Gems & Jewellery

Spring 2020 / Volume 29 / No. 1

★ ★ ★ ★ ★

SPECIAL UNITED STATES EDITION

TUCSON GEM SHOWS

MONTANA SAPPHIRE

OREGON SUNSTONE

JEWELLERS OF NEW YORK

★ ★ ★ ★ ★

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SPECIAL UNITED STATES EDITION

Gems&Jewellery

SPRING 2020

TUCSON 2020

The annual Tucson gem shows in Arizona are fast on the approach. Gemstone and jewellery aficionados across the world adore this one-of-a-kind gem extravaganza; we spoke to some of them to find out what makes it so special.

AMERICAN GEMSTONES

Elizabeth A. Gass FGA, a Gemstone Advancement and Education Coordinator in JTV's learning and development department, takes us on a road trip by way of four iconic American gems.

HEAVENLY JEWELLERY

Elyse Zorn Karlin, Co-Director of the Association for the Study of Jewelry & Related Arts (ASJRA) and Curator of the *Out of this World! Jewelry in the Space Age* exhibition shares her insights into the cosmically creative history of space-inspired jewels.

COVER PICTURE

This issue's cover picture, 'Crimson Geoscape', comes from Melissa Allen FGA GG. This photomicrograph shows the surface of an orangey-brownish red 'etched' spessartine garnet rough crystal from the Navegadora Mine, Brazil.

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Gems&Jewellery

USA Edition 2020 Featured Contributors

1. ERIC FRITZ

Eric Fritz FGA DGA is the Manager of The University of Arizona Gem and Mineral Museum. Prior to this role, he was Manager – North America for Gem-A. Eric's degree in zoology led to a passion for pearls and other organic gem materials, which are Eric's speciality.

2. HELEN SERRAS-HERMAN

Helen Serras-Herman, a 2003 National Lapidary Hall of Fame inductee, is an acclaimed gem sculptor with over 37 years of experience in unique gem sculpture and jewellery art. See her work at www.gemartcenter.com.

3. RUI GALOPIM DE CARVALHO

Rui Galopim de Carvalho FGA DGA is a Gem Education Consultant, Editor of Portugal Gemas, Associate Editor of *The Journal of Gemmology*, Vice-President of Sector A and of the Coral Commission of CIBJO and Advisory Counsellor of the Portuguese Jewellery and Watchmaking Association. He is also an author and lecturer on the history of gem materials in Portuguese jewellery.

4. OLGA GONZÁLEZ

Olga González FGA DGA is the founder of Pietra Communications and has over 10 years of experience in the field of jewellery PR and content marketing. She is a Past President of the Public Relations Society of America NY Chapter, and is President Elect of Women's Jewelry Association New York Metro Board.

5. JOHN BRADSHAW

John Bradshaw GG is a gemmologist and gemstone cutter. John began his cutting career in 1979 and shortly after launched his business, John J. Bradshaw, working full-time as a faceter and wholesale gem dealer. In 1987, he co-founded Coast to Coast Rare Stones. John has worked as a consultant on many gem projects both in the US and internationally, which includes a 20-year tenure as Curator of gems at the Harvard Mineralogical Museum.

6. MICHAEL GRAY

Michael Gray GG has been faceting and selling gems for over 50 years. Over that time, he has also been a gemstone miner, a museum curator, and managed gem cutting factories in Bangkok and Ho Chi Minh City. He is currently a partner in Coast to Coast Rare Stones and has gemstones he has faceted on display in many museums around the world.

7. KATE FLITCROFT

Kate Flitcroft FGA is head of Jewellery and Silver for Lyon & Turnbull in London. She can be seen in the current season of BBC's *Antiques Roadshow*. Kate is a ten-year veteran of Christie's and the auctioneer of choice for multiple specialist departments; she also auctioneers for charity events internationally.

8. GÉRALDINE PIGUET-REISSER

Géraldine Piguet-Reisser FGA trained as an art historian at the University of Geneva and Columbia University NY, where she specialised in contemporary art. She worked with various museums in Switzerland before developing an expertise in philanthropy. Having had a fascination with gems in her childhood, she recently decided to pursue her gemmology education with Gem-A.

9. JENNIFER-LYNN ARCHULETA

Jennifer-Lynn Archuleta is a San Diego-based freelance writer and editor with a special interest in the gem and jewellery industry. She has written for several publications on a number of topics. She is also the former Editor of *Gems & Gemology*.

10. ELYSE ZORN KARLIN

Elyse Zorn Karlin is Co-Director of the Association for the Study of Jewelry & Related Arts (ASJRA) and publisher of Adornment Magazine. She is a jewellery historian, author of several books on jewellery and a freelance curator. She is guest curating an upcoming exhibition, 'Out of this World! Jewelry in the Space Age', which opens at Tellus Science Museum in Cartersville, GA in November.

11. JAMIE RICHARDSON

Jamie Richardson is the Secretary of the UKFCG. Although running his own (non-faceting related) business, he is a keen amateur faceter and gemmologist. He enjoys the challenges that faceting gives him, especially using the less easy materials such as flourite or the more difficult designs.

Straight from the heart

Opinion and comment from CEO, Alan Hart FGA DGA

Welcome to this very special edition of *Gems&Jewellery* magazine. In this issue we have turned our attention to the United States and all the gemmological wonders and exceptional fine jewellery that can be found there.

As many of you will remember, 2019 marked some exciting steps for Gem-A in the United States. We established Gem-A USA; an independent, non-profit entity designed to offer Gem-A's world-renowned education across all 50 states. Recruiting an individual to spearhead this new chapter in Gem-A history has been an ongoing process, and we look forward to announcing the new Head of Gem-A USA in due course. In the meantime, we are actively pursuing new Accredited Teaching Centres (ATCs) to teach the Gem-A Gemmology Foundation, Gemmology Diploma and Diamond Diploma across as many regions as possible.

To celebrate all things U, S of A, we've dedicated (almost) this entire issue to the nation. Thanks must go to Jewelry Television (JTV), specifically Elizabeth A. Gass FGA, for sharing the history, properties and outlook for four American gemstones: red beryl, benitoite, yogo sapphire and rhodochrosite. You'll note throughout the issue that features have been stamped with the US state being referenced, where applicable. I don't know about you, but it has certainly inspired me to add a few more places to my 2020 travel list!

This issue of *Gems&Jewellery* is also timed to coincide with the Tucson gem shows, which take place in Arizona, in February. Our team always looks forward to this fantastic series of events, not just because of the gemstones and minerals on display, but because of the opportunities it provides to connect, network and meet potential Gem-A USA partners. In 2020, we will return to the Scottish Rite Cathedral in Tucson for Gem-A's sixth annual Big Gem Bash. Our informal networking event takes place on the evening of Thursday, 6 February, and is sure to be a fantastic evening. Do make sure to secure your free ticket via Eventbrite.

Elsewhere in this issue, we consider tourmaline from Maine; space-inspired jewellery soon to be on display in Georgia; iconic jewellery design in Boston, Massachusetts; the art of carving Oregon sunstone; and North American freshwater natural and cultured pearls. As we are stepping into a new year, we are also pleased to introduce a fresh column from the UK Facet Cutters' Guild; the first in a four-part series. There's also a fantastic image of big diamonds and gemstones from American jeweller Harry Winston that really must be seen to be believed on page 38!

...because of the opportunities it provides to connect, network and meet potential Gem-A USA partners.

Alan at the AGTA 2019 show in Tucson, Arizona.

A New Year is all about doing something new, shaking off the old and diving headfirst into the new. I hope you achieve all your New Year's resolutions and I look forward to another year of gemmological discoveries, twists, turns and, of course, gemmology education across the world.

Best wishes
Alan Hart FGA DGA

Gem-A News

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

NEW 2019 EDITION: *DIAMONDS* BY FRED AND CHARLOTTE WARD

Stay abreast of changes in the diamond sector with the latest 2019 edition of *Diamonds*, part of the popular Fred Ward Gem Series, which is available to purchase now from Gem-A Instruments.

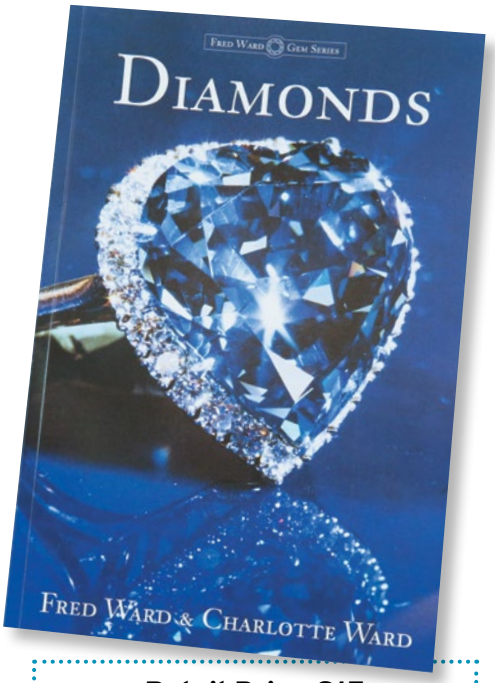
From mining advances to laboratory-grown techniques, the latest edition of *Diamonds* by Fred and Charlotte Ward is a go-to source for diamond industry insights and information.

Chapters are beautifully illustrated with photos of jewellery pieces from the likes of De Beers Jewellery, Van Cleef & Arpels and even the Crown Jewels of Iran, in addition to photographs of key mining locations such as Australia's Argyle Diamond Mine and sites in Canada.

Those new to the Fred Ward Gem Series will no doubt be inspired by the cover image, which features the Blue Heart Diamond, part of the Smithsonian Collection.

Chapter titles include History and Lore, The Hunt for Treasure, Romancing the Stone, Jewels and Artefacts, Lab-Grown and Industrial Diamonds, and Buying & Caring for Diamonds. Overall, this is an informative and enjoyable must-have for both diamond enthusiasts and professionals who want to stay clued-up in a rapidly evolving sector. ■

If you require any further information, advice or simply wish to purchase your copy now then please email **instruments@gem-a.com**



Retail Price £15

Current Gem-A Members and Students receive a 5% discount on books

GEM-A'S EAST AFRICA FIELD TRIP 2020

A faceter at work in Tanzania. Image courtesy of Rachel Dery.

This year Gem-A has collaborated with friends of the Association, the Dery family, to organise an exciting field trip to Tanzania from 19-25 July 2020! During this trip you will get the chance to experience rough gem buying, traditional Maasai culture and ruby mining, and visit local mines. If you'd like to join this once-in-a-lifetime trip, get in touch with our Membership Secretary on membership@gem-a.com to secure your place and pay your deposit by the deadline of 31 January 2020. You can also find out more about the trip and costs by visiting **gem-a.com/east-africa-field-trip-2020**.

GET 20-20 INSIGHT INTO INSURANCE APPRAISALS IN 2020

Jewellery insurance specialist JCRS is once again running its Certified Insurance Appraiser (CIA)™ training at JIBNA (Jewelry Insurance Brokerage of North America) in Louisville, Kentucky. Registration is now open for the next course, which will take place from 14-17 September 2020 at the JIBNA East Head Office. JIBNA sponsors the CIA course and also offers partial scholarships. See **jcrs.com** to find out more.

WE'RE RECRUITING!

Gem-A is seeking a qualified professional to fill the position of **Head of Gem-A USA** for the newly founded public charity, Gem-A USA.

Having gemmological knowledge and holding a Gem-A Gemmology Diploma or Diamond Diploma (or equivalent) would be a desirable qualification, but the primary responsibilities for the position include strategic planning, establishing new business opportunities and identifying possible teaching centres. Knowledge of financial and legal matters as they pertain to non-profit organisations would be useful, and fundraising will also be an important responsibility.

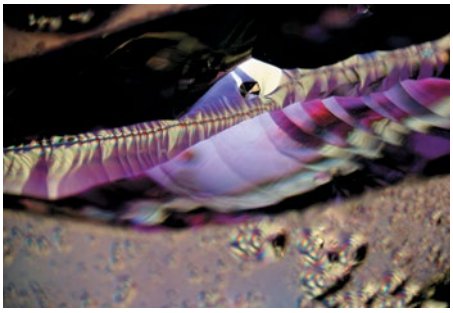
For a full job description and information on how to apply, please visit our website: gem-a.com/about/work-at-gem-a. The deadline for applications is **17:00 EST on 31 January 2020**.

ANTHONY DE GOUTIÈRE

(November 23, 1927 – December 25, 2019)

Gem-A regrets to announce the passing of esteemed gemmologist, photographer and long-standing Gem-A Member, Anthony de Goutière. Here, we celebrate the life of a friend and colleague and highlight some of his many contributions to Gem-A publications.

Anthony de Goutière was born in Mallorca, Spain, in 1927 and later settled with his family in West Vancouver, Canada, before moving to Victoria in the late 1940s. He began his career as a watchmaker's apprentice in the early 1950s, often crafting his own mechanisms and parts by hand. Initially, he worked in London, England, then ventured back to Canada to establish his own store, de Goutière Jewellers, in Oak Bay, British Columbia, in 1960. The business grew quickly, specialising in Swiss watches, clocks and jewellery. Anthony passed these valuable skills on to his son Paul, instilling in him a deep appreciation of all things micro-mechanical.



A photomicrograph of beryl inclusions by Anthony de Goutière.

Birds, beetles and brooches

A box of insects found in a curio cabinet leads **Anthony de Goutière** to research early twentieth-century insect and bird jewellery

An article written by Anthony de Goutière titled 'Birds, Beetles and Brooches' published in Gems&Jewellery *Vol. 17, No. 2, 2008.*

Early in his career, Anthony realised there was a great need for gemmological training and studied with the Gemological Institute of America (GIA) to become a Graduate Gemmologist (GG). This led him to becoming one of the first-fully qualified gemmologists in Canada. A lifelong love of photography evolved into an award-winning career in gemstone photomicrography, including the publication of books, videos and numerous articles on photography and related subjects.

In August 2019, Anthony was honoured with a lifetime achievement award from the Canadian Gemmological Association.

In addition to his gemmological pursuits, Anthony was an accomplished classical guitarist and helped to form the Classical Guitar Society of Victoria in the 1960s. He also loved to sail and spent many happy hours on the ocean.

Anthony was a valued member of the Gem-A community, having been a Member since 1992. He was a long-standing contributor to both *Gems&Jewellery* and *The Journal of Gemmology*: his photographs appeared on numerous covers dating from 1994 to 2018. He also shared his insights across 13 articles dating from 1993 to 2018, with topics including unusual inclusions in quartz, fluorescent oil inclusions in quartz, synthetic green diamonds and bird and beetle-inspired brooches. Due to his talent with the photographer's lens, Anthony was a regular winner and shortlisted finalist in the annual Gem-A Gemstone Photographer of the Year Award. His contribution to this annual competition will be greatly missed.

Anthony passed away peacefully at home at the age of 92 after a lengthy battle with cancer. On behalf of the entire Gem-A community, we would like to pass our condolences and kind wishes to Anthony's partner, Penny Joppe, his daughter Julie, son Paul, four grandchildren and five great-grandchildren, as well as many nieces and nephews. Today, Paul continues his father's legacy as a gemmologist, goldsmith and jewellery-maker. He told Gem-A: "He has left me his microscope and camera equipment perhaps as a gentle push to pick up where he left off..." ■

Three-phase inclusions in quartz (on the cover of The Journal of Gemmology *Vol. 24, No. 2, 1994) Photo by Anthony de Goutière.*

An article by Anthony de Goutière on photogenic inclusions in moldavite in The Journal of Gemmology *Vol. 24, No. 6, 1995.*

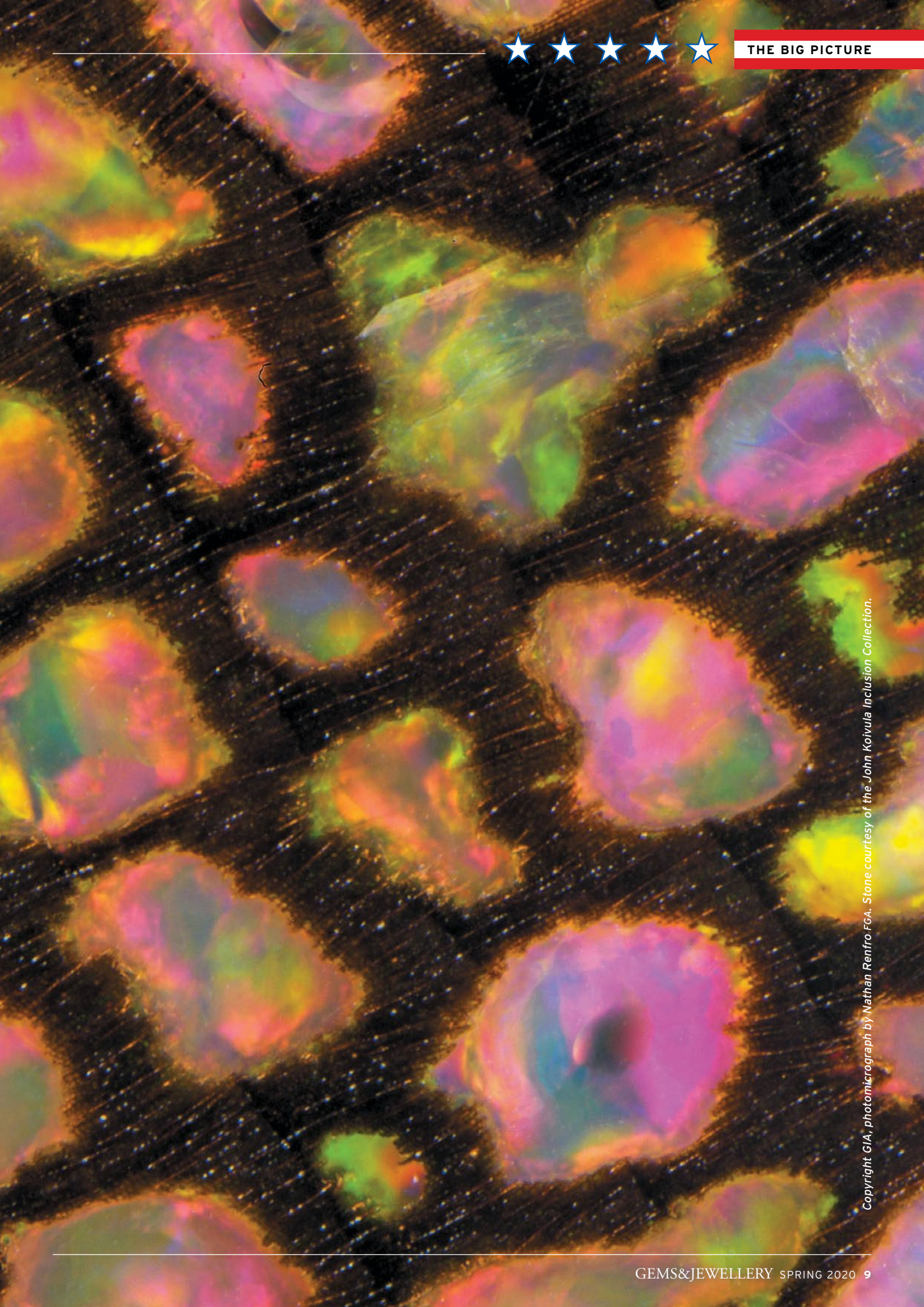
More of Anthony's photomicrographs on the cover of Gems&Jewellery *Vol. 20, No. 1, 2011 and Vol. 27, No. 4, 2018.*

Conk Opal from Virgin Valley, Nevada

Nathan Renfro FGA GG presented some of his most striking gemstone images at the Gem-A Conference 2019. Here, we focus on one of the most unusual – a close-up of conk opal from the state of Nevada in the Western United States.

