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June 2022
Quarterly Publication

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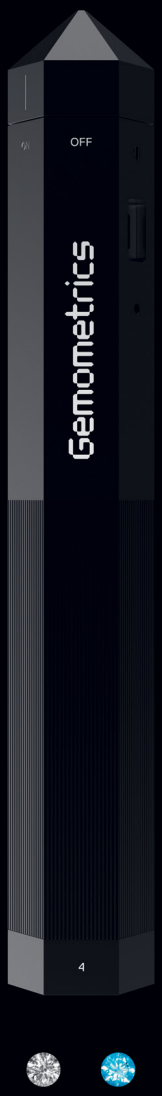


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Click here to read the March 2022 Issue

Geoff Dominy - Founder / Editor

## THE WINDS OF CHANGE

Welcome to the brand new Gemmology Today. We were going to wait until we had finished the four issue cycle but decided that it would be fun to introduce it sooner rather than later.

Everything has been revamped, redesigned and retooled to make us look more professional and hopefully more aesthetically pleasing to the eye. Huge thanks to our new Associate Editor Haimanot Sisay. Haimanot studied with us and has taken a particular interest in helping to promote the World Gem Foundation in Ethiopia. She has also brought some fresh new ideas to the magazine that I am sure you will notice right away.

I hope you also get the cover. Yes, it's a variation on the old game tic tac toe. The message however is no game. Having worked in this industry now for 42 years, I am astounded and saddened that nothing has really changed. In fact if we go back in history, we can see time after time, how foreign entities (mining companies, governments and even armies) have travelled far and wide and extracted the riches from the earth while leaving the people poorer than they were before. I have spent quite a lot of time in Peru and visited many communities where foreign mining companies have come in, taken the wealth and left devastation and destruction.

# Editor at Work

In the March 15th, 2022 issue of The Telegraph, Victor Raison writes '*You smell La Rinconada before you see it. The final approach to this gold mining town is along a road bordered on both sides by decades of accumulated waste and rubbish. Only a colony of vultures and seagulls are unfazed by the stench.*

*The town – perched 5,285 metres above sea level in the freezing air of the Peruvian Andes – is like no other. It is a teeming, medieval nightmare, with little infrastructure. There is no plumbing or running water so residents empty chamber pots directly onto the streets and melt snow to drink.*

*The extreme altitude leaves its mark on the town's residents in the form of discolouration of the lips and fingertips – a response to the body producing a large amount of red blood cells to compensate for a lack of oxygen'.*

Sadly most of the key gem producing areas are some of the poorest in the world. The people living above ground do not benefit from the riches found below ground and this has to change.

Of course many organizations talk about changing the living conditions of those most affected but words rarely translate into action. Why? Well it is really quite simple. Many of these organizations are controlled by wealthy individuals and companies who simply do not want sellers to know anything about the products they are selling. Ignorance is financial bliss. Money makes the world go round and profit is King. Why ruin a good thing by becoming too sentimental?

I started the World Gem Foundation because I truly believe that education is a key that can open many doors and those doors must be opened in the poorest parts of the world, not just in our Ivory Towers. Education can change lives yet so many people are denied it because of the circumstances they are born into. Education should be a right, not a privilege.

Project Africa is one of many initiatives the World Gem Foundation has started. It is a challenge on a gargantuan scale, a real David versus Goliath but I have never shied away from a challenge. Yes it is going to require partners who have a similar mind-set, a similar philosophy and a similar determination but I know these people exist. We just need to find them.

## WHAT'S IN THIS ISSUE?

This issue is dedicated to the future of the gem industry - Africa. A continent rich in natural resources but plagued by poverty.

How can we enjoy these beautiful gems and ignore the suffering of those living in these gem rich areas?

You may find some of the articles unsettling, however, I am a firm believer that if we are going to accept the 'good', then we must acknowledge the 'bad' and the 'ugly'. We have buried our heads in the sand for far too long.

An issue that focuses on Africa, simply could not ignore the Kimberley Process Certification Scheme. Many of you might have heard about it but probably do not know exactly what it is, why it was initiated and what it hopes to achieve.

