari!

The price is inclusive of economy class flights by Sri Lankan Airways from London Heathrow.

You will, of course, need your own travel insurance and visa for Sri Lanka with at least six months left on your passport. We will also need to have your insurance details eight weeks prior to departure.

In addition to the cost of the trip you will also need money for meals (very reasonable!) and any gems (rather less so!) you would like to purchase.

DATE: 16th OCTOBER 2017

COST: £2,250 PER PERSON, BASED ON TWO PEOPLE SHARING (SINGLE SUPPLEMENT £550). DEPOSITS OF £1,250 PER PERSON ARE BEING TAKEN NOW

CONTACT: THE NAJ MEMBERSHIP DEPARTMENT ON 0121 237 1109

Gem-A
THE GEMMOLOGICAL ASSOCIATION OF GREAT BRITAIN

The NATIONAL ASSOCIATION of JEWELLERS

MEMBERSHIP

1: A gold-mounted lapis lazuli ewer, the carving probably Bernardo Buontalenti or Ottavio Miseroni, the gold mounts apparently unmarked, attributed to Paulus van Vianen, Prague, circa 1600-10. Ashmolean Museum, Oxford, Museum No. WA2013.1.163. © Ashmolean Museum, University of Oxford.

MATERIALS AND TECHNIQUES IN LAPIS LAZULI

Gem-A in-house student Kate Flitcroft FGA shares her 2016 Gemmology Diploma project, taking a closer look at materials and techniques in lapis lazuli and a gold-mounted lapis lazuli ewer from the Michael Wellby bequest.

This project discusses the materials, techniques and cultural history of a gold mounted lapis lazuli ewer (**1**) in the Wellby Collection at the Ashmolean Museum, Oxford. The cultural context is discussed, including the concept of the *kunstkammer* (akin to a cabinet of curiosities) and *studiolo* (from the Italian, meaning little studio) as well as the metaphysical connotations of lapis lazuli. The chemical nature, desirability, localities and techniques are discussed and an x-ray radiograph is analysed. Finally suggestions are made for future research in this area.

CULTURAL CONTEXT – KUNSTKAMMER AND STUDIOLO COLLECTIONS

The *kunstkammer* or *studiolo* served multiple purposes. The collection was a manifestation of power. Objects from all over Europe and specimens from Asia and Africa were incorporated as a representation of the geographical reach of the collector (the Duke or Emperor in this case). The collections were also made during the Renaissance artistic ideal of *sprezzatura*, the artistic idea of achieving difficulty with ease. Beyond these implications, the *kunstkammer* specifically was an attempt by the collector to assemble all of the many and various items that reflect the variety of life created by God.

Goldsmiths and lapidarists in the Grand Ducal or imperial workshops worked for the ruler himself. The choice of subject-matter reflects the ruler's own inclinations. The choice of symbols and iconography were a means of communication in the same way a painter extrapolated meaning from his canvas. Gemstones at the time held very strong connotations. For example, lapis lazuli according to T. Nichols (1652) was "esteemed good against all melancholy diseases." It was more than pictorial symbols that communicated meaning.

The art of Rudolfine Prague and the experimentations in the Casino di San Marco show a concentrated desire to reveal the mystery of the universe, for example Bountalenti's attempts to melt rock crystal or the attempts at alchemy in Rudolf's court. The object of these experiments was not just to understand but also to control. They were according to R.J.W. Evans (1997) "intellectual in the sense that they sought a solution to problems lying beyond rational activity and everyday experience". The idea was that, if one could understand natural occurrences, illness or feelings, they could be inflicted upon one's enemies.

LAPIS LAZULI – OBSERVATIONS, DESIRABILITY, LOCALITIES AND LAPIDARY

A. Observations and Chemical Structure

Lapis lazuli is a rock comprised of mineral grains, predominantly lazurite, calcite and pyrite. The minerals combine in varying amounts, resulting in a gem material with speckled colouring. It has no uniform chemical formula or structure. The mineral lazurite gives lapis lazuli its signature deep blue colour. Lazurite is an isomorphic mineral with a varying chemical structure and its chemical formula has been debated.[1]

Lapis lazuli is an opaque and polycrystalline gem material, with a vitreous to resinous lustre and a hardness of 5.5. Inspection with a 10× loupe reveals the polycrystalline nature (**2**). When examined obliquely under top illumination, the surface appears pitted and irregular, similar to the 'orange peel' texture of jade (**3**). This is due to the randomly orientated mineral grains exposed at different hardness directions to the polishing agent.

B. Desirability and Localities

The best examples of lapis lazuli show an even, concentrated deep blue colour with pyrite and a few minor spots of calcite. Areas of calcite disrupt the deep blue colour; however, they are also indicative of a natural specimen.

2: Polycrystalline nature of lapis lazuli, visible patches of calcite (left) and speckled pyrite minerals throughout.

3: Pitted 'orange peel' surface of lapis lazuli, visible under oblique top illumination.

The most prized specimens of lapis lazuli are extracted from veins within metamorphic rocks mined from the Sar-e-Sang mines of Badakhshan, Afghanistan. The mines have been used for over 7,000 years, and remain productive, largely due to the inhospitable location and extreme climate. Marco Polo explored the region but it was Lieutenant John Wood from the East India Company who documented the mining process here in 1841. Miners lit fires to heat the rock, making it easier to reach the inner veins of lapis lazuli. Mining techniques have not changed much since, except for the use of dynamite.

Other localities include Lake Baikal; Burma and Pakistan; Baffin Island, Canada; New York, Wyoming, Colorado, Utah, and California, USA; Chile; Angola and the Atlas Mountains, Africa; and Latium, Italy. For the carving of art objects, it is interesting to note that some specimens in historic mineral collections from Latium have now been identified as sodalite or lazurite. In the collection of the Naples Museum are some specimens from this locality. However, the colouring is poor compared to the deep rich blues from the Afghani mines.

C. Lapidary: Fashioning and Polishing Techniques

With a moderate hardness of 5.5, no cleavage, insensitivity to heat (relevant especially considering the historical mining techniques discussed above) and a polycrystalline structure, lapis lazuli should be a comparatively easy gem material to fashion.

4: A vein of calcite underneath the spout.

The most prized specimens of lapis lazuli are extracted from veins within metamorphic rocks mined from the Sar-e-Sang mines of Badakhshan, Afghanistan.

5: Pyrite minerals along the upper curve of the lip. Lighter lazurite and calcite minerals are also visible inside the spout.

Today's lapidarists benefit from the use of engineered polishing materials such as cerium oxide[2] and Linde A (synthetic corundum). In *Discovering Lapidary Work*, John Wainwright writes that when fashioning lapis lazuli, "... care must be observed when grinding and sanding so as not to cut below the mark" and that the gem material "[c]an be difficult to polish, and we have found that whilst cerium oxide on felt gives an inferior result, cerium oxide on moist leather gives a good polish, but the best results are obtained from Linde A on leather". The author explains that while Linde A is "the best all-round polish" it is costly and should be stocked "for the difficult stone or the 'special occasion' when an extra high polish is desirable". Polishing materials are chosen according to the hardness and quality of the stone being cut.