This is a polished piece of conk opal from Virgin Valley, Humboldt County, Nevada, showing a cellular structure. Conk opal forms where wood has partially rotted away, leaving pockets and gaps that are infilled with opal showing vivid play-of-colour. I'm not aware of any other deposit producing conk opal, but it is possible that others could, especially if the deposit is known to produce opalized limb casts. This type of opal is considered extremely rare.

Nathan Renfro, a native of western North Carolina, developed an interest in minerals during his late teens, which was sparked by his grandfather's rock collection. After finishing the Graduate Gemologist program at GIA, he was hired by the GIA laboratory as a diamond grader and soon transferred to the Gem Identification Department in 2008. His primary areas of gemmological interest are photomicrography and identification of inclusions, gemstone cutting and defect chemistry of corundum. Nathan completed his Gem-A Gemmology Diploma in 2014. ■



Copyright GIA, photomicrograph by Nathan Renfro FGA. Stone courtesy of the John Koivula Inclusion Collection.

A case of mineral specimens in Tucson. Photo courtesy of Kathryn Bonanno.

TUCSON IS COMING!

A cut tourmaline discovered at the Tucson gem shows.

What makes the Tucson gem shows so special? What keeps gemmologists, collectors, geologists and lapidarists going back year after year? Here's what the Gem-A community has to say...

Every February, gem and jewellery professionals and enthusiasts from across the world gather in Tucson, Arizona to attend some of the biggest and best international gem shows and conferences. For just over three weeks the city transforms to showcase gemstones and minerals across 40 different shows, in addition to temporary stalls lining the streets.

Gem-A participates in the Tuscon gem shows every year by exhibiting at the AGTA GemFair from February 4-9. We shall also be hosting a special workshop entitled, *Seeing Colour: Succeed with the Spectroscope*, on Wednesday, 5 February. Please visit gem-a.com/event to find out more.

Elsewhere, Gem-A will support the Accredited Gemologists Association (AGA) Tucson Conference 2020 as a Ruby Sponsor, in addition to sponsoring the NAJA (National Association of Jewellery Appraisers) Conference. At the former, Gem-A Instruments Manager and Gemmology Tutor, Sam Lloyd FGA DGA EG, will present a workshop on *Fun with Filters*!

Of course, no visit to Tucson is complete without the annual Gem-A Big Gem Bash. Our sixth annual networking event will take place at the Scottish Rite Cathedral from 6.00-8.30pm on February 6. Secure your ticket by searching Eventbrite.

With such exciting gem-themed events planned, can you really afford to miss out? If you need any more convincing have a look at what some of the most dedicated Tucson visitors have had to say about this extraordinary occasion...

A furry friend visits the Gem-A stand at the AGTA Show in Tucson.

Eric Fritz FGA DGA, Manager of the University of Arizona Gem and Mineral Museum, has been attending the Tucson gem shows for the last 10 years. Here, Fritz tells us why a visit to Tucson is essential for every gem lover...

"Tucson is the show where people from both the mineral and gem trades from all over the world come together. Other international shows lack the broad appeal and no other show spans three full weeks. Plus, Tucson has generally beautiful weather, educational opportunities and a plethora of goods, sometimes never seen anywhere else.

Fabulous specimens are really everywhere. The Smithsonian exhibits are always worth seeing; from fabulous pearls to a 'pile' of uncut diamond crystals one year. It's sensory overload! Tucson is a must-do pilgrimage for anyone with a casual interest in gems and minerals to those of us who are obsessed. Come out and test the water for a few days, do some sightseeing in Arizona and then come back year after year to continue the amazing journey."

Quartz for sale in Tucson. Photo courtesy of Charles Evans.

"For me, Tucson isn't just a place, it's a coming together of the world's most colourful characters, gems and artistry. Sensory overload on every level is guaranteed..."

Shelly Sergent, Curator, Somewhere In The Rainbow Collection.

Richard Drucker FGA (Hons) is President of Gemworld International and has been visiting the Tucson gem shows for over four decades. Sharing some of his best memories of Tucson, Drucker explains why he hasn't missed this gem extravaganza since 1983!


Richard Drucker enjoying the many huge geodes that can be found in the Tucson tents. Photo courtesy of Richard Drucker.

"Tucson is a very special place for me as it was where I first started going to do research on coloured gemstones for my publication, GemGuide, back in 1983. I have this gem show in my diary year after year as it is the most invaluable resource for me for pricing and education and I have never missed it since.

If it exists, be it mineral specimen or the rarest of faceted gemstones, it will be in Tucson. There are tents with endless rows of rocks, fossils and gems, and there are pavilions with world-class gemstones to view. It is all the gem museums of the world combined spread out over one town.

My favourite memory was from my very first year when I met and had a long leisurely dinner with the legendary Richard T. Liddicoat, then President of the Gemological Institute of America and revered by all, along with my father. Here I was, relatively new to the industry, discussing gemmology with the most famous person in our American gem world. He inspired me at that dinner to continue with my gem endeavours offering incredible words of encouragement."

Kathryn Bonanno PG FGA, President of Kathryn Bonanno PG FGA Inc. in New York City, shares why she's been visiting the Tucson shows for over 30 years...

"Tucson is the greatest gem fair in the world in my opinion. As I have been told, it started as a meeting of rock hounds and gemstone enthusiasts, out in the desert, very informally trading rocks out of the beds of pick-up trucks and it just continued to grow and expand to the level it is today. It has something for everyone, from the finest 'gem' quality cut and polished rarities, exceptional crystals and fossils, to inexpensive commercial gemstones and rocks, traded in a very relaxed, informal setting.

The draw of the Tucson shows has become ever more international and for decades now has showcased the first 'finds' or gem discoveries from every corner of the earth. I think every country that produces a mineral or a fossil is represented at the Tucson shows. Let the buyer beware though — some shows have certain guarantees regarding disclosure that their participants must adhere to and many do not have these guarantees; some are only for dealers and some are open to all, and some are just roadside, open bed truck stands!

I have many fond memories from my many pilgrimages to Tucson – both professionally and personally. I have purchased many exceptional gems there – unheated sapphires of large sizes, superb spinels, opals, alexandrites, rubies, and on and on, as well as the large amethyst cathedrals that decorate each side of my desk and many crystal specimens (like a rhodochrosite crystal specimen from the Sweet Home Mine in Colorado, bought years ago!)." ■


More unusual specimens, such as these large stalagmites, are a fascinating sight at the Tucson gem shows. Photo courtesy of Kathryn Bonanno.

The pyramid and camels are iconic for Quartzsite, featured here at the town's welcome sign, reflecting the town's history of the camel driver for the U.S Army Corps, named Hadji Ali, known by his anglicised name 'Hi Jolly'.

The author sorting through a huge pile of yellow opal rough material from Zambia.

QUARTZSITE, ARIZONA

A ROCKHOUND'S PARADISE

You're undoubtedly familiar with the Tucson gem shows, but have you heard of the Quartzsite gem shows, which are just a few hours' drive away and held from January through to early February? Here, Helen Serras-Herman FGA explains why an extended and more varied trip to Arizona should be at the very top of your to-do list in 2021.

Every year from mid-January to mid-February, Arizona becomes a destination for mineral collectors, gem enthusiasts, jewellery lovers, rockhounds, gemmologists, researchers, authors, journalists and gem artists. They come from near and far, mainly to attend the gem and mineral shows and the trade conferences as vendors, shoppers or speakers. Attendees also enjoy trips to museums, guided tours of copper mines and the rugged landscapes that made the West famous, like the Sedona Red Rocks, Monument Valley and our celebrated National Parks — the Grand Canyon and the Saguaro National Park in Tucson.

The Tucson gem shows are famous the world over; many vendors and buyers converge in this quintessential south-western city for just over two weeks in February. However, preceding the Tucson shows are several gem and mineral events that take place in Quartzsite, Arizona.

The town of Quartzsite is located near the western border of Arizona and is a three and a half hour driving trip from Tucson. During the hot summer months, Quartzsite is a quiet place with about 2,000 year-round residents, but during fall and winter the population swells to over one million, making Quartzsite a spirited oasis in the desert.

The shows here are famous among professional and amateur lapidaries and jewellery artists. Some vendors will go on to the subsequent Tucson shows to sell their inventory, but several will never go to the "big city". There are miners and dealers that only come to Quartzsite, and buyers come back annually to see them.

About 2,000 vendors go to Quartzsite every year to sell rocks, minerals, gems, fossils and jewellery. Even though there are many similarities between the Tucson and Quartzsite shows, here are five things to consider before adding Quartzsite to your annual events calendar:

The annual QIA Pow Wow (the Quartzsite Improvement Association) – the equivalent of a gem and mineral society – is the main event that brings most visitors into town.

OUTDOOR VS. INDOOR

The vast majority of shows in Quartzsite are outdoors. Dust covers everything, and parts of shows can be highly weather dependent. Sometimes the desert night temperature drops below freezing, and the water in the tubs with slabs becomes ice-cold, making it almost impossible to put your hands in and sort through. Attendees with limited time, anxious to start hunting early in the morning, find out that cold nights mean a slow start for the outdoor vendors. Be prepared for cool, cold, colder or warm weather.

A LOT OF EXERCISE!

Be prepared to walk miles in the dusty aisles of the shows. The Quartzsite shows and aisles are more spread out compared to the Tucson shows, as vendors park their cars and RVs within their selling spaces. Wear comfortable shoes, a hat and sunscreen, and carry water.

RELAXED ATMOSPHERE

There is a different vibe at the Quartzsite shows. When the sun is shining, it fuels a laid-back, no-pressure atmosphere that dealers and shoppers alike enjoy. Dealers sit down under their tents awaiting customers, and shoppers stroll along the aisles with their pets alongside them. The relaxed atmosphere is in stark contrast to the pushed-for-time mood in Tucson.

MORE TIME TO ADMIRE

Compared to the Tucson shows, the duration of most of the approximately 10 Quartzsite shows is much longer. Some shows start in late December and run through to mid-February, with the exception of the annual Pow Wow, hosted by QIA (the Quartzsite Improvement Association) - the equivalent of a gem and mineral society. This year's Pow Wow ran from 15-19 January 2020 and welcomed a large number of visitors.

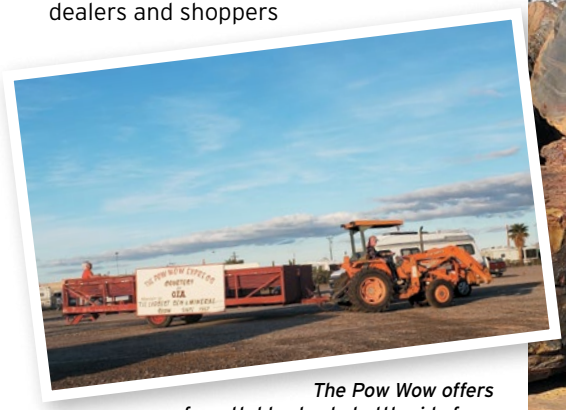
DIFFERENT SHOWS, DIFFERENT PRICING

At the Tucson shows we are familiar with the retail and wholesale price structure of merchandise. At the Quartzsite shows, due to the large number of amateur lapidary shoppers and rockhounds, there is another price, which I call the 'rock show price', which is somewhere in between retail and wholesale. Some of the shows have a gigantic flea-market atmosphere, serving all the needs of the winter visitors, and gem and mineral related booths are scattered throughout. The other show that offers a lot of lapidary rough is Desert Gardens.

What I look forward to in Quartzsite is to be surprised by treasures that fall anywhere between the new and noteworthy, the unusual and rare, the intriguing and the bizarre. It may be a small slab with an unusual pattern, huge lapidary rough boulders and entire logs of petrified wood, heaps of blocks of reconstituted turquoise and other materials or unique artistic jewellery. This is why Quartzsite is referred to as "a rockhound's paradise". ■

This amazing and gigantic (over two feet tall) amethyst gem tree was among the rarities exhibited at the Prospectors' Panorama show in Quartzsite.

For a complete list of all the shows in Quartzsite and to plan your itinerary ahead of your travel, visit xpopress.com and download a free copy of the Quartzsite EZ-Guide, or once in town, pick up a printed copy. All photos by Helen Serras-Herman.



The Pow Wow offers an unforgettable short shuttle ride from the parking lot to the show in a unique style carriage: a tractor-pulled wagon.

Piles of lapidary rough are offered for sale, such as these huge boulders of marabamba, a rare type of tiger-eye with red jasper and hematite veins from Western Australia.

ONE NATION, MANY GEMSTONES

We could think of no one better to support this United States-themed edition of *Gems&Jewellery* than Jewelry Television (JTV) – the first Accredited Teaching Centre (ATC) to join Gem-A USA and a long-standing supporter of Gem-A education. Here, Elizabeth A. Gass FGA, a Gemstone Advancement and Education Coordinator in JTV's learning and development department, takes us on a road-trip by way of four iconic American gems.

Benitoite in matrix.

The United States is a geographically vast and geologically diverse nation. It comes as no surprise that it would host some of the most sought-after gemstone species in the world. Some of these are wholly unique, while others are some of the finest quality known to man. One mineral, with a rather unique discovery story and geological occurrence is benitoite.

CALIFORNIA

BENITOITE

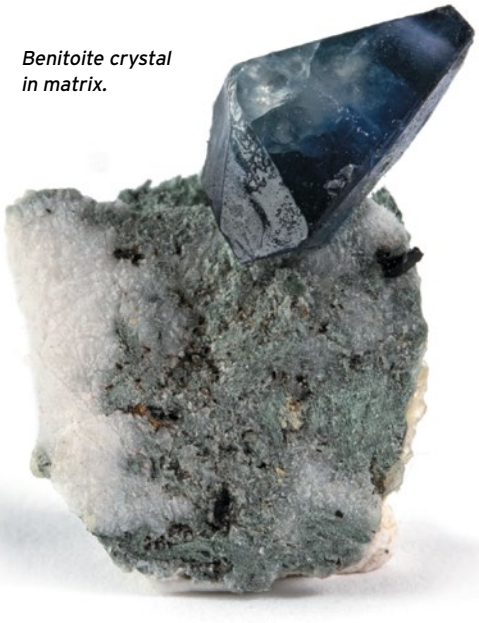
Benitoite was discovered in 1907 by James Marshall Couch, a failed melon farmer turned prospector, near the headwaters of the San Benito River in the mountains of the Diablo Range (Wilson, 2008).

The type locality of benitoite, the New Idria district, San Benito County, California, is also the only location that has produced facet grade benitoite. Out of less than 10 known locations around the world, only three are outside of California (Japan, Australia, and Arkansas), and only two mines in the New Idria district, the Benitoite Gem Mine and Junila claim, have produced any facet grade material. Of those two mines only one ever produced faceted material in commercial quantity, the Benitoite Gem Mine. It was also the original mine opened at the site of discovery (Laurs, Rohtert & Gray, 1997). The Benitoite Gem Mine operated in some capacity from 1907–2005 under several different names and owners. The site was reclaimed in 2005 and sold (Wilson, 2008). It is currently open as a small pay to dig operation.

When benitoite was first discovered it was thought to be blue diamonds by Mr. Couch who showed them to his financier Roderick William Dallas. Dallas immediately sent Couch back up the mountain to stake a claim. All the formal paperwork was filed within eight days of the initial discovery, but no one involved knew exactly what kind of blue gemstone they were looking at. Dallas asked Leland Barnes Hawkins, Sr., a mine engineer and friend to look at some of the rough crystals and take them to a jeweller in Los Angeles to determine if they had value.

The jeweller declared them to be a form of blue obsidian. Then another jeweller identified them as spinel because of their colour. A faceted sample, labelled as a spinel from California, was sent to a jewellery firm in San Francisco. The head of their diamond department studied the stone and realised that the gem wasn't anything he had seen before. He purchased the stone for $40 and sent it to a friend, Davis Louderback, who was an Associate Professor of Geology at the University of California, Berkley.