As we started to research the KPCS, it became apparent that a huge storm is brewing, one of epic proportions that will shake the KPCS to its very foundations, test the resolve of its members and have far reaching effects for its biggest producer, Russia.

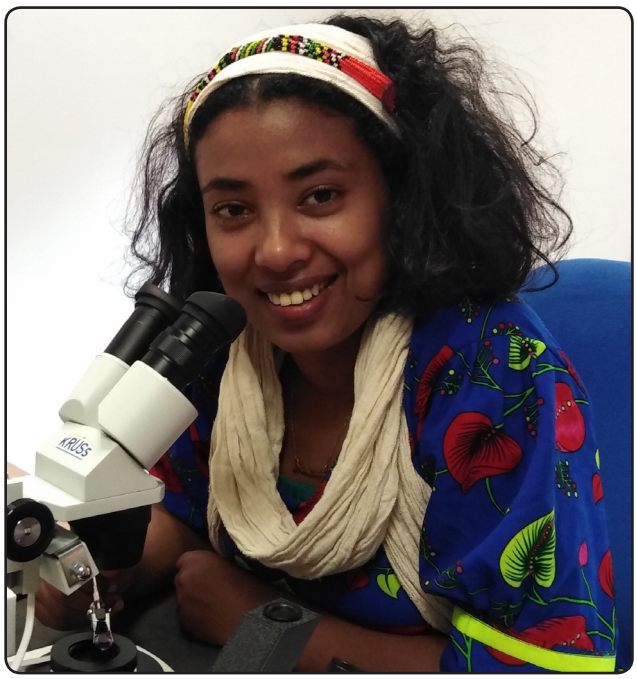
We also felt it would be impossible to ignore Cecil John Rhodes, the co-founder of De Beers. Rhodes played an influencial role in the shaping of Africa and depending on who you talk to, is either loved or hated for the role he played. As a consequence of 'Black Lives Matter', Oxford University found itself at the epicenter of the 'Rhodes Must Fall' campaign. A campaign that failed but certainly created a lot of passion and anger. We would like to thank South African History Online (SAHO) for allowing us to reprint their article on Rhodes.

We will explore why poverty is so prevalent throughout Africa even though the continent is rich in resources with our friends from AfricaFeeds. Tragically, over 300 million live on less than $ 1.90 USD a day.

Global Initiative showcases Madagascar, another gem rich island where the trickle down effect from the gem wealth has failed to help the local communities.

British gemmologist Beth West relives her experience with NGO Diamonds for Peace training artisanal diamond miners in Liberia.

Nina Zolotukhina is back, this time looking at the complex processes that give us colour in gemstones. A tricky subject, especially considering the fact that most people employed in our industry are not scientifically minded. I have always said that we cannot take the science out of gemmology but we can find easier ways to explain it. As Bill Murray used to say in 'What About Bob?'.....baby steps.




Haimanot Sisay - Associate Editor

Haimi's Ethiopian roots lead us to the beautiful opals from Wegel Tena and Shewa with particular focus on what differentiates them from each other, how they are mined and some of the challenges miners face.

Leone Langeslag looks at emeralds from Africa and tries to dispel the myth that if it is not from Colombia, it cannot be very good. You will be surprised!

And finally.....

Through all this darkness, there is finally some light. I know you will enjoy the stunning inclusion photography of Stephen Challener, our feature interview.

This issue has truly been a liberating experience working with a more artistic and free-flowing format. I know that we heading down the right path. At 112 pages it is also our largest to date and that is with a smaller font size (10)!

In these challenging times, stay safe, think positively and enjoy the summer!

**Associate Editor at Work**

# FOCUS ethiopia

## Opals from Wegel Tena & Shewa

From the origins of the name to their formation within the earth's crust, to the mistaken belief that they are purveyors of bad luck to the optical phenomenon that produces such a mesmerizing and tantalizing array of spectral colours and patterns, opal is indeed a 'stone of mystery'. Like the legendary sirens, who lured sailors with their enchanting music and voices, opal is equally adept at casting its own captivating spell. My own love affair with opals started in 2015 when I was fortunate enough to visit Australia and the opal mines in Lightning Ridge. I am not sure why it took so long but once I was bitten by the opal love bug, there was no going back.

