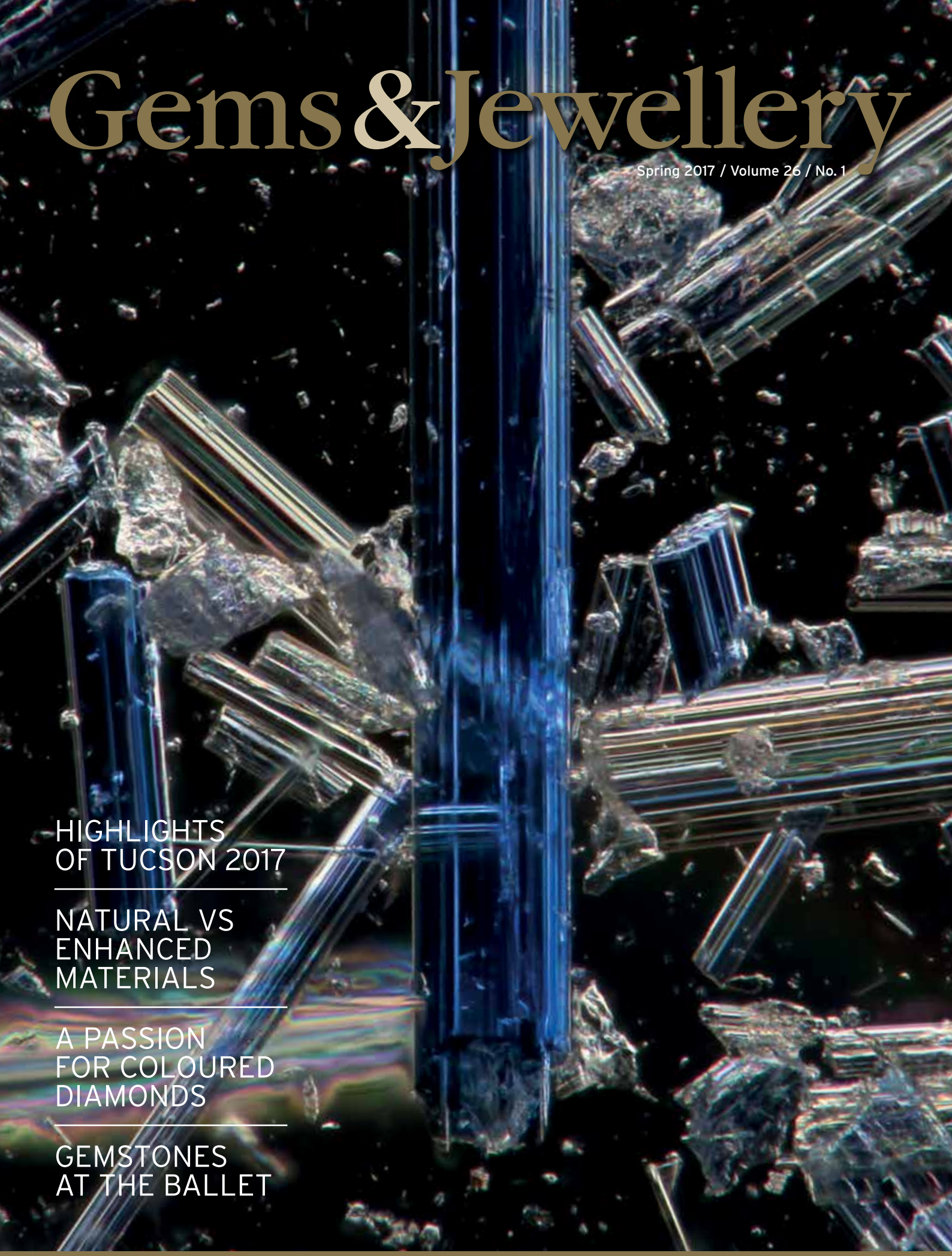
Gems & Jewellery

Spring 2017 / Volume 26 / No. 1



HIGHLIGHTS OF TUCSON 2017

NATURAL VS ENHANCED MATERIALS

A PASSION FOR COLOURED DIAMONDS

GEMSTONES AT THE BALLET

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GEMFIELDS

Gems&Jewellery
SPRING 2017

NAVIGATING LAPIDARY MATERIALS

Helen Serras-Herman FGA looks at the varieties of all-natural and enhanced gem materials, key treatments and their impact on the marketplace.

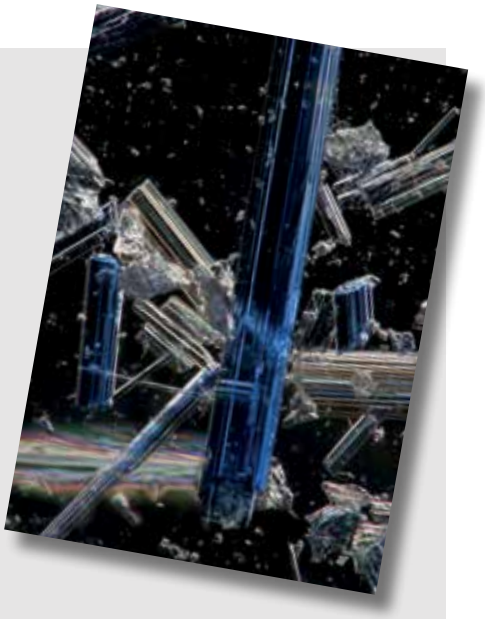
FIFTY YEARS OF SPLENDOUR

Christa Van Eerde MA MLitt Cert. GA DGA reports on the 50th anniversary of George Balanchine's gemstone-inspired ballet, *Jewels*.

TUCSON 2017

Olga González FGA DGA explains why the 2017 Tucson shows signal an exciting shift in international gemmology.

Plus, John Bradshaw GG, of Coast to Coast Rare Stones International, reveals the rarest gemstones on his stand this year.



COVER PICTURE

Strongly pleochroitic dumortierite crystals and fragments arranged in a plane representing a former crystal surface of the host rock crystal ("phantom"). Such idiomorphic, transparent dumortierite crystals showing perfect terminations are an absolute novelty. Irregular shape, polished sample, 25.55 ct. Mag 110×, dark field illumination, parallel polarisers.
Photo credit Michael Hügi FGA.

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Gems&Jewellery – Spring 2017 featured contributors

1. JOANNA ANGELETT

Joanna Angelett is the professional name of author and jewellery designer Joanna Trummer, the founder of internationally acclaimed artistic project *Tree of Life*. Joanna's jewellery collections and oil paintings are in collections across the globe, including the Collection of the Holy See in the Vatican, and the private collections of Australian government officials. Joanna has exhibited her designer jewellery collections at the Goldsmiths' Hall in London, and in Mansion House London. In 1992, she established the Angelett Gallery in Sydney, and later relocated to Hatton Garden, London, where the business has operated for 10 years.

2. DEBORAH CRAIG

Deborah Craig FGA DGA is board member and head of the Africa Group at International Women in Mining, which connects more than 9,600 members and in excess of 40 WIM associations worldwide.

3. AYAKO NAITO

Ayako Naito FGA DGA is a gemmology and diamond tutor and representative of Gem-A in Japan. Ayako studied phycology at university and started her gemmological education with Gem-A in 2005. Her background includes interning at an auction company and working in antique jewellery retail, a jewellery industrial magazine and a pearl testing laboratory.

4. HELEN SERRAS-HERMAN

Helen Serras-Herman FGA is an acclaimed gem sculptor with over 34 years' experience in unique gem sculpture and jewellery art. Her award-winning artwork has been exhibited world-wide and extensively published.

5. ALAN BRONSTEIN

Alan Bronstein is a pioneer in the field of natural coloured diamonds. He specialises in educating both the general public and the gem industry on the science, rarity and aesthetics of coloured diamonds. He curated the *Pyramid of Hope* and *Butterfly of Peace* diamond collections, which have been on display in museums across the world for the last 30 years and have led to many scientific discoveries.

6. JOHN BRADSHAW

John Bradshaw GG is a gemmologist (GIA, 1983) and gemstone cutter. With a BSc in chemistry from the University of Massachusetts (1979) and geology from Salem State College (1981), he began his cutting career in 1979. John has worked as a consultant on many gem projects including a 20 year tenure as curator of gems at the Harvard Mineralogical Museum in Cambridge, Massachusetts.

7. OLGA GONZALEZ

Olga González FGA DGA is the CEO and founder of Pietra PR and has over 10 years' experience in the field of jewellery communications. She currently serves as president of PRSA-NY, and is the networking director for the Women's Jewelry Association New York Metro Chapter Board. She is a regular contributor to consumer and trade publications on gem and jewellery-related topics.

8. ROSAMOND CLAYTON

Rosamond Clayton FGA DGA FIRV MAE is an experienced gemstone and jewellery valuer and is often instructed by solicitors to act as an expert witness. She specialises in diamonds and jadeite jade, and is a fellow of the NAG Institute of Registered Valuers.

9. ANTHONY DE GOUTIÈRE

Anthony de Goutière GG began his career in the jewellery trade as a watchmaker. He then studied with GIA and became a Graduate Gemmologist. Inspired by John Koivula and Dr. Edward Gübelin he started taking photomicrographs of inclusions. Now retired, photomicrography of gemstone inclusions continues to be a "rewarding hobby".

10. CARMEN GARCIA-CARBALLIDO

Carmen Garcia-Carballido FGA 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 a MSc. in Integrated Petroleum Geoscience from the University of Aberdeen.

11. CHRISTA VAN EERDE

Christa Van Eerde MA MLitt Cert. GA DGA is a gem lover and dance aficionado. She currently resides in the United Arab Emirates and is searching for her niche in the jewellery world. Christa completed the Cert. GA. and Diamond Diploma with Gem-A and is expecting to pass the Gemmology Diploma in the autumn.

12. 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.

Straight from the heart

Opinion and comment from CEO, Alan Hart FGA DGA

The eagle-eyed among you may have noticed that this issue of *Gems&Jewellery* looks a little different. Last year we decided to give our long-running magazine a makeover, reducing our six issues a year to four bumper issues across spring, summer, autumn, winter. This issue, *Spring 2017*, is filled with more content, more inspiration and offers a fresher feel with plenty of awe-inspiring pictures. You will also notice that we have added a contributor's page to this issue, highlighting the many supportive industry faces who offer their time, expertise and knowledge to *Gems&Jewellery*.

This magazine has always been a group effort, which is why we enjoy hearing from new voices who would like to contribute. One such voice in this issue is Carmen Garcia-Carballido FGA L.Geology MSc. EurGeol, a Gem-A student who has shared her diploma project with us. Moving forward, we will include more student projects in this magazine, highlighting the sheer amount of research, effort and creativity that is demonstrated by those studying across the world.

There is an international feel to our Spring 2017 issue, starting with a fantastic image of the pink lake in Port Gregory, Western Australia, by Joanna Angelett on pages 8 and 9. Next, we move to Malawi with Deborah Craig FGA DGA, jump across to Ise-Shima National Park in Mie Prefecture, Japan, with Ayako Naito FGA DGA, and take a lengthy pit-stop in Tucson with Eric Fritz FGA and Charles Evans FGA DGA.

On the subject of Tucson, this year's show was another fantastic experience with some incredible specimens on display. The Gem-A team certainly got stuck in, hosting workshops, seminars and Gem-A's Big Gem Bash, an annual event, which was more popular than ever. Gem-A is also proud to be involved in the Somewhere In The Rainbow Modern Gem and Jewelry Collection, curated by Shelly Sergent, at the Flandrau Science Center & Planetarium in Tucson. For the rest of the year, anyone with a passion for gems can visit the exhibition, which includes the impressive Buddha Blue Ceylon sapphire and a cabinet of historic gemmological instruments supplied by Gem-A.

If you are interested to read more, we are pleased to say that you can find an article dedicated to the Somewhere In The Rainbow exhibit on our website. We have been focusing a great deal on our online content and social media since January, with regular features posted on our Gem-A Blog and on our new Instagram account @GemAofGB. You can also find us on Facebook, Twitter and LinkedIn, and we encourage all to become part of our digital gemmology community.

Finally, I am pleased to say that I will be speaking at the Swiss Gemmological Society's 75th anniversary conference in June 2017. We also have the first glimpse of our own annual Conference on page 45, including pictures of our brand new venue overlooking the Houses of Parliament.

I hope you enjoy the issue.

Best wishes,
Alan Hart FGA DGA

> We have been focusing a great deal on our online content and social media since January, with regular features posted on our Gem-A Blog and on our new Instagram account @GemAofGB.

Muzo emerald, 3 cm. Vault exhibition, Natural History Museum. Photo credit Alan Hart.

Tucson Gem Show. L-R Alan Hart, Charles Evans, Shelly Sergent and Eric Fritz.

Gem-A News

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

GEMMOLOGICAL INSTRUMENTS

Samantha Lloyd FGA EG, Gemmological Instruments (GI) manager outlines her must-have for all gemmologists this season... the microscope.

Finding the right microscope for you can be easy if you know these few simple facts.

As gemmologists we use microscopes on a regular basis for observing inclusions, otherwise invisible to the naked eye, to aid the identification of gemstones. This rather specific purpose rarely changes, but the environment in which we use the microscope does.

If you are working through stone after stone in a laboratory setting, you need a stable microscope that is ready to use at the flick of a switch once set up to your specific requirements. However, if you are a field gemmologist, out near the mines buying new specimens, you are likely to find yourself in a sticky situation if you are relying on there being a 240 V mains power source and sturdy desk for you to plug your trusty microscope into.

Photo credit Henry Mesa.

The Gem-A Instruments travel microscope has been perfectly designed to complement the travelling gem enthusiast, with a compact frame, rechargeable battery pack that lasts for hours on full use, and a convenient travel case to pack it and the rest of your essential testing kit into!

It is a steal at £665+VAT for a well put-together microscope that can zoom up to 60× and charge your iPhone from its USB output at the same time.

See the GI instruments catalogue for more information. ■

LUCY COVINGTON JOINS THE GEM-A TEAM

Photo credit Henry Mesa.

Kim Foxwell BA MA FGA DGA moved in December to a newly created ODL design and development role. We are pleased to announce that Lucy Covington, who started with us in February, is now Gem-A's newest member of staff, filling the role of membership secretary. Email her on **membership@gem-a.com**.

GEM EMPATHY STONE SELECTED

Gem-A's Elaine Ruddie DGA purchased a fantastic stone from award-winning gem cutter John Dyer for this year's Gem Empathy Award competition, in association with International Jewellery London. One lucky jewellery designer will have the opportunity to work with this very special gem.

OBITUARIES

Dennis Durham
5 May 1929
– 31 Dec 2016

Gem-A regret to announce the passing of renowned faceter, Dennis Durham, on New Year's Eve after a prolonged illness. Dennis excelled in the faceting of coloured gemstones and was a much-loved member of the British faceting fraternity. His recent book, *Faceting Adventures*, enhanced his reputation abroad. He will be missed by many in the trade for his personality and expertise.

Jules Roger Sauer
21 Dec 1921
– 1 Feb 2017

Jules Roger Sauer, founder of iconic Brazilian gem and jewellery brand, Amsterdam Sauer, has passed away aged 95. A passionate gem collector, adventurer and great story-teller, he will remain in history as the man who recognised the first commercial emerald deposits in Salininhas (Bahia), Brazil, in 1963. As a collector he gathered an outstanding gem and mineral collection, on display at the Amsterdam Sauer Museum, in Rio de Janeiro. Jules authored several books, namely the best-seller *Brazil: Paradise of Gemstones* and was one of the key players of the Brazilian gem industry.

Evelyn Rosemary Symes
25 May 1947
– 6 Dec 2016

It is with great sadness, but fond memories, that we announce the passing of Evelyn Rosemary Symes, known to us as Eve, the 'Mother' of the Southwest Branch of Gem-A. Eve dedicated a great deal of her time to the branch and was generous with her knowledge and hospitality. Eve, was a woman to admire, intelligent, capable, adventurous, and caring, accepting of all people, she had no prejudice, possibly with one exception of having no patience for stupidity! Eve will be very much missed, and the world has one less gem now.

GEM-A REVIVES HISTORIC TIES WITH CANADIAN GEMMOLOGICAL ASSOCIATION

Gem-A has renewed its historic partnership with the Canadian Gemmological Association (CGA) to offer students and graduates the best in gemmological education. The new Gem-A and CGA educational partnership aims to create a stronger international community of gemmologists through access to a core syllabus. In practice, this will enable CGA students to achieve a region-specific certificate qualification, while also providing the core competencies required to 'transition' to the renowned Gem-A Diploma.

CGA president Donna Hawrelko FGA FCGmA and Gem-A CEO Alan Hart.

THE UNIVERISITY OF NANTES ANNOUNCES DUG DIPLOMA TO BE TAUGHT IN ENGLISH FROM WINTER 2017

The French gemmological education centre, the University of Nantes, has announced that it will commence teaching the DUG (Diplôme d'Université de Gemmologie) in English for the first time from winter 2017. Students on the DUG Diploma will learn how to use lab tools, such as infrared, Raman and UV-visible spectrometers and a scanning electron microscope (SEM), under the tutelage of expert gemmologists.