GOLD-MOUNTED LAPIS LAZULI EWER FROM THE MICHAEL WELLBY BEQUEST

At the time the ewer in the Ashmolean Museum was made, engineered materials were not available but the fashioning process was very similar. In 1652, Thomas Nichols explains that the process begins with a whetstone or grindstone before polishing and faceting. He writes, "A stone for hardness next to Diamond is the Simris[3], the powder of which is used as the powder of the Diamond in the forming and fitting of stone for politure and engraving; which being formed and polished may be thus engraven [sic], either with letters or forms".

> Analytical tools from the field of conservation science are becoming more vital to the art historian.

The lapis lazuli body on the present ewer was evaluated carefully by the lapidarist to best display the intensity of the deep blue colour. The most obvious patches of calcite have been disguised in the design, by placing them under the lip (**4**) and inside the bowl (**5**). Pyrite is also accounted for in the design process, as seen in the trail of pyrite exposed at the peak of the curved lip, where light would catch and highlight the form (**5**). Precision was necessary for a gem material of value, leading us to question who was responsible for the carving and design. This is discussed in greater detail in the unabridged version of this Gemmology Diploma project.

X-RAY RADIOGRAPH ANALYSIS

X-ray radiography images show the material density of a substance. This technique is often used in pearl testing where organic materials can be distinguished from artifical materials (due to their irregularities and growth gaps) and it can reveal the bead nucleus of a cultured pearl.

The present ewer has been x-rayed, revealing a repair to the rim. At first glance, the repair has been made with a material that has a similar outward appearance (**6**). There is not much difference in lustre. The repair has a slightly darker, murky colour to the natural gem material (**7**). The x-ray radiograph, taken by the conservation department at the Ashmolean Museum reveals a different material density and structure, but due to copyright it can not be reproduced here.

6: Image of the repair.

The x-ray radiograph shows the polycrystalline nature of the natural gem material, with the pyrite minerals showing as dark spots. The replacement material appears to be secured with metal pins. The repair shows as a mottled light grey with short whitish pale grey streaks and a pale grey centre nucleus, concentric pale grey bands and a dark grey area at the top near the mount. It appears to be built up, with a denser material at the top.

It is possible this is a carved piece of lapis set into a resin. Another likely candidate for the replacement material is Gilson 'synthetic' lapis lazuli. It is marketed as a 'synthetic', but it is not truly the same chemical structure. It is has a lower specific gravity (and therefore would appear lighter in the x-ray radiograph). The material does closely resemble natural lapis lazuli, so it would be a good match in terms of colour and lustre.

A final possible material for the repair is reconstructed lapis lazuli, made from ground lapis lazuli and pyrite mixed with resin. Again, this would have a lower specific gravity compared with the natural gem material. It has angular and round fragments, which can be seen with a microscope.

To determine the true nature of this repair, examination under a microscope is necessary. If round and angular fragments are observed, it would likely be reconstructed lapis lazuli. If many small angular dark violet patches are observed then it would likely be Gilson's 'synthetic' version. If the material is similar in all instances to natural lapis, then it is most likely to be a freshly carved piece of natural material set into a resin.

[1] Lissie von Rosen suggests a chemical formula for Lazurite of $(NaCa)_4$ $(AlSiO_4)_3$ (SO_4SCl) "but with considerable variation in the amounts of SO_4, S and Cl" (L. von Rosen, 1988). Lazurite has been described as an isomorphic combination of haüyne $[(NaCA)_{4\text{-}8}$ $(Al_6Si_6O_{24})$ $(SO_4, S)_{1\text{-}2}]$ and sodalite. It has also been regarded as "a mixed crystal of the sodalite group".

[2] Cerium oxide is a "pinkish coloured powder, comparatively cheap and excellent for polishing most of the gem materials other than those which undercut or the extremely hard stones. It can be regarded as the general purpose polish." (J. Wainwright, 1971).

[3] Presumably corundum, 9 on the Mohs Hardness Scale.

7: Image of the repair inside the ewer. Notice the circular pattern (circled) corresponding to the build-up effect which was seen on the x-ray radiograph.

CONCLUSION AND FURTHER RESEARCH

Further analysis of the stylistic influences for the lapidary and gold mounts were discussed in greater detail in the unabridged version of the Gemmology Diploma project, leading to possible attributions of the lapidarist, goldsmith and a circa date, concluding in a suggestion for further research.

Gem materials mounted in silver or gold create a particular challenge for art historians. To meet the demand for these objects in the nineteenth century and in the current art market, imitations were dispersed into the market. Gems (defined as any material, which is used for adornment or decoration) and the metals used to mount them can be replaced or recycled. If provenance leads to a dead-end, art historical analysis needs scientific support. For example, LASER-Ablation-ICP-Mass Spectrometry is used to analyse precious metal alloys, looking for anachronistic elements such as the presence of cadmium and/or low contents of gold and bismuth. Laboratory testing methods for gem materials such as x-ray diffraction and spectroscopy (x-ray, infrared and laser) can supply the crystalline identity, molecular analysis, chemical identification, colouring agent or composition of a specimen.

Analytical tools from the field of conservation science are becoming more vital to the art historian. The financial gain or loss involved with authentication can create a conflict of interest between art historians, auction house specialists, dealers, art advisors, curators and collectors. The art historian must work together with the conservator and scientist to use the analytical techniques to objectively interpret an art object and its history. An interdisciplinary approach, pursuing all strands of art historical and scientific analysis in an equally searching and fearless manner create a more objective case for authenticating or discrediting an art object.

The overall objective of further research would be to determine a methodology for authenticating art objects made of silver- or gold-mounted gem materials. There are multiple aims. One aim is to use the Wellby Collection as a study collection to authenticate the objects, and understand more about this particular *kunstkammer* collector. A second aim is to develop a network between conservation labs and curators at institutions with significant *kunstkammer* collections worldwide. ■

Complete bibliography available upon request. All images by Kate Flitcroft unless otherwise stated.

Namdeb Platform in Namibia .

DIAMOND DYNAMICS

A year since his appointment as CEO of De Beers Group, Bruce Cleaver, who first joined De Beers in 2005, speaks to Belinda Morris about the industry today and the challenges ahead.

How will you promote and advertise diamonds after the industry has lost so much ground to other luxury products?

Our approach to marketing is twofold: via proprietary channels and partnership approaches. The former was developed around 10 years ago when we formed De Beers Diamond Jewellery (DBDJ), which has established a growing business in greater China and with Chinese clients worldwide, an established presence in London and Paris, and a new flagship location in New York City, and the Forevermark diamond brand (now in more than 2,000 retail doors globally).

This model was introduced as a result of De Beers' changing business environment – we used to have a very high market share, so it made sense to invest in category-based marketing on behalf of the entire industry, even though we were the only ones really spending on generic diamond promotion. However, our market share reduced sharply in the early 2000s – it is now around 30-35% by value, much lower than before – so we needed to approach our role in global marketing in a different way. This is when DBDJ and Forevermark were born and we moved away from independently supporting the entire category's marketing investment.

However, this changing dynamic led to something of a vacuum in generic diamond promotion, so it is really positive the various leading producers have recognised that category-based promotion is an area on which we can collaborate in a mutually beneficial way. It is right the various producers should share the financial cost of the Diamond Producers Association (DPA) and I am pleased to say that we have seen it deliver substantial benefits already.

Is the DPA's 'Real is Rare' campaign proving successful?