After concluding that the stone was neither spinel nor sapphire, he asked for more material, preferably crystals, to confirm that this was a new mineral. After backtracking the gem to its source, it took Louderback only a few days, with the new samples, to confirm that Couch and company had a new mineral on their hands. From there, a visit to the mine was required so that Louderback could write a formal bulletin on the discovery. Word of a possible new gemstone reached Tiffany & Co.'s George F. Kunz, who sent a telegram asking for more information on the discovery. From there the race was on to see if Louderback could complete his research before Kunz wrote his own proposal. Others involved with the discovery pushed Louderback to tirelessly work on his proposal because they wanted their Californian gem to have a "California name". Louderback succeeded and on July 30, 1907 his report was published, officially naming the new mineral 'benitoite' (Wilson, 2008).



Benitoite crystal in matrix.

Benitoite's discovery could have never happened without the unique geology of the New Idria region. The New Idria region is predominantly composed of a serpentinite body that was tectonically emplaced into the surrounding sedimentary and metamorphic rocks (Laurs, Rohtert & Gray 1997). When two tectonic plates collided, one dipped below the other in a process called subduction. This creates a massive amount of heat and pressure. Because of this the serpentinite rose through the

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A fascinating example of benitoite in matrix.

Rough benitoite (right) and a cut and polished benitoite gemstone (left).

overlying rocks due to its relatively lower density as a plume. As it rose it captured some of the overlying rocks, namely those of the Franciscan Complex, which is composed of a wide variety of rocks like basalt, greenstone, chert, limestone, sandstone and blueschist. The main constituents are graywacke sandstone and blueschist, but all the mentioned rock types can be found and are highly folded and faulted in the Franciscan Complex. The serpentinite is composed mainly of chrysotile-lizardite serpentinite and minor antigorite serpentinite (Tsujimori, 2007). With these randomly interspersed pieces of the Franciscan Complex the geochemistry varies widely from one area to the next.

Once these rocks were in place, a later intrusion of syenite (intrusive igneous rock similar to granite but containing less than 5% quartz) in the southern portion of the serpentinite body took place. This caused hydrothermal alteration to occur in localised areas of the serpentinite and its tectonic inclusions (Tsujimori, 2007). The benitoite is solely found in the hydrothermally altered zones of the blueschist and, even then, only when the amphibole and pyroxene show recrystallisation; there is dissolution of albite and pervasive infilling of natrolite in the veins (Laurs, Rohtert & Gray, 1997). Even then, the benitoite usually only forms where the veins narrow or terminate and it is always coated by natrolite, which formed in the later stages of alteration. Geologically this is a very narrow window for the growth and formation of benitoite and other accessory minerals like neptunite.

Because of benitoite's rarity in the world and its very specific growth requirements, it should come as no surprise that its crystallographic properties are also unique. It is a barium titanium silicate ($BaTiSi_3O_9$) that forms in the trigonal portion of the hexagonal crystal system. The common form that it crystalizes in is a ditrigonal-dipyramidal habit, which is the most complex form of a trigonal crystal (Louderback & Lawson). This form is so rare, in fact, that it took 77 years for a natural occurrence of this morphology to be found after it was predicted in 1830 (Laurs, Rohtert & Gray, 1997).

Crystals are typically smaller than one centimeter with many of them being highly included. Gemstones are typically very small due to the flat habit of the crystals, strong colour zoning and inclusions of amphibole and pyroxene. Cut stones are typically smaller than one carat but many stones larger than 4ct have been produced over the years with the largest cut benitoite weighing in at 15.42ct (Laurs, Rohtert & Gray, 1997). Don't let the relatively small size of benitoite fool you though; it can come in a beautiful range of colours from blue to slightly purplish-blue, or white to colourless, with very few stones being naturally pink. Most stones are not treated in any way, but an orange colour can be caused in some stones through heat treatment. Even though the dispersion is sometimes masked by its deep colour, it is in fact higher than that of a diamond. This sets it apart from many other similarly coloured gemstones.

This form is so rare, in fact, that it took 77 years for a natural occurrence of this morphology to be found...

The state gemstone of California is as American as a gemstone can be. It comes from unique geological circumstances, has a rare crystalline structure, and has an incredible story of its discovery by a humble melon farmer turned prospector, looking to improve his family's lot in life, through determination and a lot of luck. Considering all this, benitoite is truly one of the greatest American treasures.

Further examples of benitoite gems in a range of hues.

RED BERYL

Many mineral discoveries in the US were made by those in search of the 'mother lode' but instead miners found themselves looking at something totally new and unexpected. Red beryl was no exception.

Like many other gemstone species in the United States, red beryl was discovered mostly through serendipity. Maynard Bixby was a bookkeeper turned prospector, who travelled to Utah after becoming involved in mining in Colorado and Arizona. He staked several claims in a remote part of the Thomas Range of Utah. The claims focused on the recovery of topaz specimens and rough but at one of his claims, Maynard's claim, he found the first red beryl crystals in 1904. He sent a sample to National College in Washington D.C., where it was formally identified as a new variety of beryl. The name bixbite was originally given to the new beryl variety but the name was too similar to another mineral discovered a few years earlier by Bixby: bixbyite. The name was discredited due to the risk of confusion in favour of calling the mineral red beryl. Soon after discovering red beryl, Bixby turned his efforts toward red beryl mining, but production was limited, and the material was not gem quality.

In 1958, a second occurrence of red beryl was discovered by Lamar Hodges in the Wah Wah Mountains in Utah, some 90 miles south of the original find. He was unsuccessfully prospecting for uranium ore when he unearthed gem quality red beryl crystals. He staked the Violet claim and for 18 years he and his family worked the claim as a hobby. The rights to mine the property were purchased by the Harris family in 1978. They staked 12 claims called Ruby 1-4 and Violet 1-8. These claims became the Ruby Violet Mine. In 1994 the Kennecott Exploration Company (KEC) signed a three-year lease with an option to buy with the Harris family. The company wanted to see if larger scale mining of red beryl was feasible. KEC took numerous core samples and tunnelled into the deposits, removing as much as 11,000 tons of rock. They were able to estimate the yield of the ore deposits at 1.2ct of red beryl per ton of ore with only 10% yield during faceting. This means that the mine was estimated to produce .125ct of faceted red beryl per ton of ore. Even though their explorations were considered a success, in 1996, the company downsized and decided to let the mine go back to the Harris family.

Red beryl has been produced by only seven locations, the majority of those are in Utah. The only other country to produce red beryl besides the US is Mexico. Other beryl varieties are quite common around the world and most form in granitic pegmatites, metamorphic or metasedimentary rocks. Red beryl is different.

All the known occurrences of red beryl have been found in one unlikely host rock: rhyolite. Most geological studies on red beryl have been conducted at the Ruby Violet Mine in the Wah Wah Mountains of Utah. This is because it is

A rough red beryl crystal.

the only occurrence of red beryl that has produced facet grade material in any kind of quantity. The geology of the Wah Wah Mountains consists mainly of volcanic rock, but the original country rock is mainly composed of sedimentary rocks from the Paleozoic and Mesozoic overlying Proterozoic basement rocks. These rocks were extensively folded and faulted during the Sevier Orogeny that took place 140-50 million years ago. Volcanic activity began 34 million years ago but the deposits that hold red beryl formed 23 million years ago. During this time, regional tectonic activity caused large scale faulting and smaller scale volcanism in the form of small domes, igneous intrusions and lava flows. The red beryl formed in the rhyolitic lava flows.

The rhyolite is flow banded and porphyritic, but the red beryl is found in areas that show hydrothermal alteration

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A striking example of a red beryl crystal in matrix.

with the original minerals being replaced by clay minerals. The gem quality red beryl is found along almost vertical fractures that were formed as the rhyolite cooled and contracted. These fractures can be filled with clay minerals like kaolinite, which sometimes marks areas where red beryl is concentrated.

A red beryl.

Red beryl, unlike other minerals that form in topaz rhyolites, like topaz and garnet, did not form in gas cavities. Its genesis was due to the beryllium (Be) content of the rhyolite and its relatively low calcium content. As the rhyolite cooled, hot fluorine-rich gases were released, mixed with water vapour from sediments beneath the rhyolite and created a supercritical fluid. This fluid reacted with the rhyolite along the fractures creating a Be-F complex that could be transported by the fluid. The Be-F complex reacted with the rhyolitic glass, Fe-Mn oxide minerals and alkali-feldspar along the fractures forming red beryl. Chemical alteration along the fractures occurred after the formation of the red beryl as the fluids cooled.

Red beryl has a very specific formation environment that lends itself to unique chemical and physical properties, but this is not entirely true. It very much falls in line with other beryl varieties. What does make it unique are its chemistry and colour. Compared to other beryl species it is high in iron and manganese oxides, low in alkali elements and is almost devoid of water. Its colour is caused by Mn^{3+}, just like morganite. Where the two differ is where the Mn^{3+} came from. It is believed that the Mn^{3+} in red beryl was sequestered during formation whereas the Mn^{3+} in morganite is an oxidation product from exposure to natural radiation after formation.

Red beryl is a beautiful and unique gemstone produced in the United States. The low yield and small distribution area make it particularly difficult to mine. Thankfully man has a thirst for adventure and is no stranger to hard work and dedication. Without it we would not have this American treasure.

SWEET HOME MINE RHODOCHROSITE

Mining in the Alma district of Colorado began in 1861 when gold was found in one of the headwater creeks of the South Platte river. This was one of the last major discoveries of gold during the Pikes Peak gold rush. From there, prospectors quickly turned from mining the river to the hard rock when seams of quartz containing gold were found in an area called Buckskin Gulch. Although mining processes were rudimentary, by 1864 miners had made quick work of both the river and bedrock gold deposits. Most deserted Alma in search of the next big gold strike. Seven years later, in 1871, outcrops were discovered near the summit of Mount Bross that contained mineralised silver. A mine was quickly opened on the over 14,000 ft tall mountain and other similar outcrops were discovered.

The district once again drew fortune seekers from all over and the town of Alma became the official district trading center in 1873. The outcrops that would later become the Sweet Home Mine were discovered that same year. Nestled near the timberline on the southern slope of Mount Bross, miners focused their energy on following the mineralized veins. Short tunnels were dug, but while the veins were rich in silver ore, they were narrow and their paths were unpredictable, which made mining difficult. The early miners noted the presence of rhodochrosite as a gangue mineral, which is a term reserved for minerals of no value found alongside the desirable minerals. Someone must have found them beautiful because, in 1876, a federal mineralogical report mentioned the "very beautiful specimens" of rhodochrosite that Sweet Home Mine was producing. In the 1880s silver production in the United States boomed, leading to an excess on the market. In 1893, the cost of silver plummeted leading to the closure of most silver mines; the mines in the Alma district were no different (Voynick, 1998).

While many silver mines in the area were wildly successful, Sweet Home is likely to have never turned a profit during its first two decades of operation. Official workings at the mine began again in 1922. Production was intermittent from 1924-1929 but in 1925 Sweet Home produced more silver than at any other time it had been in operation. 1925 was not just a great year for silver production, there was also a major find of rhodochrosite, which produced numerous matrix pieces that found their way into many prominent museum collections. After that find, Sweet Home Mine became recognised as a producer of some of the finest-known rhodochrosite specimens.

In 1966 an incredible pocket, reported by the owner as being 7 ft tall, 4 ft deep, and 2 ft wide, covered in fine rhodochrosite nestled on beds of quartz crystals, was discovered. Very few would ever see it. Six weeks later, the owner returned only to discover one of the miners had high-graded (stolen) the entire pocket while the mine was supposed to be closed for winter. That miner sold all the crystals, one of which would later be named The Alma Queen, took the money, left his family behind, and disappeared to start a new life with his girlfriend.

With the 1966 find and the large injection of fine rhodochrosite into the market, the Sweet Home Mine became a recognisable name throughout the mineral community. A book published in

A rhodochrosite specimen.

A rough rhodochrosite crystal cluster.

1973, *The World's Finest Minerals*, even had the Alma Queen grace its cover. In 1980, Sweet Home was leased by a large mining corporation in search of molybdenum due to the high market demand. Luckily for Sweet Home, molybdenum prices plummeted in 1981 and the lease was allowed to expire.

In 1990, a group of investors created Sweet Home Rhodo Inc., led by Brian and Kathryn Lees, owners of The Collector's Edge (Voynick 1998). Their endeavours in the 90s produced some of the most recognisable rhodochrosite specimens in the world including the Alma King, The Ribbon, The Alma Rose and The Butterfly. Numerous other world class specimens were extracted into the early 2000s but by 2004, with the discovery of the Hedgehog pocket and later the 4-20 pocket, all known potential targets were exhausted. The decision was made to permanently close the iconic Sweet Home Mine. Today, the sight has been reclaimed by nature except for a building acting as the lone monument to one of the greatest specimen mines of the 20th century. During its history, Sweet Home Mine produced enough rhodochrosite specimens to make it one of the most successful mines in the history of Colorado, their value far exceeding the production of most gold and silver mines.

The Mosquito range, that hosts the Sweet Home Mine, has a long history of geologic processes including intrusions of igneous rocks, faulting and heavy erosion that produced the mountain range seen today. The Mosquito range is made up of Cambrian to Pennsylvanian aged sedimentary rocks overlying older Precambrian igneous and metamorphic rocks with much younger (Laramide to Tertiary) intrusions of igneous bodies in the forms of stocks, dikes and sills. Faults have offset the sedimentary rocks and underlying igneous and metamorphic rocks. This created weaknesses that later acted as guides for the intruding igneous bodies, and thus created the ideal locations for the myriad of mineral deposit types that exist in the area (Misantoni, Silberman and Lees, 1998). Later glaciation and erosion exposed the older igneous and metamorphic rocks as well as the younger igneous intrusions that are found in the Sweet Home mining area. For most of the district the sedimentary formations contain the majority of the economically →

important ore sources but for the Sweet Home Mine, the important formations are the intrusive igneous bodies. All rock units in the Sweet Home Mine are hydrothermally altered and show mineralisation at each stage of hydrothermal activity.

Faceted rhodochrosite.

The crystallisation of minerals in the veins can be simplified as happening in two stages. The first is a higher temperature, magmato-hydrothermal alteration, that produced fluorite, pyrite, quartz, hübnerite and muscovite, as well as other minerals.

The second stage is characterised by the mineralisation of chalcopyrite, tetrahedrite, galena, apatite, barite, calcite, more fluorite, and, of course, rhodochrosite. This second stage is attributed to hydrothermal fluids thought to be cooled by meteoritic water over time.

The Sweet Home Mine is known for its incredibly red rhombohedral rhodochrosite crystals, but there are other locations around the world that do produce deeply coloured rhodochrosite. The N'Chwaning Mines in South Africa are probably the most recognised, but the colour of their crystals is typically more of a dark blood-red than a bright cherry red. Specimens from Peru, Argentina and Mexico are also recognised for their quality. The colour of all rhodochrosite is caused by the presence of manganese (Mn), making it an idiochromatic mineral with the formula $MnCO_3$. The strength of the colouration is dependent on the amount of contamination of other cations, namely calcium, iron and magnesium. The predominant contaminant that affects the strength of colour, and value of the rhodochrosite, is iron. Calcium and magnesium can also affect the colour, but they must be present in greater concentrations to have a noticeable effect.

Gemmy rhodochrosite is noted as typically having less than 1% Fe+Mg+Ca contamination and pink material as having over 2% Fe+Mg+Ca. Relatively pure rhodochrosite is rare in nature but many of the rhodochrosites from Sweet Home have less than 1% (atomic) Fe+Mg+Ca contamination with some having as low as .2% contamination. Previous studies claim a rhodochrosite from Bosnia was one of the purest ever tested and it contained .6% Fe and .36% Ca. This makes Sweet Home mine rhodochrosite the purest rhodochrosite in the world (Wenrich, 1998).

YOGO SAPPHIRE

One state in particular, Montana, has so much mineral wealth that one of its nicknames is 'The Treasure State'. Gold is what first drew settlers to its vast landscape but, in the gemological community, Montana is most well-known for one of its more colourful treasures: sapphire. There are a few mines that have produced sapphires over the years, but the most desirable material is from Yogo Gulch.

The story of the discovery of Yogo sapphires is much like the discovery of many American sources of gemstones; no one was really looking for them. In 1895, a miner by the name of Jake Hoover discovered gold along a bench (flat area on the side of a mountain) east of Yogo Creek. Thinking that there was the possibility that the deposit could yield significant amounts of gold, he searched for investors. They raised somewhere around $40,000 to invest in the mining operation, $38,000 of which was used to construct a ditch and flume to bring water to the mine. It extended for several miles and evidence of it can be found today. Luck was not on their side and after a year of mining they came away with only 40 ounces of gold, worth around $700. Miners had been noticing 'blue pebbles' in their sluice boxes since mining took off in the area but everyone just discarded them in their search for gold.

Hoover was different, he collected the small blue stones in a cigar box until it was full. He then sent them off to Tiffany & Co. to see what they were and if they were worth anything. Hoover received quite the surprise when George F. Kunz of Tiffany & Co. identified the pebbles as sapphire. Tiffany & Co. bought the cigar box full of rough for $3,750 and Kunz declared the stones "the finest precious gemstones ever found in the United States" due to their exceptional colour and clarity. Realising that the sapphires could be the remedy to their financial problems, Hoover and his partners set out to find the "mother lode". Another prospector stumbled upon the source of the sapphires when he found a fissure filled with soft material in a limestone outcrop. When he washed some of the material, he immediately found sapphires. Hoover and company quickly identified the vein as the source of the sapphires. It did not take long for claims to be staked along the five-mile length of the vein. Eventually, 33 claims, all mining sapphire, were established.

The famous Yogo sapphires would never have existed without the geological processes that occurred in the

A tie or lapel pin set with a Montana sapphire.

Cut and polished Montana sapphire gemstone.

Yogo mining area. They are found in a system of igneous intrusions called dikes. There are six main dikes that are the center of the Yogo sapphire deposit. All are composed of a type of igneous rock called a lamprophyre. A lamprophyre is a dark igneous rock with porphyritic texture, meaning that there are larger crystals in a fine-grained matrix.