Those interested in finding out more about the course are encouraged to contact Emmanuel Fritsch FGA (Hons): **Emmanuel.fritsch@cnrs-imn.fr** and Benjamin Rondeau: **Benjamin.rondeau@univ-nantes.fr**

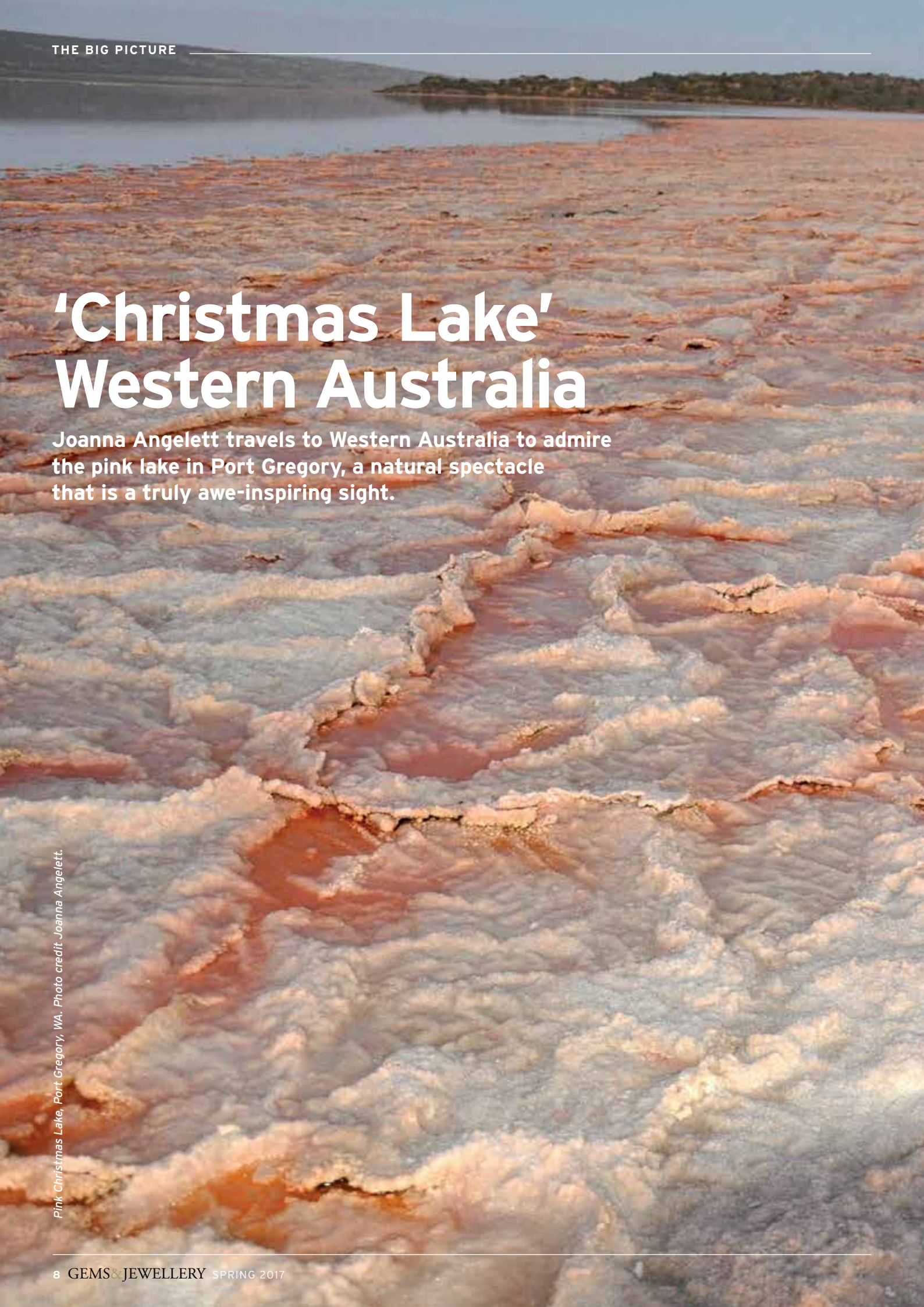
28TH INTERNATIONAL JEWELLERY TOYKO 2017

Gemmology and diamond tutor, Julia Griffith FGA DGA EG, and Gemmological Instruments manager, Samantha Lloyd FGA EG, travelled to Tokyo to represent Gem-A at the 28th International Jewellery Tokyo (IJT) 2017 show, held from 23-26 January 2017.

During the show Julia gave a seminar on 'The Colours You Can't See; Exploring Fluorescence', which was translated into Japanese. The practical hands-on seminar was well attended and received positive feedback.

‘Christmas Lake’ Western Australia

Joanna Angelett travels to Western Australia to admire the pink lake in Port Gregory, a natural spectacle that is a truly awe-inspiring sight.



Pink Christmas Lake, Port Gregory, WA. Photo credit Joanna Angelett.

Christmas Lake Ring.

Despite so-called 'pink lakes' being some of the rarest phenomena in the world, Western Australia is spoilt by two of these natural wonders. Thousands of years ago the pink lake in Port Gregory was a lagoon, but today it is completely cut from the ocean by dunes and relies on underground springs as a connection to the sea.

When we reached the lake the sun was already close to the horizon, gilding the surrounding bushes and dunes in a golden glow. We hurried to take photos from a distance — subtle shades of pink, lilac and violet flickered on the amethyst-like shining surface of the water, creating a picture of surrealistic beauty.

We decided to drive close to the rose-hued water, but there was no visible road. A group of locals from Port Gregory told us for good photos we should go around and turn to the rough road, going through the dunes to get close to the shore. They also warned us that we had arrived late in the day, commenting "the morning is when Christmas Lake is flashing colours".

This was the first time we had heard the lake referred to in this way, so we had to ask what they meant. "In December we rarely get snow here," one of the locals said, "so we have to substitute it with snow-like halite. It's our local salty gem!"

They were right. Upon our arrival the snow-white field of halite surrounding Christmas Lake looked gloomy in the twilight. We considered using the flash to snatch the colours out of the darkness, but we were worried this would not give a correct representation. Fortunately, our cameras had other ideas resulting in something incredible — the whole area came to life with lightning white-pink light to the horizon, spilling sparks and producing a glow on the crystal halite. We could instantly see why it is known as Christmas Lake!

Although, scientifically, this amazing effect is explained as a carotenoid fluorescence in *Dunaliella salina* – a unicellular green alga found in environments with high salt concentration, which produces a carotenoid of distinct pink colour – the sudden transformation from twilight to a fiesta of lively light is forever imprinted in my mind.

A piece of salty gem halite, light pink in colour and surprisingly strong, was taken to our London designer studio and placed, as the main treasure, in our Christmas Lake ring. It is nestled between branches made of pure gold and Western Australia's Argyle diamonds in champagne shades. Finally, the palladium base of the ring reflects the beauty of dazzling-white sand dunes, fringing the pink lake from the ocean side.

1: L-R John Chikokoto, Deborah Craig, Hellen Chasowa, Andrea Antonucci. Photo credit Deborah Craig.

Can gemstones bring prosperity to Malawi?

Deborah Craig FGA DGA, head of the Africa Team at International Women in Mining (IWIM) and board member within the organisation, reports on her recent trip to Malawi.

Peaceful, democratic Malawi remains one of Africa's least-developed countries. Yet this small landlocked place, affectionately known as 'The Warm Heart of Africa', sits within the Mozambique Belt, surrounded by its famous gemstone-producing neighbours: Tanzania, Zambia and Mozambique. What is Malawi's potential to join their ranks as a source of some of the world's most beautiful coloured gemstones? Can Malawi's nascent gemstone industry create prosperity for the country?

In autumn 2016, Andrea Antonucci FGA and I travelled to Malawi to visit the Chimwadzulu Hill sapphire and ruby mine and meet with members of the local gemstone community. We began in Blantyre with John Chikokoto (**1**), the president of the Gemstone Association of Malawi (GAM). GAM was re-energised in 2015 with funding from the World Bank's 'Mining Governance and Growth Support Project'.

Mr Chikokoto brought ruby and tourmaline crystals to show us (**2**). GAM members are mining sapphire, ruby, aquamarine, rhodolite, zircon and blue agate. There is even a rumour that kimberlite has been discovered near the Mozambique border, but much of what we hear is merely speculation. The bulk of rough material is immediately exported out of Malawi, often illegally. Unlike Tanzania, Zambia and Mozambique, Malawi does not have a value-addition strategy, which would ensure more gemstones were processed in-country. He tells us if the gemstone industry is to grow, develop and provide long lasting economic benefits, his

members need skills training at all stages of the value chain — mining, valuation, lapidary and marketing.

These sentiments are echoed by Hellen Chasowa, regional chairperson south for Malawi's Women in Mining Association (MAWIMA). GAM has around 2,000 members, of whom approximately 800 are women and also members of MAWIMA. Attracted to gemstone mining and dealing as an alternative to subsistence agriculture, which occupies most Malawians, MAWIMA's members would also like to add value to the stones they are mining to increase their incomes and develop sustainable livelihoods. They are seeking project sponsorship for a tumbling machine and a drill, to make beads and create jewellery for Malawi's burgeoning tourist trade.

Two companies, Nyala Mines Ltd and Columbia Gem House are working hand-in-hand to bring Malawi's gemstones to the attention of the world market. Nyala Mines Ltd mines sapphire and ruby at Chimwadzulu Hill, and has created a fully-integrated, transparent supply chain extending from mine to retailer with its cutting, marketing and sales partner, Columbia Gem House.

2: Ruby, from a new discovery at Makanjira, glow in the afternoon sunshine. Photo credit Deborah Craig.

They are seeking project sponsorship for a tumbling machine and a drill, to make beads and create jewellery for Malawi's burgeoning tourist trade.

They would like the Nyala brand to equal quality, trust (disclosure of treatments) and social responsibility. The last is of critical importance when engaging with the economically disadvantaged communities close to the mine. Nyala works together with community leaders to understand how best to provide local support. To date, Nyala has built new school blocks (**3**), constructed boreholes for wells and upgraded the local health clinic.

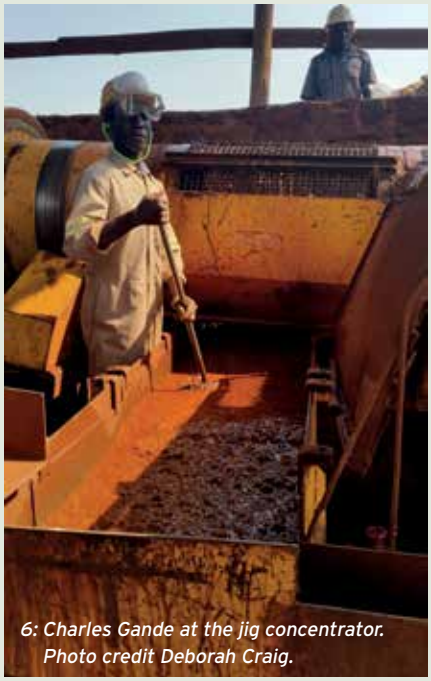
Chimwadzulu Hill (**4**) is an eluvial corundum deposit discovered in 1958 about 145 miles south of Lilongwe, Malawi's capital. The heavy minerals have been eroded by in-situ weathering and scattered down the sides of the hill, like sprinkles on top of an ice cream cone. The presence of both chromium and iron mean that corundum is found here in a rainbow of colours: pale green, blue and yellow sapphires (**5**), but rubies and padparadscha sapphires are also found here.

3: A warm welcome at the Kandoma school. Photo credit Andrea Antonucci.

4: View from Chimwadzulu Hill. Photo credit Deborah Craig.

5: A beautiful 4.71 ct blue sapphire from the deposit, now in the Smithsonian Gem Gallery. Photo courtesy of Columbia Gem House.

Mining at Chimwadzulu Hill



6: Charles Gande at the jig concentrator. Photo credit Deborah Craig.

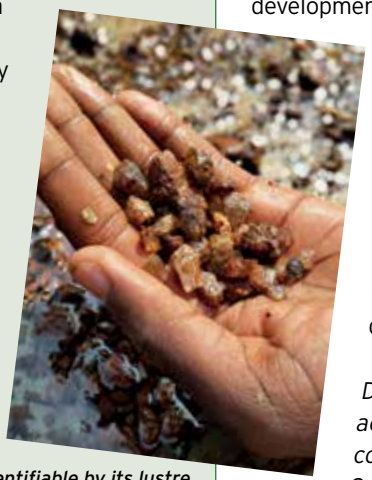
The Chimwadzulu Hill operation begins with front-end loaders excavating the corundum-bearing ore within a 2 km mining area. The ore is then fed into the diesel-powered processing plant with water pumped from the local river. A trammel screen separates and discards larger pieces of rock. The smaller pieces of rock and water continue their onward journey to a jig concentrator, which shakes back and forth. This separates out the heavy minerals, which fall into a collection tray (**6**). When full, the collection tray is removed and its contents are deposited onto a sorting table (**7**), where the experienced sorters identify corundum by its extraordinary lustre (**8**). Thus begins the complex sorting and grading of the corundum to maximise the value obtained.

The first step is 'first sorting' or 'mine sorting' the corundum into 'industrial' and 'gem quality' at the mine site. The majority of the corundum is heavily included and used as industrial corundum, although some of this material can be used for heat treatment testing, lapidary training or depending on the colour, inexpensive beads. The less included gem-quality material is separated by clarity into two colour categories: 'red/pink' or 'other'. As most of the larger pieces of rough will be broken down, size is not that important.

The gem quality material is shipped to Columbia Gem House, where it is washed with hydrofluoric acid and submitted to 'second sorting' by colour and specific types of inclusions. For each batch of poor colour rough that will be heat treated, an optimal process is developed. Only one level of traditional heat treatment is used and no elements are added. Clarity enhancement is typically unnecessary, because when the corundum formed at Chimwadzulu Hill, the titanium never formed rutile. Gemstones in a range of 16 different colours, with up to three clarity grades, can ultimately be obtained.

The untreated and treated rough is then sent to a sample cutter in China, who balances beauty of the stone with weight retention, always mindful of market demand. Nyala brand sapphires and rubies are marketed by Columbia Gem House in the USA, Canada and Europe, where the stones are valued not only for their attractiveness, but for their ethical pedigree — an increasingly important consideration for consumers.

7: Ganizani Lomosi, mine worker. Photo credit Andrea Antonucci.



8: Corundum, identifiable by its lustre. Photo credit Deborah Craig.

Over the years, the government, as well as various investors, have mined the deposit with varying degrees of success. In 2008, Nyala Mines Ltd acquired Chimwadzulu Hill, but the financial crisis, combined with rampant theft and high operating costs forced the mine to close. In 2013, Malawian national Abdul Mahomed acquired 80% of Nyala Mines Ltd bringing new life to the mine. Columbia Gem House, which had partnered with previous owners, reaffirmed their commitment to cut and market the stones.

Chimwadzulu Hill is primarily a low-grade (in terms of carats per tonne) sapphire deposit; the rubies and padparadschas are a welcome bonus. The key to ensuring the mine's profitability is to increase the volume of ore excavated and processed, thereby bringing down the mine's operating cost per tonne. The current plant processes 30 tonnes of ore per day. Mr Mahomed would like to increase production significantly to 1,000 tonnes of ore per day. The new plant and equipment has been ordered and an environmental impact assessment has been filed, pending government approval. An increase in production will also hasten the removal of the overlying secondary deposits, hopefully exposing the primary source of corundum that Mr Mahomed believes lies below.

It is time for Malawian gemstones to take their rightful place among the most beautiful gemstones in the world, while providing economic opportunity to Malawians. For this to happen, it is critical that the Malawian government implements value-addition strategies that ensure more rough material stays in-country to be cut and fashioned. There will be challenges, but small steps in skills training and market development can be taken at the local level, through associations such as GAM and MAWIMA, supported by Malawian and international partners. Nyala and Columbia Gem House have shown that operating in an ethical manner creates important benefits for local communities, as well as making good business sense. ■

Deborah Craig would like to acknowledge the financial contribution of the Swedish Gemmological Society who helped make the trip possible.

Investigating Cultured Pearls

Gem-A members, students and other enthusiasts visited Ise-Shima National Park in Mie Prefecture, Japan, to discover seawater pearls on an overnight trip in October 2016. Ayako Naito FGA DGA gemmology and diamond tutor and representative of Gem-A in Japan, reports on the adventure.

3: The view of a tidal flat, where the group received an explanation from Mr. Uranaka about Satoumi.

1: Ms. Sakaguchi showed us how to cultivate pearls.

Even for those that live in Japan, the opportunity to study pearl cultivation is a rare experience, as the process has long been something of an industrial secret.

The Ise-Shima region is characterised by its interestingly shaped landforms, ria coast and numerous bays. Around the turn of the twentieth century, in the city of Shima in Ago-Bay, Kokichi Mikimoto discovered how to cultivate hemispherical pearls from Akoya oysters (*Pinctada fucata martensii*).

Akoya oysters are very delicate, meaning the bays where they grow must be carefully monitored to cultivate pearls. However, due to increased nutrients flow [increased water flow from the land and higher sedimentation of organic materials in the water] in the last few decades, the coast and sea environment where they are found in the Ise-Shima region has changed dramatically.

First we visited Maruyama Park where the Pearl Oyster Memorial Tower can be found, alongside the monument where the names of Tokichi Nishikawa, Kokichi Mikimoto and Tatsuhei Mise were inscribed in recognition of their achievements. We then moved on to the Sakaguchi pearl farm, to learn about pearl cultivation.

2: Mr. Tanaka explaining how to measure the intensity of light interference on pearls.

Ms Ruriko Sakaguchi who works at the Sakaguchi pearl farm is an expert pearl cultivator. She showed us how to open the oyster shell with a special tool, remove the gill using a spatula and cut out part of the oyster to make a path where the bead can carefully be inserted with a sharp knife (**1**).

Next we visited the Mie Prefecture Fisheries Research Institute. The researcher, Mr. Shinji Tanaka, gave a presentation entitled the 'Allure of Pearl' and explained a recent study about a measuring instrument, which detects the intensity of light interference on pearls (**2**).

We also heard about the production of golden Akoya pearls, similar to South Sea golden pearls. Usually Akoya pearls are not golden in colour, but in the Mie Prefecture Fisheries Research Institute they are trying to produce them. Golden Akoya pearls are incredibly beautiful and have a deep refined, colour. However, researchers have only been able to produce a few golden Akoya pearls so far.