The name opal is believed to be derived from the Sanskrit word 'Upala', meaning 'Precious Stone'. This first appeared in Roman references dating back to 250 BCE. Pliny the Elder implies in a passage from his book Naturalis Historia, published circa 77 - 79 AD that opals were prized by ancient Romans. Certainly, the stone he refers to as 'Opalus' and describes as 'displaying at once the piercing fire of the carbunculus, the purplish brilliancy of amethystos and the sea-green of smaragdus, the whole blended together and refulgent with a brightness that is quite incredible' would seem to confirm that he was indeed referring to opal.

Originally believed to be a stone of good fortune, the value of opal dropped drastically in the 1830's due to what can only be described as the most blatant misinterpretation of a literary masterpiece. In his novel 'Anne of Geierstein' (1829) by Sir Walter Scott, an opal is blamed for the grandmother's disappearance and demise, however if one continues to the third volume of the 1063-page tome, one learns that instead of bringing the grandmother ill-fortune, it was acting as an amulet, protecting her from being poisoned by a sinister group of ladies in waiting.

It is particularly interesting to observe the role folklore has played in the world of gemstones, from the farcical belief that wine imbibed from a goblet made from amethyst quartz could prevent drunkenness to the misconception that a gemstone can bring the wearer misfortune. While they may seem absurd to some, Man has held onto these unshakable beliefs and passed them down from generation to generation. Fortunately, in the case of opal, the market was finally revitalized by Queen Victoria who showed an extraordinary love and passion for fine opals, bestowing them as gifts and including them in the dowries of her daughters. As the second longest serving British monarch at 23,226 days, one can perhaps say that the notion that opals bring misfortune to those who wear them is also somewhat farcical.

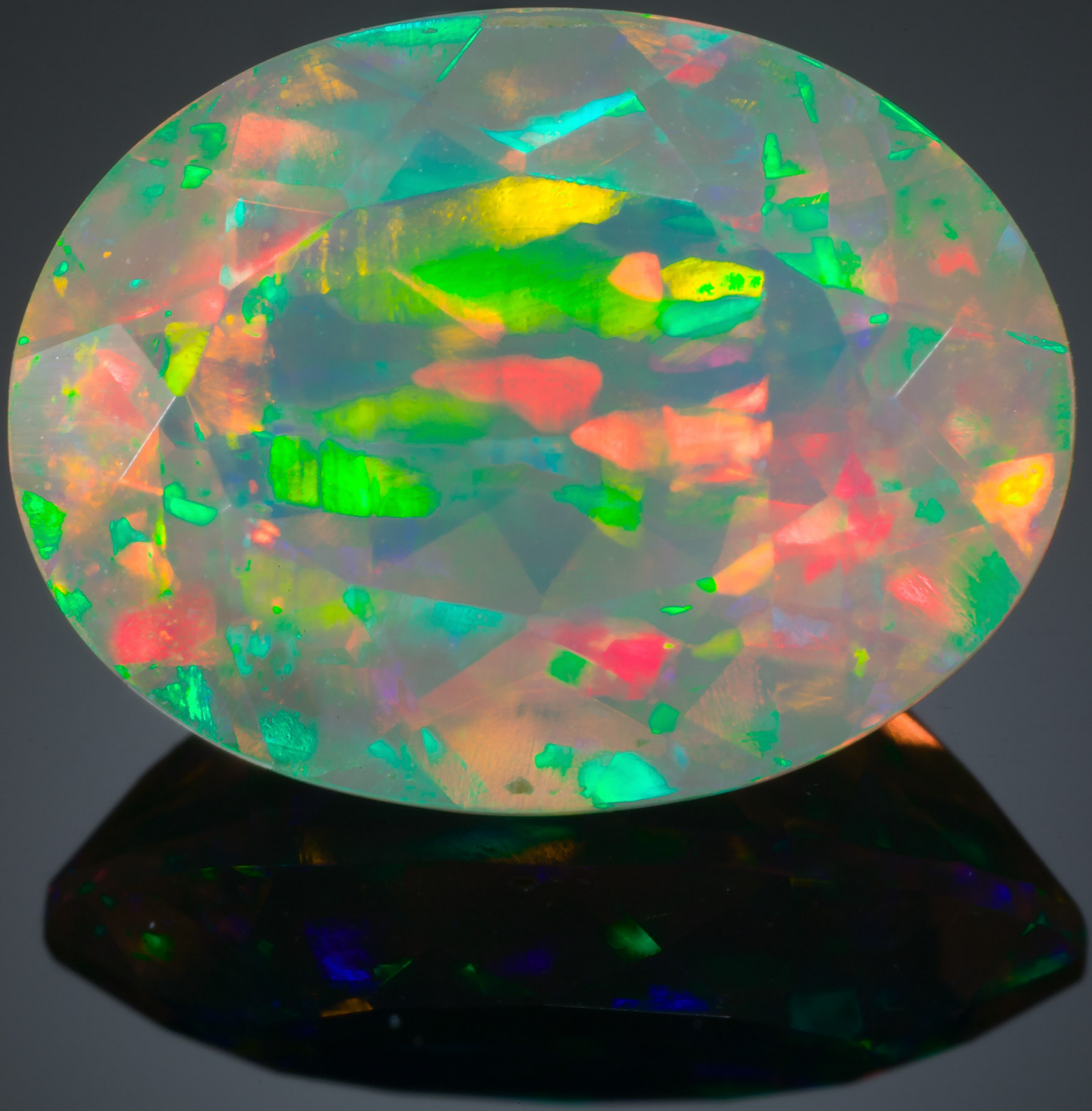
Fast forward to the 21st Century and we find a new source of opal (Ethiopia), one that just might challenge Australian opals and their hierarchy in the Gem Kingdom.