'Real is Rare' has definitely been a vital step forward for the sector. The response from the trade has been very positive and it has connected consumers to the industry in a different way. But to appreciate the major benefits of the campaign, it is important to understand that there are two aspects to diamond marketing: short-term demand and long-term demand. Short-term demand is about driving people into retail outlets just before major selling occasions.

It is undoubtedly effective, but does not really impact long-term attitudes and behaviours. Long-term marketing is about shaping generational thoughts and feelings about a product and encouraging younger consumers to understand the symbolic power of diamonds that connect them to a very important and inherent human need. That connection needs to be reasserted in young consumers' minds, as they have not had exposure to the same amount of promotional messages as previous generations.

What are your views on defending rough and polished prices and increasing margins throughout the pipeline?

It is important for businesses to focus on their key strengths, build strong customer relationships, stay financially robust, focus on accessing good information, inspire confidence in their supply chain partners and be operationally flexible. Doing these things and maintaining success builds a profitable organisation, regardless of the external environment and its challenges.

However, there is no doubt that it is a more competitive environment today, and the cost of rough diamonds can be expected to increase over time as mines get deeper and more remote, and thus the recovery process becomes costlier. So we all have to work hard to ensure we maintain relevance and do not just compete on price alone. If we seek to focus only on price and not on how we build value, then we do not have much of a future.

The use of technology will also continue to be a crucial factor in making businesses as efficient as they possibly can be.

Polishing a rough diamond.

Inspecting a diamond cut.

Which markets are the key drivers in diamond prices and sales currently?

The US continues to drive global polished diamond demand. Meanwhile, we are also seeing some encouraging signs from India after a challenging period, as well as some more positive activity in the Far East after a slowdown in the rate of growth in China.

The US really is an amazing story of demand – despite being by far the largest and most mature market for diamond jewellery; it is still driving global growth. Longer term, we have real excitement that China and India will continue to fuel global growth in the same way as we are seeing the US do currently.

What are your views on defending diamonds against those selling them online as a cheap commodity?

Diamonds are, I believe, the ultimate luxury product – and should always be promoted as such. While some businesses may have a more short-term approach to selling their inventory, we believe that our long-term marketing activity will help reinforce the position of diamonds as ultimate luxury items and encourage retailing approaches to reflect this. We will also reinforce this message through the premium positioning of our Forevermark brand and our De Beers Diamond Jewellers retail outlets.

Our retail studies show that increasing numbers of consumers are asking retailers about branded diamond jewellery, so it is vital that we as an industry continue to provide compelling, differentiated and exciting branded offerings.

Clearly online is becoming a more important channel, both for research and sales, but we believe consumers will always be more enticed by the diamond dream if they can also see and touch the product, and if they can share in the story of their diamond. It is the job of all those involved in jewellery retail to remind consumers of the immense history of diamonds, their uniqueness and rarity.

Are lab-grown diamonds a continuing trend? Are they a threat or simply a reality now?

If there is one thing we have learnt about diamond marketing over the years, it is that consumers desire what is real and rare – synthetics simply do not offer the emotional resonance that is central to the diamond purchasing decision.

Synthetics already occupy something of a place in the industry as diamond imitation products and I would expect

> If there is one thing we have learnt about diamond marketing over the years, it is that consumers desire what is real and rare...

that to continue, like with other synthetic gemstones. But they will rapidly see very considerable reductions in value – some categories have already plummeted to less than half of what they were worth two years ago – and they are likely to end up in the same kind of place as synthetic emeralds, rubies and sapphires which are now worth a fraction of the natural counterpart.

Synthetics do not have enduring value, they simply cannot fill the same symbolic space that has been the basis of the huge success of diamonds.

Where is the diamond industry now with regards to responsible business practices?

I believe the industry overall has made great strides in this area, led by De Beers, and has a very positive story to tell. It is perhaps one of the most heavily scrutinised and monitored industries and diamonds do a huge amount of good around the world. Around 10 million people are supported by the diamond industry globally and we have seen countries such as Botswana undergo huge economic development thanks to the wise management of their diamond resources that could, in many ways, offer a prototype for collaboration between the public and private sectors.

Sometimes the industry can be a little too modest – many of our Sightholders have amazing social programmes around their operations, but the stories of their initiatives have not been told. It is time we started shining more of a light on the light that diamonds bring to so many lives around the world.

How is your exploration going and are there any new projects coming on stream?

Exploration is always tough as so few mines are ever discovered — there has historically been a very low hit rate when it comes to diamondiferous kimberlite pipes, let alone those that are economically viable to mine. But De Beers was one of the few diamond companies to keep its exploration budget stable this year at c. US $30m-35m, and we continue to focus our activities on our prospective areas in Botswana, Canada and South Africa. We are also soon to launch the world's most sophisticated diamond sampling and exploration vessel, the mv SS Nujoma, off the Namibian Atlantic coast so the future is looking bright. ■

Sorting rough diamonds.

Images courtesy of De Beers Group.

The Limits of Lustre

Gemmologist Renée Newman GG shares an extract on pearl treatments from her latest book *Pearl Buying Guide: How to Identify and Evaluate Pearls.*

After pearls are removed from a mollusc, they must be cleaned and washed to get rid of residues and odours. They are typically tumbled in rotating barrels with salt during this procedure. The tumbling must be closely monitored; otherwise, some of the nacre may wear off. There are other processes which are not considered routine and which should therefore be disclosed. Some of these are listed below.

BLEACHING

Chinese freshwater pearls and Akoya pearls are often bleached with chemicals and intensive light sources. This whitens them and makes the colour look more uniform. Improper bleaching can soften the nacre and make it more susceptible to wear, especially if the nacre is thin. Top quality pearls do not need to be bleached, and it would be pointless to possibly reduce their lustre and durability by treating them.

BUFFING

This is done to improve lustre and remove superficial scratches. Beeswax or chemical polishes are sometimes used during buffing to add lustre. The wax wears off fast and the chemicals may eat away the nacre. Buffing without chemical intervention is considered acceptable if it's done to clean off oil and dirt from the pearl and remove minor scratches.

COATING

In her book, *Pearls* (p 661), Elisabeth Strack states that Akoya and South Sea white and black cultured pearls are being treated with silicone polymers in Japan. The coating is mainly applied to Tahitian cultured pearls of lower qualities. Large dyed Chinese freshwater cultured pearls are also sometimes coated with a transparent polymer film to improve their lustre. This coating can be detected by its strange smooth feel compared to uncoated pearls and occasionally by bald spots on the pearl where the coating may have worn away. Some thick coatings may show bubbles and pockets of dirt under magnification. Polymer coating is not an accepted trade practice because it is not permanent; it eventually wears off. Good-quality pearls do not have to be coated to look lustrous.

FILLING

Low-quality cultured baroque pearls are occasionally filled with an epoxy substance if they are partially hollow or have a loose nucleus. This helps the bead nucleus stay in position when the pearls are restrung; it makes the pearls more solid and improves their durability.

Hollow natural pearls are often filled with foreign materials to bring them to somewhere near the weight one would expect for a pearl of that size (Stephen J. Kennedy, January-March 1998 issue of the *Australian Gemmologist*). Natural pearls are often sold by weight, which can lead to this practice. Such fillings can be detected with x-radiographs.