In an effort to protect the extraordinary environment found in Ise-Shima, Shima City has decided to employ *Satoumi* – the prolonged interaction between humans and ecosystems to form and maintain marine and coastal landscapes. For the last part of our trip we saw *Satoumi* in action on a tidal flat (**3**).

The project is looking to improve the biological productivity and biodiversity of the area in harmony with the local community, while decreasing mineral loads from the land, making the environment better suited to pearl cultivation, restoring tidal flats and seagrass beds, and educating people about man's effect on the environment.

This was the first gemmological trip Gem-A has run in Japan and in the future I would like to run an annual trip of this nature (**4**).

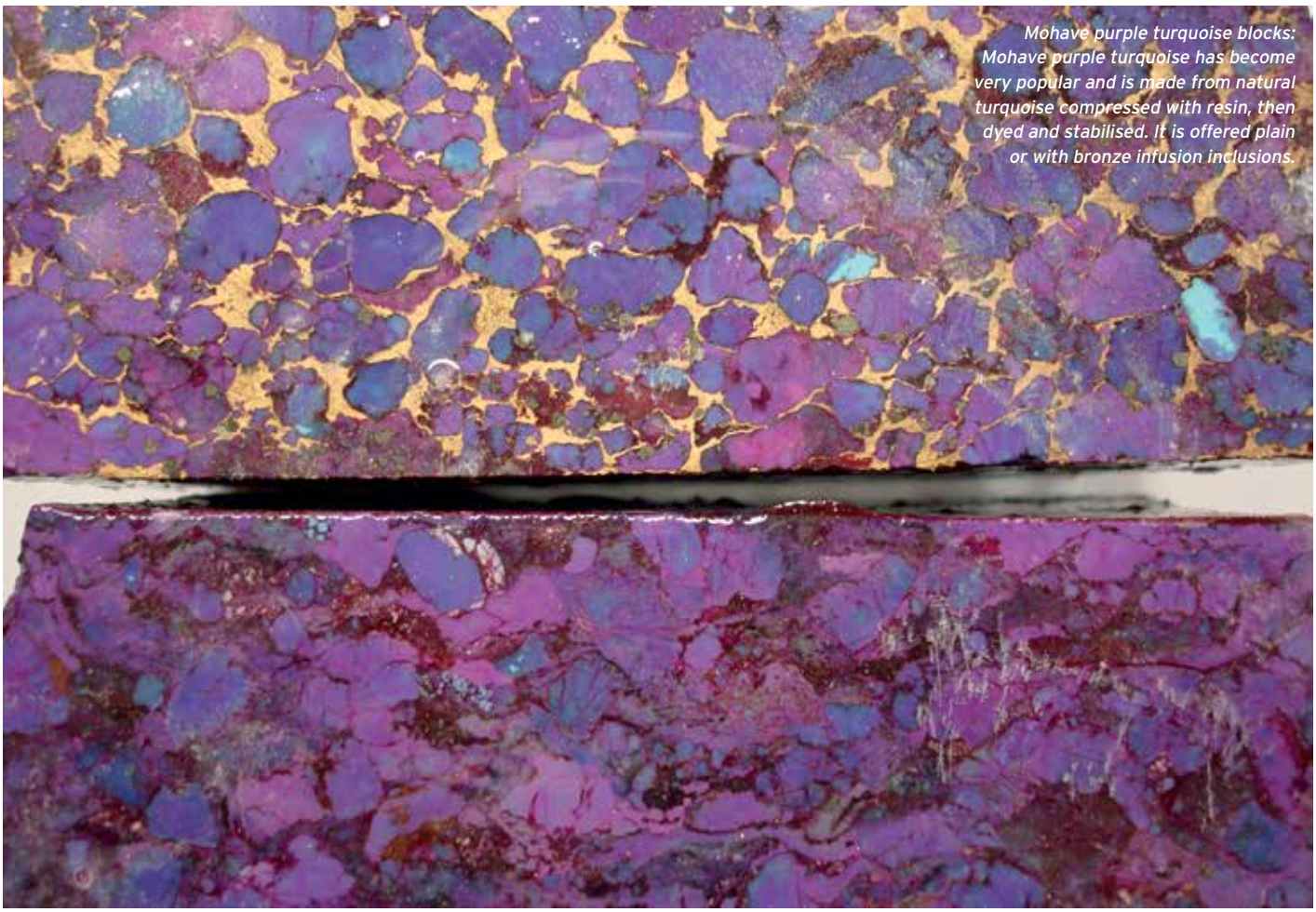
To find out more about Gem-A in Japan, contact **ayako@gem-a.com**. ■

4: Field trip attendees with Mr. Nakamura, Ms. Hamaguchi (from Mie Prefecture Pearl Promotion Council), Mr. Takahashi and Mr. Uranaka (from Shima City Government).

ACKNOWLEDGEMENTS

The author wishes to acknowledge Mr. Yuichi Nakamura of P. J. International who organised the trip, Mie Prefecture Pearl Promotion Council, Mr Naotsugu Hata from Mie Prefectural Government, Mr. Hideharu Takahashi and Mr. Hideto Uranaka from Shima City Government, Mr. Shinji Tanaka and Mr. Isao Kuriyama from Mie Prefecture Fisheries Research Institute, and Mr. Jun Taniguchi and Ms. Ruriko Sakaguchi from Sakaguchi pearl farm.

NATURAL vs ENHANCED: Navigating Lapidary Materials



Mohave purple turquoise blocks: Mohave purple turquoise has become very popular and is made from natural turquoise compressed with resin, then dyed and stabilised. It is offered plain or with bronze infusion inclusions.

Helen Serras-Herman FGA guides us through the varieties of all-natural and enhanced gem materials, highlighting key treatments and their impact on the marketplace.

There is an endless inventory of lapidary gem material on the market today, created or enhanced to look like other natural materials, usually one that is rare and expensive. Most of these enhanced materials are natural materials that have been dyed or compressed to simulate a better quality material, while some are partly natural stone and partly other materials, such as resins and metals. There are also natural materials that have been dyed to a completely different colour in order to look like another natural material, which we could call 'look-a-likes'. All these simulants provide an inexpensive alternative to natural gems, and many of them are beautiful, with bold patterns and durability.

The only problem surrounding these stones is disclosure, or the lack of it. Dealers should always let their customers know exactly what they are buying. Even though many times the original wholesaler or lapidary may have disclosed information about the nature of the rough, cabochons or beads, somewhere down the line, or online, information gets buried or blurred.

One of the reasons for disclosure, besides honesty, is for the customer to know how to take care of the finished stones. The customer may be the lapidary, designer, metalsmith, the final jewellery client or collector. Disclosure helps determine how well stones will wear once set into jewellery, whether they should be set into rings (which take more abuse) or pendants and brooches, or how will they survive in an ultrasonic cleaning machine.

According to the Federal Trade Commission (FTC) guides for the jewellery

industry, with the exception of normal fashioning (cutting and polishing), it is the seller's responsibility at all levels of commerce to clearly disclose to the buyer at the time of the sale whether the stone is natural or not, and about any enhancements.

While many articles focus on disclosure of enhancements of faceted rubies, emeralds or diamonds, the cabochon and bead market slides almost quietly under the disclosure radar.

NATURAL SONORA CHRYSOCOLLA VS SIMULANT SONORA CHRYSOCOLLA

Sonora chrysocolla, also known as Sonora Sunset or Sonora Sunrise chrysocolla, is a copper-based rock composed of blue or green chrysocolla and red cuprite. It has been mined since 2006 at the Milpillas Mine in northern Mexico. It may also contain orange-red chalcotricite and black veins of tenorite.

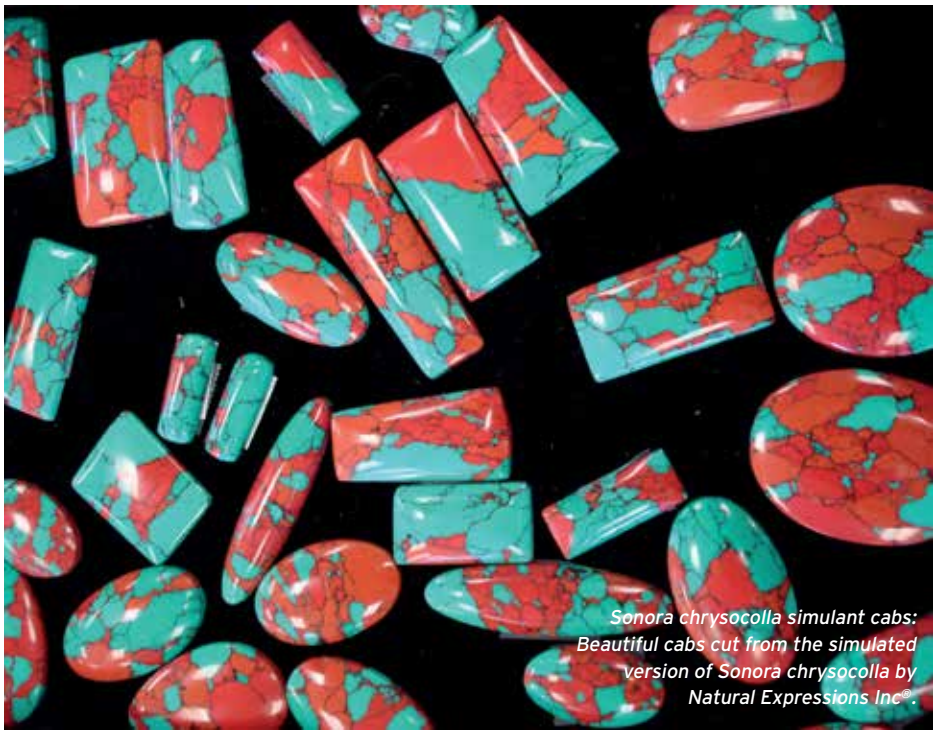
Great quantities of Sonora chrysocolla (Mohs 3-4) have come out, but it is getting harder to find good quality rough material, especially with balanced portions of the colour ingredients, an attribute that made the material famous.

Sonora chrysocolla is one of the most desired new stones, and it was inevitable that an imitation would show up on the market. The simulant version is crushed natural turquoise, dyed, compressed and stabilised and sold in a block form or slabs. It is manufactured and sold by Fred Thiele of Natural Expressions Inc, a company in Gilbert, Arizona.

The advantage in purchasing a compressed block – besides the price difference – is the ability to cut even slabs with very little waste. There is also no need for special orientation of the rough.

NATURAL TURQUOISE VS STABILISED & COMPRESSED TURQUOISE

Turquoise is a beautiful gemstone found in several places around the world. As one by one the famous Arizona turquoise mines close – Bisbee, Sleeping Beauty – there are not too many options left to source the all-natural material, which is sought after and appreciated by lapidaries, gem collectors and jewellery-lovers alike. Hard, all-natural turquoise is probably less than 3% of all turquoise sold today.



Sonora chrysocolla simulant cabs: Beautiful cabs cut from the simulated version of Sonora chrysocolla by Natural Expressions Inc®.

The vast majority of turquoise on the market has been stabilised with polymers in order for the stone to harden, a permanent treatment. When dyes are added to the resin, the turquoise is referred to as 'treated' instead of 'stabilised'.

> The only problem surrounding these stones is disclosure, or the lack of it. Dealers should always let their customers know exactly what they are buying.

A rarer form of turquoise comes in a compressed type. Small, natural nuggets of quality turquoise are compressed with resin into blocks. The outline of each nugget is still visible. There are no dyes in these blocks. These blocks are created by Colbaugh Processing Inc, a very-well known company owning the only active mine for turquoise in Arizona, the Kingman mine. They also create compressed blocks of natural turquoise nuggets infused with bronze or zinc that offer a very unique look, simulating natural turquoise with golden web inclusions. A dyed bright green turquoise block is also available, with or without infused bronze, simulating the rare bright green gaspeite from Australia.

Turquoise Sky necklace made by Helen Serras Herman: The carved turquoise in this 'Turquoise Sky' pendant, set in sterling silver with orange sapphires from Montana, is from the Hatchita Mine in southwestern New Mexico, showing natural beautiful golden-colour matrix inclusions.

Blocks by Colbaugh Processing Inc: A variety of compressed natural turquoise blocks is offered by Colbaugh Processing, including turquoise with bronze, Mohave purple turquoise with and without bronze, and Mohave green turquoise with and without bronze.

Mohave purple turquoise cabs: Brilliant-coloured cabs in Mohave purple turquoise; material made of natural turquoise compressed with resin, dyed and stabilised, and cut by master lapidary Keith Horst.

SUGILITE VS MOHAVE PURPLE TURQUOISE

Sugilite (Mohs 5.5-6.5) is a pink to purple cyclosilicate mineral most commonly found as a massive form in South Africa. Colours include lavender, purple, lavender-pink and dark purple. The brighter the purple colour and more translucent (gel) the sugilite, the rarer the material is considered. The price of sugilite has increased many times over in recent years. In rare occasions, bright blue veins of richterite (or rictorite) are associated with sugilite and make a stunning colour combination.

The Mohave purple turquoise, offered by Colbaugh Processing, imitates a very rare sugilite/richterite combination. Mohave purple turquoise is made from natural turquoise compressed with resin, dyed and stabilised. The result is a material with a brilliant purple colour, often with the original natural blue colour still visible. It is also made with bronze infusion inclusions with a golden webbing look. Mohave purple turquoise has now become very popular, and it is sold as blocks, slabs, cabochons and bead strands.

NATURAL DRUSY GEMS VS ENHANCED

The term 'drusy' (also called druse, druzy) describes a very fine mineralisation with clusters of tiny crystals that present a shimmering effect. Drusy crystals may cover (or encrust) rock surfaces, veins or vugs. To asses quality it is important to observe the size and uniformity of crystals and the even distribution against the matrix background.

The list of all-natural materials is shrinking daily, and the variety of enhanced lapidary materials on the market today is almost overwhelming.

Drusy gemstones first appeared on the market about 20 years ago. The steep rise of drusies among designers is due to an appealing feature: the combination of a natural mineral surface, with a wearable gem.

Drusy gems come in a wide variety of minerals: quartz, pink cobalto-calcite, green uvarovite garnet and blue chalcedony, just to name a few. Almost all non-quartz drusy gems are of natural colour, but may be enhanced with Opticon fracture sealer, which should always be disclosed to the customer.

Drusy quartz in white, brown, rust, tan, orange, and black lines the inside

Drusy quartz dyed: Natural drusy quartz, just like agates, is commonly dyed in a multitude of bright colours. Cabs cut by Keith Horst.

surfaces of agate geodes. It is commonly dyed in a multitude of bright colours. During the last decade, technology has been developed to coat drusy quartzes with titanium or precious metals (gold, silver, platinum). This metal coating is permanent and is often produced in spectacular iridescent colours that Mother Nature would envy. Now drusy gemstones are divided into 'natural drusies' and 'coated drusies'. Even though the treatments are permanent, the coating can be scratched off or chipped off if the stone is dropped, and stones should not be re-polished. Cleaning drusies in an ultrasonic machine works well for natural stones, but not for coated ones. It is best to follow the precautions and care advice given by the sellers.

Drusy quartz dyed: Natural drusy quartz, just like agates, is commonly dyed in a multitude of bright colours. Cabs cut by Keith Horst.

NATURAL LAPIS VS ENHANCED VS SIMULANT

Lapis Lazuli is a striking rich blue opaque rock, composed of several minerals; lazurite, calcite veins and pyrite crystals are the most predominant. There are only a few well-known mining areas in the world producing fine quality lapis: Russia, Chile and Afghanistan, and they are all ancient deposits.

Pale and mottled material is successfully marketed as 'Denim lapis'. Lapis should be kept away from heat and chemicals, especially in the event that the stones, carvings or beads may be dyed. Simulants include a brightly-coloured man-made lapis crushed for inlays, and magnesite from China, a soft and porous material, dyed blue with added metallic inclusions that simulate pyrite, that truly looks like natural lapis.

Azuzite-malachite carved by Helen Serras Herman: Spectacular specimens of azurite-malachite from Bisbee, like this carved one, now in a private collection, with radiating malachite discs, are sought after by collectors.

AZURITE WITH MALACHITE VS AZURITE/MALACHITE BLOCK

Azurite (Mohs 3.5-4) is a deep blue-coloured copper mineral, more commonly found in a massive, nodular or stalactitic form. Azurite is habitually found together with malachite. The two minerals make a stunning visual arrangement when cut together as a gemstone, often with a combination of drusy and polished surfaces.

A compressed block combination of small natural nodules, azurite and malachite is created by Colbaugh Processing Inc. It is also offered with bronze infusion, which creates a stunning golden webbing pattern.

RAINBOW CALSILICA

Rainbow Calsilica is a manufactured material created and sold by Colbaugh Processing Inc. The material imitates natural quartz with veins of blue chrysocolla and red jasper found in copper mines in Arizona. This colour combination is rare making the natural pieces highly prized.

Tests were undertaken on samples of Rainbow Calsilica at the SSEF Swiss Gemmological Institute laboratory in Basel in 2002. Their final report, as referenced in the GIA's *Gems & Gemmology* magazine in 2002, states that "the samples examined appear to have been made of pulverized carbonate rock (calcite) mixed with pigments and stabilized with a polymer."

CONCLUSION

As lapidaries, designers and collectors, we always look for new gem materials to incorporate into our artwork. The list of all-natural materials is shrinking daily, and the variety of enhanced lapidary materials on the market today is almost overwhelming.