### ETHIOPIAN OPALS

Gem-quality opals are found in two types of deposits: volcanic and sedimentary. The latter is found in Australia while the former can be found in Mexico, the U.S (Idaho), and Canada (British Columbia).

In the early 1990's, opals like those found in Idaho (Butte) were discovered at Yita Ridge in the Menz Gishe region of Shewa Province located between the capital Addis Ababa and the Yangudi Wassa Natural Park at an elevation of 2,450 meters in nodular rhyolite. Initial samples showed not only the 'Contra Luz' effect (where the play of colour is only visible when the stone is illuminated from behind) but also opals resembling fire agate with play of colour against a dark brownish background.

The opal nodules, measuring approximately 10 centimetres in diameter, were found in a continuous layer of welded tuff, a rock that is composed of fused volcanic ash and volcanic debris that forms a solid mass because the glowing cloud particles are so hot when they settle that they fuse together, roughly 3 meters thick, sandwiched between weathered layers of rhyolite. The deposits date back to between 8 and 27 million years (Miocene Epoch). Essentially horizontal in nature, several outcrops were found due to the inclined, canyon-like topography. Initially only 15% of the opals were gem quality with a mere 1% of this material exhibiting a distinct play of colour.



Ethiopian Opal (Photo by Tino Hammid)

In 2008, a new deposit of opal was found in Tsehay Mewcha in Wollo Province near Wegel Tena in Northern Ethiopia. Unlike the opals from Shewa Province, these new opals were mostly white with an uncommon play of colour and exhibited hydrophane behaviour (become transparent) when immersed in water. Like other Ethiopian opals, some of the new opals also displayed characteristic 'Digit' patterns of interpenetrating play of colour and common opal, however testing showed that these new opals were more resistant to crazing and demonstrated above average durability.

In 2013, at the Stayish mine in Wollo, near the town of Gashena, located between Lake Tana and the Mile Serdo Wildlife Reserve, dark and black opal, together with white and crystal opal was discovered in a distinct opal-bearing layer roughly 3,000 meters above sea level in a mountainous area. Like the white opal, the black opal nodules (measuring anywhere from two to ten centimetres in diameter) were found at the contact zone between the volcanic rock series and the underlying clay-rich layer (*GIA*), in a single stratum (roughly 60 centimetres thick) extending approximately one hundred kilometres along the mountain belt. Extraction was possible by digging horizontal tunnels fifteen to twenty metres into the mountain slope.