DYEING

Akoya pearls are often soaked in pink dye to give them a desirable pink tint. This dye can usually be detected in the drill holes or in cracks (**1**, **2**, **3**). Yellow and golden pearls may also be dyed (**4**, **5**, **6**). These pearls are especially popular in Asia.

Shane Elen of the GIA Research Department wrote some excellent articles on identifying treated and untreated South Sea yellow pearls in *Gems & Gemology*: Summer 2001, Spring 2002 and Summer 2002. An update was published in the Winter 2012 issue of *Gems & Gemology*.

It states: "While most dyed yellow or 'golden' cultured pearls can still be detected with relative ease using magnification, some show very clean surfaces lacking any evidence of dye. We have demonstrated that these can be identified by nondestructive, advanced instrumental techniques such as UV-Vis reflectance and PL spectroscopy." In other words, one must rely on labs with high-tech equipment to confirm if the colour of golden pearls is natural.

Off-colour pearls from the Akoya and silver- or gold-lip oysters are sometimes dyed to improve their appearance. They are then sold as "black pearls" or "chocolate pearls" depending on their colour. If black pearls are smaller than 8 mm, just assume they are dyed Akoya pearls. Dyeing these small pearls is an accepted trade practice because it provides consumers with an option that is not available from natural-colour Akoya pearls. Nevertheless, the treatment must be disclosed.

If pearls are not properly dyed, the colour won't be stable. Therefore, it's important to buy dyed pearls from reputable jewellers. That way if there is a problem, you'll be able to return the pearls and get a refund. If you're buying expensive untreated pearls, have them checked by an independent gem laboratory.

IRRADIATION

This method works best on freshwater pearls, but off-colour Akoya and South Sea pearls may also be darkened in this manner. It involves bombarding pearls with gamma rays. This blackens the shell bead nucleus of Akoya and South Sea pearls and can make their nacre appear dark if it is thin. Sometimes pearls are both dyed and irradiated. The irradiation will give them an iridescent bluish or greenish gray colour and the dye will further darken their appearance.

SILVER SALT TREATMENT

This is the most common way of blackening Akoya pearls. The pearls are soaked in a weak solution of silver nitrate and diluted ammonia and then exposed to light or hydrogen sulfide gas. Unfortunately, the silver nitrate tends to weaken pearls and make them more susceptible to wear. Silver nitrate treatments can usually be detected by X-radiography.

1: Pink dye in pearl cracks. Photo by Renée Newman.

2: Pink dye in pearl drill-hole. Photo by Renée Newman.

3: High quality Akoya strands. Top: Natural color, unbleached strand; bottom, pinked strand. Pearls and photo courtesy of Jeremy Shepherd at Pearl Paradise.

4: Magnified view of a blemish with dye concentrations in a dyed golden South Sea pearl. Photo by Renée Newman.

5: Dye concentrations and black nucleus visible in blemishes of two dyed pearls. Photo by Renée Newman.

6: Visible dye concentrations. Photo by Renée Newman.

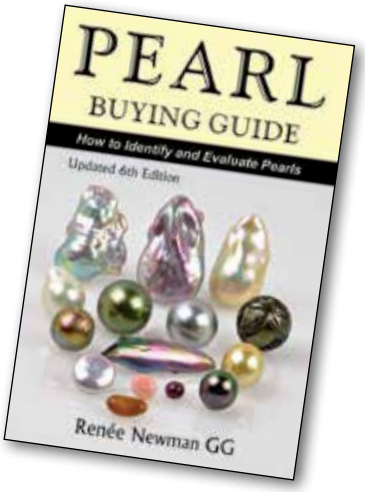
DYING THE BEAD NUCLEUS
Occasionally shell bead nuclei are dyed before they are inserted in the oyster. Afterwards the dark bead may show through the nacre and make the pearl nacre look dark.

INJECTING METAL FLUIDS INTO THE PEARL'S SAC
This is done during the culturing process to induce varying colours in a pearl, depending on the metal used.

HEATING
Golden South Sea pearls are occasionally heated to intensify their colour. High-tech lab equipment is required to detect the heating process.

BALLERINA PISTACHIO COLOUR TREATMENT PROCESS
A proprietary chemical and physical process developed by the Ballerina Pearl Company to give Tahitian pearls a yellowish green to greenish yellow colour. (*Gems & Gemology*, Spring 2016)

MAESHORI
A Japanese term meaning before (mae) treatment (shori), which can refer to a variety of treatments done to freshwater, Akoya and some South Sea cultured pearls. They may vary from one pearl factory to another. Today 'maeshori' usually refers to a proprietary nacre tightening and lustre improvement treatment process involving heating and cooling and sometimes chemicals. The effects of the process are not always permanent and the resulting lustre may diminish over time. ■



Pearl Buying Guide: How to Identify & Evaluate Pearls, 6th Edition, published by International Jewelry Publications, RRP US $19.95. Available for £17.50 from Gem-A Instruments.

Understanding Maeshori

Chrissie Douglas, owner and creative director of Coleman Douglas Pearls, explains more about this pearl treatment and its limitations.

Chrissie Douglas inspecting a pearl.

Maeshori is a process developed in Japan over half a century ago to enhance the lustre of pearls while leaving the base colour similar to its original. This process is performed before bleaching with hydrogen peroxide to ensure efficient results. Maeshori is deemed a preparation for treatment, hence often not disclosed.

PEARLS SUBJECT TO THE MAESHORI TREATMENT
Akoya pearls including those produced in China, are processed and sometimes the Maeshori results in a slightly pinker colour. When some Silver-lipped oyster or South Sea pearls from the *Pinctada maxima* are subjected to Maeshori, they become more lustrous and whiter. Even the humble freshwater pearls get the treatment to enhance their lustre. Tahitian pearls thankfully are Maeshori free because they lose their beautiful depth of colour with this treatment.

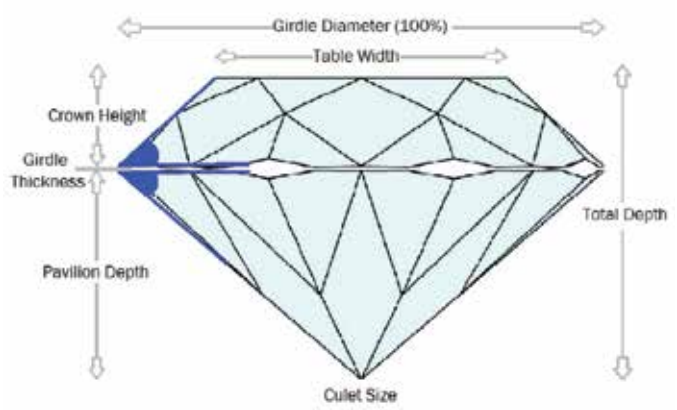
THE MAESHORI PROCESS
Everyone performs it differently, and no one wants to divulge how they do it. In essence, Maeshori consists of soaking the pearls in mineral salts, ammonia and water; or mineral salts and methyl alcohol or hydrogen peroxide and methyl alcohol, for anything between half an hour to 30 days. The pearls are then heated with hot, dry air, cooled down for a period and then re-heated. This cycle is repeated several times. The effect of this treatment is to draw out the moisture from the pearl and tighten its skin layers... tight skin layers give great lustre. After the Maeshori process there is a slight decrease in weight in the pearls.