The better we understand these materials, the better we will be able to sell them to our customers. Today's gem and jewellery consumers are educated, and look up to artists and jewellers to alert them about the natural origin of the materials or the technological enhancements that made these lapidary gem materials available, affordable, durable and appealing. ■

ACKNOWLEDGEMENTS

Helen Serras-Herman would like to thank Keith Horst of A & K Gems and Minerals, Marty Colbaugh of Colbaugh Processing Inc, Fred Thiele of Natural Expressions Inc. and Dennis & Larraine Demerly for allowing her to photograph their materials and for sharing their knowledge.

Rainbow Calsilica, natural vs. man-made: Rainbow Calsilica is a manufactured material made of pulverised calcite mixed with pigments and stabilised with a polymer, imitating quartz with veins of blue chrysocolla and red jasper.

All images by Helen Serras-Herman.

From the Aurora Pyramid of Hope collection — rough and polished diamonds. Image courtesy of The Trustees of the NHM, London.

A Spectrum of Diamonds

Curator Alan Bronstein reveals how the world-renowned *Aurora Pyramid of Hope* evolved and shares the story behind his lifelong passion for coloured diamonds.

It is difficult to trace all the challenges, twists and turns, triumphs and failures, which characterise the journey of a dream from fantasy to reality. For me, it all began with one experience, one stone, and one revelation.

In 1977, as a college graduate who could not find a job, it was suggested by my mother Jeanette, the book-keeper at the New York Diamond Dealers Club, that I become a diamond broker.

Such a job only required you try to sell loose colourless diamonds from one dealer to another. Such a job did not require any skills other than banging on doors (you could still do that in 1977) and getting offers on the diamonds you were soliciting. I found it to be one of the least fulfilling ways I could spend my time, as diamonds were already becoming commoditised by the price lists all diamond dealers carried. As a result, the illusion of what might be a visually beautiful stone disintegrated when it was deemed not to fit within the defined parameters of the emerging grading system, which qualified the stone on paper as a commodity.

This was the new standard procedure for doing business. No room for conversation, interpretation or human connection. I was bored, especially because of the innate desire like most people, to strive for personal fulfillment, for creativity and not just to make money. Do not get me wrong, I wanted as much as anyone to make a good living and support my future family with all the material benefits I could provide. But I think the goal of any life is the self-fulfillment of a purpose greater than yourself. I was seeking such a passion for my journey, and I had not experienced one yet.

There came a moment I was ready to let go of this mindless delivery boy feeling. All I was doing was treading water and wasting precious living time. I had not explored the 10,000 other options that were out there waiting for me to find purpose and passion for work.

As fate often intervenes at the moment it is most necessary, just as I was about to make my break for the unknown, I saw something I had never seen in my years as a diamond broker; a yellow diamond that shined like the sun, hypnotising me and opening my mind to something new and exciting. Although it was part of the natural diamond world, it was a well-kept secret. Not because they had no beauty but because diamond dealers did not know how to make money with them, and thought they were the poor cousins to the 98% highly-promoted and coveted colourless diamonds.

There were no discussions about them, they were never advertised and remained an underground trade that was only mentioned among the few aficionados in the diamond industry who collected them as curiosities, simply because they could not sell them.

Into this small group of connoisseurs, I was embraced as a broker and as a peer because of my intuition for recognising the idiosyncrasies within the colours of the diamonds. This small group of mentors allowed me into their private world, and I learned what to keep my eyes open for from their experience and knowledge. This is the ultimate and true way to learn, from the wisdom of experts that have come before you. What a gift to be allowed to study among this exclusive club of dealmakers.

The first thing I learned was not all yellow diamonds have the same colour characteristics. I saw all different colour reflections in almost every stone I looked at carefully. At this time, in 1980, the grading system so highly-regarded in colourless diamonds was generalised in coloured diamonds, to say the least. All yellowish diamonds were called yellow. All pinkish diamonds called pink. Yet when you had an opportunity to make comparisons, you could often see major differences in saturation and colour modifiers that were not identified by the labs.

Instinctively, one could tell that the science of natural colour diamonds was in its infancy and that to determine a greater hierarchy of colours, perceived as more desirable, would be an advantage to finding, selecting, buying and selling the prettiest stones. It was the fork in the road I was travelling.

I set out to find small sample stones that would be my standard for analysing differences that were hard to notice without comparison. These few small sample stones became the foundation for my business and for the concept that would become the *Aurora Pyramid of Hope*.

The Aurora Pyramid of Hope collection — polished diamonds. Image courtesy of The Trustees of NHM, London.

AT SOME MOMENT MY CONSCIOUSNESS GAVE WAY TO THE CONCEPT THAT THE PYRAMID WAS NOT JUST A SCIENCE PROJECT BUT ALSO A WORK OF ART IN A NEW MEDIUM.

Soon my interest and passion turned into an obsession. Every day I would enthusiastically go hunting for unusual diamonds as the colour matrix began to fill in. Often I would see something new, something different, quite often with dealers who did not know what to do with their curiosity. Soon I realised even though many stones had similar colour characteristics and intrinsic colours, when scrutinised subtle differences would become clearer leaning toward a spectral modifier. Even the shape and cut, angles and facet arrangements of the stone would change the appearance of the face up colour.

Diamonds shown are between 0.5-1.5 ct. Copyright Aurora Gems Inc. Image courtesy of Robert Weldon.

This was a turning point, as I decided without the means to do so, that I would try to organise a collection with as many different colours as I could find, afford and obtain. The colour of the stones, many of which one would find extraordinary and many that were commonly seen, would be the primary driving force for gathering. Other factors like size, natural inclusions, and natural phenomena like fluorescence were secondary to trying to find stones that fit the universal matrix of colour in nature and specifically diamonds.

For the last 37 years, beginning with the first sample stone to the present, I have collected 296 diamonds that now compose the Aurora Pyramid of Hope. The collection has gone through a metamorphosis in its composition and its meaning. It has served a great purpose for science, through studies of its colours at museums and laboratories around the world, and revealed many secrets that have advanced our understanding of these rare gemstones.

As the colour matrix began to fill in, it took on a new meaning for me. At some moment my consciousness gave way to

the concept that the pyramid was not just a science project but also a work of art in a new medium. A painting using only unmounted loose diamonds had never been seen before.

I saw humanity in the collection as it grew. All the colours, shapes and inclusions were the perfect metaphor for all the races, colours, religions, faces of people and the infinite personalities that make us all individuals. I am also of the belief that we are related to diamonds, because we are made from the same essence created by the universe – carbon – the key element in all living things. Although natural diamonds seem inanimate, they reveal life through their brilliance.

I have many favourite stones in the collection; some for their stories and some for their extraordinary colours. One such amazing story is when a South American miner showed me a small rough diamond that was opaque and coated black. He had cut one flat surface into the stone so when you peered through this window it appeared green in colour. Many stones like this were colourless inside when you removed the skin coating the stone, which was caused by natural radiation in the ground. Other stones with this outer skin were often black or ground into diamond powder, because they were not considered gem material.

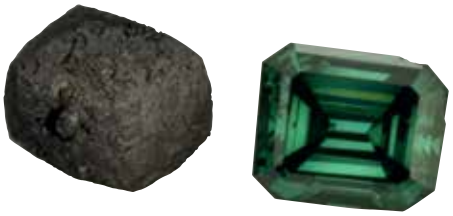
This particular stone was re-examined in the lab during the multiple phases of cutting over one year, to make sure it was the same specimen and that it had not been treated from the previous observation. At the end of the process, to my shock and that of the lab, it emerged as the most beautiful natural green diamond I have seen to this day.

Waterfall: Polished diamonds from the Aurora Pyramid of Hope collection. Copyright The Trustees of NHM, London. Image courtesy of Robert Weldon.

L-R Dr Jeffrey Post, Harry Rodman and Alan Bronstein in front of the Aurora Butterfly of Peace collection at the Smithsonian. Photo courtesy of Alan Bronstein.

The pyramid shape itself has many spiritual and historical meanings that add to the symbolism I have tried to create. As does the name Aurora, the Roman goddess of the sunrise, and the colourful lights that appear at the northern and southern tips of the earth.

When the collection was about to go on display at The American Museum of Natural History (AMNH) in New York, all the stones were in parcel paper and it was at this moment that I had to figure out how to present them. As I experimented with different forms, by laying out stones, it soon evolved naturally into the pyramid shape seen today. It unconsciously pulled me in that direction and I was pleased at its display and play of colours.



Green diamond: the original rough on the left and the finished stone emerald cut on the right. Copyright Aurora Gems Inc. Image courtesy of Robert Weldon.

The collection is, however, dynamic, and I have continued to collect and look for missing pieces to the puzzle. A further 36 stones were added in 2005 when the collection went on exhibit at the Natural History Museum (NHM) in London, joining the original 260 documented in 1998. I also replaced 20 stones that I felt would improve the variety and aesthetics of the original suite, thus the pyramid is greatly improved from its original museum exposure in 1989 at AMNH in New York where it spent 16 years.

The Pyramid of Hope's sister is the *Aurora Butterfly of Peace*; a collection evolved from the desire to make a pure artwork painting with natural colour diamonds. It was a 12 year process of building and arranging its mythic shape. Although the concept behind the pyramid began as science and became art, the butterfly began as an artwork and was also a bounty for science. It is proof that nature is science and art, and nature is the greatest artist of all.

Along with its sister, the *Aurora Pyramid of Hope* is meant to be a universal non-secular artwork and symbol to point humanity to our common purpose for living; hope, peace and love. It serves as a legacy for all mankind. ■

Alan Bronstein is the curator of the *Aurora Pyramid of Hope* with the financial assistance of his late step-father and business partner Harry Rodman.

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TUCSON 2017
A sign of the times

Olga González FGA DGA explains why the 2017 Tucson shows signal an exciting shift in international gemmology.

The tide is turning. After many years of writing about trade events, occasionally a show will stand out as a sign that our industry has shifted. Tucson 2017 was one such show.

Technically, it is not just a show. There are over 40 gem and jewellery related shows in the Tucson and Scottsdale area, and I had 10 days to cover them. Headway was made, but there is never enough time to visit them all. Despite this, I was struck by the palpable shift that seems to have occurred in our industry — something that seemed to permeate the whole of Tucson.

Change fell into three categories, often overlapping, with shifts in: responsibility, generational thinking and design.

1: LOVE Collection Cuff by Atelier Zobel, designed by Peter Schmid. Crafted in 24 kt, 22 kt and 18 kt gold with trapiche emeralds black diamonds and green diamonds.

THE SHIFT IN RESPONSIBILITY

My first stop in Tucson was the two-day Jewelry Industry Summit and it did not disappoint. I was delighted to find that it balanced many interesting topics, while offering a forum for discussing difficult issues of environmental and social responsibility from mine to market.

The second annual Summit empowered every person that attended to become part of the solution, and either join an existing initiative (developed during the debut 2016 Summit), or create and develop a new initiative to help solve its problems or do better for the trade, one step at a time.

Initiatives ranged from a designer collective dedicated to working with ethically sourced gold, to educating grade school students about local stones in Africa, and funding research to find a substitute for mercury. Jeffrey Bilgore, president of the American Gem Trade Association (AGTA), said that he hopes the Summit provides: "Dynamic opportunities to discuss the good that is being done, and where and how we can improve."

Although social and environmental issues have always existed, and discussions have been ongoing, there was a collective sense of urgency for solutions that felt new in Tucson. There are simply too many cracks in the glass to ignore and moves are now being made to fix the problem. Encouragingly, the suggested initiatives were creative and it was apparent that enthusiasm and a shared vision were permeating the shows.

THE SHIFT IN GENERATIONAL THINKING

When interviewing people in Tucson, I aimed to collect a plethora of industry perspectives, including retailers, dealers and designers, in order to get a better idea of where the industry is moving. It seems everyone now accepts that 'millennials' are here to stay, leading many to shift their business models to accommodate them.

First and foremost, there was recognition that selling to each generation is different,

2: Earrings with four Colombian trapiche emeralds (5.82 ct) accented with diamonds by Omi Prive.

and inventory needs to be varied to target generations and their unique set of values. Retailers recognise that, although their 'baby boomer' customers can afford bigger diamonds and like high-quality stones, appreciate traditional settings and value a personal relationship with a store, these values do not necessarily translate to millennial customers (typically aged 18-35).

The millennial wants a story that aligns with their values. They may insist on ethically-sourced and traceable precious metals and stones, or may only want to use a man-made diamond. Similarly, they may want to purchase a piece of fine jewellery that subtly expresses their political beliefs, or that supports

a charitable cause relating to their environment, education or diversity. The way they value experience, ease and customisation has drastically affected retailers, dealers and designers.

In Tucson, several gem dealers reported that their retail partners are requesting more stones without treatments for millennials, stating that while baby boomers prefer the vibrancy of a single colour after heat treatment, millennials aesthetically prefer the more neutral spectrum of colour that occurs naturally in some gemstones. "The market is gravitating towards bespoke and un-treated. People love a custom cut and a custom setting," says Glenn Preus of gemstone wholesaler and pearl supplier, Glenn Preus Ltd. He continues: "Female self-purchasers want the complex colors and undertones. The more neutral palette is easier to match with an entire wardrobe compared to a single, brightly coloured stone."

Some fine jewellery designers present at Tucson reported wiping out their inventories in favour of traceable stones, such as Canadian diamonds. Others noted they are making conscious decisions to phase out inventory that does not include ethically-sourced gems and precious metals, or treated gem materials. This shift will certainly have lasting consequences, but can also provide a wealth of opportunity for companies that position themselves in ways that appeal to up-and-coming millennials. It will also be interesting to see whether this movement, from an environmental standpoint, will also boost the second-hand jewellery market as a 'green' alternative for 'jewellery recycling'. Only time will tell.

> The millennial wants a story that aligns with their values. They may insist on ethically-sourced and traceable precious metals and stones, or may only want to use a man-made diamond.

3: Rhodolite garnet, alexandrite and diamond pendant by Omi Prive.

At the ever-bustling Centurion Show in Scottsdale, Andrew Brown, president of London-based company, WP Diamonds, noted that he has seen "a keen and persistent interest from retailers in antique and estate pieces, second-hand branded jewellery and recycled diamonds."

Retailers are also working with designers to create customisable pieces, with bespoke jewellery now the bread and butter of some businesses. This has made retailers more reluctant to buy large amounts of inventory; although they will invest in designers that have a plan for creating custom work with them, for their customers.

THE SHIFT IN DESIGN

The Tucson shows are eye candy for jewellery design trends, especially in terms of the gemstones used to bring those designs to life. Here's what's hot:

Trapiche Emeralds

I was incredibly excited to see some beautiful trapiche emeralds set in jewellery at this year's event (**1**). The trapiche's unique look comes from carbon impurities in the crystal junction, which form a radial pattern (**2**).

Purple Garnet

Last year, purple garnets appeared as the 'must buy' gem of the show, and now this year, things have come full circle and we are seeing them set in jewellery (**3**). It is only the beginning of what will certainly be a boom, so be on the lookout for this gorgeous gemstone.

Montana Sapphires

While walking through AGTA, there was a booth that stood out as being packed at all hours of the day — Columbia Gem House. The company had a large space, incredible sales staff, and many gem wares, but most importantly, they represented the growing trend of American gems being set in jewellery. They were selling Wyoming rubies, Montana amethyst, but by far the most popular American gemstone seen at the shows was the Montana sapphire (**4**).

4: Montana sapphires by Sapphires of Montana.

Lisa Brooks-Pike from Sapphires of Montana, also saw a lot of gem show traffic, noting: "Since the 2016 Tucson GemFair, we have seen a significant increase in interest and sales of our Rock Creek Montana Sapphires, so it shouldn't have been such a surprise to us that we experienced overwhelming traffic at our booth this year. What is truly exciting is that 90% of our business is millennial designers designing for a millennial clientele in both engagement rings and in collections unlike anything we've seen before. Montana's have finally found their place in jewellery design for the first time since Louis Comfort Tiffany at the turn of the 20th century. We couldn't be happier." This trend does seem to be one for American designers though, who

5: Two rings set with Montana sapphire centre stones by Sapphires of Montana.

are looking to add 'American Gemstones' to their 'American Made' repertoire (**5**).

Another local gemstone that was making a splash was the Oregon sunstone. One GJX designer, Alexander Kreis, beautifully captured both of its contrasting orange and green colours in a pair of handsome cufflinks (**6**).

He says of the design: "Every gem is a fingerprint of its origin and we try to capture this unique beauty with every piece we encounter."

Burmese Everything

With the lift on the Burmese ruby and sapphire sanctions recently, Burmese stones were at the front and centre of booths at GJX and AGTA... and it was lovely to see (**7**). There were also quite a few large stars, and some interesting cuts. My personal favourite was the return of the sugarloaf. Of note were many Burmese spinels, in which purple seemed to be doing particularly well for dealers (**8**).

6: Oregon sunstone cufflinks by Kreis Jewellery.

"OUR RAREST STONE IN THE BOOTH THIS YEAR WAS A 3.18 CT REMONDITE"

John Bradshaw GG, of Coast to Coast Rare Stones International, gives his thoughts on this year's crop of shows in Tucson.

Like moths to a flame, so do those involved in the gem, mineral and fossil industry gather in Tucson each year. This year was no different with over 40 venues in town ranging from wholesale only to retail vendors, from high-end goods to what might have been best left by the side of the road.

For those who have never attended the Tucson gem shows, I highly recommend it to find virtually anything and everything in gems, minerals, and fossils available under the sun.

As if the days were not busy enough, there were nightly events to network and meet with old friends, as well as making a few new ones. Early reports from Tucson 2017 were mixed. With an estimated 4,000 vendors in town, those that featured unusual and one of a kind material did very well, while those that had 'run of the mill' or overpriced goods struggled to make expenses. In speaking with other dealers that had a successful show, blue sapphire, pastel sapphire, tourmaline, spinel, aquamarine and garnet were best sellers.