While the opal resembled dyed, smoked or sugar-acid treated opal, in this case, the dark colour was not confined to the surface, and they did not exhibit any staining in surface pits or fissures.

## APPEARANCE

### Wegel Tena

Most opals have a white body colour, although they can also be found with body colours ranging from a pale yellow to dark orange (fire opal) to a brownish red and even a dark 'chocolate' brown. Some even exhibit zonal layers of contrasting body colour and play-of-colour.

While most are translucent, opals can be found ranging from opaque to transparent. When immersed in water (ranging from a few minutes to an hour), the opaque and translucent opals became more transparent (hydrophane) with more noticeable play of colour. However, the opals revert to their original appearance within a couple of hours depending on the thickness of the material and the temperature / humidity.

Invariably, they exhibit a mosaic pattern with the play of colour distributed along parallel columns that resemble fingers with rounded tips. In some cases, 'planar zoning' (*GIA*) has been observed that consists of common and play of colour opal while in 'Honeycomb' opal (that typically have a light brown colour base), the individual cells display intense colour flashes that display a honeycomb pattern. Colours from red to violet are found with many stones showing an intense red and orange play of colour.

In some opals, the perfect organization of the silica spheres create pinpoint colours instead of patches that move together as the stone is tilted or the light source is moved.

GIA report that one opal exhibited 'rainbow' colours within a colour patch instead of a homogeneous colour with the spectral colours diffracted along a small area that ranged from 1 to 5 mm.

### Shewa Province

Opals displaying both play of colour and the 'Contra Luz' effect have been found in a range of transparencies (transparent to opaque) with diverse colours including near-colourless, milky white, yellow, orange, pinkish brown and brown.

## SPECIFIC GRAVITY AND REFRACTIVE INDEX

### Wegel Tena

While the S.G. ranges from 1.74 to 1.89, immersion in water (for less than one hour) increases the values by up to 10% (1.90 to 2.00), a phenomenon that could be reversed and repeated. The R.I.'s range from 1.36 to 1.44 although it is often difficult to get an accurate reading due to the porosity.

### Shewa Province

While the S.G. ranges from 1.35 to 2.03, opals that are less porous will give values in the 1.87 to 2.03 range. R.I.'s range from 1.40 to 1.45.

## UV LIGHT

### Wegel Tena

Under LW UV light, most non-brown opals exhibit weak to very weak luminescence that ranges from bluish to greenish white, with weak to very weak greenish white phosphorescence that lasts a few seconds. Under SW UV light, weaker reactions can be expected while phosphorescence will be more prolonged. Opals with a brownish body colour or brownish zones are inert. The strength of the fluorescence is more intense in white opals that exhibit a strong play of colour.

### Shewa Province

Under long-wave UV light, opals will show a wide variety of reactions ranging from inert to weak including even yellow-green (with weak phosphorescence); slightly chalky faint blue (moderate whitish blue), faint uneven blue and yellow; and faint even orange. Under short-wave UV light, reactions vary from inert to strong including even yellow-green (with no

phosphorescence); slightly chalky faint (even] to weak (uneven) yellow-green; slightly chalky faint-to-weak blue; faint even blue-white; faint uneven blue and yellow; and faint even orange.

## POLARISCOPE

### Wegel Tena

Reactions vary from 'cyclic variations in diffraction colours as the stones are rotated a full 360° (*GIA*) to ADR (anomalous double refraction).

### Shewa Province

Reactions vary from weak to moderate anomalous double refraction (ADR) to no ADR.

## HAND-HELD SPECTROSCOPE

### Wegel Tena

Reactions using a hand-held spectroscope vary depending on the body colour, the depth of the body colour and the thickness of the stone with some opals showing absorption in the blue and violet regions that occasionally extend into the green while others show no distinctive spectrum.

### Shewa Province

In lighter coloured opals, typically no spectrum will be seen, however, GIA report that in some samples, cut off edges were seen at 510 nm (yellow stone), 530 nm (yellowish orange stone), and 600 nm (brown stone). One mottled brown stone showed a band between 550 and 590 nm, a lower cut off at 520 nm, and an upper cut off at 670 nm.