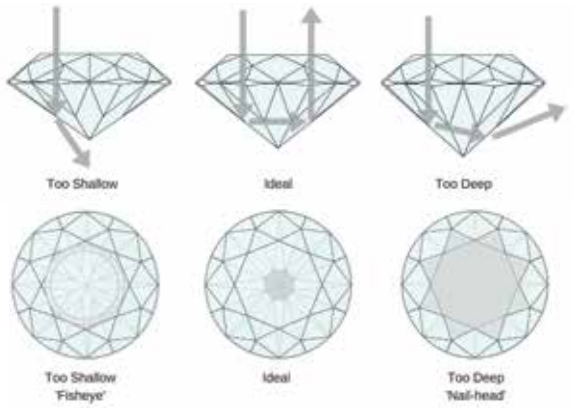
LUSTRE ENHANCEMENT
Maeshori is in fact a lustre enhancement. It makes the pearls look brighter for a while, they can look more transparent enhancing their lustre. However, there is a catch. If the process is overdone or incorrectly performed and damages the protein layers in the pearls, the nacre can become brittle and pearl layers peel off. Also, after a few years, the pearls could become duller, or chalky. One of the signs of Maeshori treatment is a harsh glow or slightly metallic look; often the soft, gentle glow effect is lost.

While Maeshori treatment makes the pearls 'brighter' in the short term, it is rather like a facelift... it works for a while, but then disappoints in the long run and goes saggy in all the wrong places. I know what I would choose.

THE 'CUT' FACTOR

Good proportions are crucial in diamond cuts, Gem-A diamond and gemmology tutor Julia Griffith FGA DGA EG explains what to look out for when choosing a stone.





When all other grading factors are equal — it is the cut grade that has the greatest influence on a diamond's beauty.

Diamonds that return light through the crown of the stone show a scintillating display of fire (dispersed light) and brilliance (white light).

The brilliant cuts have been designed for the greatest amount of fire and brilliance and it is the modern round brilliant that displays this to the maximum.

It is the proportions of the stone that fully control this interaction of light — these have been perfected since the 1870's when it was proposed that one must sacrifice weight in order to get a more sparkly diamond.

Proportions refer to the relationship of the angles and facets of a diamond. The beauty secret behind a lively stone lies in a narrow range of proportions that guarantee light return.

Obtaining the strict proportions is skilled and laborious work. The round brilliant has been the most popular cut since its conception and it is the premium cut style for diamonds.

SO WHY ARE PROPORTIONS SO IMPORTANT?

A good set of proportions will make for a brilliant and lively diamond — stray outside of the ideal and the results may be dull and lifeless.

The considerations falling under proportions are vast — every single angle, facet position and size is thought-out and has an effect on the appearance of the stone.

Out of all the proportions, the pavilion is arguably the most important, as it responsible for keeping light in the stone. It is intentionally angled to ensure the light that strikes it will reflect internally — this can be as high as 97% in round brilliant stones.

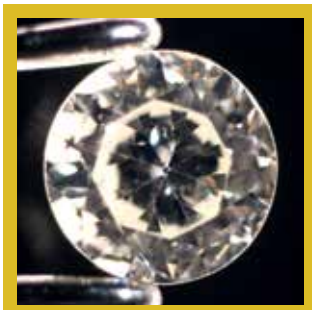
The pavilion facets essentially act as mirrors reflecting the light around the stone, which will then exit out of the crown. The crown facets act as windows, letting the light escape. The side crown facets release the fire; brilliance is seen through the central table facet. An equal balance of fire and brilliance is preferred — this is controlled by both the crown angle and the size of the table. When the proportions are outside the accepted range, negative visual effects ensue.

A pavilion that is too deep shows a 'nailhead' — light falls out the back of the stone making the centre of the stone appear dark. A shallow pavilion reflects a white rim inside the table of the stone known as a 'fish-eye'.

A small table can have the illusion of making a diamond appear small for its weight. Likewise, a diamond with a large table can make a diamond appear bigger — these diamonds will have reduced fire and an increased risk of showing a fisheye, even in stones with an ideal pavilion angle.

Good proportions bring out the best in diamonds — the reason for this lies within physics and there is more science behind diamond design than you originally thought. The effect that one proportion has on another will not be seen within the figures listed in the diamond report — instead it is seen in the beauty of your jewels.

A wise colleague of mine advises customers to "trust your eyes" when selecting a diamond — the sparkle you see is telling you a lot more than you may realise. ■



Diamond Fisheye 37% pavillion.

Diamond Nailhead.

Diamond with very good proportion grade.

All images by Julia Griffith.

In Memoriam: Jules Roger Sauer

Jules sorting a large parcel of emeralds from Campos Verdes, 1990, Rio de Janeiro. Image by Francisco Saura Ramos.

Jules Roger Sauer, founder of the iconic 75 year old Amsterdam Sauer gem and jewellery chain in Brazil, was a gem enthusiast and adventurer who contributed decisively to the early development of the modern gem and jewellery industries in Brazil. Rui Galopim de Carvalho FGA DGA takes a look at his life and adventures.

Jules Roger Sauer born in 1921, was a sociable, smart and outspoken boy that grew up in Antwerp, Belgium. The instability and insecurity of the 1930s in Europe were not friendly to young Jules' political views and Jewish heritage, and he eventually joined the massive migratory movement towards the Americas to escape the Nazi invasion of Belgium in 1940. Argentina was his destination, but a short stop in Rio de Janeiro would change this young refugee's life forever.

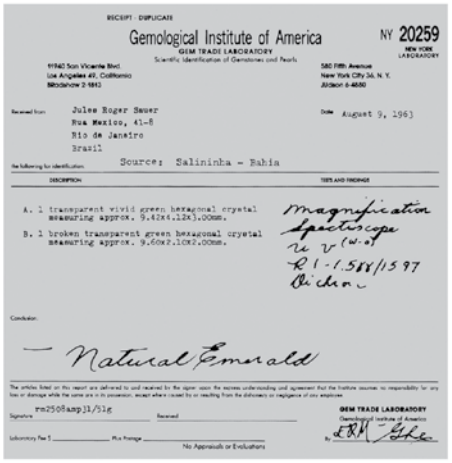
Soon after he set foot on Brazilian soil, he met Oswaldo Dantes dos Reis, a gem dealer who claimed to have discovered the famous Presidente Vargas diamond, a 726.6 ct diamond discovered in 1938 in the Santo António do Bonito river, in Minas Gerais. According to the literature, the gem was found by Joaquim Venâncio Tiago and Manoel Miguel Domingues (Balfour, 1992), not by Oswaldo Dantes dos Reis. Oswaldo invited him to work in his lapidary firm in the city of Belo Horizonte, Minas Gerais, and it was here, with no experience whatsoever in gems, that he became passionate about beautiful rocks and began his journey in gemmology.

1: A rare 1954 photograph of the 36.5 kg Martha Rocha aquamarine rough.

In 1941 he opened his own firm, Lapidação Amsterdam, putting in place the lapidary expertise he had gained with Oswaldo and a natural skill for gem collection in the field among the garimpeiros, the local name for artisanal miners. After the war, Jules decided to push the company to the next level and with the help of his newly appointed manager Zilda Waks, he moved to a prestigious spot in the waterfront Copacabana area in Rio de Janeiro. Later in 1950 they married and the company, named Sauer and later renamed Amsterdam Sauer, started a new flourishing journey.