These dikes intruded into the predominantly limestone country rock. The limestone had previously undergone dissolution processes that created karst topography in the form of channels, caves, and sinkholes. The lamprophyre dikes followed the natural topography during emplacement. The main dike, which is where the bulk of the mining for Yogo sapphires has taken place, is un-weathered compared to the other dikes. The weathered dikes are altered to clay minerals, often yellow to reddish brown in colour. One dike that was discovered does not bear sapphire. It is a mafic lamprophyre whereas the others that do bear sapphire are all ultramafic. This means that the sapphire bearing rocks are made of less than 45% silica. Because the other dikes are altered, the main dike is the most appropriate dike to study and infer the emplacement conditions of the Yogo sapphire deposits. It is also the only dike to have significant research available.

The main dike has a limited amount of contact metamorphism with the surrounding rock which indicates a quick emplacement and cooling process. The magma that made the lamprophyres is thought to have originated in the upper mantle. The magma moved through existing metamorphic rocks, rich in aluminum, partially melting and heating them. The sapphires formed as a reaction between the magma and the aluminum-rich rock in what is called a peritectic reaction. Peritectic reactions occur between a solid (country rock) and a liquid (lamprophyre) at certain temperatures and compositions resulting in a new solid (sapphire and other minerals). The sapphires did not crystallise from the lamprophyre, but the intrusion caused their formation.

Pieces of the country rock that now contained sapphire were incorporated into the magma as xenoliths. The magma melted many of these xenoliths and incorporated the elements into itself. Even the sapphires were partially absorbed with some showing a spinel reaction rim or etching and pitting. There are a few theories of how the sapphires came to be in these igneous bodies, but this is one of the more recent that correlates well with the known data.

> The story of the discovery of Yogo sapphires is much like the discovery of many American sources of gemstones; no one was really looking for them.

The unique geology of the Yogo mining area leaves an imprint, not just on the geologists and miners that know the area, but also on the sapphires themselves. They are known for their even colour, lack of colour zoning, and are fairly-free of inclusions. Their quality as cut stones is also increased due to their high lustre and brilliance. They are typically a 'cornflower blue' colour but can also be found in shades of violet or purple. Typically, it is difficult to distinguish sapphires from different deposits because of how physically similar they are. Yogo sapphires, on the other hand, are wholly unique.

Their origin can be considered igneous, instead of metamorphic, like most sapphires. They have unique inclusions and distinct trace element concentrations that make them readily distinguishable from sapphires mined in other locations. Some of the more notable and recognizable inclusions include negative crystals of carbonates or analcime, pyrope-almandine-grossular garnet crystals, elongated dark rutile crystals with or without tension fractures and melt inclusions with contraction halos. There is also a notable lack of silk in Yogo sapphires. If it is present, which is extremely rare, it is a minute amount which is called 'rutile dust'. The trace element concentrations distinguish them by their generally elevated magnesium and titanium content. Some Sri Lankan sapphires can overlap the lower end of the Yogo sapphire range, but they always have a much higher iron concentration than Sri Lankan material.

The United States may have vast wilderness and incredible natural wonders, but it is some of our smallest treasures that have captured mankind's attention. Sapphires from the Yogo Gulch of Montana are no different. This unique formation environment provided a distinct chemistry and readily identifiable inclusions. The Yogo sapphire's accidental discovery and all the subsequent successes and failures of different mining ventures gives this precious stone an incredible story. ■

Complete bibliography and references available upon request. All images courtesy of JTV.

Two examples of cut and polished sapphires from Montana.

HEAVENLY JEWELLERY

Lunar Excursion Module (exact replica) Cartier Paris, 1969. Yellow gold, white gold, black lacquer, red, white, and blue enamel (15 x 10 x 25 cm). The lunar vehicle or LEM (Lunar Excursion Module) was the lander spacecraft that was used in 1969 for the Apollo 11 mission, which enabled man to walk on the moon for the first time. Courtesy of Cartier.

The race to put a man on the moon dominated American culture in the 1960s and, unsurprisingly, had a fascinating impact on jewellery design. Here, Elyse Zorn Karlin, Co-Director of the Association for the Study of Jewelry & Related Arts (ASJRA) and Curator of the *Out of this World! Jewelry in the Space Age* exhibition shares her insights into the cosmically creative history of space-inspired jewels.

Humans have been pondering the mysteries of our universe since the dawn of civilization. Early cultures methodically observed the night sky and then placed images of the moon, sun and stars as decoration on objects they created, including those that they used to adorn themselves.

The origins of Western astronomy can be found in Mesopotamia, where the ancient kingdoms of Sumer, Assyria, and Babylonia were located. A form of writing known as cuneiform emerged among the Sumerians around 3,500–3,000 BC. Our knowledge of Sumerian astronomy comes from the earliest Babylonian star catalogues dating from about 1,200 BC.

'Man in the Moon' ear clips Tiffany & Co. (1837-present), Donald Claflin for Tiffany & Co. gold, chalcedony, plastic, rubber 1966-1976 3.1 x 3.2 x 1.7 cm (each) Provenance: Gloria Vanderbilt (1924-2019). Copyright Tiffany & Co. Archives 2019.

Astronomy in the Indian subcontinent dates back to the period of the Indus Valley Civilization during the 3rd millennium BC, when it was used to create calendars. And the sophisticated study of astronomy as a branch of mathematics was developed by the ancient Greeks.

The first geometrical, three-dimensional models to explain the observed motion of the planets were

20th century Halley's Comet brooches. Courtesy of Deborah Hewitt.

developed in the 4th century BC by ancient Greek astronomers Eudoxus of Cnidus and Callippus of Cyzicus.

As jewellery is always created within the context of what is happening in the wider world, it follows that designs often reflect man's interest in outer space. In ancient Egyptian culture, Ra is known as the God of the Sun and creator of the world — he is depicted in jewellery often with the 'sun disk' above his head. Another example of early space-influenced jewellery is the *lunula*, a crescent moon shaped pendant worn by girls in Ancient Rome until they were married. It was related to fertility and healing, as well as offering protection against the Evil Eye.

As expert navigators using the stars, the Vikings viewed the constellations as having both mystery and power. They wore lunar pendants as pectorals or suspended them from belts, clothing and horse harnesses. There are many other examples of space images in jewellery in almost every culture that has existed throughout time. However, it was a 17th century astronomer who set the stage for a jewellery 'craze'. Royal astronomer Sir Edmond Halley constructed an observatory on Saint Helena, a remote volcanic outpost in the Atlantic Ocean, in 1676, where he recorded a transit of Mercury across the Sun. He realised a similar transit of Venus could be used to determine the size of the Solar System and also used his observations to expand contemporary star maps. In September 1682 he used the laws of motion to compute the recurring intervals of a specific comet in his 1705 *Synopsis of the Astronomy of Comets*. The comet was posthumously named after him upon its predicted return in 1758.

Moon phase necklace by contemporary Genevieve Yang.

The next return of the comet Halley predicted in 1835 led to the popularity of the genre 'Halley's Comet jewellery' of which many versions were made. Examples of brooches were wrought in gold and diamonds as well as in silver and paste. The stone is the body of the comet with a metal tail trailing behind it, and most are quite diminutive. Each time the comet has reappeared approximately every 75 years since 1758, brooches depicting it have become popular all over again, with many costume jewellery examples being created in the 20th century. Not all brooches with comet themes are tied to the return of Halley's Comet, but many are put in that category by those who collect and sell them.

As a point of interest, Halley's Comet is the only known short-period comet that is visible to the naked eye from Earth and the only naked-eye comet that might appear twice in a human lifetime. It last appeared in the inner parts of the Solar System in 1986 and will next appear in mid-2061.

In the 18th and 19th centuries many developments in the sciences allowed mankind to better understand the makeup of the heavenly bodies and the origins of the universe. In the second half of the 19th century, novelist Jules Verne imagined a rocket ship trip to the moon in his iconic book *From the Earth to the Moon*. In his fantasy novel he even placed the launch of his rocket at a location on the coast of Florida. This perpetuated interest in the cosmos, making starburst and sunburst fine and non-precious jewellery popular throughout the second half of the 19th century. Interestingly, Verne's choice of Florida pre-dated the establishment of Cape Kennedy (Cape Canaveral) as the launch site for the American Space Race by almost 100 years.

Alexandra of Denmark (later Queen consort of the United Kingdom and the British Dominions and Empress consort of India as the wife of King Edward VII). Here, she is adorned in star-shaped brooches. Alexander Bassano [Public domain].

At the end of the century, during the brief reign of King Edward VI, his consort Queen Alexandra, set the trends. She popularised the wearing of multiple diamond and platinum star and crescent moon brooches across her bosom. Numerous examples of these jewels in

Costume jewellery moon surface bracelet by Kenneth Jay Lane.

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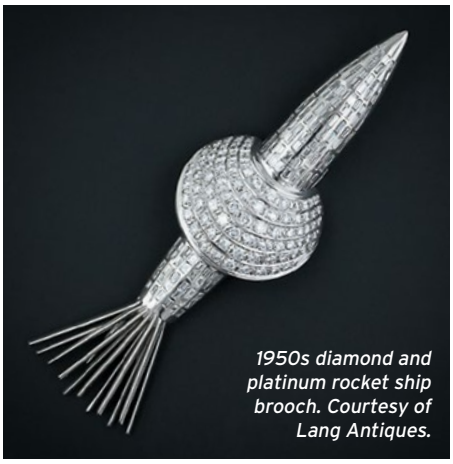


1950s diamond and platinum rocket ship brooch. Courtesy of Lang Antiques.

precious and non-precious materials can still be found in the marketplace.

Throughout the early 20th century, books, comics, movies and later TV, focused on space exploration before it was ever feasible, and jewellery with moon, star and sun motifs continued to be popular in all categories of jewellery. Even inexpensive adornments like Bakelite jewellery featured out of this world motifs.

The launch of the first artificial satellite, Sputnik, in 1957 influenced 20th century design unlike anything that had come before it. Suddenly a stylised 'sputnik' design was everywhere — in architecture, goods for the home, fabrics, lighting fixtures and in jewellery. From fashion jewellery to Cartier, a fanciful depiction of sputnik in brooches, earrings and pendants became extremely popular. Even the first dog in space (Laika) and the first cosmonaut, Yuri Gagarin, can be found adorning costume jewellery.

In the late 1950s and early 1960s, after America entered into the Space Race, images of space capsules and astronauts appear in charms and charm bracelets, on tie tacks and cufflinks and on other items of jewellery.

The culmination of space-related jewellery arrived when Neil Armstrong and Buzz Aldrin landed their lunar module on the Mare Tranquillitatis or 'Sea of Tranquility' and walked on the Moon's surface on July 20, 1969. The renowned firm Van Cleef & Arpels created 'moon landing brooches' for the three astronauts involved in the voyage (Michael Collins remained in the Apollo 11 support module). Elsewhere, the noted goldsmith Ilias Lalaounis was commissioned by Aristotle Onassis to create gold, diamond, and ruby earrings for Jackie Kennedy's 40th birthday gift.

When the three American astronauts travelled through Europe on a press tour following their historic landing, Cartier created a gold replica of the moon landing module for each of them. The maison was commissioned by the French publication *Le Figaro* to create the modules with money raised by its readers. The names of all those who donated to their creation was recorded in microfiche held within the modules. Today Cartier's archives possess the module given to Michael Collins; Buzz Aldrin recently sold his at auction. Sadly, Neil Armstrong's module was stolen from the eponymous Ohio museum and no doubt was melted down for its gold value.

The fascination with space continued into the 1980s and is best reflected in jewellery from a number of Scandinavian jewellery artists, most notably Björn Weckström, who made very large cast silver space-influenced pieces. He is best known for designing the silver collar necklace worn by Princess Leia in the final scene of the original *Star Wars* movie. The necklace was part of his *Planetoid Valley* series.

We have come a long way in our quest to explore space. Americans have walked on the moon and made many visits to the International Space Station. Robotic spacecraft have allowed us to communicate worldwide, to predict the weather, and explore distant worlds where manned spacecraft cannot yet reach. Missions to Mars, Mercury, Pluto and beyond are in the news, revealing the secrets within our Solar System and beyond. With the end of the space shuttle program, the private sector has jumped in to fill the gap... there are even companies preparing to offer tourist trips to the Moon!

Many inventions that benefit our daily lives originate from America's development of spacecraft. Even jewellers have taken advantage of some of the unique materials utilised in space travel, including polymer, nitinol (nickel titanium), fiber optic glass, dichroic glass, titanium and others.

Galileo Cuff by Jacob Albee. Gibeon meteorite with inlaid gold, diamonds. Courtesy of the artist.

Moon and Pierrot brooch, c. 1930s or 40s. Bakelite and rhinestone. Private collection.

In addition, materials that have fallen to earth from space have found their way into contemporary jewellery. Meteorite has become a very popular material, especially for men's jewellery, specifically in wedding rings. Gemstones from space — pallasite (extraterrestrial peridot), moissanite (the synthetic version is used in jewellery) and tektite (glass formed when a meteorite hits the earth in a fireball) and forest green, olive green or blue greenish moldavite (a specific kind of tektite) are all being used by jewellers in unique creations.

There are many contemporary jewellers still influenced by space or specialising exclusively in jewellery with a cosmic connection. Their beautiful and whimsical creations demonstrate how pondering the mysteries of the universe isn't a historic pastime or a contemporary obsession, but a condition of human nature. ■

Don't miss *Out of this World! Jewellery in the Space Age*, which will go on view at its third venue, Tellus Science Museum, Cartersville, Georgia, in November 2020. Images courtesy of the author unless otherwise stated.

GEM HISTORY

Manager of The University of Arizona Gem and Mineral Museum, Eric Fritz FGA DGA, shares an exclusive preview of the much anticipated Alfie Norville Gem and Mineral Museum, which will be unveiled to the world in February 2021...

The University of Arizona has just celebrated its 100th anniversary of having a mineral museum. What better "present" could there be than to introduce a new facility in Tucson, Arizona, the gem and mineral capital of the world in February each year. A gift by the Norville family, in memory of their wife and mother Alfie, started the process of planning this museum several years ago. The Norville family also runs the GJX (Gem and Jewelry Exchange) show in Tucson.

The museum features three main galleries in the most historic building in Southern Arizona, formerly the Pima County Courthouse. Mineral Evolution is the scientific theory, co-authored by UA mineralogy professor Dr. Robert Downs, which explains the progression of an original 60 minerals shared with all rocky planets in our solar system. Uniquely, Earth currently has 5300 known minerals. Mineral evolution explains a co-evolution with life itself, leading to this incredible diversity not seen elsewhere. Fabulous mineral specimens complement the story as the gallery unfolds.

The second gallery represents the minerals of Arizona and Mexico. Early copper mining in Arizona led to the discovery of beautiful minerals alongside the raw materials, which enabled us to build an infrastructure of electricity and telecommunications resulting in the Industrial Revolution. Early mine engineers preserved many of these beautiful azurite, malachite and cuprite specimens, sparing them from the smelter where the copper contained within would have been treated as common ore. Indigenous people mined and appreciated turquoise well over 1000 years ago in the area and UA researchers have investigated the isotopic determination from several historic mines.

The final gallery outlines the new Gem Science programme under development at the University. Exhibits explain what a gem is and where gemstones are found both geologically and geographically. The various types of cutting and fashioning are each featured in detail alongside examples of the equipment used. A changeable gallery features gem cutters, miners, jewellery designers and artists. The culmination of the gallery explains synthetics, simulants and composite stones, complete with a Verneuil furnace!

An optical bench provides interactives to help visitors understand the effects of light, showcasing optical effects such as chatoyancy, asterism, colour change and more. An OPL spectroscope is mounted with three options for identifying a red gemstone while a mock refractometer provides a quick tutorial in how we identify gemstones with graphics for single, double and over the limit readings.

The Treasury, a culmination of the finest gems and jewellery, is a feast for the eyes and will feature a generous loan of the Somewhere In The Rainbow collection, based in Phoenix, Arizona and curated by Shelly Sergent. Displays will include rotating exhibits of the gem species tourmaline, zoisite, beryl, corundum, spinel, topaz and garnet. A suite of cut gems showing the variation in colour, fantastic jewellery and a beautiful mineral specimen will be showcased in each exhibit. Other exhibits will include birthstones represented in rings, diamonds, exotic species and organics plus a few surprises!

The grand opening will take place during Gem Show Tucson 2021. Please make sure to join us and celebrate a new world-class venue. ■

The premises of the new Alfie Norville Gem and Mineral Museum, formerly the Pima County Courthouse.

All images courtesy of The University of Arizona Gem and Mineral Museum.

A rendering of the Mineral Evolution gallery at the new museum.

MASSACHUSETTS

San Diego-based writer, Jennifer-Lynn Archuleta, travelled across America to visit *Boston Made* – an exhibition of Arts and Crafts jewellery and metalwork taking place now at the Museum of Fine Arts, Boston, in Massachusetts.

Arts and Crafts in Action

1: Necklace with gold, green garnet, sapphire and opal. Frank Gardner Hale (American, 1876–1945). The Susan Donald Collection.

The Arts and Crafts decorative and fine arts movement, which had its roots in England's mid-to-late Victorian era, was a reaction to the factory-produced goods that became widely available thanks to the Industrial Revolution.

Adherents and admirers of the Arts and Crafts philosophy valued design over ornamentation and the aesthetic appeal of a material – whether metal, gemstone or found object – over its financial value. At the same time, they decried the mass-produced furniture, jewellery and *objets d'art* as lacking humanity and character. Instead, they celebrated hand-tooled efforts and high-quality materials and advocated for designers who were craftspeople, including women.

As the movement spread to North America, organisations dedicated to the spread of the Arts and Crafts philosophy through lectures and other means opened in major cities. The first city to have such a group was Boston, where the Society of Arts and Crafts was founded in 1897. Here, the Arts and Crafts community flourished until the great stock market crash of 1929. It is fitting that the Museum of Fine Arts, Boston would host the exhibition *Boston Made: Arts and Crafts Jewelry and Metalwork*, in Gallery 104 (the Rita J. and Stanley H. Kaplan Family Foundation Gallery) until March 2020.