## CHELSEA FILTER

### Wegel Tena

Brown, milky, and white opals may appear orange or red under a Chelsea Filter while lightly coloured transparent opals will show no reaction.

### Shewa Province

Brownish stones will appear red under a Chelsea Filter

## INCLUSIONS

### Wegel Tena

Inclusions may include elongated, cylindrical inclusions filled with silica, black micro-inclusions dispersed throughout the stone, opaque pyrite crystals, rutile, graphitic carbon, and barium-manganese oxides (possibly hollandite).

### Shewa Province

Typical inclusions include tiny red and black particles that extend throughout even the most transparent opals, hollow tubes, and black platy manganese oxides

## STABILITY AND DURABILITY

One of the key concerns regarding opal is their toughness and stability. Opal-A (natural hydrous silica with a highly disordered near amorphous structure) and Opal-CT (natural hydrous silica that is a combination of disordered α-cristobalite and disordered α-tridymite) are known to destabilize, or 'craze' with time. While research by GIA was unable to determine the opal type of Ethiopian opals from Wegel Tena, the consensus was that opaque white, yellow, and brown opals appeared to be very stable while transparent opals (in particular, pale yellow to orange fire opals and near colourless opals) did show a tendency to craze. No appreciable difference was seen between common opal and those exhibiting play of colour.

Due to their hydrophanic property, colour, diaphaneity (ability to transmit light), crazing and play of colour were not affected by immersion in water with opals tested returning to their original appearance.

This property also makes opals receptive to a host of treatments including dying (producing a myriad of colours), smoke and sugar treatment to darken the body colour, and the use of resins and oils to hide cracks and cavities.

## REFERENCE

*Play of Color – Opal, Wegel Tena, Wollo Province, Ethiopia* by Benjamin Rondeau, Emmanuel Fritsch, Francesco Mazzero, Jean-Pierre Gauthier, Bénédicte Cenki-Tok, Eyassu Bekele, and Eloïse Gaillou

*Opal from Shewa Province, Ethiopia* By Mary L. Johnson, Robert C. Kammerling, Dino G. DeGhionno, and John I. Koivula

Gems and Gemology, *Gem News International*

## ABOUT THE AUTHOR

Geoff Dominy is the author and creator of The Handbook of Gemmology and Gemología Para Todos. He lives in Palma, Mallorca, Spain.

# FEATURE interview

## Meet Stephen Challener

**Who is Stephen Challener? Tell us about yourself.**

I am a life-long rock and mineral collector, gem enthusiast and all around geology nerd. When I was growing up our family went on road trips across the country and my dad would research places to search for gems and minerals all along the route. We looked for sunstone in Oregon, agates and sapphires in Montana, opals in Idaho and many more. One of my earliest memories is pulling thunder eggs from the decayed lava in Rockhound State Park in New Mexico. In retrospect it seems inevitable that I ended up with a masters in geology and a career in gems.

**When did you first develop an interest in inclusion photography? Was there a defining moment when you realized this an area you wanted to specialize in?**

My first experience with microscopy was as an undergraduate studying geology. We spent hours on the scopes learning to identify microscopic minerals in thin slices of rock. I was enchanted by how beautiful these common rocks looked at high magnification, each crystal rendered colorful by polarized light, and before long I was shooting pictures through the eyepiece with my cell phone. Since gems were what got me into geology in the first place it also wasn't long before I was taking my own samples into the lab between classes, awkwardly holding gems under scopes decidedly not meant for that and doing my best not to scratch any of the expensive optics. Fortunately, my professors were very patient!

**What is the one inclusion photograph that sticks in your mind the most, either through the sheer beauty of the inclusion or the challenge in capturing it on film?**

I think the one that stands out is the first shot I took at a really high magnification. I had picked up a sample of golden beryl from Madagascar with sheeny aventurescence and really wanted to know what was causing it. Using a standard gem microscope, I could see that there were some very small inclusions within the stone, but I just couldn't make out any of the details. Similar things had happened enough times that I decided I needed a microscope that could give me that extra magnification.