His passion for gem hunting and his credibility among the miners and garimpeiros enabled him to secure priority when viewing new findings. One of the most significant highlights of his early career was his baptism of one of the most famous aquamarines of all time: the 36.5 kg Martha Rocha crystal (**1**). A deep and intense blue colour, the crystal was found in 1954 near Marambaia in Minas Gerais by Tibúrcio José dos Santos, a local garimpeiro (Sauer, 2011). Informed of the find by his field scout, Jules immediately went to Minas Gerais and was the first major gem dealer to ever see the gem. He was astounded. The colour was absolutely unique and reminded him of the beautiful blue eyes of Martha Rocha, who had won second place in the Miss Universe competition that year.

The firm went further into the beneficiation of Brazilian natural gem resources, investing more labour in the fashioning of rough, a key element of today's gem industry in Brazil. In the 1940s the vast majority of the country's coloured gemstone production was exported as rough to many countries like Germany, Switzerland and the USA. Lapidary skills were therefore an advantage. At the same time, local jewellery shops did not use national gem materials much and Jules saw the opportunity to make a difference in the domestic market, to both locals and visiting tourists. This bold decision set



Gemological Institute of America
GEM TRADE LABORATORY
NY 20259

Jules Roger Sauer
Rua Mexico, 41-8
Rio de Janeiro
Brazil

August 9, 1963

Source: Salininha - Bahia

A. 1 transparent vivid green hexagonal crystal measuring approx. 9.42x6.12x3.00mm.
B. 1 broken transparent green hexagonal crystal measuring approx. 9.60x2.10x2.00mm.

Magnification
Spectroscope
RI 1.588/1.597

Natural Emerald

2: A GIA Trade Laboratory document, dated 9 August 1963, reporting on two green hexagonal crystals from Salininhas, identifying the samples as natural emeralds.

solid foundations for the development of the country's lapidary industry and for the emergence of a national jewellery design industry, today recognised worldwide.

His name, however, gained international recognition in the 1960s over a dispute on emerald nomenclature between the european gemmology community led by the late Basil Anderson from the Gem Testing Laboratory of Great Britain and the american community led by Richard T. Liddicoat from the Gemological Institute of America (GIA), (Liddicoat, 1966). In June 1963, emerald-green coloured beryls were found in Salininhas, east of the São Francisco river, in the state of Bahia, but as their colour was due to their high vanadium content, instead of chromium, the stricter nomenclature authorities did not recognise the materials as emerald, naming it chromium-free beryl. The new discovery had to be called something like green beryl or 'emerald' in quotes (Wood, 1968), not emerald, in observance with these rules.

Jules had personal contacts with the GIA – when he studied gemmology in California – he asked GIA for help in the process of recognising the green beryl from Salininhas as an emerald (**2**). This was a major step towards the international recognition of this material.

Brazil, which had not produced commercial quantities of emerald in the past, became an important emerald producer despite the fact that the mine was exhausted in just one year. Subsequent finds in Carnaíba and Socotó in Bahia, Nova Era and Itabira in Minas Gerais and Santa Teresina in Goiás, placed the country in a unprecedented position as an emerald source, with implications in the development of the cutting industry in Jaipur, India, and in the world's jewellery industry. Jules Sauer was an active participant in this and his name was engraved in the history of emeralds.

Jules was also active in removing the 'semi-precious' epithet from the gemmological and jewellery industries' lexicon and slowly his arguments were accepted among professionals. Traditionally, diamond, blue sapphire, ruby, emerald (and pearl) had the right to be grouped under the term 'precious stones'. All others, regardless of their market value, would not and were grouped under 'semi-precious' stones. Today, The World Jewellery Confederation (CIBJO), states that semi-precious is a misleading term that should not be used (2015, *CIBJO Gemstone Book*, clause 5.64). The fact that in his stock only emerald was traditionally called a precious stone, all others falling under 'semi-precious', might have fuelled his mission, creating a better standing for the majority of coloured gemstones in his inventory.

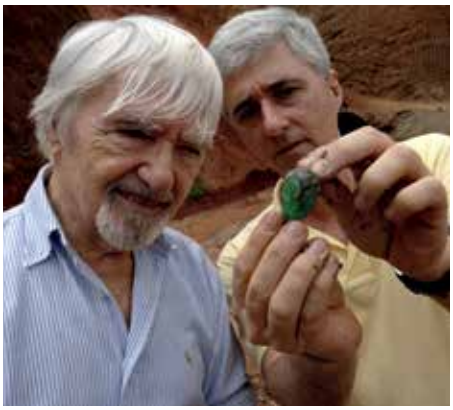
To perpetuate Jules' legacy in the country's history, in 1989 the firm decided to gather the very best gem mineral specimens and distinguished cut stones from his personal collection, into a museum — The Amsterdam Sauer Museum now located in the Ipanema neighbourhood in Rio (**3**). The museum has more than 3,000 specimens and constitutes one of the most important and comprehensive Brazilian gem and mineral permanent exhibitions in the world. It is a must see for every mineral and gem lover (**4**).

His vast knowledge and passion for the gem industry also materialised in several publications written by Jules. Namely the renowned *Brazil, Paradise of Gemstones* (translated into seven languages), *Emeralds around the World*, *As Eras do Diamante* and his biography *Jules Roger Sauer — O Caminho das Pedras*, a truly inspiring read.

Jules Roger Sauer, the adventurer, the passionate gem enthusiast, the collector, the author, the yoga master, the visionary and the family man (**5**), passed away on 1 February 2017 aged 95 shortly after celebrating the diamond jubilee of his brand in November with the release of a book containing Bob Wolfenson's photographs of 75 Brazilian celebrities wearing his creations, with all proceedings going to a local public art school for adolescents in Rio de Janeiro. Jules will forever be remembered and recognised as having contributed decisively to Brazil's gem and jewellery industries and to the domestic and overseas desirability of Brazilian coloured gemstones. ■

Complete bibliography available upon request. Images courtesy of Amsterdam Sauer unless otherwise stated.

3: The Amsterdam Sauer Museum in Ipanema, Rio de Janeiro. The Amsterdam Sauer Museum houses more that 3000 specimens. 4: (inset image) Fabulous aquamarine crystal from Marambaia, Minas Gerais, on display in the Amsterdam Sauer Museum.



5: Jules and his son Daniel Sauer, CEO of Amsterdam Sauer, examining a large emerald from the Piteiras mine, Minas Gerais, in 2006.

Gem-A
THE GEMMOLOGICAL ASSOCIATION OF GREAT BRITAIN

BOOK NOW!

NEW VENUE ANNOUNCED:
etc.venues
County Hall,
Westminster,
London

Gem-A Conference 2017

Saturday 4 and Sunday 5 November

THE £50 STUDENT RATE IS BACK!