Overall, the feeling was that traffic was down this year, but our booth at Gem & Jewelry Exchange (GJX) for Coast to Coast Rare Stones kept extremely busy for the first four days then trailed off a bit for the last two days. The rare, unusual and exotic stones are all that we display in Tucson, while our sapphires, tourmalines, garnets, beryls and zircons take a two week holiday. This year, over 125 species were represented at the booth. As is always the case, benitoite, rhodochrosite, sphalerite, apatite, jeremejevite, fluorite, and cerussite were popular items for dealers, retailers, designers and collectors.

Our rarest stone in the booth this year was a 3.18 ct remondite — a rare earth carbonate from Canada with a colour change of neon yellow to pumpkin orange from fluorescent light to incandescent light and daylight. Other examples of one-of-a kind gems at the booth were hibonite, carletonite, gorgeyite and stibiotantalite.

A tray of rare stones, including remondite, exhibited by Coast to Coast Rare Stones in Tuscon.

Rare gemstone specimens exhibited by Coast to Coast Rare Stones in Tucson.

7: Cushion-cut 2.59 ct Burmese sapphire as seen at Glenn Preus Ltd.

8: A 9.5 ct Burmese spinel as seen at Glenn Preus Ltd.

9: Sunset bridal ring by Audrius Krulis in 18 kt yellow gold and tourmaline.

PERFECT PEARLS

Gem-A marketing and events manager, Elaine Ruddie DGA, reveals one of her highlights from Tucson 2017...

As a gemmologist I spend a lot of time 'ooh-ing' and 'ah-ing' at stones. For me it is usually feldspars or opal-anything that shows iridescence or combinations of colour. It is rare that a finished piece of jewellery will stop me in my tracks, especially if it does not contain the aforementioned stones, but I had this experience in Tucson at AGTA.

The Cultured Pearl Association was showcasing a number of unique pearl designs but one necklace in particular stood out. I was struck by the size of the perfectly round pearls and by the intricacies in the organic design.

On talking to Brenda Smith, the talented designer behind this necklace, I learned that the pearls used are the largest freshwater, round, cultured pearls in the world. There are only 27 of them in existence and they range in size between 21.5 mm to 18 mm. Brenda was commissioned by the Somewhere In The Rainbow collection to create an 18" necklace from the pearls that, if strung, would have been about 21"-22". The solution was to cluster them. The necklace is entirely hand-crafted and the attention to detail is superb.

Smith explains: "I love designing with organic forms. Since the pearls were the focus of the necklace I decided to accent them with 18 kt gold leaves and flower buds containing multi-colored sapphires and diamond accents. Ten of the pearls have 1 mm diamonds simulating dew drops. The leaves and buds were carved in wax and cast in 18 kt. The vines themselves were also fabricated in 18 kt. The necklace itself actually sits on the neck rather than hanging from the neck."

To see more visit Brenda's website: brendasmithjewelry.com

Brenda Smith wearing her unique pearl necklace.

Freshwater pearl necklace in 18 kt gold and accented with sapphires and diamonds by Brenda Smith.

Pretty in Pink

Engagement rings do not look like they used to. Pink sapphires, morganite and pink tourmalines offer an opportunity to get the larger size brides want, at a more affordable price. The JCK Show at Starr-Pass is the go-to show for design driven jewellery, where many forward-thinking makers exhibit. New York-based Lithuanian designer, Audrius Krulis, comments: "Diamond engagement rings have long had a history of symbolising the purity and strength of love. To me, the engagement ring brings up the question: 'What does love mean?' Everyone will find their own answer; to me it can be seen in enchanting hues and tones of colored gems."

The pink center stone may have a halo of diamonds surrounding it, or may be flanked with retro baguettes. Either way, it's a good look (**9**). ■

The Tucson Experience — what makes the show so special?

Our IT and infrastructure manager, Charles Evans FGA DGA, explains what makes Tucson so exciting for Gem-A and the international gemmology community.

Tucson is both exhilarating and exhausting. But let me qualify that by saying that my own fatigue will be significantly less than that of our North America manager, Eric Fritz, who will have sleepless nights in the run-up to the Tucson shows and, when we head home, he has to tidy everything away and follow up on all the plans and deals that are sealed during the shows.

So what is Tucson to a gemmologist? In the field of gemmology, it is the biggest, best known, most diverse and yet most concentrated collection of people and products one will ever see together in the course of a year and out of all the other shows that one could attend around the world. It is the opportunity to see and buy every gem or mineral you ever read about, often from the people who are directly involved in their discovery, extraction, polishing or mounting. It is the opportunity to do this daily for weeks either side of the peak fortnight where the AGTA and TGMS shows dominate the wonderful Tucson Convention Centre.

It is the opportunity to meet the people who wrote the books you studied to learn your profession (Alan Hodgkinson, Bill Hanneman, Renee Newman, Antoinette Matlins, Richard Hughes, Richard Wise, Gloria Staebler, John Koivula). It is the opportunity to hear them, or any one of the eminent names in gemmology, talk at any one of the conferences that are held in Tucson by any one of the associations that go there precisely because everyone with a gemmological interest will be present.

Why does Gem-A go to Tucson? What do we get out of it? What do you, as a Gem-A member get out of it? I will provide an answer and I will keep it simple. To a staff member, just one obvious reason is that we are there for our amazing American members, sponsors, tutors and supporters who stand behind us despite the other obvious option in the USA. We engage with important industry players like JTV, JIBNA, World of Color, Somewhere In The Rainbow, Gemewizard, GemmoRaman. We share discussion platforms with Gübelin, Lotus Gemology, AGL, GIA, CGA, EGM, GIT, Mindat and SGL. We attend functions with associations like the AGTA, ICA, GIA, AGS NAJA, and AGA. We see people we will not see at any other point in the year, Australians, Taiwanese, Sri Lankans, Thais, Brazilians, Colombians, and Chinese. Our fellow Europeans from Idar-Oberstein are all conveniently located on one pavilion. We watch progress that is being made by people who cook and create gem materials, improving year upon year and we see the legends like Tom Chatham.

We deliver the British viewpoint with pride. Through participation and engagement; through talks and workshops that we deliver as well as those of others that we attend, so it is that we learn and we give our learning.

For all our other members, we follow up on the rumours and snippets of information. We hunt down the next conference speakers and cajole them into sharing, in London, what might never otherwise reach an audience.

Pyrite and quartz. Photo credit Barbara Kolator.

Our Big Gem Bash is where, thanks to the generosity of JIBNA, every tier of gemmologist, from every sphere of gemmology, will congregate for a couple of hours in one amazing venue with no name badges or pressures. What emerges is a new level of respect for our association. An organisation that through dedicated and hard-working staff will continue to add value to all those associated with us. This is then reflected in the opportunities that present themselves, like our association with Arizona State University, one of the top few universities worldwide in the field of mineralogy.

If you are a Gem-A member, you may still wonder what this means to you. It means that by association, by your own personal investment in professional improvement and our drive for excellence, you can take pride in being part of something truly special. ■

... it is the biggest, best known, most diverse and yet most concentrated collection of people and products one will ever see together...

North America manager Eric Fritz FGA describes his experiences of the recent gem, mineral and fossil shows held in Tucson Arizona.

Tucson, Arizona... the Wild West, especially during the world's largest gem, mineral and fossil shows taking place over three weeks beginning in late January. Gem-A was present in full force bringing our message of quality education to participants from around the world.

A typical day started early and ended late with networking events nightly. While Gem-A has a worldwide presence, we are not always well-known here in North America, which is why I am happy to take this opportunity to report on the event, in the hope that exposure will move us forward.

Events started off with the National Association of Jewelry Appraisers (NAJA) conference, which over 120 people attended. I presented an organics workshop with an emphasis on ivory and its simulants; quite the challenge for such a large group but numerous displays, plus sets to differentiate modern from fossils, held the room's attention. Gem-A CEO Alan Hart FGA DGA provided the keynote address on 'A Modern Evaluation of the Koh-i-Noor Diamond'. It was grand exposure and the information Alan has worked on for years drew many questions and comments.

Gem-A senior gemology and diamond instructor Claire Mitchell conducting one of her popular, hands-on workshops.

Setup for the next show overlapped and transitioned nicely: a table in the Galleria of the most prestigious show of the year, American Gem Trade Association (AGTA). The main emphasis was on our courses with many present and past students stopping by to say hello. I also presented a seminar during the week, along with Chris Smith and Alan Hodgkinson FGA DGA. Opening day was followed by a night at the museum, the University of Arizona Mineral Museum. The featured year-long exhibit for 2017 is the Somewhere In The Rainbow Collection, because a safe is no place for jewellery. Gem-A took an active role providing historical testing equipment for the exhibit. The reception was sponsored by AGTA and featured past Spectrum Award winners.

The Accredited Gemologists Association (AGA) Conference gave a nice mid-week break with intensive sessions on 'cutting edge gemmology'. AGA had its origins with Antonio Bonanno, father of Gem-A board member Kathryn Patrissi PG FGA. The original mission of the organisation was an alumni group for Gem-A. Antonio taught gemmology in Washington DC for students to sit our exams... an early teaching center, before they even existed. Claire Mitchell FGA DGA provided the first hands-on session ever offered at AGA, with overwhelming success. They are already asking for topics for 2018.

Thursday was Gem-A's Big Gem Bash, sponsored by Jewelry Insurance Brokerage of North America (JIBNA). Gem-A's signature event continues to grow in numbers as well as complements, offering a who's who of gemologists, dealers and appraisers the chance to network. There is no agenda, just a gathering of like-minded participants. Gem-A's renewed historic partnership with the Canadian Gemological Association was announced, as well as new incentives in North America.

A second opening at the U of A for the mineral crowd — the AGTA Spectrum Awards — rounded out week one.

One day to catch up with old friends then back to education. The Tucson team that remained was grateful to M & A Gemological Instruments (MAGI) for an intensive hands-on advance gem testing session. FTIR, UV/VIS and Raman were explored and demonstrated to team members. Having the knowledge to share with students on what can and cannot be done with advanced instrumentation is essential in this day and age.

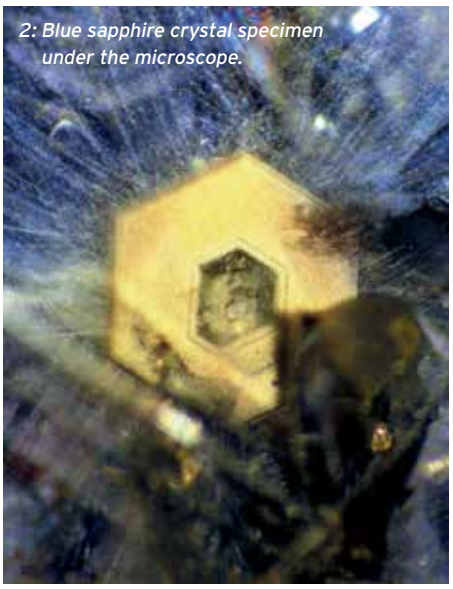
297 ct hand-carved ametrine by Naomi Sarna – 1st place winner of the 2017 Spectrum Award for Carving.

In the final week, Claire and I attended the main Tucson Gem and Mineral show, hosting over 20,000 attendees. Friday brought in school groups, for which we had prepared stations with each of our instruments, as well as simple explanations of the stone reactions and what that meant. The assumption that we might hold attention through just one test was quickly dispelled. Most students went down the row. All it really takes is a bit of time and who knows where the next great gemmologist will come from! Despite feelings of exhaustion, we were gently reminded why it is we do what we do! Missed the show? See you next year. ■

Buried Treasures

Anthony de Goutière GG rediscovers a sapphire crystal specimen with unusual properties in his personal gemstone collection.

1: Blue sapphire crystal specimen.



2: Blue sapphire crystal specimen under the microscope.

3: Orange sapphire crystal specimen.

While tidying up an old box of gemstone specimens that I had not looked at for about 20 years I found this blue sapphire crystal specimen (**1**) and put it under the microscope. A beautiful rutile hexagon floating on a blue background appeared (**2**).

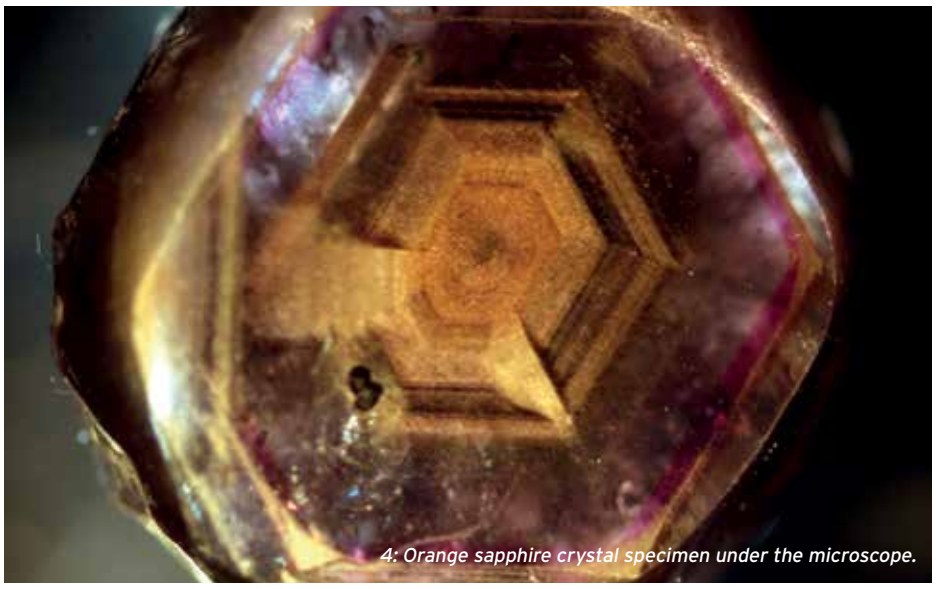
It was quite a surprise and I wondered how I had missed it 20 years ago. Further searching in the old box produced this orange sapphire crystal specimen (**3**), which revealed the same type of rutile hexagon and colour zoning plus extra hexagonal bands (**4**).

I purchased these specimens from Kusum Naotunne at the Tucson Gem Show in 1996. She was from Sri Lanka and, in later years, she sent me little water colour sketches of specimens with inclusions. I purchased many specimens from her, based on her drawings and written descriptions, and was never disappointed.

The terminal face on the blue sapphire was smooth enough not to need polishing and the orange sapphire had been polished on the terminal face.

This rutile growth zoning is very beautiful, and it only reveals its splendour under the microscope. There is a cluster of small liquid and gas inclusions in the centre of the hexagon in the blue sapphire. The rays of microscopic rutile needles add to the beauty of the scene. ■

All images by Anthony de Goutière.



4: Orange sapphire crystal specimen under the microscope.

Gem-A
INSTRUMENTS

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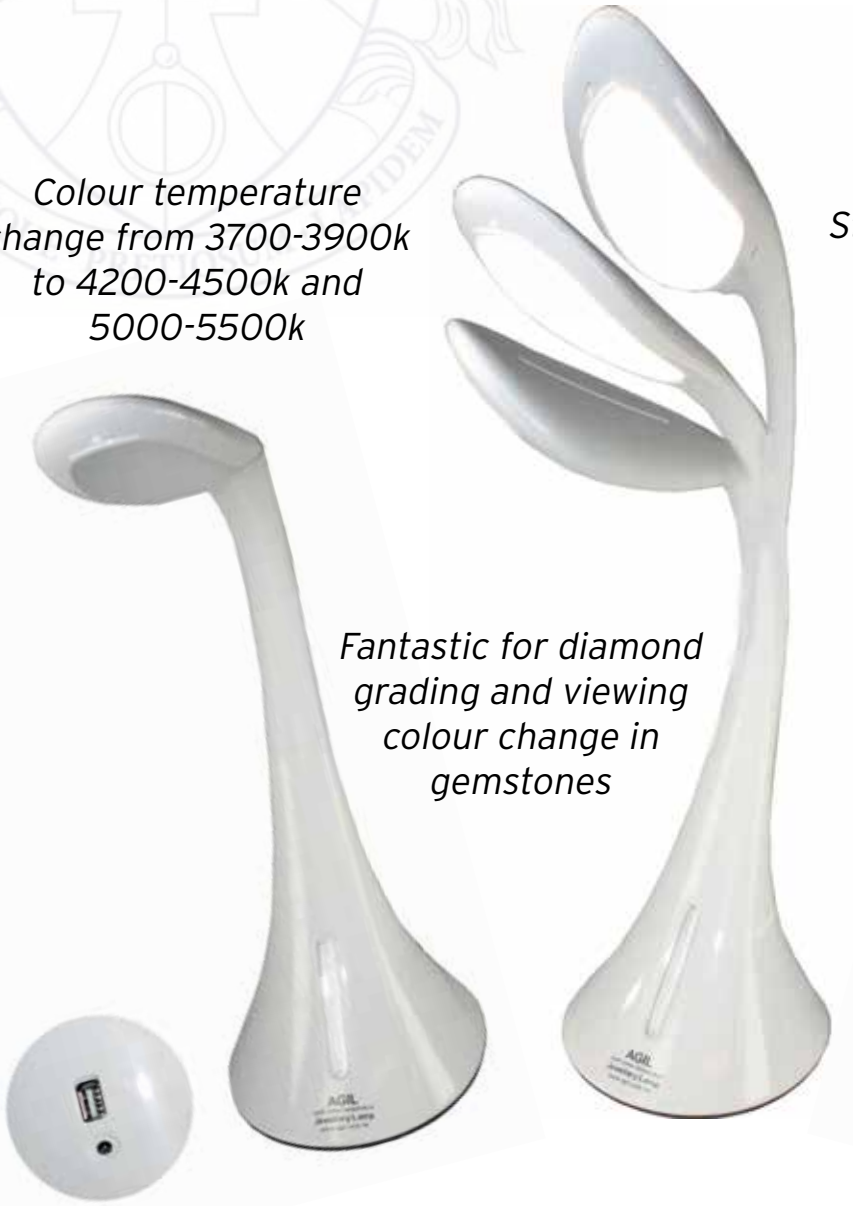

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A Lifetime of Expertise

Rosamond Clayton FGA DGA FIRV MAE, a gemstone specialist and jewellery valuer, is often called upon as an expert witness in trials to identify and value precious stones. She talks to Gem-A deputy editor, Angharad Kolator Baldwin, about her career.