Once I had gotten enough of the scope together to try viewing at 400x, I decided this beryl would be my first experimental subject. What a difference it made! Instead of specks I saw intricately formed metallic crystals, dendrites rendered in rainbow iridescence and fluid-filled cavities each with their own silvery bubble of gas. Since then, a lot of my work has ended up being at higher magnifications than typical for gem examination, from 100-1200x. Even at the highest magnifications I can usually see hints of further intricacy, but until someone volunteers to set up an electron microscope in my basement I'll have to be content with what I can see now.

**John Koivula's 'Photoatlas of Inclusions in Gemstones' has become an essential reference tool for all gemmologists. What is your motivation? Do you approach inclusion photography more as an art form or more scientifically like John?**

The Photoatlas is amazing—I first ran into it as a freshman in the geology library and like most people who see it, it blew my mind. I'd seen many of these classic inclusions before at gem shows and in museums, but never under a microscope. Their sheer beauty was what first attracted me, but as I learned more about geology, I became more and more interested in what they could tell us. Every inclusion within a gem gives a hint of how they grew and what they experienced afterwards, and untangling that mystery is exactly like what I did in my geological studies. There's almost always something surprising about a gem under a microscope, some detail which is different from how you'd imagine looking at it in the hand.

**With software such as Photoshop, many photographers are finding it easier to create stunning imagery. Are you a purist or have you embraced this new technology?**

Photomicrography may have benefited from the transition to digital more than any other field of photography. In the microscopic world, everything is at best a little fiddly. Fine vibrations become massive earthquakes, and specks of dust stubbornly cling to surfaces and light up like spotlights—being able to use cameras that take pictures without any mechanical

movement and to easily edit out offending surface features makes everything a lot easier. Focus stacking has also revolutionized the field. High resolution lenses only focus on a very thin plane, so it is hard to capture a three-dimensional subject like a gem inclusion using one. However, if you take dozens or hundreds of shots, each with the focus on a slightly different spot, they can be digitally combined into a single focused image. This allows for images that would never have been possible on film.

**What in your opinion is the most challenging part about inclusion photography?**

Lighting is probably the greatest challenge. At high magnifications light must be carefully diffused, as point lighting will kill fine details, but that also makes it challenging to get enough light exactly where it is needed. At very high magnifications it's even harder since the lens often must be 1mm or less from the surface of the gem. Lighting through the lens itself avoids this issue but is only useful for flat subjects like surface textures or platelet inclusions. As such, getting things just right involves a lot of fine adjustments, ad hoc reflectors, improvised diffusers, and careful positioning of lights.

Iridescent Hematite in Tanzanian Sunstone (200x)

**Talk us through a typical photo shoot (if there is such a thing).**

My first step is always to have a look at the stone at lower magnification to position it with a perfectly level face towards the lens and find my areas of interest. I'll then move to a higher magnification and start adjusting my lights and diffusers to see how the inclusions react and what gives the most interesting look. After the lighting is worked out, I start working out what the best composition would be to present the inclusions and if possible, to use them to tell a story. Once everything is ready, I start shooting a stack, taking dozens of photos while adjusting the focus slightly between each one. Once I've taken my stacks for the day, I bring them over to my PC and process them into a single focused image, which is then adjusted for color and contrast, sharpened, and cropped. In a long session I might shoot ten stacks, though only a couple are likely to end up good enough to share.

**Guitarists are always asked about the equipment they use and the ones they most prefer. What are the 'essentials' in your photographic arsenal?**

I am very 'gear-oriented', to the point that assembling and collecting microscopes has grown into a hobby all on its own. I created my two personal scopes from parts, obsessively researching different systems and waiting with bated breath for the right components to come up for sale. One is a classic Wild M400 macroscope for low magnifications and the other is a customized industrial microscope for high magnifications using parts from several different brands.