Here, over 75 pieces from 14 Boston-based artisans – nine women, five men – are on display. The exhibition includes jewellery (**1**), ecclesiastical objects (**2**) and decorative works from the 30-plus years that the Arts and Crafts movement held Boston's craftspeople in thrall.

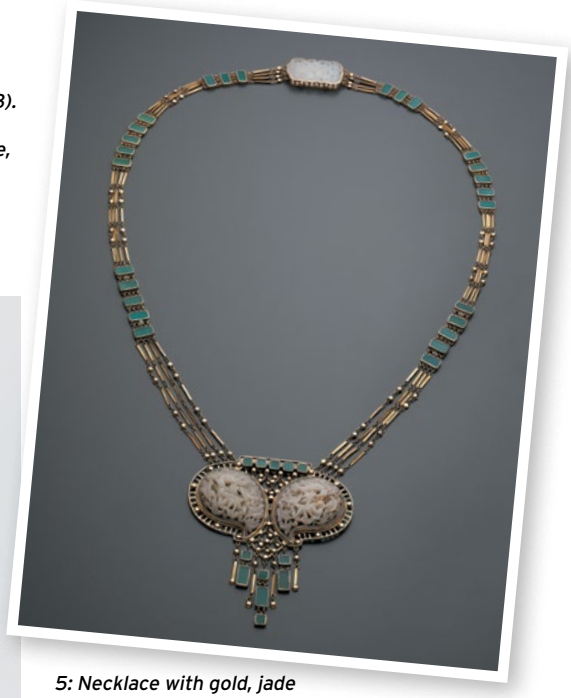
There was no signature 'style' or single material used to signify Arts and Crafts pieces. The different regions where the movement flourished led to diversity of finished output, and objects from Boston were easily distinguishable from Arts and Crafts pieces from other places. Here, designs are lifted from previous eras (such as the medieval and colonial periods) and interpreted for the contemporary owner; Frank Gardner Hale's necklace in figure 1 revisits Renaissance styles.

Unlike their peers, Boston-based designers frequently used expensive materials, such as the gold and diamonds accompanying the sapphire and pearls in the ring in figure **3**. Under the direction of English-born silversmith and Society member Arthur J. Stone, artisans became trained in hand-working silver, creating such objects as the bejewelled, R. Clipston Sturgis-designed silver chalice (again, see 2).

Colour also signifies Boston origin, in part because colour theory was taught in the Boston public schools, thereby educating generations of children about

2: Sarah Wyman Whitman Memorial Chalice (1905). Designed by R. Clipston Sturgis (American, 1860–1951) and made by Arthur Stone (American, born in England, 1847–1938). The chalice features gold-plated silver, alexandrite chrysoberyl, sapphire, tourmaline, cat's eye chrysoberyl, citrine quartz, spinel, pyrope garnet, grossular garnet (hessonite), pink sapphire and yellow sapphire. Lent by Trinity Church, Boston.

3: Ring featuring gold, sapphire, diamond and pearl by Margaret Rogers (American, 1868–1949). Neil Lane Collection.



5: Necklace with gold, jade and coloured glass by Josephine Hartwell Shaw (American, 1865–1941). Museum of Fine Arts, Boston. Gift of Mrs. Atherton Loring.

its proper use. Boston was particularly known for objects with colour from enameling or gemstones. Boston Arts and Crafts enamellists – many of whom, including Frank J. Marshall, were taught by Laurin Hovey Martin – used solid or gradient enamels to enhance the sense of colour that gemstones gave a piece. This multilayer technique known as painted enameling was popular for creating images, such as the one on the box by Marshall in figure **4**. The use of bold combinations of gemstones, notably in the works of Margaret Rogers (see the ring in figure 2) and Jessie Ames Dunbar – who created the multi-gemstone brooch in figure 4, right – also fostered Boston's colour-oriented reputation.

Of particular interest is the inclusion of women in the exhibition; in fact, one of the most well-known of the Boston Arts and Crafts designers/workers is Josephine Hartwell Shaw (the other is Frank Gardner Hale). Metalwork was once considered unfeminine and dirty, especially in a factory setting. But Shaw was not unusual in the Arts and Crafts movement itself; by 1910, 63% of Society members (and 58% of metalworkers) were women. One jewellery maker at the time pointed out that she was able to do her work at home. Like many of her sisters in artistry, Shaw was empowered by her jewellery work (**5**). In fact, in 1913, she was the first contemporary female jewellery maker to have her work represented in the Museum of Fine Arts' collection. This was a significant shift away from the factories that would have been too masculine for her to gain admittance into just a generation before.

> The first city to have such a group was Boston, where the Society of Arts and Crafts was founded in 1897.

Boston Made is accompanied by a complementary exhibition, including ceramics, furniture and paintings on the second-floor Lorraine and Alan Bressler Gallery titled *Arts and Crafts in America* (gallery 222). The two installations give the visitor a glance at the incredible craftsmanship promoted by the Arts and Crafts movement. ■

Boston Made: Arts and Crafts Jewelry and Metalwork is open at the Museum of Fine Arts, Boston until 29 March, 2020.

4: Left: Enameled copper round box with lid by Frank J. Marshall (American, 1884–1975). Museum of Fine Arts, Boston; gift of Lois and Stephen Kunian. Right: Brooch by Jessie Ames Dunbar (American, 1876–1957). Silver, gold, red tourmaline (rubellite), amethyst and watermelon tourmaline. On loan from the family of the artist, courtesy of Museum of Fine Arts, Boston.

All photographs © Museum of Fine Arts, Boston.

ILLUMINATING OREGON SUNSTONE

Gems&Jewellery speaks to Alexander Kreis, Master Lapidary at Kreis Jewellery, to find out about his incredible creations featuring Oregon sunstone.

Tell us about your business, Kreis Jewellery.

We specialise in unique coloured gems and jewellery and our company's heritage of gemstone cutting and carving dates back around 500 years. Our atelier is based in Niederwoerresbach, Germany. We also have a store in Dusseldorf.

We are a small family-run business. My mother Sonja, a goldsmith, creates the jewellery together with my sister Vanessa. My brother Carsten, a former banker, takes care of our administration and publicity. Then there is my father Stefan, who brings in more than 40 years of gemstone experience. I am a Master Lapidary and a Member of the Board of Curators at the German Gemstone Museum. My passion is to create something truly unique which is in harmony with a its natural beauty.

What inspired you to embark on a career in gemstone cutting and jewellery?

I grew up surrounded by gems and jewellery. Since my youth I was fascinated by my father's travels: when he came home with a bag full of aquamarine and tourmaline crystals and other minerals I admired their beauty. Then I could watch my grandfather and other cutters use their craft to transform the rough crystals into sparkling miracles of colour. This had a huge effect on inspiring the young me and it still remains today.

A 18.63 carat cut Oregon sunstone by Kreis Jewellery.

Where did you learn your craft?

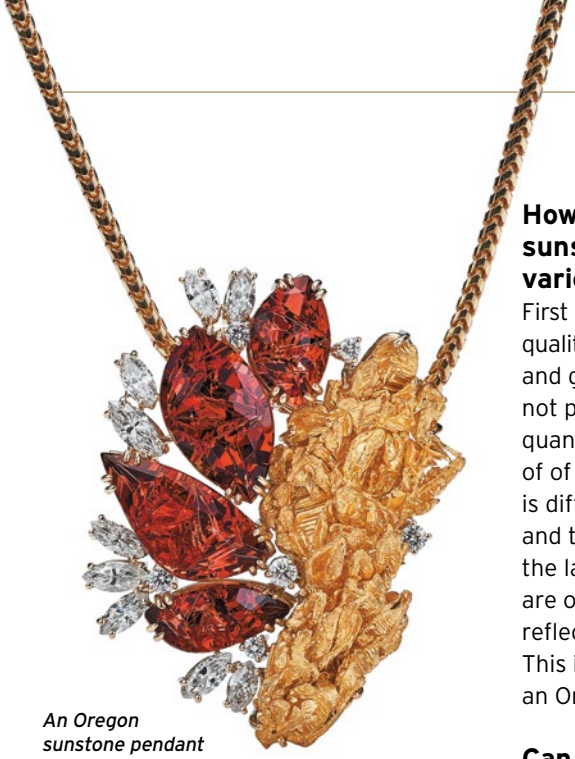
As a kid, I made my first steps into lapidary in my grandfather's cutting workshop. I was fascinated by the craft, so I wanted to do it myself. I started by polishing cabochons, then I realised that it wasn't as easy as my grandfather made it look, but this just pulled me into this world even more. I wanted to learn the craft and become a lapidary. After finishing high school and my gemmological education at the German Gemmological Institute I started my apprenticeship as a lapidary at the company Albert Engel in Idar-Oberstein, where I learned traditional carving techniques. After my apprenticeship I returned to our family's business and from there on I focused 100 percent on creating unique gems.

How do you go about designing the unique cuts for each stone you work with?

This is a lifelong process based on my feelings for beauty, combined with substantial experience. It is also a conversation; I ask each rough gem: where is your beauty? How can I light up your attitude, your elegance? I develop my idea on how to create the gem and at the same time the gem shows me his idea on how he wants to be shaped. The entire process is a continuous dialogue.

Realising a project can take hours, or it can take months. There is no standard

An Oregon sunstone ring by Kreis Jewellery (top right); a 23.34 carat Oregon sunstone cut by Kreis Jewellery (above).



An Oregon sunstone pendant flanked by diamonds and natural crystallised gold by Kreis Jewellery.

approach; each and every journey is different. For example my piece, 'Chanting of the Stars', from the first sketch to the final polishing took about a year to complete.

How do you go about sourcing the gemstones for your creations?

It involves a worldwide network of contacts including miners, collectors, mineral dealers and rough stone dealers. There are even some miners that we have known for generations. Often the task is focused on travelling from mine to mine and meeting with the miners; they show me their special finds and from then on it's up to me and the gems and what appeals to me in terms of beauty and rarity.

What is it about Oregon sunstone that appeals to you in particular?

I love Oregon sunstone because of its distinct red and green shades which, at times, are highlighted by tiny flakes of copper that make it sparkle like stardust. Sometimes, the display of colour looks like someone has dropped red and green ink onto a canvas, and my carvings on the underside cause reflections, which in turn will make the colours appear as if they are moving. It is this richness and playfulness of colour that appeals to me. This is a gem with a strong character, and a fine quality stone is tremendously beautiful and scarce.

How does Oregon sunstone differ from other varieties of sunstone?

First of all, Oregon sunstone in high quality is very rare, particularly in rich red and green colours above five carats. It's not possible to compare it to the huge quantities one finds on the quartz side of of sunstone's family. Oregon sunstone is different: it is a labradorite feldspar, and the name 'sunstone' comes from the layers of little copper plates, which are orientated in a single direction and reflect the light in shimmering patterns. This is a kind of magic we only can find in an Oregon sunstone.

Can you tell us about the process of cutting Oregon sunstone and crafting it into a piece of jewellery?

Oregon sunstone is a very pleasant gem to work with when it comes to making jewellery. The physical appearance and parameters are comparable with tanzanite. There are no challenges in setting or goldsmithing with this gem.

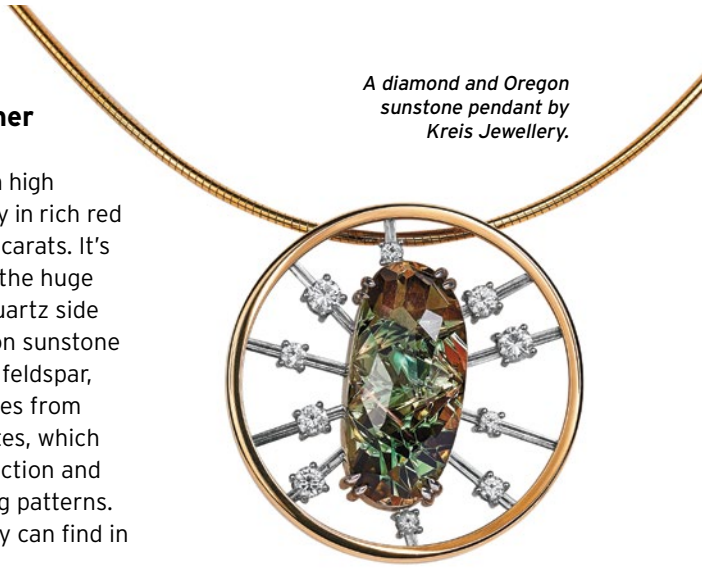
In terms of cutting, one has to take care of each and every gem's distinct personality. A classical, one-size-fits-all approach does not work. Therefore it is hard to say how long it takes. At times I have an instant connection to the gem, but at other times, it might take months until I know how to proceed.

Is Oregon sunstone a good gemstone to invest in?

I need to state that this is just my opinion, and I cannot predict the future. Until recently, this gem was most popular with a small group of collectors, and not so well known in the general market.

These circumstances changed some years ago, when TV channels around the world began to showcase Oregon sunstone on their shows. This created a worldwide demand in the market. Now, even collectors are willing to spend more and more for the extraordinary pieces.

Oregon sunstone cufflinks by Kreis Jewellery.



A diamond and Oregon sunstone pendant by Kreis Jewellery.

What are you working on at the moment? Have you got any special projects coming up?

I'm currently working on some Oregon sunstone collector pieces which are truly special and one of a kind. I am already able to share two of them, which you can see in the photos featured (bottom pg. 28 and immediately below). The rest are a surprise and will be revealed at my booth in Tucson! ■

All images courtesy of Kreis Jewellery.

Spotlight on: Oregon sunstone

Colour: red, orange, yellow, green, and colourless. Particoloured gemstones and colour zoning are also common.

Hardness: 6.5 to 7

Mineral Group: Plagioclase feldspar, a variety of labradorite

Crystal System: Triclinic

RI: 1.54 to 1.57, birefringence of 0.004 to 0.09

SG: 2.64 to 2.67

Lustre: Vitreous

A Golden Frontier

Finished gold-bearing quartz jewellery designs by Orocal.

Gems&Jewellery speaks to David Conner, president of natural gold jewellery business, Orocal, to find out more about gold-bearing quartz from the unique state of Alaska.

On their own, quartz and gold are two indispensable parts of the gem and jewellery industries, but together, these two natural materials tell a whole different story.

Orocal is a fourth-generation family business specialising in natural gold jewellery, including gold-bearing quartz and gold nugget pieces, made in the United States. Orocal began wholesaling gold nugget jewellery in 1965 and introduced gold-bearing quartz jewellery to its offering in the 1980s under the leadership of third-generation family member and now president, David Conner.

Alaska has a long history of gold mining, dating back to the mid-to-late 19th century. Gold has been found throughout the state and there are large and small-scale mining operations currently active in numerous locations. Gold-bearing quartz is understood to have been discovered in Alaska in the 1880s in the town of Juneau. Although it is not unique to Alaska (gold-bearing quartz of gem quality has been found in regions of British Columbia, Canada, California and Australia), gold-bearing quartz has developed a reputation as an Alaskan speciality, especially when fashioned into jewellery.

Put simply, gold-bearing quartz is quartz stone with naturally embedded gold veins. White quartz offers the most pronounced contrast with the gold veins, making this the most valuable type of gold-bearing quartz.

An example of a natural gold nugget and gold flakes being weighed. Royalty Free.

"The reason why very few people have ever seen gold quartz is because it is extremely rare and very difficult to find," explains Conner. "Most of the world's gold is microscopic and less than 1/1000th of one percent of the gold-bearing quartz found has large enough patterns of gold to become a jeweller grade stone."

Gold-bearing quartz is extracted by hard-rock mining underground. As Conner explains: "Though you can find some specimens near dry river channels and riverbeds, they are usually stained with dirt and rusted, so not suitable for nice jewellery pieces. When mining underground, they used to blast, dig, shovel and extract the ore from the mines in an ore cart. As most ore has micro-sized gold that is not visible, they would crush it and extract the gold. However, when mining for jewellery grade specimens that can be cut into stones, you want to bring it out more carefully as to not fracture it. With the help of modern metal detectors – that can now go as deep as three feet [from] the surface of the mines – miners will go back in and search for gold."

Deciding what makes for an exceptional, versus merely 'good' specimen of gold-bearing quartz is a challenge. Orocal has developed its own grading system based on what its customers like best: a white stone; minimal mineral inclusions; and a gold pattern that flows with the overall jewellery design. "The whiter the stone

and the nicer the pattern of gold, the higher the grade," explains Conner. "We have grades 1 to 7. Grade One would be like a perfect cut, flawless diamond that was D colour. We only get one of these every few years and consider them a AAA+ stone. Our next grade, Grade Two or AAA, is very white with an excellent pattern of gold. It might have very slight traces of other minerals."

Gold-bearing quartz is a natural partner to gold nuggets as they occur together. Over time, as erosion exposed veins of gold in quartz, pieces with high concentrations of gold separated from the quartz completely and washed into rivers. The impact of rushing water tumbled this 'free' gold in sediment and created gold nuggets, each with their own individual shape, texture and surface finish. Conner continues: "There are two different types of nugget jewellery; one is called overlay in which we take several smaller sized flakes and solder them into a jewellery design. We fit them in like a puzzle side-by-side. We screen the flakes into different sizes and use nuggets that are of medium thickness between 1.5 and 3 mm. The other type uses a single nugget to fit into a design or just a simple bail on top to make it into a pendant. For this, we look for pear-shaped nuggets with lots of character; not too thick and not too thin."

A natural gold nugget ring by Orocal. Image from YouTube courtesy of Orocal.

> White quartz offers the most pronounced contrast with the gold veins, making this the most valuable type of gold-bearing quartz.

This niche specialism in natural gold has served Orocal well in its 55-year history, allowing it to become a leading advocate for Alaskan gold-bearing quartz and nugget jewellery. According to some sources, a one-ounce gold nugget can now be considered as rare as a five-carat diamond. From the perspective of customers and collectors, Alaskan gold-bearing quartz and gold nugget jewellery is a nod to the north-western tip of the continent and the last state to join the Union. ■

Gold-bearing quartz jewellery and gold nugget jewellery atop a piece of natural, gold-bearing quartz. Image from YouTube courtesy of Orocal.