When did you get started in gemmology?

I had been working in Hong Kong on a contract posting when I married in the 1970s and I needed to find a new and interesting career. Fortunately, my search for a fulfilling subject to study coincided with the arrival of Marcia Lanyon FGA in Hong Kong, whom I met at a friend's house one evening.

I was soon enrolled on a foundation gemmology course and quickly became a fanatic. Many in our trade will recognise this 'disease'. When I visited China in 1973 for a business trip with my husband, we were each only allowed 15 pounds of luggage, including handbag and camera; *Webster's Gems* formed part of this allowance!

I took my foundation exams in Hong Kong in 1974 and passed, but it was diamonds that interested me and therefore I needed to study for the Diamond Diploma. I was helped by Noel Deeks FGA DGA who taught the practical diamond grading at Sir John Cass College in London, but there was nowhere to study in Hong Kong, so I partly commuted to London (subject to load on British Airways). Noel Deeks introduced me to a Mr Shun Wai Woo FGA DGA, the only DGA in Hong Kong at the time, who worked in a senior capacity with his cousin, who had started the only diamond manufacturing company there.

In addition, through a friend, I was introduced to Bill and Joan Hsu who had studied the residential GIA diamond course in Santa Monica and returned to Hong Kong to run a diamond wholesale business. I went to their office at least once a week and graded all their stock; they taught me how to survive in business in Hong Kong.

How did you transition to the world of valuations?

When Marcia Lanyon left Hong Kong she passed her consultancy work with the Hong Kong tourist association on to me, so by this time I knew most of the retailers. My boss at the time, a shrewd Chinese business woman, saw an opportunity to open up new accounts with these retailers. After three years I moved to a retailer in Kowloon on the mainland, called Tse Lee Yuen.

One Monday I was instructed by my employer that I would become the valuer! I was to value all the customers' diamonds and jadeite. My protests fell on 'dead ears' as I was told my English was better than my Chinese colleagues' and the valuations had to be written in English – there were no typewriters with Chinese characters – therefore there was no argument.

Rosamond Clayton in Hong Kong, 1981.

A great deal of research is required, sometimes many months just for one item. No other type of valuation work provides this opportunity.

How did your own business evolve?

In 1985 I set up my own valuation business in Hong Kong, which I sold when I returned to the UK in 1987. Initially, on return to the UK, I rented space with jewellery designer John Donald at 120 Cheapside who I knew through Marcia Lanyon. It was a matter of going back to the start on the Monopoly board, only saved by the fact that the NAG and Gem-A

Rosamond Clayton and her colleagues from the Institute of Registered Valuers.

Loughborough 2002 Valuer of the Year. Photo credit Vicky Morrison.

were housed together in Carey Lane (in close proximity to Cheapside), and I was soon taken under the wing of Philip Stocker FGA the NAG in-house valuer. He introduced me to the Academy of Experts, who provide training for those taking instruction as expert witnesses.

Have there been any memorable moments that really stand out?

I have always enjoyed travelling abroad for work and my most memorable business trip was for a Chinese friend, who was chairman of a marine diamond mining company in Namaqualand, looking at the possibility of cutting diamonds mined there in Hong Kong or New York, where he lived.

My cousin was working as a commercial pilot in South West Africa (now Namibia), so I flew to Windhoek with a commercial airline and she flew me from Windhoek to the mine in a Beechcraft Bonanza. We stayed the night at Okiep near Springbok, about 500 miles from Windhoek and the next day to De Punt, North of the Oliphants River.

In earlier times this river was much larger and brought the diamonds down, it is thought from Lesotho, exiting into the Atlantic and carrying the diamonds north with the current, in the same process as the Orange River at a later stage. Due to the rough sea conditions, the members of the mining franchises were only able to dive on average four times a year and I was fortunate to be there on one of these occasions. Apart from a substantial yield of fine quality diamonds they brought up crayfish for our evening barbecues.

Can you tell us a little bit more about your profession and what makes it unique?

I had been instructed as an expert in jewellery cases in Hong Kong and this work in the field of gemstones and jewellery had always held the greatest interest for me. Importantly, it is necessary to train to supply reports as an expert witness in court proceedings and it is now becoming a requirement by the courts, not merely a wise precaution. The cases are varied but the civil cases frequently involve post loss assessment, divorce or some aspect of alleged unethical trading.

A case set down for a High Court hearing can last a number of years from the preliminary report to additional reports in light of new evidence, experts meetings and finally the hearing which can frequently last a week or a number of weeks. A great deal of research is required, sometimes many months just for one item. No other type of valuation work provides this opportunity.

What would your advice be for anyone who wants to get into what you do?

For aspiring valuers today it takes time to obtain the required qualifications and experience and the process may seem costly. However, it would be hard to find another field of interest with so many enthusiastic and generous people willing to give their time and knowledge. As a valuer, even once the initial qualifications are obtained, without the wealth of knowledge available and help from those in specialist fields, it would not be possible to operate. In addition there is not a moment to lose in grasping every opportunity for further knowledge and training in every aspect of our rich world.

My own career in the field of gemstones and jewellery has been a long and challenging path and, at the outset, I had not entertained the idea of being a valuer but I believe that there has been a revolution in the methodology of jewellery valuing in the UK and I am proud to be a part of it. ■

TOP TIPS: BECOMING A VALUER

Essential qualifications: Gemmology, diamond grading, Certificate of Diamond Grading (CAT). Join the National Association of Jewellers Institute of Registered Valuers (NAJ IRV).

Concurrently with obtaining qualifications: Try to obtain experience with a diamond wholesaler, coloured stone wholesaler or manufacturer.

Network: It is impossible to operate even as an experienced valuer without contacts. Visit auction houses, museums, attend lectures and most importantly attend The NAJ Loughborough Conference where workshops and lectures are provided on every imaginable valuation topic.

Rosamond Clayton at the London Diamond Bourse in 2016.

> Be aware that the road to valuing is not a structured path but if you are determined to succeed you will.

The Sights of Spain

1. The 'Cruz de los Ángeles' (as seen in December 2015).

Gem-A Online Distance Learning (ODL) student Carmen Garcia-Carballido FGA L. Geology MSc EurGeol shares her 2016 Gemmology Diploma project, honing in on a Pre-Romanesque jewelled cross at the Oviedo Cathedral in northwest Spain.

This is a gemmological review of the *Cruz de los Ángeles* (Angel's Cross), a Pre-Romanesque jewelled cross on permanent display in the Cámara Santa (Sacred Chapel) of the Oviedo Cathedral (Asturias, northwest Spain). The cross dates from 808 AD and is richly adorned with gold filigree and gemstones.

This paper highlights the historic significance of this emblematic cross and provides a description of the adorning gemstones. The *Cruz de los Ángeles* has suffered robbery and pillage throughout history, and has had various restorations. Using available literature, it is possible to trace the history of some gemstones we see on the cross today. This paper brings together history, jewellery and gemmology. It has been researched through Spanish sources and here it is presented in English.

THE CRUZ DE LOS ÁNGELES

The *Cruz de los Ángeles* (**1**) is on permanent display, alongside many other treasures and reliquaries, in the Capilla de San Miguel, the upper floor of Oviedo's Cathedral Cámara Santa (Asturias, NW Spain).

The Cámara Santa, is a Christian pilgrimage site, whose foundations date from the ninth century, and was declared a National and World Heritage Monument by UNESCO in 1989 (López Fernández, 2011). This jewelled cross, the symbol of the city of Oviedo and the coat of arms of the Oviedo diocese, is an irreplaceable treasure of great historic significance for Asturias and Spain.

The *Cruz de los Ángeles* was commissioned by King Alfonso II El Casto (791-841 AD) who donated it to the basilica of San Salvador in 808 AD; this church evolved into Oviedo Cathedral. Its name comes from two angels set on each side of the cross. According to the Crónica Silense (dated 118 AD) angels made the cross (Franco Mata, 2010). Today the cross is believed to have been made by two goldsmiths from northern Italy (García de Castro Valdés, 2008) who visited the Asturian court (Cid Priego, 1997). The angels were added many centuries later.

The cross unfortunately suffered damage in thirteenth century wars, during the Asturian Revolution of 1934 and an infamous robbery on 9 August 1977.

Documentation on the restorations carried out after each of these events, when gemstones were damaged or stolen, provides vital clues on the description and number of the gemstones adorning the cross at different stages in its history.

The *Cruz de los Ángeles* is a Greek cross (i.e. all arms have approximately the same length) made up of two pieces of yew/cedar (Schlunk, 1950, and Manzanares Rodríguez, 1972); cherry wood was used during the

last restoration. The arms meet in a central disc of 8.5 cm diameter. The arms, which become wider towards the edges, measure 46.5 cm and 45.0 cm and have a thickness of 2.5 cm (Cid Priego, 1996). There are 10 gemstones on each lateral arm and on the upper arm, nine gemstones on the lower arm and nine gemstones on the central disc (Franco Mata, 2010). Some of the gemstones are classical (Roman) intaglios and have been documented by Salcedo Garcés (1987), Perea Yébenes (2006) and Arias Páramo (2014).

The front of the cross is completely covered with intricate gold thread filigree and has 48 gemstones in 'box' settings. Such goldsmith techniques are of Byzantine style (Schlunk, 1950). The back of the cross is totally covered by a gold sheet with inscriptions. It features a large central cameo surrounded by a ring of pearls and other stones, and also four gemstones located at the extremes of the cross, each surrounded by a similar ring (**1**).

*2. 1988 '*Cruz de los Ángeles*' reproduction from the original hand drawings by Amador de los Ríos made in 1860, and first published in 1877. Photo credit César del Amo García.*

> The cross suffered considerable damage after the Cámara Santa was blown up on 11 October 1934. Of the initial (pre-1934) total of 393 main stones and beads, only 106 stones and 108 pearls were found after the explosion.

Cid Priego (1996) cites a Medieval codex (Gutierrez de Toledo, 1385) stating that at the time, the *Cruz de los Ángeles* displayed several cameos and 49 stones.

The first detailed drawings and description of the *Cruz de los Ángeles* and its gemstones dates from 1860 (**2**). This original work was reproduced in Amador de los Ríos (1988), where 48 gemstones are named on the front of the cross as agate, amethyst, sapphire, topaz, cornelian, onyx, opal, emerald and rock crystal. Eight of the stones were in the central medallion around a significant ruby (we will never know if this was indeed a ruby. Nowadays a rock crystal is in its place).

Five Roman signets were described on the front of the cross. The back of the cross had five medallions located on the extremes of the arms and in the centre. The top rectangular colourless gem (**2**) no longer exists. An oval amethyst can be seen there today (**1**). Each medallion was surrounded by two circles of pearl, amethyst and emerald beads threaded on gold (some rings were already incomplete in 1860 as seen in (**2**)).

The cross suffered considerable damage after the Cámara Santa was blown up on 11 October 1934. Of the initial (pre-1934) total of 393 main stones and beads, only 106 stones and 108 pearls were found after the explosion.

During the 1941-42 restoration, several stones of modern cut, artificial stones and modern coral beads were added to make up a total of 383 stones and the broken cameo on the back of the cross was restored. The front medallion conserved a large pyrope garnet cabochon (25x21.5 mm) surrounded by eight stones — rubies, sapphires, amethysts and opals (Cid Priego, 1996); this garnet might be the 'ruby' mentioned in 1860. Four rubies, two sapphires, four amethysts, several agates and some rose quartz are also recorded (Manzanares Rodríguez, 1972).

A robbery in August 1977 almost destroyed the *Cruz de los Ángeles*. The wood, the delicate goldsmith work and gemstones were all affected. The great Roman cameo, restored in 1942, disappeared. A modern agate replica was made in 1985 (Perea Yébenes, 2006). The thief was soon caught and many stones and parts of the cross were recovered.

As part of a new painstaking and very detailed restoration phase, a gemmological study was commissioned at Oviedo University's Crystallography and Mineralogy Department (Álvarez, Campon and Moreiras, 1985). The study focused on non-destructive physical testing of 46 gemstones (mostly cabochons) removed from their settings during the robbery. 30 were identified as natural gemstones: six rock crystals, five amethysts, one rose quartz, six chalcedony (all varieties of quartz), three blue sapphires (variety of corundum), two almandine garnets, two fluorites, one beryl, one turquoise and one possible flint. Eight of these gemstones are engraved with figures and six of them show notches. The remaining 16 stones are artificial,

3. Gemstone distribution on the front (upper image) and back (lower image) of the 'Cruz de los Ángeles' after the 1977 robbery. Hand-drawn and not to- scale from Álvarez, Campon & Moreiras (1985). Colours do not represent the actual stone colours, and shapes are approximate. Gemstone numbers relate to (4).

man-made glass/paste. 12 acquired their colour during fusion and four were coated after the glass was created. The beads in rings on the back of the cross were identified as pearls and paste of various colours; whereas in 1860 pearls, amethysts and emeralds were described.

The following tests and descriptions were carried out by Álvarez, Campon and Moreiras (1985) on the gemstones studied: weight, shape and dimensions, specific gravity (SG), colour, 10× loupe and microscope observations, inclusions description and microphotography, polariscope, conoscope, dichroscope, and spectroscope. When possible, one refractive index (RI) reading was taken (as the majority are cabochons).

Key features are described below by gemstone type and (**3**) shows the distribution of stones at the time of the study.

Glass (paste)
16 stones of various shapes, most round or oval cabochons (some are pear-shaped, square or rectangular). A few are small round beads; one rectangular glass stone has inclined side facets (a simple table cut). Colours included red, blue, white to milky, green and light purple. Some were isotropic, but many showed anomalous extinction effects (due to internal strain). All showed clear bubbles; some contained dark brownish-grey elongated inclusions. No SG data and a single RI value of 1.52 was taken.

Amethyst
All five stones are double round or oval cabochons, mostly light violet coloured; one shows colour banding. All are anisotropic, some showed uniaxial character. Typical inclusions observed are: feathers and veils, isolated crystals and two-phase inclusions. No SG data was taken. Consistent RI values of 1.54.

Rock Crystal
All six stones are oval. One is a bead, the rest are cabochons (half of them are double). Most stones are colourless, one has an Iberian god painted (Perea Yébenes, 2006). Typical inclusions are: fractures, veils and feathers and two-phase inclusions. No SG data was taken. A typical RI value of 1.54 was taken.

Chalcedony
Five out of six stones are flat oval plates (flat top) of various colours: light brown, black and blue, black and white, and orange. Some have beautiful carvings of deities: Minerva, Fortuna, Hebe, Mercury documented by Salcedo Garcés (1987), Perea Yébenes (2006) and Arias Páramo (2014); see (**4**) for illustrations.

As most are opaque, only two stones showed a few (rounded) inclusions. A typical RI value of 1.54 was obtained. Just two SG values of 2.56 and 2.61 were taken; the 2.56 SG value appears low for chalcedony.

A reddish-orange double cabochon ('Gem 29' amulet in (**4**)) has rounded inclusions aligned in bands and showed isotropic character. This optical character is not expected in chalcedony, therefore the stone could be glass.

Rose Quartz
Just one oval double cabochon of light pink hue with an RI of 1.55. No SG data was taken. Anisotropic stone with uniaxial character. Variety of inclusions, some two-phase.

Fluorite
Two large oval beads of colourless to milky hue; one shows breakage along the cleavage. Strain anisotropy observed. RI of 1.45. No SG data was taken. Negative crystals and two-phase inclusions.

Almandine Garnet
Two red cabochons, one oval and the other square. No SG data was taken. Two RI values of 1.76 and 1.79 were taken. Some anisotropic behaviour (garnets are optically isotropic, but often show anomalous extinction effects). Typical inclusions observed: veils, small crystals, some arranged in groups or parallel bands.

Sapphire
Three oval, pear-shape and round large beads, two light blue and one milky to colourless. Anisotropic, uniaxial character and dichroism (colours not reported). Only one SG value of 3.99 taken. RI values of 1.75 and 1.76 taken.

*4. Roman carved gemstones from the 'Cruz de los Ángeles' (modified from Perea Yébenes, 2006 and reproduced with permission of the author). Stone numbers refer to (**3**).*

> The Byzantine-style cross has survived pillage and robbery and has been restored several times... Little is known about the exact provenance of the gemstones, some of which have classical (Roman) carvings, but it is believed that they came from ancient royal treasures.

Typical inclusions reported are: veils, two-phase inclusions, some are elongated and grouped together.

Beryl
A single faceted stone with table and two sides faceted of light green hue. SG measured 2.72 and an RI of 1.58 was obtained. It was not possible to obtain a spectrum. Elongated inclusions and also negative crystals with bubbles.

Turquoise
A single intaglio opaque stone cut as an oval plate (flat top) of greenish-blue hue with a carving of Aeneas fleeing Troy carrying his father Anquises, and leading his son Ascanio, by the hand (Salcedo Garcés, 1987). A SG of 3.12 was taken, but this is too high for turquoise. Maybe other heavier material was part of the stone or the identification is incorrect. The colour picture of this intaglio, Gem 11, shown in (**4**), does not look like a typical turquoise; nonetheless, Egyptian turquoises can be quite green. It was not possible to determine any RI. Few brownish-grey inclusions seen.