SOME OF OUR SPEAKERS:

Vladyslav Yavorskyy, IVY/Yavorskyy
Klemens Link, Güeblin Gem Lab
Dr Ulrika D'Haenens-Johansson, GIA
Larry French, Gianmaria Buccellati Foundation
Dr John Rakovan, Miami University
Reena Ahluwalia

Booking is now open on Eventbrite:
https://gemaconference.eventbrite.com

Events Directory

Your essential guide to gemmological events

GEM CENTRAL

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: Corals and Shell Cameos... Gifts from the Sea
4 July 2017, 18:00-19.30
Gem-A Headquarters,
21 Ely Place, London
Gem-A North American manager Eric Fritz FGA will discuss how organic gemstones continue to bewilder even the seasoned gemmologist. You will learn to quickly separate the different types of precious corals from dyed and stabilised materials. Black, gold and the family of red and pink coral will be discussed, along with the mountains of sponge and bamboo coral seen on gem show tables. We will also take a brief look at shell cameos and find out what's happening with traditional carvers.

Precious coral. Image courtesy of Pat Daly.

OTHER EVENTS

Midlands Branch — Valuation Practice
29 September 2017, From 18.30
Fellows Auctioneers, Birmingham
Geoff Whitefield will discuss valuation practice at the Midlands Branch. For more information please contact the chairman of the Gem-A Midlands Branch, Georgina Southam, at **georgekettle@hotmail.com**.

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

European Gemmological Symposium
30 June-1 July 2017. Zermatt, Switzerland
A two day Conference with an impressive line-up of internationally renowned speakers to celebrate the 75th Anniversary of the Swiss Gemmological Society. Martin Rapaport is the keynote speaker.

For more information and registration visit **www.gemmologie.ch**

Sainte-Marie-Aux-Mines Mineral & Gem International Show
22-25 June 2017.
Sainte-Marie-Aux-Mines, France
Perfectly placed mid-year between Tucson and Munich for those wanting to see exceptional gem and mineral specimens, this refreshing show offers an eclectic mix of workshops, cultural activities and gem dealers stalls. With a relaxed village feel, Europe's equivalent of Tucson is not to be missed.

For more information and registration visit **www.sainte-marie-mineral.com**

GEM-A ONLINE

Top stories from the Gem-A blog

Flux healed ruby. Image courtesy of Julia Griffith.

Gem Central Exploring Ruby Treatments
Julia Griffith FGA DGA EG

Whitby Jet: A Discussion of its Simulants
From the archives by Sarah Steele FGA DGA

Birthstone Guide: Emeralds for Those Born in May
Monthly birthstone guide round-up

Twitter @GemAofGB

Facebook @GemAofGB

LinkedIn Gem-A

Google+
The Gemmological Association of Great Britain (Gem-A)

Instagram @GemAofGB

Head to the **News & Blogs** section of **gem-a.com**

EDUCATIONAL WORKSHOPS

Understanding Diamond Grading
22 Sep 2017
This workshop is the perfect foundation for those wanting to study our Diamond Diploma or those wanting to embark upon a career in the retail diamond market.

Focussing on the key aspects of diamond grading this workshop will give a unique insight into the 4Cs of diamond: cut, colour, clarity and carat weight, as well as diamond certification. Led by an experienced diamond tutor, you will be guided through diamond theory before looking at the practical side of the 4Cs, also learning how these factors contribute to valuations and diamond certification.

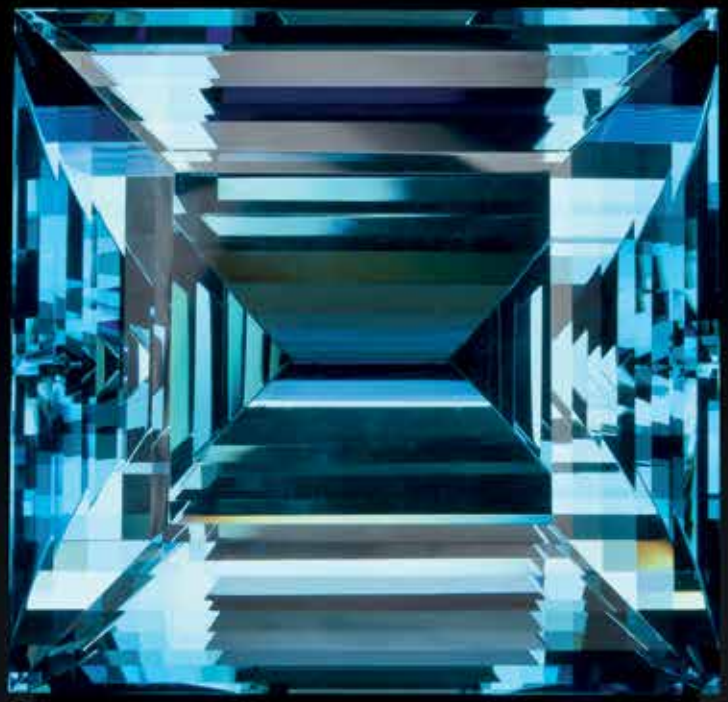
Understanding Diamond Simulants
29 Sep 2017
This is a valuable practical workshop for anyone working in or considering entering the diamond market. Some knowledge of diamonds is advantageous but not essential.

You will look at the key differences between diamond and its simulants. Using basic observation techniques and readily available instruments such as diamond and combination testers, participants will be taught to differentiate diamonds from the two most popular diamond simulants: synthetic moissanite and CZ. Participants will also be able to test lesser seen stones that have been used predominantly in antique jewellery, such as colourless sapphire, zircon, synthetic spinel and paste.

These workshops take place at Gem-A Headquarters, 21 Ely Place, London. For more information contact the Education Department via education@gem-a.com.
Price: £120 for Gem-A members, students and NAJ members; £150 for non-members.

"There are many localities for aquamarine in Pakistan, including a large area in the Shigar Valley. Many mines are operated for both crystal specimens and cutting rough. The cut aquamarines are of good commercial quality, but most of what is produced colour wise is not up there with the finer Brazilian or African material. This being said, there are large parcels produced with many going directly to China, while others find their way to Idar-Oberstein and some to the USA. A second large area is Nagar but while it has produced extensive crystal specimens the cutting value in general and much less valuable than Shigar material. Some of the lines are at high elevation and mining is quite difficult. You can imagine getting proper explosives and equipment is a hardship at best."