A PLEDGE TO PEARLS

The United States may not be the first country that comes to mind when it comes to pearl production but, as Rui Galopim de Carvalho FGA DGA explains, it has notable historic importance as a producer of natural freshwater pearls and contemporary significance as a supplier of shell bead nuclei for the cultured pearl industry...

1: The unusual and lovely quahog, or hard shell clam, Mercenaria mercenaria, with its characteristic white interior with a purple rim, pictured along with its non-nacreous natural pearls in different colours. © American Pearl Company.

In modern times, the United States is known to produce limited quantities of natural pearls, both from saltwater and freshwater. Between 1979 and 2000 it also produced beaded freshwater cultured pearls in the Tennessee river basin. The main pearling activity has been, however, the economically more relevant production of mussel shell, which was historically important as mother-of-pearl for the button industry and as a decorative material for inlays. After the 1950s, the United States became the world's largest supplier of shell beads (*kaku* in Japanese) that continue to serve as nuclei for the beaded cultured pearl industry from Japan to China, Australia, Indonesia, the Philippines, French Polynesia, Fiji and elsewhere.

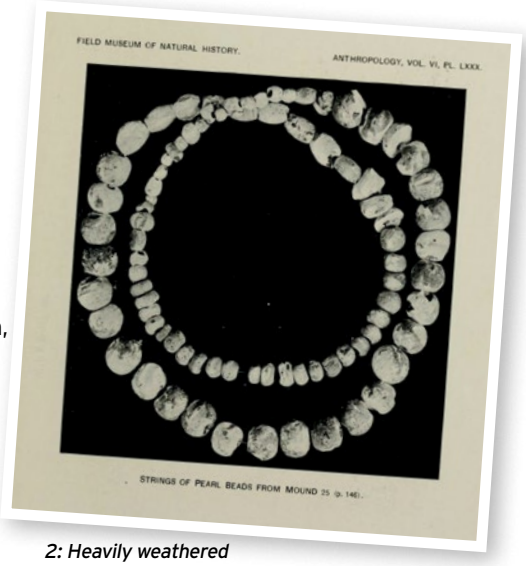
SALTWATER PEARLS

On the East Coast, notably between Cape Cod in Massachusetts and New Jersey, the *Mercenaria mercenaria* mollusc, locally-known as the hard-shell clam or quahog, is known to produce occasional uneven white, cream to deep purple non-nacreous natural pearls with a characteristic surface texture and porcelanous lustre in sizes from 3 to 8 mm, to above 10 mm in exceptional cases (**1**).

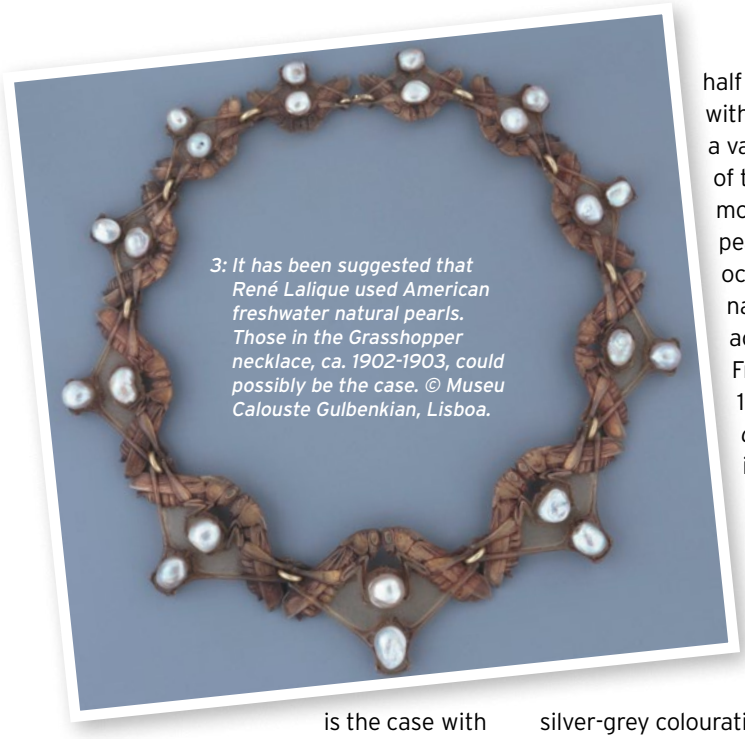
These so-called quahog pearls may exhibit an eye-effect caused by a concentric colour distribution (lighter colour in the centre and darker colour in the rim) and some examples exhibit a rare mosaic pattern. In the southern state of Florida, the rare non-nacreous pink, salmon to brownish to white natural pearl known in the trade as conch pearl is also found as a by-product of the food industry from the local queen conch gastropod (*Lobatus gigas*, formerly known as *Strombus gigas*).

This pearl with a cross lamellar micro-structure and porcelanous lustre has a characteristic surface flame structure that is a known diagnostic feature and occurs in sizes of 3 to 8 mm, rarely larger than 13 mm and being exceedingly rare above 20 mm. Their trade is regulated since the species has been listed in Appendix II of CITES since 1992 mostly due to harvesting for the food industry.

On the West Coast, especially in California, the most relevant pearl producing mollusc is the abalone or ear-shell, notably the red abalone (*Haliotis rufescens*) and the green abalone (*Haliotis fulgens*), both edible marine gastropods with a characteristic colourful, iridescent inner shell. These have typical tooth or horn-shapes that are due to their growth not in the mantle, as



2: Heavily weathered freshwater natural pearls from the Hopewell Mounds in Ohio. Photo by Warren K. Moorehead. Photo credit: Laufer, Berthold; Moorehead, Warren King [Public domain].



3: It has been suggested that René Lalique used American freshwater natural pearls. Those in the Grasshopper necklace, ca. 1902-1903, could possibly be the case. © Museu Calouste Gulbenkian, Lisboa.

is the case with most nacreous natural pearls, but in the gonads of the animal and are often hollow. Round abalone pearls are very rare and the largest reported is a 29.95 carat pearl, measuring 18.45 × 17.25 × 15.75 mm, which is not hollow.

FRESHWATER PEARLS

It is not that well-known that the United States produces nacreous natural freshwater pearls of gem quality. Archaeological evidence, notably at the Hopewell Mounds site in Ohio, shows that local natural freshwater pearls were used by indigenous Americans for decoration and reportedly as coinage more than 2,000 years ago (**2**).

Mussel harvesting for food, fish bait or to collect shell has been reported in many river basins across the US, namely in Tennessee, Mississippi but also in nearly half of the country's states, with natural pearls being a valuable by-product of those activities. The more than 300 species of pearl producing molluscs occasionally produce natural pearls that, according to George Frederick Kunz (1856-1932) in his *The Book of the Pearl* published in 1908, are found in the region of one pearl for every 10,000 shells, with white being the most common colour with occasional golden, pink, mauve, bluish or silver-grey colourations.

4: The washboard, or Mississippi pearl mussel (Megalonaias nervosa) that not only produced occasional natural pearls but also served locally in the Tennessee river basin as a host for culturing. © American Pearl Company.

In the mid 1800s, notable finds in New Jersey created a stir and, in the following decades, notably in the early 1900s, a 'pearl rush' occurred throughout the territory. Kunz reported that, by 1906, more than 8,500 fishermen were involved in pearling in US rivers and lakes, producing both pearls for the jewellery industry as well as mother-of-pearl mostly for the button industry but also for the marquetry industry. Famous early 20th century jewellery artists, like René Lalique and Tiffany reportedly used North American freshwater natural pearls in their creations (**3**).

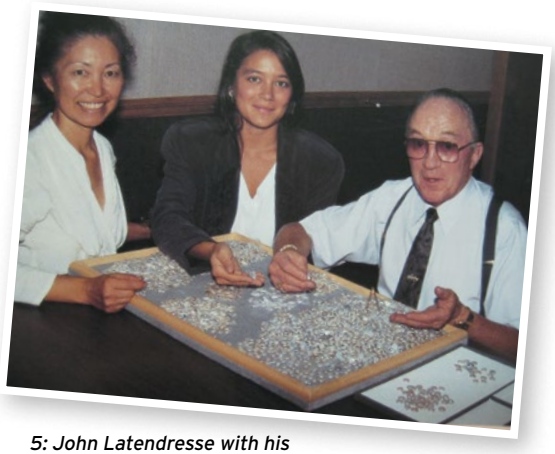
CULTURED PEARL INDUSTRY

After the Second World War, the then thriving Japanese cultured pearl industry created a higher demand for the shell beads, locally known as *kaku*, that were used in the culturing process. The best nuclei material was derived from American freshwater mussels namely the Ohio Pigtoe mussel, *Pleurobema cordatum*, and the washboard or Mississippi pearl mussel, *Megalonaias nervosa* (**4**).

An American visionary, John R. Latendresse (1925-2000) saw a business opportunity there and founded the Tennessee Shell Company in 1954 (**5**). He began collecting shells for the production of beads, eventually becoming the largest supplier. In 1961, he founded the American Pearl Company and, as he was buying shells from local fisherman, he also collected the occasional natural pearls they offered as by-products, gathering a significant collection that is still available through his family company.

After being challenged that he could never grow a cultured pearl in America, he engaged in a long period of trial and error that eventually resulted in the first commercial production of American freshwater beaded cultured pearls in 1979 in Birdsong Creek, Kentucky Lake, Tennessee. Typically, these pearls had fancy shapes, that Latendresse used to call 'fancishapes' and were produced in sizes from 10 mm up to 30 mm. The very occasional non-bead by-products were locally termed as lagniappe pearls, or bonus pearls — a southern Louisiana and southern Texas term for 'unexpected gift', in an attempt to avoid the word 'keshi', which is typically used for non-bead saltwater cultured pearl by-products.

The production of these cultured pearls went on until 2000 with minor production still reported today. The pioneering work of John Latendresse and the historical and cultural heritage that is deeply associated with local pearling eventually led to the freshwater pearl becoming the state gem of Tennessee and Kentucky. Although not a major player in the pearl world, the United States has a place in their history and in the development of the modern beaded cultured pearl industry. ■



5: John Latendresse with his wife Chessy and daughter Gina sorting a harvest of their 'fancishape' beaded freshwater cultured pearls from their former Tennessee river pearl farm. © American Pearl Company.

ACKNOWLEDGMENTS

The author wishes to thank Gina Latendresse for her assistance in reviewing the manuscript and adding important information to this article.

Tiffany's Finest

Kate Flitcroft FGA, Head of Jewellery and Silver at Lyon & Turnbull, explores the innovative artistry and history of Tiffany & Co., especially its Japanese-inspired silver and mixed metal work.

The exhibition *Bejewelled by Tiffany 1837-1987* held at the Gilbert Collection, London (then in Somerset House) from 24 June to 26 November 2006, featured some spectacular pieces from New York-based jewellery house, Tiffany & Co., which continue to inspire; naturalistic floral brooches with curling enamelled petals and diamond-set stamen, platinum and diamond set bodice ornaments, carved rock crystal scent bottles with gold mounts encircled by gem-set insects and foliage and powder cases by designer Jean Schlumberger.

The exhibition's curator, Clare Phillips, and the project team also selected a Japanese-style tray and pieces of the firm's 'Japanesque' jewellery. Although these pieces are not 'bejewelled,' they reflect a key period in Tiffany & Co.'s history. They share design elements and mixed metal techniques imported from Japan during the late 1870s and captured the continued attention of the auction market.

Tiffany and Co.'s silver and mixed metal pieces are identified by their hammered, engraved and sometimes acid-etched surfaces, applied with copper and gold. The Japanese technique of applying base metal and gold onto silver was introduced to the firm via Christopher Dresser (1834-1904), who visited Japan in 1876-77 representing Tiffany & Co. as well as the South Kensington Museum. British hallmarking regulations would not support the combination of silver with copper or other base metals; hence Dresser was uniquely placed to propose this technique to the American firm.

1: A late nineteenth-century Tiffany & Co. cloak clasp commissioned for Mrs A.D. Weekes. © Sotheby's.

2: A Tiffany & Co. gourd-shaped mixed metal tray which realised an incredible $302,500 in a 2011 auction. © Christie's.

Designers at Tiffany & Co. adopted more than just the Japanese metalworkers' techniques, they also employed their design vocabulary. Throughout his travels, Dresser sent Japanese metalwork, ceramics, swords, silks and 'manga' to New York for Tiffany & Co. designers to use for inspiration. Motifs from nature such as fruit, birds, insects, flowering apple blossom trees, bamboo and the chrysanthemum were prominent themes. These elements were deployed asymmetrically across the hammered surfaces of silver hollowware and gold jewellery. Tiffany & Co. exhibited their Japanese-style mixed metal pieces at the Paris Exposition Universelle of 1878, winning the Grand Prix for Silverware.

3: A Tiffany & Co. mixed metal perfume bottle in an ovoid shape. © Christie's.

The silver designs for mixed metal tableware were transitioned into small personal items such as snuff boxes and scent bottles. In her article *Charmingly Minute: Tiffany Japanese-Style Jewellery*, Annamarie Sandecki, director of the Tiffany & Co. Archive, discusses this interchange of design patterns between different types of objects. For example, a design drawing for an ovoid perfume bottle (of comparable form to figure three, which sold at Christie's, New York in January 2008) uses the pattern 'Bird table spoon' (Sandecki, A. V., *The Journal of the Decorative Arts Society 1850 – the Present*, No. 34, The Aesthetic Movement).

4: The quirkiness of this octopus silver and mixed metal snuff box helped it to achieve a hugely impressive result at a Christie's auction in 2008. © Christie's.

The inspiration for Tiffany & Co.'s Japanesque jewellery was filtered through work by the famed French designer Alexis Falize. Falize's enamelled lockets and jewels were "miniature portholes into a lively natural world" (*ibid*). Tiffany & Co.'s Japanesque jewellery is applied with green, yellow, rose and white gold, capturing Falize's colourful designs in the spirit of Japanese metalwork. The firm's designers render closely cropped scenes of nature, capturing a fleeting moment in time using a similar colourful technique as with the silver mixed metal pieces.

In the last quarter of the 19th century, Tiffany & Co. relied on sophisticated clients who travelled to Europe and the world fairs, consuming fashionable objects as a pastime. Sandecki explains that Tiffany & Co. "satisfied the appetite these New Yorkers had for the very latest fashions in personal adornment," (*ibid*) and specifically cites the design for a cloak clasp, commissioned for a Mrs. A D Week(e)s, applied with the date '1876' and 'Xmas' (**1**). The clasp cost $83 at the time. The clasp appeared on the auction market on 20 January 2017 at Sotheby's, New York, with a pre-sale estimate of $1,500-$2,500. It realised a total of $25,000 (including premium), showing the appetite of the market for documented pieces with provenance.

Important examples of mixed metal pieces by Tiffany & Co. can achieve six-figure prices in the auction market. In January 2006, The Westinghouse Set appeared on the market at Sotheby's New York. The Japanese-style silver and mixed metal seven-piece tea and coffee service with tray realised $380,000 (including premium) against an auction estimate of $300,000-$500,000. Five years later, in January 2011, Christie's, New York offered a spectacular gourd-form tray that fetched $302,500 (including premium), performing very well against its $200,000-$300,000 estimate (**2**).

Even for smaller personal items such as perfume flasks and snuff-boxes, the market preference is still for pieces with character, provenance and good condition. A silver and mixed metal perfume flask realised $1,500 (including premium) against an auction estimate of $1,500-$2,500 at Christie's, New York in January 2008. The scent bottle displays a bird swooping after two butterflies, applied asymmetrically in gold and copper. However, the bottle lacks its chain (for attaching to a chatelaine) and the condition held it back from achieving more (**3**).

A different lot in the same sale, a silver and mixed metal snuff-box inlaid with an octopus set with copper eyes, nearly doubled its high auction estimate, fetching $11,250. The octopus is rendered with personality and character (much like a Japanese 'netsuke'), which helped contribute to a successful result (**4**). More recently, a gourd-form scent bottle with its chain from the estate of a Washington D.C. collector sold at Freeman's, Philadelphia for $4,375 (including premium) on 14 November 2018, demonstrating how important condition is to collectors (**5**).

Tiffany & Co.'s vari-coloured gold Japanesque jewellery performs strongly in the current auction market. A pair of earrings applied with birds in flight and bamboo sold at Rago Auctions, Lambertville on 2 December 2018, realised $7,500 (including premium) against an estimate of $2,500-$4,500 (**6**). A vari-coloured gold and pearl-set pendant featuring a Japanese man smoking an opium pipe was offered as the subsequent lot in the same sale and fetched four times its low estimate, achieving $10,000 (including premium) (**7**).

6: An example of Tiffany & Co.'s vari-coloured gold Japanesque jewellery: earrings applied with birds in flight and bamboo. Photo courtesy of Rago Auctions.

The Japanesque mixed metal pieces and vari-coloured gold jewellery produced by Tiffany & Co. in the late 1870s share more than just design inspiration and techniques. They continue to realise robust prices at auction. Hollowware and jewellery in good condition exhibiting the key characteristics of asymmetrical applied natural motifs perform well. Size and provenance are significant contributing factors to ensure strong prices at auction; however, the market most appreciates pieces that have personality, quirkiness, character and capture an ephemeral moment. ■

5: A Tiffany & Co. gourd-form scent bottle complete with chain commanded a strong result at auction in 2018. Image courtesy of Freeman's.

7: This vari-coloured gold and pearl-set pendant from Tiffany & Co. quadrupled its lower estimate at a Rago Auctions sale in 2018. Courtesy: Rago Auctions.

A GOOD INVESTMENT

Expand your fine jewellery collection with pieces by United States-based designers, artists and goldsmiths who are destined to be tomorrow's collectible stars. *Gems&Jewellery* contributor, Olga González FGA DGA, gives her pick of the best...