Flint(?)
A single stone of 'dark brick' hue, cut as an oval plate (flat top) and showing the carving of an allegoric demon (Gem 49, (**4**)). No SG data was taken. A 1.52 RI value was obtained. No information on optical character nor inclusions. Three healed fractures cross-cut the stone, one is a micro-fault showing displacement. This stone could be jasper.

SUMMARY

It is believed that the original gemstones used to decorate the cross belonged to King Alfonso II El Casto. They might have been a legacy from his ancestors.

Some could have been purchased or received as gifts or taken by his Visigoth ancestors as booty. Fluorite and all the quartz varieties might be native Asturian, but were they cut locally? It is significant to find so many pagan intaglios and amulets in a Christian sacred cross. In any case, it is remarkable that we can still admire these gemstones and the cross.

CONCLUSIONS

The *Cruz de los Ángeles* is a treasured jewel from the early ninth century, which is decorated with intricate goldsmith work and profusely adorned with gemstones. The cross is on permanent display in Oviedo Cathedral (NW Spain).

The Byzantine-style cross has survived pillage and robbery and has been restored several times. As part of the last reconstruction after the robbery in 1977, archaeological and gemmological studies were carried out. Little is known about the exact provenance of the gemstones, some of which have classical (Roman) carvings, but it is believed that they came from ancient royal treasures.

ACKNOWLEDGEMENTS

I wish to thank the following individuals for their assistance during my research: César García de Castro Valdés (archeologist) and Sofía Díaz Rodríguez (librarian) both from the Archeological Museum of Asturias (Oviedo); José María Hevia Álvarez (Dean of the Cathedral of Oviedo); and Mariasun Serrano (Archpriest Oviedo Diocese). ■

Complete bibliography available upon request. All images belong to Carmen Garcia-Carballido.

"We should not rush to a solution purely on the basis of emotions as it may not truly benefit the animals"

Maggie Campbell Pedersen FGA ABIPP provides an update on UK law regarding organic materials such as ivory.

Ivory remains much in the news. We are all extremely concerned about the plight of the elephant — and rightly so. Unless something is done to protect the animals (and that goes for all ivory-bearing animals, not just elephants), there will soon be none left. The situation, however, is complicated, and it is questionable whether a total ban on all sale or movement of ivory is the only answer. We should not rush to a solution purely on the basis of emotions as it may not truly benefit the animals.

Ivory has been carved for about 40,000 years and is used world-wide. It has been a part of the culture of many countries, and was used long before there was a poaching problem. To destroy a magnificent Medieval carving, to prise the ivory inlay out of a piece of antique furniture, or to rip the keys off an old piano will not bring any elephants back to life, but will destroy historical examples of many cultures. As these are not items that are being produced today, destroying them can serve no purpose.

In the UK we presently have a law stating that no ivory can be sold that has been made – or altered – after 1947. This law came into effect in January 1990, and is widely known. An addition to that law came in a couple of years ago but has not been widely publicised, yet it can lead to hefty fines if contravened. It governs the term 'worked'. In the case of ivory, a tusk must be carved on most of its surface to be legally sold; otherwise the material could be easily reworked.

The same law also applies to other organics. Not only must tortoiseshell be pre-1947 to be legally sold, but a polished turtle carapace is no longer regarded as having been worked (though, ironically, a whole taxidermied turtle is). Jewellers may be thinking this does not really apply to them as they do not sell tusks or turtles, but big cat claw jewellery is also now banned, as the claws have only been polished and mounted and are therefore not regarded as worked.

It is our responsibility to find ways of protecting the animals. Meanwhile it is our duty to know the laws as they stand at present and to abide by them. So in a few words, the law in the UK today states that these organic materials must be pre-1947, they must be worked, and they must not have been altered after this date. I shall endeavour to keep us updated on the laws as and when they change. ■

Introducing a New Fei Cui Testing Standard

Anne Carroll Marshall BA Hons BA Hons FGA DGA FGAHK AGA talks about what is new in gemmology in Hong Kong.

In the Hong Kong region, fei cui (jadeite, omphacite and kosmochlor) is always a major subject of debate and one that many of our very senior local colleagues spend a lot of time on. Gem-A's chief examinations officer HK, Cecilia Lam BSc OT MSc D.Mgt ND FGA GG and Gem-A life member Professor Mimi Ou Yang, BSc MPhil FGS (Ldn) FGA (Ldn) Dip. Dia. (GIA), FGAHK, CG (fei cui) founder and principal of the Hong Kong Institute of Gemmology have both published books on the subject in English as well as Chinese. Dominic Mok MSc FGA FGAA DGA AGA founder and principal of the Asian Gemmological Institute and Laboratory Ltd, agreed with Gem-A's CEO Alan Hart FGA DGA, when he was in HK recently, to give a workshop on 'Jade Testing and Grading' at the Gem-A Conference in London, this November.

The new *Fei Cui Testing Standard* that the Gemmological Association of Hong Kong (GAHK) has been working on, with the Hong Kong Council for Testing and Certification (HKCTC) and Hong Kong Productivity Council (HKPC) was released at the HK Gems and Jewellery show in March; the fruit of years of labour. GAHK will be posting the PDF version on their website, as soon as it is live.

A question constantly asked is how members outside the UK can keep learning and developing in the gemmology world? Some graduates from Accredited Teaching Centres (ATC)-specific groups continue to meet up and support each other this way. In HK there are also two associations that many of our members subscribe to, offering a continuation of professional development.

In many ways the Gemmological Association of Hong Kong (GAHK) started as an alumni association for Gem-A graduates, but it is now open to all gemmology graduates, with members also being able to become GAHK certified gemmologists (CG) specialising in diamond or fei cui.

The other association, the Asia Pacific Gemmologist Society Limited (APGS), was founded by Dominic Mok, in 2013. It has various tiers of membership such as AGA expert or AGA professional. New applicants must, of course, prove that they have recognised gemmological qualifications such as the Gem-A Diploma, but in addition they may be required to pass the society's own entry examination.

Some feedback I received recently from the Diamond Federation of HK (DFHK) is, while large numbers of students sit our Diamond Practical exams there each year, they find it really hard to recruit new staff. I will be talking to them about this soon and perhaps we will come up with some answers as to why this could be. ■

Quick Guide to Opals

As more and more retailers react to the growing popularity of opals in commercial jewellery collections, Gem-A gemmology tutor Samantha Lloyd FGA EG offers a quick, but essential guide to opal value factors.

COLOURS IN OPAL

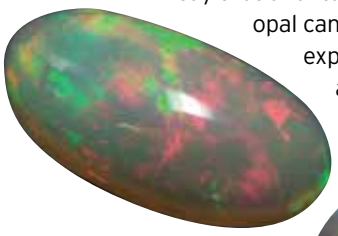
Opal is composed of uniform spheres of silica, which form a grid-like structure. The spaces between these spheres contain a silica solution. When light passes through the spheres and hits the silica solution, it is diffracted, producing differing rainbow hues. Colour play depends on the size of the spheres, for example, smaller spheres result in blue colours, but orange and red will be present when they are larger. The more uniform the grid-like structure, the more intense the colours will appear.

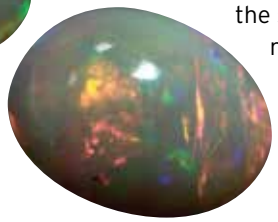
TYPES OF OPAL

Customers may be most familiar with light opal, which makes up the majority of mined opal. It has base colours that range from white, to milky white and light grey, with varying degrees of colour play dancing on top. If the body of the opal is transparent – also known as light crystal opal – the colour patches can be seen below the surface. It is these specimens that command exceptionally high prices. Your customers may also be familiar with black, or dark, opal, which has a dark body colour — sometimes enhancing the brilliance of the colours. This is the rarest and most valuable opal variety.

VALUE FACTORS

There are a number of factors that alter the value of opals. As mentioned, black opal can command higher price points than light opal (especially with an inky black body tone), although this is not to say that a fantastic light opal can not be more expensive than a mediocre black opal.





Examples of Ethiopian opal

The brightness and brilliance of an opal is particularly important for its value, even if it is average in other areas. Therefore, lots of colours flashing on a dull stone may not command the same value as a gem with a higher degree of brilliance.

We have already hinted at transparency, but this is also an important value factor. Light opal is much more desirable if it is transparent, with crystal opals with vibrant colours being particularly prized.

A secondary and more complex layer of value arises when considering colours. The 'dominant colour' in an opal can affect its value, with red commanding the highest cost, followed by orange, yellow, green, blue, indigo and violet. However, do not forget, a blue-green brilliant stone will be more valuable than a dull red.

OPAL PATTERNS

In some rare cases, the diffraction of light within an opal can cause interesting patterns to arise. These patterns can increase the value of a stone. 'Pinfire' and small dot-like patterns are less desirable than bold ones, such as stripes, peacock feather shapes and broad brushstroke-like flashes of colour.

ETHIOPIAN VS AUSTRALIAN

Customers may ask why one opal costs thousands of pounds, while another is mere hundreds or less. The answer could lie in its origin. Australia is a phenomenal source of opals and produces some of the world's most incredible specimens. Crucially, opals from this region have a lower water content, which means they are less susceptible to drying-out and less likely to exhibit 'crazing' — hairline fractures that impact the durability of the stone. In contrast, Ethiopia is a newer source of opals, but some material has been found to have a much higher water content, making it unreliable and potentially unsuitable for jewellery. ■

Examples of Australian opal

With thanks to Hatton Garden-based gemstone supplier, Marcus McCallum FGA, for taking these striking photos of Ethiopian and Australian opals.
Read more facts in The Opal Story by Andrew and Damien Cody, available in the Gem-A library.

Fifty Years of Splendour

Christa Van Eerde MA MLitt Cert. GA DGA reports on the 50th anniversary of George Balanchine's gemstone-inspired ballet, *Jewels*.

Window displays are designed to attract attention and that is just what Van Cleef & Arpels' Fifth Avenue boutique did in 1961 to none other than the co-founder of New York City Ballet, and one of the greatest choreographers in the history of ballet, George Balanchine.

Soon after being entranced by the emeralds, rubies and diamonds displayed on the infamous Manhattan street, Balanchine was introduced to Claude Arpels by a mutual friend, the celebrated violinist Nathan Milstein. It is unlikely either debonair could have predicted the wonders that would result from their friendship. Balanchine introduced Arpels to the world of dance, Arpels introduced Balanchine to the many facets of gems, and the rest, as they say, is history.

Balanchine's newly acquired knowledge of gems became the inspiration for the first ever full-length plot-less ballet, *Jewels*, now performed worldwide by the most prestigious ballet companies.

The Bolshoi Ballet performing Emeralds. Image courtesy of John Ross.

Héloîse Clip set with emeralds from the Ballet Précieux collection by Van Cleef & Arpels.

Jewels has no narrative; it is an abstract ballet. This will not sound innovative in today's day and age, but 50 years ago, when it premiered on 13 April 1967 at The New York State Theatre, it was a novelty. Many readers can relate to experiencing a personal reaction to a stone, a certain gut feeling. Balanchine invited the audience to bring their own experience to *Jewels* and see it for what it is — a gem. Three, in fact.

Jewels is a ballet in three acts: Act 1, *Emeralds*, Act 2, *Rubies*, and Act 3, *Diamonds*. *Emeralds* is danced to music by Gabriel Fauré and exemplifies French Romanticism. *Rubies* is set to music by Igor Stravinsky and embodies the hustle and bustle of America during the jazz-age. *Diamonds* is to music by Pyotr Ilyitch Tchaikovsky and symbolises the grandeur of Imperial Russia. With costumes by Barbara Karinska, each act offers a visual feast, opening with long green ankle-length tutus, continuing to short sassy red skirts, and finishing with the traditional shorter length tulle tutu in white, the closest a costumier can get to colourless, for *Emeralds*, *Rubies* and *Diamonds*, respectively. Whilst it is stage jewels and crystals that are sewn into the costumes and not stones themselves, as Balanchine said they would prove too heavy, the adamantine lustre of the dancers can be seen from the very back row of any theatre.

It is impossible to provide a comprehensive analysis of the relationship between each act and its relevant gemstone in this article; however, it must be noted that there are more things in common with the ballet and the stones it represents than first meets the eye. *Emeralds* is the least athletic of the three acts, suggesting an emerald's fragility and brittleness. The dancers in the opening sequence suggest an undulating chain or necklace with their overlapping arms and ceaseless bourrées, a common movement in ballet, which is the rapid changing of weight from one foot to the other whilst on demi-pointe. The dancers continue to form detailed, intricate patterns on stage, alluding to the heavily included nature of most emeralds.

The start of *Rubies* presents dancers on pointe and in an upstage semicircle,

insinuating a tiara. The dancers exude charisma and seduce the audience, just as rubies entice all from emperors and maharajahs to the gem collector and enthusiast, with thrusting hips and high kicks that breed excitement. The choreography is full of bent arms, flexed ankles and wrists, and pure vivaciousness; the dancers endlessly leaping from one movement sequence to the next.

Diamonds is the epitome of purity. The main *pas de deux*, danced between a male and female principal dancer, represents the clarity of a diamond. It is Balanchine's tribute to the classical *pas de deux* itself, a magical encounter between a man and a woman. The music is slow, as compared to the opening and closing, and movements are not rushed, allowing the audience to appreciate the clarity of line of the dancer. Particularly when seen from the balcony or amphitheatre, the audience can appreciate the groupings of dancers in *Diamonds*, which create the crown and pavillion of a round brilliant diamond. Throughout each act, the dancer's long limbs and eloquent lines conjure the dispersion of light through a stone, whilst their mica-infused make-up provides their expressive faces with brilliance.

The Royal Ballet first performed *Jewels* at the Royal Opera House in 2007, and to mark the 40th anniversary of the ballet, Van Cleef & Arpels created the iconic high jewellery collection, *Ballet Précieux*. The collection draws inspiration from

Artists of The Royal Ballet perform Diamonds from Jewels. Image courtesy of the Royal Opera House, Bill Cooper, 2013.

many of the dance poses seen within *Jewels*, such as an arabesque, as well as the headpieces of the crystalline ensemble of dancers.

However, these were not the first bejewelled ballerinas Van Cleef & Arpels created. The maison's connection to ballet stretches back to the 1940s, when the first ballerina brooch was created by the jeweller John Rubel and designed by Maurice Duvalet at the request of ballet an opera enthusiast Louis Arpels, who was known to leave his office in Paris early to catch a performance at the Garnier Opera House. *Jewels* did, undeniably, inspire the Maison to design more variations on the theme of ballet, and it is indeed now a motif synonymous with the name Van Cleef & Arpels.

A dancer is in constant motion. Even when still, a breath, flick of a finger, or raising of the eyes can connect one movement to the next. As dance is ephemeral, it is a challenge to capture in a static piece of jewellery featuring gemstones, which are themselves time preserved. Van Cleef & Arpels masters it, however, using their 'Mystery Setting', which creates the illusion of a flow in conjunction with the way the light interacts with the stones. Many of the words that epitomise a ballerina – splendor, elegance, sophistication, femininity – can also be used to characterise the maison's jewellery. It is therefore no surprise Van Cleef & Arpels maintains a strong connection to the world of dance, sponsoring various companies and most recently the Dubai Opera.

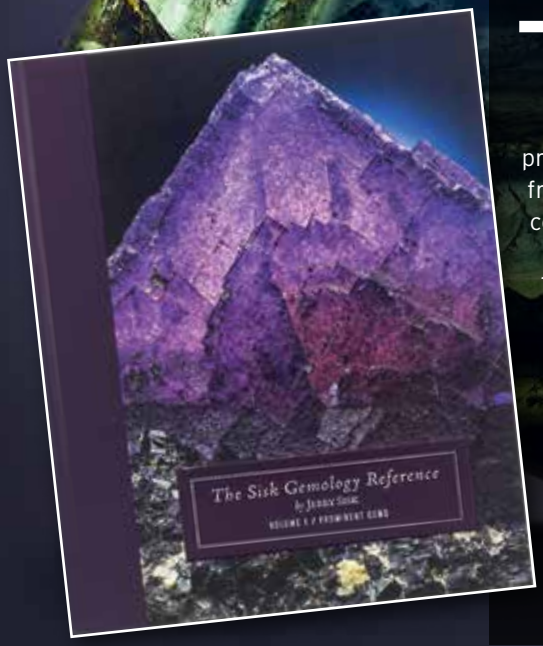
If one desires an introduction to ballet other than classics such as *Swan Lake*, or *Sleeping Beauty*, *Jewels* would prove most prosperous, as in one evening the audience is introduced to three periods and styles of ballet, three renowned composers, three countries important to the history of ballet as well as Balanchine's own life, and three of the four major gemstones which are aptly anthropomorphised. There is something for everyone. Just as some might prefer rubies and others emeralds, if one act does not strike your fancy, the next will present and offer something completely different, yet no less dazzling. The beauty of the dancers and costumes, their undeniable talent, durability, strength and charisma, make *Jewels* a gem of extreme rarity and desirability.

Artists of the Royal Ballet perform Rubies from Jewels. Image courtesy of the Royal Opera House, Bill Cooper, 2013.

Jewels is being performed by The Royal Ballet 1-21 April 2017 at The Royal Opera House in London, and in a historic cross-company performance, Paris Opera Ballet will perform Emeralds, and New York City Ballet and the Bolshoi Ballet will alternate performing Rubies and Diamonds from 20-23 July 2017 at New York City's Lincoln Center. ■

Gems worth reading about

Claire Mitchell FGA DGA RJ DIP, senior gemmology and diamond instructor at Gem-A, reviews *The Sisk Gemology Reference Volume One: Prominent Gems*.



This publication is the first in a three volume set of "comprehensive and visual gemology resources featuring prominent and noteworthy gemstones," from the manuscripts of the late co-founder of JTV, Jerry Sisk GG.