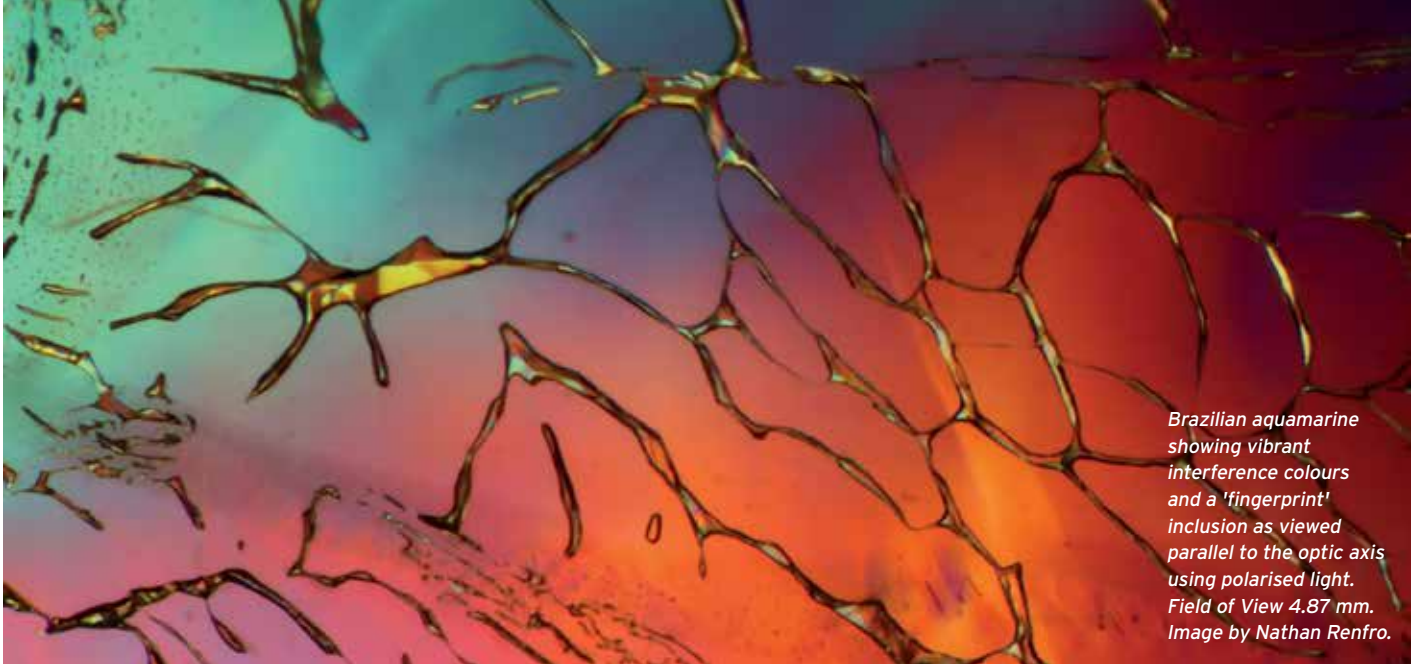
Bill Larson FGA (Hons), Palagems.



The Many Guises of Aquamarine

The Arkenstone (www.iRocks.com) specialises in the world's most precious natural crystals, including this natural aquamarine cross from Pakistan paired with a 450 carat cut gem.

The Arkenstone regards the best minerals as an art form, each measured by defined criteria that include crystal form, colour, transparency, lustre, proportions, and orientation. With galleries in Dallas, Texas and Shanghai, China, The Arkenstone helps curate private collections and museum displays for lovers of natural art including gems, fine minerals, and rare crystals. ■



Brazilian aquamarine showing vibrant interference colours and a 'fingerprint' inclusion as viewed parallel to the optic axis using polarised light. Field of View 4.87 mm. Image by Nathan Renfro.

GEMSTONE PHOTOGRAPHER OF THE YEAR 2017

Have you got what it takes to be Gem-A's gemstone photographer of the year?

Enter Gem-A's Photographer of the Year 2017 competition and you could be in with a chance of winning a year's free Membership and a Photoatlas of Inclusions.

There are three categories for entry:

The Internal
Including photomicrography, gemscapes and unusual inclusions

The External
Unusually cut or faceted gemstones, carvings and objets d'art

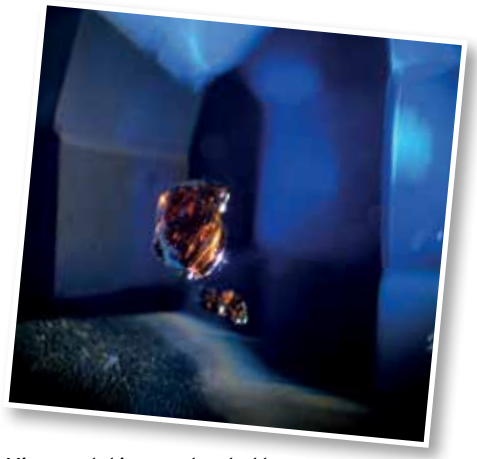
The Humanity in Gems
The life around gemstones, including mining, dealing, gemmologists at work or studying

SUBMISSIONS

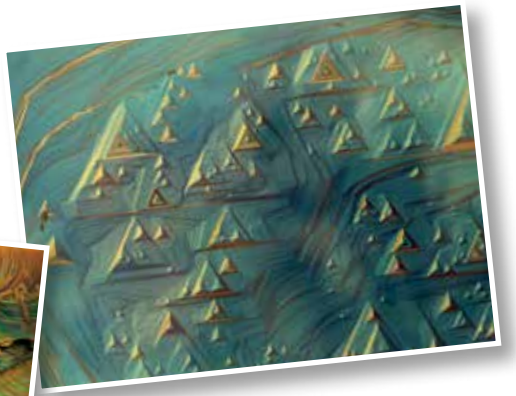
Members and current students of Gem-A only. Please submit all entries to *editor@gem-a.com*, specifying your membership or student number and category of entry. Please send files larger than 10mb via Dropbox or WeTransfer. Closing date for entries is Friday 1 September 2017.

WINNERS

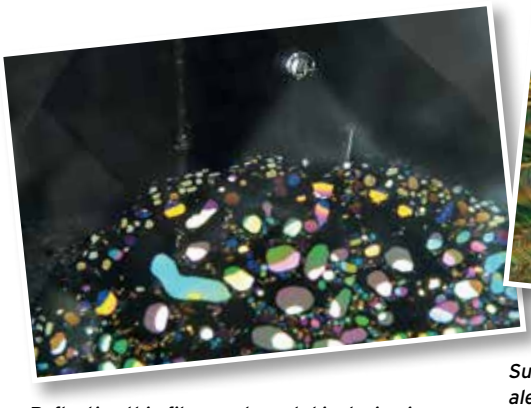
A Member Award and a Student Award will be given. Honourable mentions will also be given for each category. Winners will be announced at the 2017 Gem-A Conference.



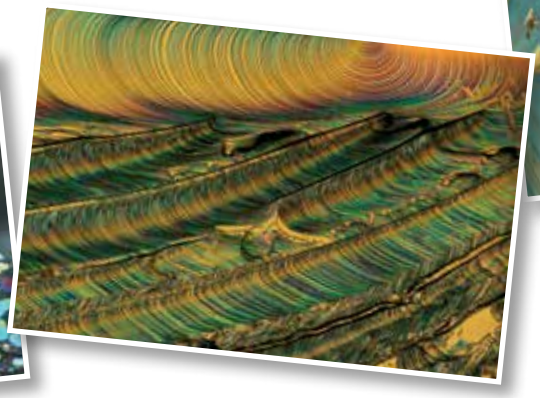
Mica crystal in an untreated burmese sapphire, taken with an iPhone 6s through an Eickhorst microscope with darkfield, magnification approximately 40x. Image by Sebastian Hänsel.



Trigons and growth marks on a diamond macle; field of view 2.81 mm; imaged using episcopic differential interference contrast (DIC). Image by Ziyin Sun.



Reflective thin films and crystal inclusion in Goshenite Beryl. Field of view 7.19 mm. Fiber optic light. Image by Jonathan Muyal FGA.



Surface growth features on pulled synthetic alexandrite. Field of view 2.81 mm. Differential interference contrast. Image by Jonathan Muyal FGA.

Gem-A
THE GEMMOLOGICAL ASSOCIATION OF GREAT BRITAIN


Silver, Freiberg, Erzgebirge,
Saxony, Germany
Specimen courtesy of
Collector's Edge
Minerals, Inc.
Now Available
The Sisk Gemology Reference
by Jerry Sisk
jtv jewelry love • jtv.com/sgr