North America hosts a treasure trove of contemporary jewellers. Many are being collected by museums, fashionistas and gemmologists alike. For this themed issue of *Gems&Jewellery* we have created a roundup of some of the most collectible jewellers today – covering style, how they got started, their first works, inspiration, their thoughts on jewellery as an investment, and how their pieces fit into the North American aesthetic, in their own words...

★ CLAUDIO PINO ★

"Since 1995, I have been dedicated exclusively to one-of-a-kind pieces of jewellery. I strive for originality and innovative expression. Whether exploring systems in motion, the metamorphosis of insects, or the pace of urban life, my passion first awakens in the transformation of the raw material. Each metal has its own properties, and

Claudio Pino Fall Kinetic two-finger ring with opal, citrine, garnet and pearls in palladium.

Michael Galmer Abbey Cuff in sterling silver with 24k gold hand-gilding and green topaz.

I often juxtapose two metals together in a search for equilibrium within my asymmetric design. In fact, I never search for a futuristic look for my pieces, but everyone describes my art as this, which is fine with me. Does this come from my fascination for the world of Jules Verne? Films like *Around the World in 80 Days* (1956) are still today a source of inspiration to me."

★ MICHAEL GALMER ★

"I love to spend my spare time at the botanical gardens. I enjoy looking at the beautiful flowers, their shapes and colours. They always inspire me to create a new design for my jewellery. I especially love the chrysanthemum; it is one of the most exquisite, delicate and sophisticated flowers. This is why you can see chrysanthemums in almost all of my collections. I love working with silver. It is a marvelous and amazing metal, yet has an elegant and cold look, and to add some emotion and feelings to my repoussé pieces, I use gemstones and gold."

★ NAOMI SARNA ★

"Unless you are buying investment grade diamonds, which often are not worn, I suggest that the jewel be something you love. Fine jewels have an intrinsic value, and there are designers whose pieces have increased considerably in value as the artists become well-known. Important jewels have value as treasured objects to be a part of an inherited estate. And some gems rise in value as they become more and more rare, as mines run out of gem rough. But primarily, I think you should buy with your heart."

Naomi Sarna Solar Flare hand-carved citrine and pink sapphire ring in 18k yellow gold.

Naomi Sarna hand-carved aquamarine and diamond pendant in 18k white gold.

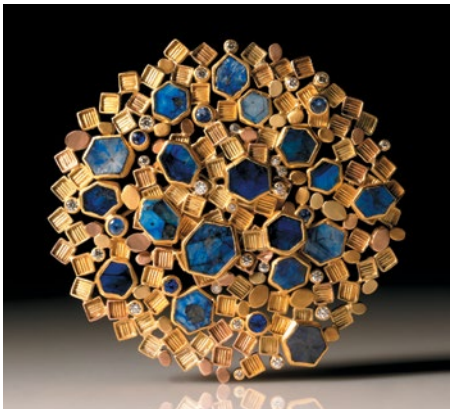
★ JENNIFER TRASK ★

"As an artist I buy artwork, including jewellery, when I feel it is powerful, conceptually, or aesthetically resonant for me. It's personal, but there has to be a level of virtuosity, and that comes with experience and vision on the part of the maker. I say buy what speaks to you, challenges you, inspires you. One wonderful thing about jewellery is it often comes with a memory, an occasion of sentiment. I have several pieces I cherish because of who wore it before me or the memory of the person who gave it to me. It certainly takes up less space than sculpture."

Jennifer Trask's Cochleae Cordis (cockles of my heart) object and pendant crafted in 2017 from bone, antler, shell, resin, spessartite garnets, spinel, South Sea, freshwater and Tahitian pearls with 22k gold, 18k rose and yellow gold and palladium.

★ JUDITH KAUFMAN ★

"My first work included brass, copper, and silver. I liked the complimentary look of tone on tone. For many years, I didn't work with gems. I began to incorporate textures of reticulated silver to earrings, bracelets, rings, etc. After a while, it felt like a natural progression to begin incorporating gemstones into my jewellery."



Judith Kaufman brooch with sapphire crystal cross sections, diamonds, 22k yellow gold, 14k rose gold and 18k green gold.

★ LORD JEWELRY ★

"The way I see it is that the concept of jewellery as an investment is similar to investing in art, especially when it comes to artisan and handmade jewellery. It is a long-term investment that can be passed down in a family for generations as an heirloom. My jewellery combines European style old world luxury with a touch of modern. It is for the buyer who loves bold statement pieces that are unique, artistic and timeless. My clients are collectors who love creative statement pieces," says Sinork Agdere, owner and designer, Lord Jewelry.

Majestic Dragonfly pendant/brooch by Lord Jewelry. 18k yellow gold, with 5 carats of sapphires, 0.30 carats of rubies and 1.28 carats of diamonds, plus multi-colour plique-à-jour enamel.

★ PAULA CREVOSHAY ★

"I'm sure different knowledgeable people would have differing opinions about what the 'Americanness' of my work might be. In addition to fine art, I studied anthropology, particularly symbols and architypes. I find that the beauty of my work speaks to people from many cultures and walks of life. My hope is to create artwork that transcends the bounds of time and place. That said, I have used the amazing gemstones of the American gem cutters who emerged at the same time as I was getting started. I have incorporated the work of these modern masters in my jewels for decades. Their work is as creative and innovative as the American culture that spawned them."

Paula Crevoshay Princess of Stewart 18k yellow gold hand-made earrings with tourmaline from the now closed Stewart Mine in California, all cut by the late George Crevoshay.

★ THOMAS HERMAN, SEVEN FINGERS JEWELRY ★

"In 1983, I stumbled into the Van Craeynest jewellery factory in San Francisco. I wouldn't leave until they gave me a job. It was the most impressive place I had seen where jewellery was made. That was my college – I got paid to go to the best art school. Larry van Craeynest taught me that if I wanted to make good work, I needed to make good tools first. I came in an hour early and stayed two hours late, often working through lunch hour, to make tools so that I could make better work. If I wanted to learn how to chase, I had to make a chasing hammer from scratch, then make the chasing tools. The people who worked there were by far the best craftsmen I had ever met, and yet they had absolutely no ego about it. It was merely the level that was expected. I was soon embraced by this group of metalsmiths."

Thomas Herman Boulder Opal Temple Brooch with gem chrysocolla in 18k gold.

Each of these designers has created a signature look and voice through his or her jewellery, which is being recognised by their contemporaries. If you are looking to add a piece to your wardrobe, these artists offer an exceptional place to start. ■

All images courtesy of the designers.

Harry Winston holds famous stones in the palm of his hand, including The Indore Pears, Catherine The Great Sapphire, The Jonker I, Hope Diamond, a 14 carat ruby, a 42 carat emerald, The Idol's Eye and The Star of the East.

JEWELLER TO THE STARS

"Talk to me, Harry Winston, tell me all about it!" That's just one of the immortal lines from *Diamonds are a Girl's Best Friend*, sung by Marilyn Monroe... and it turns out the renowned American jewellery house has plenty to say, especially when it comes to extraordinary gemstones.

With the nickname 'the King of Diamonds,' Mr. Harry Winston (1896-1978) was a visionary in the world of larger-than-life diamonds and red carpet fine jewellery. He founded his eponymous business in New York in 1932 and swiftly became known as the go-to source for Hollywood screen legends and royal dignitaries.

Before this though, Winston had learned a few tricks. In the 1920s, while navigating the competitive diamond market via his first business, Premier Diamond Company, Winston quickly discovered an alternative source for purchasing more affordable gemstones — estate jewellery auctions. His natural eye for diamonds and gems meant Winston could get his hands-on exceptional stones, remove them from their outdated settings and re-cut them into more contemporary styles that enhanced their natural beauty and brilliance.

Throughout the course of his career, it is estimated that Harry Winston owned more than one-third of the world's most famous diamonds. Of those diamonds, perhaps the most famous is the Hope Diamond, which Harry Winston procured in arguably one of the most significant estate jewellery sales in history. The magnificent blue gem had belonged to American socialite Evalyn Walsh McLean, who wore it to parties at her home in Washington, D.C.

Following her death in 1947, the Hope Diamond was put up for sale along with McLean's impressive jewellery estate, which also included the 94.80 carat Star of the East. By 1949, the purchase was complete, and the Hope Diamond took its place among Harry Winston's most cherished gemstones.

So, what other treasures could be found in Harry Winston's safe? Here, we outline some of the most fantastical diamonds that passed through his hands...


The Vargas Diamond, 726.60 carats in the rough.

BRIOLETTE

With its unusual shape and exceptional size (90.38 carats) and quality (D colour), the Briolette remains as one of the world's rarest gemstones. Purchased in 1947 by an Indian maharaja, who wore the stone as both a pendant and as a diadem, the Briolette was acquired and sold by Winston on several other occasions, before ultimately being purchased by a European family in 1971.

IDOL'S EYE

The history of the Idol's Eye is shrouded in mystery — discovered in India in the 17th century, the stone disappeared for nearly 300 years before resurfacing in the possession of a Sultan in 1909. Winston purchased the unusually shaped 70.20-carat flawless oval-cut diamond in 1946, nearly 10 years after he first set his sights on acquiring the intriguing stone.

INDORE PEARS

In 1946, Harry Winston purchased two pear-shaped Golconda diamonds from the former Maharaja of Indore. The two teardrop-shaped stunners, at 46.62 and 44.18 carats respectively, were purchased and sold by Winston on three separate occasions between 1953 and 1976, with his last sale to a member of a royal family.

JONKER

Acquired by Harry Winston in 1935, the 726 carat Jonker was not only Winston's first important diamond, but also the first major piece of rough to be cut in America. Given the high risks associated with cleaving a diamond – especially one of that size – Winston's insurance company refused to cover him against any loss on the stone. After 14 months of preparation, the Jonker was successfully split, producing 12 diamonds in total. The largest was a 125.35 carat emerald-cut, which Winston loved so much that he refused to sell it for 14 years.

LESOTHO

Originally discovered in 1967 in the South African kingdom of Lesotho, the 601 carat rough diamond was purchased by Winston in 1969. At his request, the cleaving was broadcast on live television, and eventually the diamond was cut into 18 unique stones, the largest being a 71.73 carat emerald-cut. Perhaps the most famous was the Lesotho III, a 40.42 carat marquise shape, which was purchased by Aristotle Onassis as an engagement ring for Jacqueline Kennedy.

McLEAN

Named for Washington socialite and jewellery connoisseur, Evalyn Walsh McLean, the 31.26 carat diamond was purchased from McLean's estate in 1949, along with the Hope Diamond and the Star of the East (94.80 carat, D colour). The McLean would later become one of the most beloved jewels worn by the Duchess of Windsor Wallis Simpson, who purchased the stone from Winston in 1950.

PORTUGUESE

Once believed to have been a part of the Portuguese Crown, the 127.01 carat emerald-cut diamond was purchased in 1951. In 1963, the Smithsonian Institution acquired the stone from Winston, where it remains on permanent display.

STAR OF INDEPENDENCE

The 75.52 carat, D flawless diamond was cut by Harry Winston from a 204 carat piece of rough in 1976. Rumoured to have been carried in his pocket – just for the pleasure of having such a perfect stone near to him – Winston named the diamond the Star of Independence, in celebration of the American Bicentennial.

VARGAS

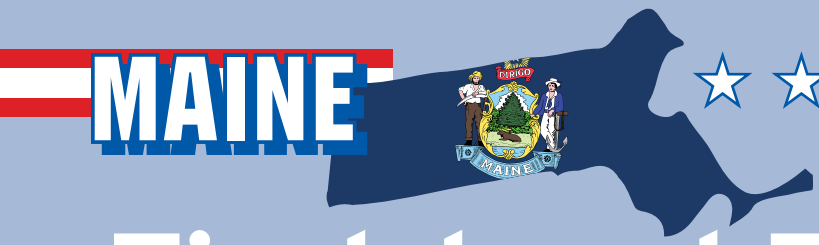
Discovered in Brazil in 1938, the Vargas was Winston's second important diamond purchase. He pursued the 726.60 carat rough across three continents before he was finally able to purchase the stone. Once the diamond was successfully split, Winston's cleaver passed out from the enormous amount of stress associated with the cutting of the stone. In total, the Vargas resulted in 29 individual diamonds.

Harry Winston's legacy and passion for exceptional stones continues to this day through his namesake company. In 2013, for example, Harry Winston Inc. acquired a 101.73 carat flawless and colourless diamond, now known as the Winston Legacy, and the following year it secured a rare 13.22 carat, internally flawless, fancy vivid blue diamond, named the Winston Blue.

It seems where there are one-in-a-million, world-class diamonds, the names 'Harry' and 'Winston' are not far behind. ■


The Hope Diamond worn with Jonker 1 at the Bal de Tête held at the Ritz-Carlton on 15 November, 1949.

All images courtesy of Harry Winston.



First-hand Experiences

John Bradshaw and Michael Gray of Coast to Coast Rare Stones share their experiences of mining in Maine and California, respectively.

John Bradshaw on mining for tourmaline in Maine

Tourmaline is by far the most important of Maine's gemstones, although production has always been small compared to other worldwide localities. Historically, Mount Mica and the Dunton Quarry have been important tourmaline localities. From my 13 years of mining at Mount Mica, I parcelled rough into a number of boxes. Each calendar year, I cut one of the boxes: half for the spring and half for the fall. When the stones are all sold, there are no more until the following season. This ensures I have desirable material for many years.

Considerable amounts of tourmaline have come from Mount Mica in Paris, Oxford County, since it was first discovered by Ezekiel Holmes and Elijah Hamlin in late 1820. The area has been mined for tourmaline sporadically since that time. Mining in the 1990s led to substantial production. More recently, the Havey Quarry in Poland, Maine, has joined the ranks of important sources of gem tourmaline.

The famous Hamlin necklace currently resides at the Harvard Mineralogical Museum in Cambridge, Massachusetts. Most of the tourmalines in the necklace as it exists today were fashioned and used prior to 1890. There are two notable exceptions; the large green 34.25 carat tourmaline in the centre of the necklace, which was cut from a crystal mined in 1893; and the pink tourmaline to the left of centre, which is the only tourmaline not from Mount Mica. It was cut from material mined in 1891 from nearby Mount Rubellite in Hebron, Oxford County.

The Dunton Quarry in Newry, Oxford County, is Maine's most productive gem pegmatite. In the early 1970s, reportedly 800 kg of gem tourmaline was discovered. The majority was cranberry in colour. In addition, greens, blues and watermelon slices were cut from the tourmaline logs. ■

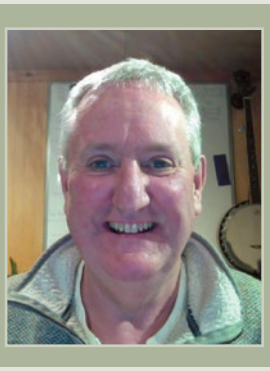
The famous Hamlin necklace which currently resides at the Harvard Mineralogical Museum in Cambridge, Massachusetts. Photo credit: Tino Hammid.

Michael Gray on mining for benitoite in California

The benitoite locality was discovered on a hilltop in 1907, in San Benito County, California. At first, the Dallas Mine was mined by tunnelling, following the vein through the serpentinite outcrop. The Dallas Mine was only in production for about five years. For decades, the mine sat dormant and was explored by casual collectors. In the 1950s, the hilltop was open pitted, exposing the veins further, but there was very little production, as the heart of the vein had already been mined out. When Elvis Gray (my father) and Bill Forrest acquired the rights to the mine in 1968, many nice mineral specimens were found, but very little rough benitoite was mined. However, we unearthed the tailings of the original tunnels, and found small specimens and rough missed by the original miners.

We also started using UV lights at night to locate loose crystals of benitoite (benitoite fluoresces a bright blue under shortwave radiation), which is how we found the largest stone ever found, a 15.42 carat flawless trilliant cut stone. The mine was renamed the Benitoite Gem Mine. In the late 1970s, while creating holding ponds for our water supply, we found good specimens and many broken crystals down near the creek.

At first, we mined the same way as we did up near the mine, turning over the soil with bulldozers and washing it using only hand-tools and our eyes to locate specimens. Around 1980, we acquired a gold processing shaker and jig system and modified it for collecting gem rough. Since the specific gravity of benitoite was heavier than the surrounding rock, we were able to fine tune the jig to collect the broken crystals, while the shaker washed the rock so that we could pick out the specimens protected by their coating of natrolite. Most of the rough that I am cutting today is from this process of mining. ■



A Cut Above The Rest

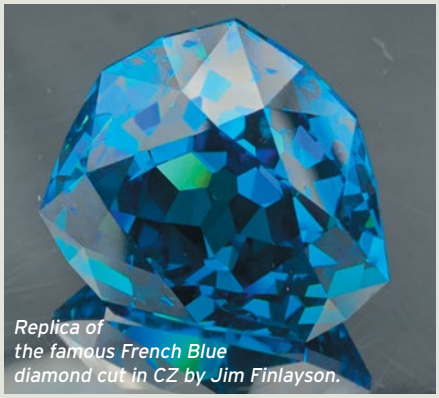
In the first of a new four-part series of columns, Jamie Richardson, Secretary of UKFCG (United Kingdom Facet Cutters' Guild), shares insights into a membership community of international talents, as well as his plans for future-proofing the expertise at the heart of the Guild.

As a young boy I was in awe of the sparkly stones found in jewellers' windows en-route to catching my bus home after school. I looked for the biggest and the most expensive: diamonds of course, but also rubies, emeralds, sapphires and some others that were unknown to me.

Imagine my surprise when one day I saw the most beautiful light blue gemstone. About the size of a hen's egg, not mounted, just sitting there. I entered to enquire about it. It was an aquamarine and I thought that if I saved all my pocket money and washed every car in the street, I might just be able to buy it. I left the shop crestfallen, it cost £25,000!

I was, however, hooked. Fast forward 50 years and here I sit writing an article for Gem-A about the United Kingdom Facet Cutters' Guild of which I am now Secretary.