The next two volumes are *Volume Two Noteworthy Gems* and *Volume Three Gallery of Gems*.

The book also includes a forward by JTV president and co-founder Timothy B. Matthews JD FGA GG DGA JTV, focusing on the author and remembering his legacy in the trade.

The main body of Volume 1 starts with looking at gemstones and their properties, including classification, observational properties, optical phenomena, optical properties such as colour, lustre clarity and dispersion and physical properties. The basic scientific principals behind each property are explained in a straightforward way.

Each subsequent chapter then is gemstone specific, covering prominent gems from abalone through to zoisite — also included are cubic zirconia and synthetic moissanite. The information in each gem section is informative, as well as engaging for both those readers with a basic passion for gems or for those with more advanced gemmological knowledge and experience.

For each gem the history, lore, treatments, inclusions features, localities and varieties are given if applicable — with additional information on observational,

> This comprehensive volume is beautifully presented. The illustrations used throughout are of the highest quality — in many cases the best examples of their type...

optical and physical properties, as well as chemical make-up provided, in a clear and concise table form.

This comprehensive volume is beautifully presented. The illustrations used throughout are of the highest quality – in many cases the best examples of their type – encompassing both cut gems and minerals, and jewellery. Images are placed within the text, while additional full-page photos are used frequently to add life and colour. The physicality of the book is to a very high standard, with excellent binding and thick quality paper.

It is clear to the reviewer that this book has been borne of a true passion for gemstones and a desire to share such enthusiasm and knowledge. It is a work that I found informative and engaging and very difficult to put down!

For all those interested in or with a passion for gemmology this is a must have book – although much in its comprehensive content is not 'new' information — its style of presentation, format and images make it a perfect and essential addition to any gemmological library, office laboratory or retail store.

Gem-A has been proud to work with JTV in reviewing technical aspects of the publication. On a personal level I had the pleasure and honour of knowing Jerry, and in this book – a culmination of his gemstone research – his love of gems and his desire to share his knowledge with others shines through.

Congratulations to the book's editors Renata R Lafler MSc Earth Sciences and Christopher M. Clark, GG FGA and their JTV colleagues for bringing Jerry's life's work to fruition. I look forward with great anticipation to reading the next two volumes. ■

The Sisk Gemology Reference Volume 1 Prominent Gems

By Jerry Sisk and JTV Knoxville Tennessee 2016

436 Pages
ISBN: 978-0-692-71318-1
Hardcover

Volume 1, $149.99 (approx. £120)
Three Volume Professional Edition set with slipcase, $199.99 (approx. £165)

Available to buy 1 May 2017, jtv.com

1: Rose gold pendant with Whitby jet, blue topaz and diamond by W Hamond (CW Sellors).

2: Otto white gold earrings set with jade and diamonds by Sarah Ho London.

3: Opal and diamond earrings by Theo Fennell.

The allure of COLOUR

The beauty of coloured gemstones has always captivated, but from a jewellery trend perspective, they are riding particularly high now. Belinda Morris speaks to jewellery designers and brands to gauge the current and forthcoming directions.

COLOUR DIRECTIONS

While most designers working with coloured gemstones say they are invariably inspired by the gem itself (or personal favourites), the new trend palette issued annually by Pantone can be a useful influencer.

The fine jewellery hall of trade event Inhorgenta Munich in February, revealed Pantone's 'Greenery' to be, if not a dead ringer, then certainly close to peridot, tsavorite, emerald, chrysoprase, jade and some green-enhanced diamonds. All were in clear evidence, highlighting how the colour green has captured the imagination of designers and manufacturers.

It's horses for courses though — while studying all shades of beautiful coloured diamonds at Hans D Krieger, I am told that for the UK market, for instance, it is blue that wins hearts. So, for gemstones, that means sapphire, tanzanite and aquamarine in that order. At Richard Hans Becker blues also dominated, with cocktail rings, set with cabochons and faceted tourmaline, tanzanite and aquamarine, practically leaping from cabinets.

Attracting a Pan-European market as it does, Inhorgenta did not draw the line at cool tones. Central in the fine jewellery hall, German designer Georg Spreng's work revolves around colour... and drama. Huge, bold gold cocktail rings – with a retro-space-age feel – and pendants and bracelets feature faceted and cabochon stones of every hue.

Equally, Ariel Tivon of Tivon Fine Jewellery has been drawn to colour this year. "Considering the world feels a bit doomy-gloomy, we want to put lots of emphasis on bright and pastel colours, like aquamarines, morganites, peridots, tourmalines, lemon quartz and mandarin garnets," he says.

4: Gold ring with topaz stone and diamond detail by Dalia Daou.

Sometimes though, it is just about preference. "Our collections always include many bright, beautiful gemstones, of which Paraibas have been among my favourites since first I saw them many moons ago," says designer Theo Fennell. "They remain extremely rare in a flawless state and the colour of a Hockney swimming pool. Other fiery, rare stones we use include opals, mandarin garnets, lilac sapphires, tsavorites and cobalt spinels."

5: 'Space Station' cocktail ring with hexagonal cut emerald and layers of diamonds, enamel and ceramic by Solange Azagury-Patridge.

8: Gold disc bracelet with garnets and prasiolite charms by Farah Qureshi.

GEMSTONE INSPIRATIONS

If Inhorgenta Munich is anything to go by, jewellery designers and brands continue to use gemstones as their creative, inspirational starting point — rather than picking any gemstone to fit a particular mount. "While I always see the latest catwalk designs, I find that the fashion industry is unpredictable and changeable, so prefer to take creative inspiration and lead from the gems themselves," explains Rebecca Sellors of CW Sellors (**1**). "I'd rather explore ways to unlock their secrets, to make their colours sing."

"I design solely around gemstones," agrees Emily Rogers of recently-launched Flamingo Jewellery, which showed at Birmingham-based trade event, Jewellery & Watch. "As soon as I place a gemstone in my palm I wonder which precious metal would suit its tone and which jewellery item would best suit its cut and size."

At Sheldon Bloomfield, cushion shape stones prove to make the best rings; award-winning designer Dalia Daou is excited about cabochons, baguettes and oversized emerald step cuts at the moment, and British jeweller Dinny Hall is inspired by cushion cuts, rose cuts and emerald cuts.

"I've been working with a very special collection of jade that has been cut in different shapes, and by mixing them together and adding my signature fine lines of diamonds and intricate metalwork, the look is very modern but still classic," adds jewellery designer Sarah Ho, of Sarah Ho London (**2**). "I love baguettes and mixing them with the round stones and pear shapes. Another stone I've used is rubelite – pear shapes, with baguette and round emeralds and diamonds – a current trend for me."

Renowned for his adventurous, dramatic designs, Theo Fennell is using, as always, a lot of carved stones — intaglios and cameos, Essex crystal and portrait carving. "I'm also working with some very pretty, natural cabochons that have real depth and character; I use them for 'opening rings' for a double surprise," he says.

While designers naturally have their favourite, or signature, stones, many are on the hunt for something a little different. Theo Fennell, for instance, has been bewitched by opal (**3**). "It's theatrical and succulent, but also enigmatic and full of depth," he explains. "But, to intrigue, they need to be unusual. They range from dark, cosmic black stones, to the fieriest of orange and red stones. Such a palette is a wondrous thing for a designer, but not for the faint-hearted."

SETTING THE STONE

From big, bold and geometric, to delicate and natural, jewellery trends today are as varied as the stones that adorn the pieces. "My latest collection is feminine, referencing bird of paradise feathers — a softening of the now ubiquitous geometric trend," says Daou (**4**). "Dimensions are larger and more exaggerated than before."

"My new 'Poptails' collection of supersized cocktail rings incorporates a collection of centre stones with lacquer, ceramic plate, and randomly assembled gemstones," notes designer Solange Azagury-Partridge (**5**). "The shape of the ring is determined by the shape of the combination of central gemstones."

Meanwhile the choice of metals for setting jewellery is as much a matter of taste as trends. Yellow gold is creeping back into fashionable favour, but rose gold remains a favourite across all levels of the market.

6: Platinum earrings set with blue sapphires by Domino.

7: Silver and gold ring with peridot centre and diamond halo by Dinny Hall.

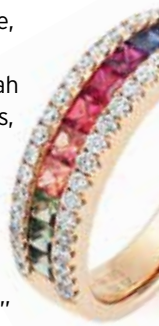
"Domino's designs are crafted exclusively in platinum and 18 ct gold. The way different metal colours can transform the character of a stone and therefore a piece is incredible; a blue sapphire set in platinum appears cool, in yellow gold it is lively, while in rose gold its warmth shines through," says Naomi Newton-Sherlock, director of Weston Beamor and Domino Jewellery at British company, WB The Creative Jewellery Group (**6**).

WINTER WONDERS

Many jewellery designers and brands tend towards one collection a year, perhaps introducing a few new seasonal designs or colours. While Dinny Hall's summer is about blues and greens, she is shifting towards red tones and cinnamon shades of brown later in the year (**7**). "We do well with red tourmaline, almandines and spinels," she says.

Meanwhile, jewellery designer Farah Qureshi will introduce red gemstones, like garnet, to complement colours like inky blue, black sapphires and sea green quartz (**8**). "I'll be using more geometric shaped gems, plus round ones — I enjoy mixing and matching different shapes and sizes," she adds. Sarah Ho, who is researching unusual and specially-cut stones, is creating one-off pieces, also using spinels.

There is a real sense of adventure and experimentation edging into the jewellery market, hinting at a more exciting future for gemstones in commercial collections, both in the UK and in Europe. The stalwarts of sapphire, ruby and emerald could still be found at Inhorgenta Munich and Jewellery & Watch, but it is now exciting to see them rub shoulders with opal, tanzanite, spinels and tourmalines in collections destined for the shop floor. ■



Sheldon Bloomfield, gold and sapphire ring.

Events Directory

Your essential guide to Gem-A events

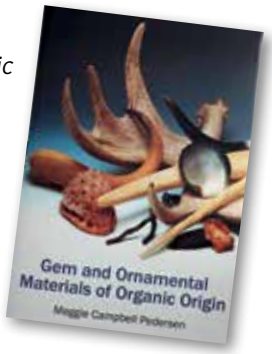
GEM CENTRAL

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: An Overview of Organics with Maggie Campbell Pedersen
24 April 2017, 18:00-20:15
Gem-A Headquarters, 21 Ely Place, London
Maggie Campbell Pedersen FGA ABIPP author of Gem and *Ornamental Materials of Organic Origin* gives a presentation on organics. Join Maggie for what promises to be an exciting and informative evening.



OTHER EVENTS

Gem-A Midlands Branch — Suffragette Jewellery
21 April 2017, From 18.30
Fellows Auctioneers, Birmingham
Elizabeth Goring will discuss suffragette jewellery at the Midlands Branch. *Please note the change in date.*

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

Scottish Gemmological Association (SGA) Conference 2017
28 April-1 May 2017
Stirling Court Hotel, Stirling, Scotland
Gem-A CEO Alan Hart will be speaking at this year's Scottish Gemmological Conference.
For more information see page 21 or visit **scottishgemmology.org/conference**

GEM-A ONLINE

Top stories from the Gem-A blog

Ruby and Pink Sapphire from Aappaluttoq, Greenland
Journal digest by Guy Lalous ACAM EG

Exploring the wonders of Myanmar
Field trip report from Gem-A member Patricia Campion

Interview with Dr Jeffrey Post of the Smithsonian Institution
From the archives

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EDUCATIONAL WORKSHOPS

Ruby, Sapphire and Emerald (Intermediate) *12 May 2017*
This informative practical day is ideal for those working in the trade particularly in retail. Intermediate gemmological knowledge (such as the Gem-A Gemmology Foundation or Gemmology Diploma or equivalent) is required. You will begin by looking at the properties of ruby, sapphire and emerald and learn how to identify them, followed by their treatments, simulants and synthetics. You will handle and examine a wide range of these stones and, through hands-on observation and gem testing techniques, gain experience and learn about 'quality' and 'value' and how they affect current market values of the stones.

Understanding Diamond Simulants
26 May 2017
This is a valuable practical workshop for anyone working in or considering entering the diamond market. Some knowledge of diamond 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 please contact the Education Department via **education@gem-a.com.**

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

Gem-A

THE GEMMOLOGICAL ASSOCIATION OF GREAT BRITAIN

SAVE THE DATE

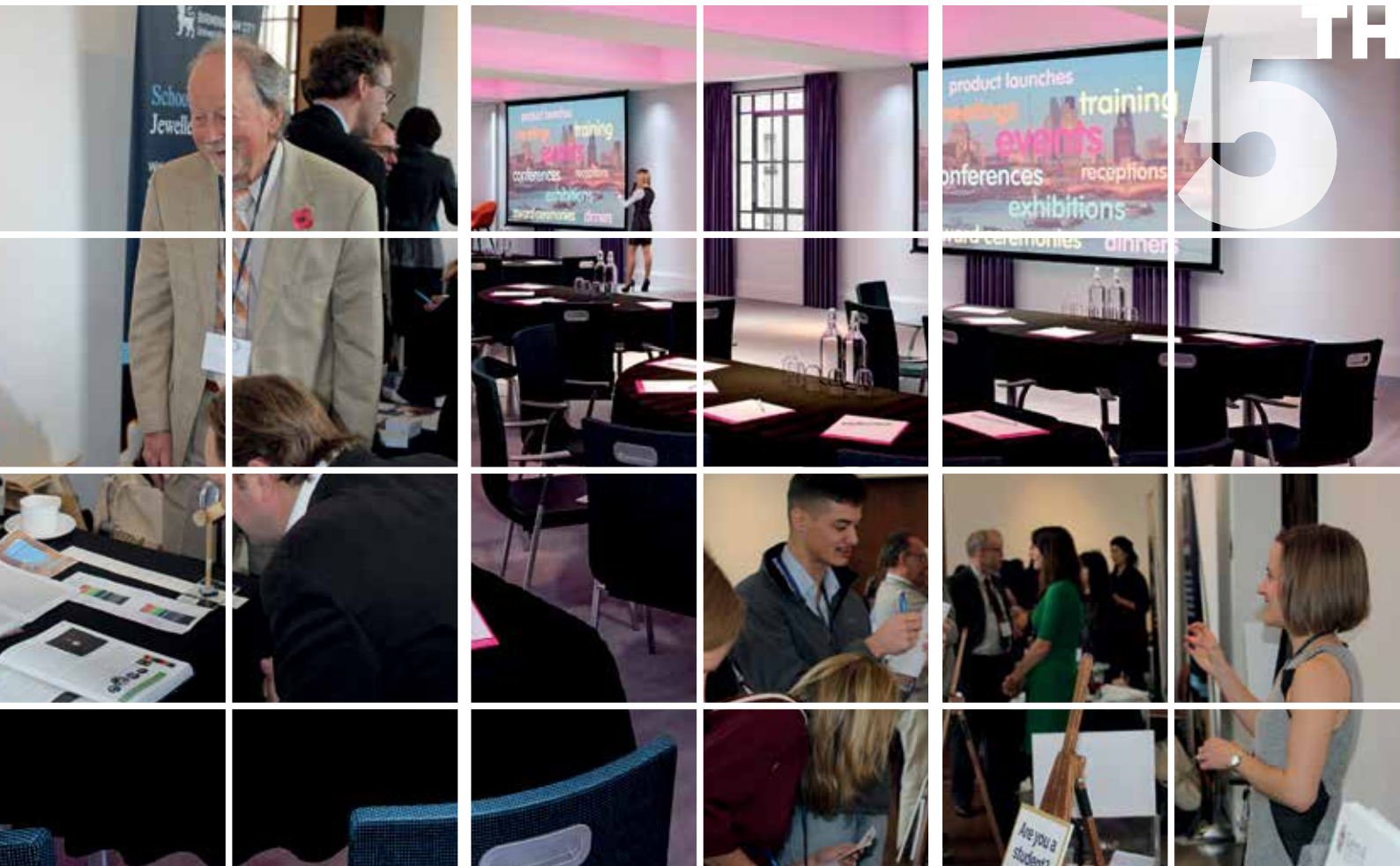
Gem-A Conference 2017

Saturday 4 and Sunday 5 November

etc.venues County Hall, Westminster Bridge, London

4TH

5TH



Golden beryl, or heliodor, is the yellow, lemon/golden-yellow to greenish-yellow variety of beryl coloured by iron. It is mined in Brazil, Madagascar, Namibia, Nigeria, Sri Lanka and Zimbabwe. It has excellent clarity, a vitreous lustre and it is found in large crystals.

Gemstones: Terra Connoisseur by Vladyslav Y. Yavorskyy, $88 (approx. £70), ivynewyork.com

This incredible image of a giant heliodor crystal from Ukraine features in the latest book by IVY New York founder and jewellery designer, Vladyslav Y. Yavorskyy.

Yavorskyy is the author of a number of successful books, including *Terra Spinel* (2010) and *Terra Garnet* (2014). His latest tome incorporates more than 2,000 original photographs of faceted and rough gems, and over 50 mineral specimens, jewellery pieces and historical artefacts. During the production process, Yavorskyy and his team travelled extensively, visiting gem mining sites across the globe to collect the most up-to-date specimens and take over 260 authentic photos of gem mining activities, landscapes and miners themselves. ■

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OUR NEXT SESSIONS		
May 8-13	**Rough Diamond Grading and Evaluation Diploma** (in English) Complete 6-day program - theory and practice	Contact us : + 1 514 844-0024 info@egmtl.com egmtl.com
July 3-26	**Gem and Jewellery Appraisal Diploma** (in English and French) Endorsed by Gemworld International and accredited by the Canadian Jewellers Association	

Photo : Charlotte Évrard

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by Jerry Sisk
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