So why this little vignette from my past? Well, even though my career took many different turns I never forgot the beauty of that aquamarine. About six years ago, I finally decided to re-kindle that unquenchable flame. Thankfully, after a bit of searching I found the UKFCG and they helped me source my faceting machine, gave me amazing advice and mentored me to cut my first stone and quite a few since. Without the Guild I'd still be a grown-up little boy with a dream.



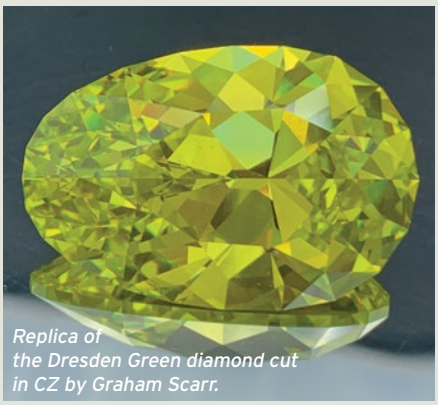
Replica of the famous French Blue diamond cut in CZ by Jim Finlayson.

So, what is the UKFCG and what's it about? Historically, interested facetors in the UK would post a folder to each other with ideas and thoughts that each could contribute to and learn from. Obviously, this folder got steadily bigger, heavier and significantly more expensive to post. From this the seed was sown to morph the folder into a newsletter; the concept of a Guild was born.

> we have produced some stunning gemstones... creating designs that show the stone to its maximum beauty...

The leading light behind this was a gentleman called Jim Gemmell and, wanting to invite others to his Guild, he placed an advert in *The Journal of Gemmology*. He must have been disappointed as he received just one reply. This, however, was Jim Finlayson and, not to be dissuaded by this seeming lack of response, the gallant duo contacted other interested people, inviting them to The Swan in Harrogate during the August weekend meet-up of the British Lapidary and Mineral Dealers' Association in 1994.

The combination of beer and a common interest in faceting was enough to give birth to the UKFCG. We must also say a big thank-you to our friends at the Australian Faceting Guild who helped model our Guild on theirs.



Replica of the Dresden Green diamond cut in CZ by Graham Scarr.

All images supplied by UKFCG.

Where are we today? Although not at our peak, we have around 75 members across the UK, and as far away as Australia and California. We seek and welcome new members from all walk of life and still offer advice, support, mentoring and pointers to good rough and equipment.

Over the years the level of expertise and knowledge within the Guild has grown to extraordinary heights and we've pushed some of the boundaries of faceting too. As there is a dearth of easily available rough in the UK, we have produced some stunning gemstones using minerals not found on the high street and creating designs that show the stone to its maximum beauty: lithium niobate, fluorite and scapolite to name but a few.

While technology will allow us to do things more quickly, the Guild remains true to its beginnings as a means by which both amateurs and professionals alike can grow and share their expertise and enthusiasm. I'm sure there are lots of little boys and girls out there spellbound like I was. As a Guild we strive to ensure that their wait to realise their dream won't be 50 years. ■

Find out more about UKFCG by contacting Jamie on secretary@ukfcg.com.

Behind Closed Doors: A Brief Journey into the History of Christie's and Jewellery

Géraldine Piguet-Reisser FGA shares an abridged version of her Gemmology Diploma project which explores the relationship between the auction house, Christie's, and the development of jewellery design and marketability over the past 250 years.

"Nothing tells a story better than a piece of jewellery", says Raymond Sancroft-Baker, who was European Jewellery Director at Christie's for over twenty years. Like all forms of art, jewellery is a true mirror of its time, it is the expression of the values and organisation of a society at a given time. Like a photograph, it captures proof of a momentum.

We may not typically associate auction houses with being central to the history, transmission and preservation of jewellery, but a quick look 'behind the scenes' might actually reveal that beneath the expensive sales promotion campaigns and huge annual turnovers lies a process that is more complex and valuable to our common history.

As one of the oldest auction houses, Christie's certainly has some secrets to reveal. The house, founded in London in 1766 by James Christie, and now the property of Groupe Artémis S.A., generated total global sales of $6.6 billion USD in 2018. As part of the luxury cluster, the jewellery department contributed a turnover of $530 million USD in 2017, which amounted to 8% of Christies' global revenue.

James Christie's first sale on 5 December 1766 consisted of 'Genuine Household Furniture, Jewels, Plate, Fire-Arms, China, & c. And a large Quantity of Maderia *[sic]* and high Flavour'd Claret. Late the Property of A Noble Personage (Decease'd)'. But at the end of the 18th century, an influx of new commodities hit the salerooms. With the outbreak of the French Revolution, thousands of immigrants escaped France and sold their belongings to survive. Amongst all other European capitals, London was the

Enamel, diamond and pearl pendent necklace, by René Lalique, 1899-1901. © Christie's, Manson & Woods Ltd (2017).

destination of choice for many French aristocrats and more than 10,000 of them took refuge in the British capital. This would have a tremendous impact on the jewellery market.

The century of the Enlightenment truly was the century of *joaillerie*, and this sudden and extraordinary supply of French jewellery partly answered an unprecedented high demand for gems and sumptuous jewels. Since the beginning of the century, under the impetus of the French court and the patronage of King Louis XV, jewellery had developed significantly. Necklaces, earrings and brooches made almost exclusively of precious coloured stones and diamonds, abundantly set in silver pavés or clusters became hugely popular in Europe. Floral and naturalistic patterns, bows and ribbons were the trend, such as the *Sévigné* brooches, the *girandole* earrings or the *aigrettes*. The demand for diamonds was greater than ever and for the first time, they were not the privilege of aristocracy and dignitaries.

The demand was actually so great that it led to the development of new simulants; strass, cut steel, often confused with marcasite, and pinchbeck were invented throughout the 18th century. Another imitation of diamond was made of fused beryl or quartz. By 1767, Paris counted at least 314 jewellers who worked exclusively with imitation gems, specifically diamond artefacts.

Within this context, and with London being the centre of the jewellery trade, James Christie held his first sale devoted exclusively to jewellery, by selling Madame du Barry's jewels in February 1795. Madame du Barry had been one of the five favourites of Louis XV. The extraordinary collection of jewels given by the King of France to his mistress was a true legend already at that time. Among other items, it included a pair of shoe buckles set with 78 carats of diamonds.

Gold and enamel pair of bracelets, by Louis-René Duplessy, Paris, 1828/1838. Paris, Musée des Arts décoratifs. © MAD, Paris / Jean Tholance.

Madame du Barry's tragic destiny follows the typical pattern of the French Revolution: she was arrested, sentenced to death by the French authorities and finally executed by guillotine in 1793. The sale made the equivalent of $1,175,100 USD in today's money, a record-breaking figure, yet significantly below the original estimation of the jewellery's value. Almost thirty years after Christie's first auction, the famous sale of Madame du Barry's magnificent jewels secured his reputation.

Reputation and accountability are the key factors of success for a house such as Christie's, above even the works of art themselves. This is particularly true in jewellery. Since the 20th century, highly elaborate techniques have allowed the creation of extremely convincing pieces and synthetics. Some of these simulants can only be detected with laboratory instruments and innovative imitation techniques are continuously being developed.

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Furthermore, the context of the sales has changed. In parallel to its auction sales and private sales, Christie's has developed new digital platforms, such as Christie's LIVE and online sales. In 2017, the latter brought 37% of the total of new buyers and generated $72.5 million USD, while Christie's LIVE achieved $144.5 million USD. Considered as a new market with high potential, digital sales are a strategic priority for the auction house, along with augmented reality, content marketing and representation on social media.

In terms of the percentage of signed jewels, natural, synthetic and treated gems, "each sale is different, there are no constants [and we] have to stay vigilant" says Patrick Cervantes, Cataloguer at Christie's jewellery department in Geneva. He says the role of the cataloguers is precisely to ensure the jewels are completely and accurately documented and that the information is coherently presented in the sales catalogue.

Cataloguers liaise with external service providers, mainly gemmological laboratories and photographers. On their arrival, jewels are taken for a first assessment by the specialists. Most of the jewels are then sent to laboratories for further expert assessment. Testing will determine the identity, →

Diamond, enamel and glass brooch, by René Lalique, 1899-1901. © Christie's, Manson & Woods Ltd (2017).

origin and possible treatments of the gemstones. The results are crucial as they will impact the later valuation. The reputation and authority of the laboratories are important, as all condition reports are made available to the buyers and some are published in the sales catalogue.

On various occasions the auction house commissions the expertise of at least two different laboratories and if the reports are divergent Christie's publishes them all. The geographical origin, especially when it comes to Kashmir sapphires, has a tremendous impact on valuation, which is precisely the specialists' core activity. Their expertise relies mainly on experience and a sharp knowledge of the market. While diamonds are valued according to market prices, Christie's considers there is no valid equivalent for coloured stones, whose estimations are based on previous sales across all auctions houses.

Besides the quality of the gems, signatures, craftsmanship, trends and demand can considerably influence valuation, says Jean-Marc Lunel, Senior International Specialist and director of the jewellery department in Geneva. The auction house and the owner then agree on a reserve – if any – that is kept confidential, before the jewel is taken for an intense promotional campaign.

Aquamarine, garnet and enamel ring, by Georges Fouquet, circa 1900. © Christie's, Manson & Woods Ltd (2017).

The promotional and communications apparatus has always been a hallmark of the auction house. Today, the auction house organises international travelling exhibitions that are run several weeks before the auction takes place. Focus is also put on augmented reality, such as the video produced for the *Grand Mazarin* diamond sale.

In particular, the *Beyond Boundaries* jewellery auction sale, held in Geneva in November 2017, benefited from a special promotional treatment. "It is one of the most important private collections of Art Nouveau jewels ever sold at auction. Important enough for us to organise a separate sale and publish a dedicated catalogue", comments Marie-Cécile Cisamolo, Junior Specialist and Cataloguer at Christie's Geneva, who led significant research into documenting the collection.

Historians and Art Nouveau specialists contributed to the catalogue through original interviews and articles. This was augmented by an international exhibition and an original scenography that travelled for some weeks prior to the auction, from New York, to Hong Kong, Paris and London. "This is only the second time that Christie's values a jewellery collection through a dedicated scenography. The first scenography was realised for the Lily Safra sale, Jewels of Hope, in 2012", explains Marie-Cécile Cisamolo. One hundred and ten lots of jewels by René Lalique, Henri Vever and Georges Fouquet to name but a few, were sold three, four or five times above the lowest pre-estimate, for a sale total of more than $12 million USD.

The fact that the *Beyond Boundaries* jewellery sale took place in Geneva also played an important role. Christie's holds all its magnificent jewels sales there as does Sotheby's. According to Jean-Marc Lunel, "Geneva has a particular 'cachet'. It's like the centre of the world, between Asia, the Middle East and America." Marie-Cécile Cisamolo also comments that "when it comes to jewellery,

Opal and enamel brooch, by René Lalique, circa 1900. © Christie's, Manson & Woods Ltd (2017).

But the primary cause of this unprecedented sale might actually be explained by the fact that Art Nouveau was the expression of a profound social and artistic transformation at the time.

Geneva is the most important place. Many jewellers and auction houses are represented here. Dealers meet here twice a year, they take part in the sales but also take the chance to do some business."

But the primary cause of this unprecedented sale might actually be explained by the fact that Art Nouveau was the expression of a profound social and artistic transformation at the time. It crystallised the very premise of modernism and as such, is a milestone in the history of jewellery.

Today, contemporary jewellers, among the most significant of their time, present solo exhibitions in internationally renowned museums. Entire galleries dedicated to jewellery are also created in the most famous historical institutions.

The auction houses certainly played an active role in this radical change of the status of jewellery. While this article has only made a brief attempt to demonstrate the relationships between the social and historical background of an auction house such as Christie's and the art of jewellery, one could dig further by adding another question to the discussion: Do auction houses have any role to play in passing on historical and artistic heritage?

What remains of the *Beyond Boundaries* jewellery sale, once a unique private collection of Art Nouveau jewels? For a start, we now have a detailed and high-quality documentation of each piece, supported by impeccable photography.

But there is more to it. According to Marie-Cécile Cisamolo, an auction house can play an important role, albeit indirectly, when it comes to transmission and preservation. "It might happen that patrons buy jewels at Christie's that they will later donate to a museum. We also accompany and advise our clients in the constitution of their collections. And it isn't rare that jewellery firms ask for information and photographs of the creations that they wish to document". It seems, therefore, that jewellery history is woven in secret, behind the doors of the auction house.

ACKNOWLEDGEMENTS

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A full list of references and a bibliography is available upon request.

Gold, silver, coral and pearl brooch, by Mercier & Fournier, Paris, circa 1860. Paris, Musée des Arts décoratifs. © MAD, Paris / Jean Tholance.

Live from London

Left: Rui Galopim de Carvalho FGA DGA giving us a historical review of Brazilian diamonds.

Right: Enjoying dinner at The House of Commons' Strangers' Room.

The Gem-A Conference is always an exciting time for gemmologists and our 2019 edition was certainly no exception! Here's what you missed...

We were delighted to welcome more than 260 delegates to the Gem-A Conference 2019, which took place at etc. venues County Hall, on the banks of the River Thames, from November 2-3.

Our schedule of presentations, led by 10 industry-leading speakers, spanned a variety of fascinating gemmological subjects including Greenlandic gemstones; the chemical composition of tourmaline; trends and issues in the gem trade; charitable initiatives for mining communities; rare gemstones and the astonishing field of photomicroscopy.

Examining pearls at the 'New Types of Cultured Pearls' workshop.

Gem-A CEO, Alan Hart kicking things off at Gem-A Conference 2019.

There was also not one, but four fantastic talks on diamonds, ranging from super-deep diamonds and what they can reveal about ocean origins; the practice of diving for diamonds in Sierra Leone; the Namibian diamond mega-placer and a historical review of Brazilian diamonds and how they influenced European jewellery design.

The much-anticipated Gem-A Conference Dinner on 2 November was one of our most dazzling yet, taking place in the magnificent and historic surroundings of the Strangers' Room at the House of Commons. The dinner, and the preceding tour of the Houses of Parliament, proved hugely popular and sold out in record time.

Gem-A would like to thank all our sponsors (JTV, Marcus McCallum FGA, the Canadian Gemmological Association (CGA), Ruppenthal, Crown of Light, Gemworld International, Asian Gemmological Institute and Laboratory Limited (AGIL) and École de Gemmologie de Montréal), speakers and workshop and trip hosts who contributed to make this year's Conference such an interesting, enjoyable and successful event.

We are especially thankful to all our enthusiastic Members and attendees who travelled from across the world to share in a brilliant weekend of gemmological learning. ■

Comparing gems at Gem-A Conference 2019.

GEM-A INTERNATIONAL SCHEDULE 2020

Want to say hello? We will have a presence at these shows in 2020:

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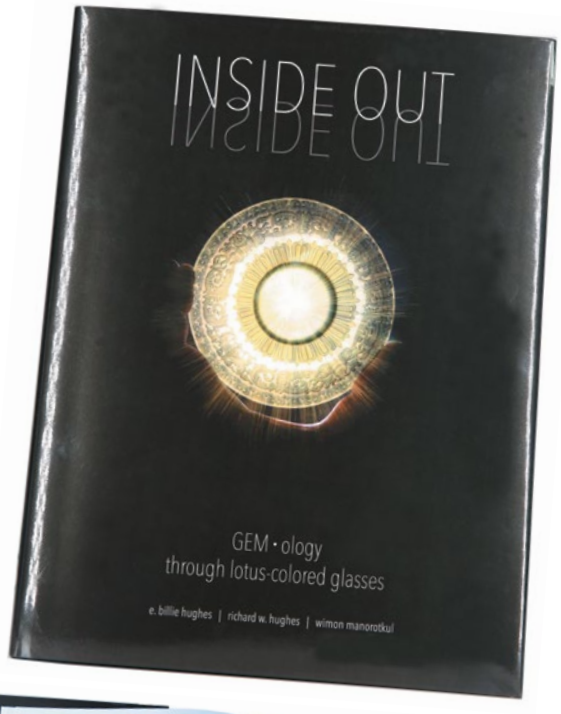


Start your 2020 with a hefty dose of gemstone inspiration courtesy of the latest book by E. Billie Hughes, Richard W. Hughes and Wimon Manorotkul titled *Inside Out: GEM•ology Through Lotus-Colored Glasses.*

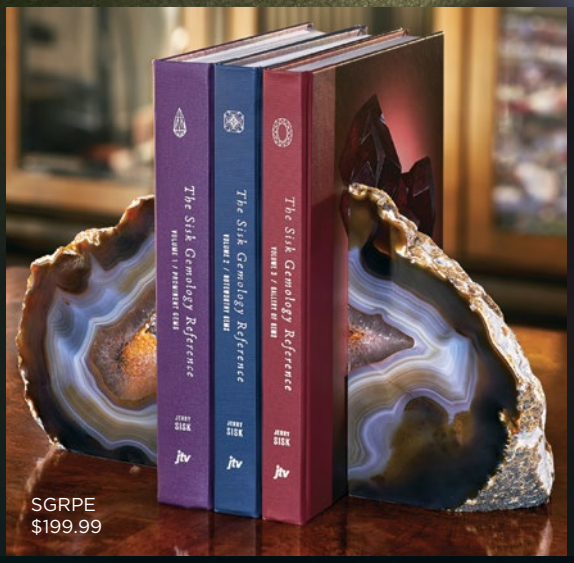
This visually impactful book, designed to "link the external and internal worlds of precious stones for the first time," features a unique collection of colour photographs taken by the authors. Highlights include a range of stunning photomicrographs revealing hematite plates in Australian feldspar, cristobalite in quartz and rutile silk in Myanmar ruby, among other natural wonders.

Described by the authors as offering "humanistic gemmology," the book includes photographs of miners and their communities to offer fascinating insights into their diverse lifestyles and cultures. Madagascar, Sri Lanka and Tanzania are just some of the global mining localities featured in the book.

Inside Out also features bilingual text in English and Simplified Chinese, making its insights accessible for a wide range of Gem-A Members and Students.

Retail price £120

If you require any further information about our products or simply wish to make a purchase, please email ***instruments@gem-a.com*** ■



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