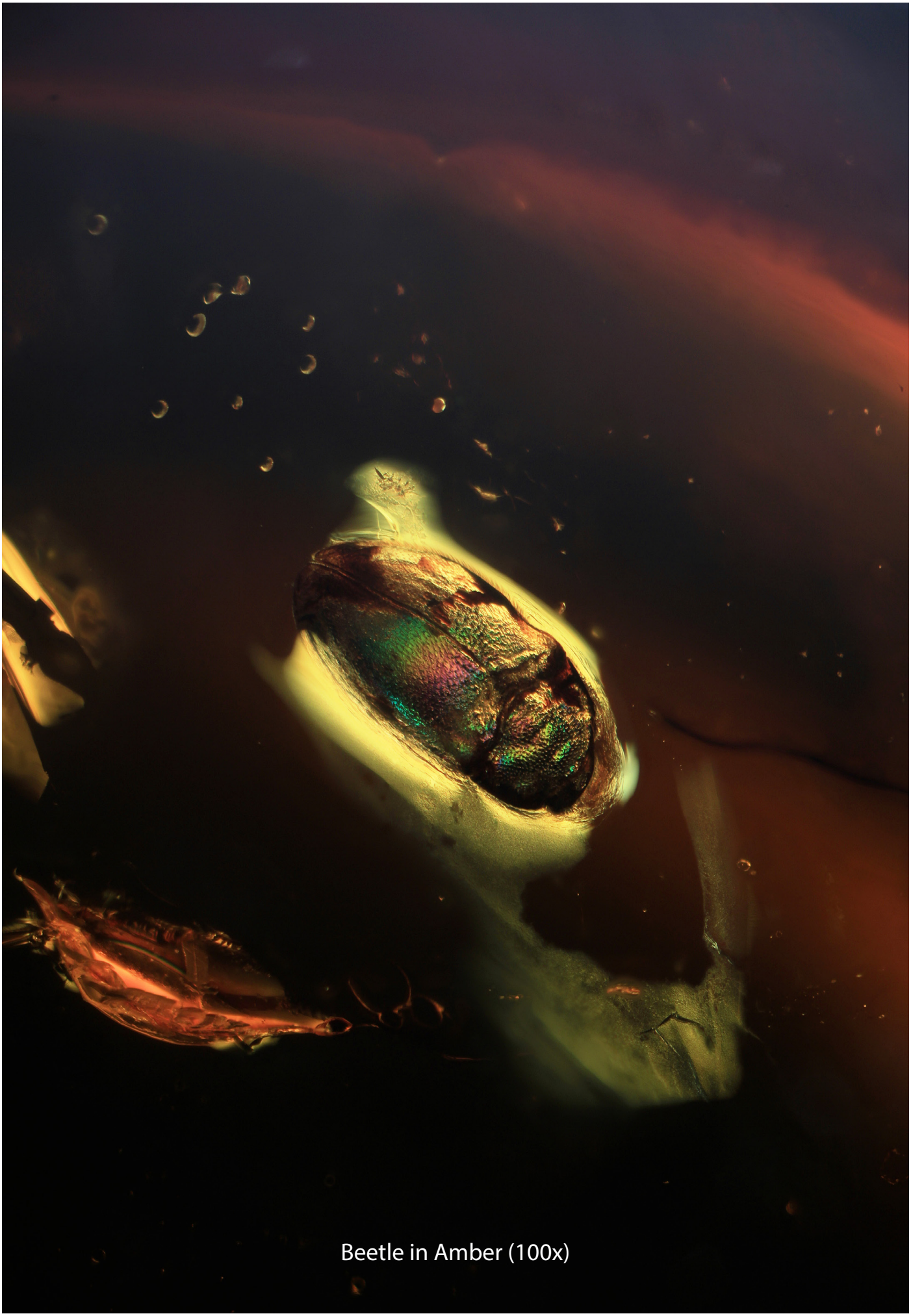
My favorite unusual feature on my microscope is episcopic DIC (differential interference contrast). This technique, normally used in fields like metallurgy and chip fabrication, was introduced to gemology by John Koivula and has been championed by Nathan Renfro. It allows surface textures to be rendered in stark contrast and bright colors, revealing details that are normally invisible. Using DIC the surface of a gem crystal is often just as intricate and revealing as the crystals included inside.

**Where do you see the future of gemmology ten years from now?**

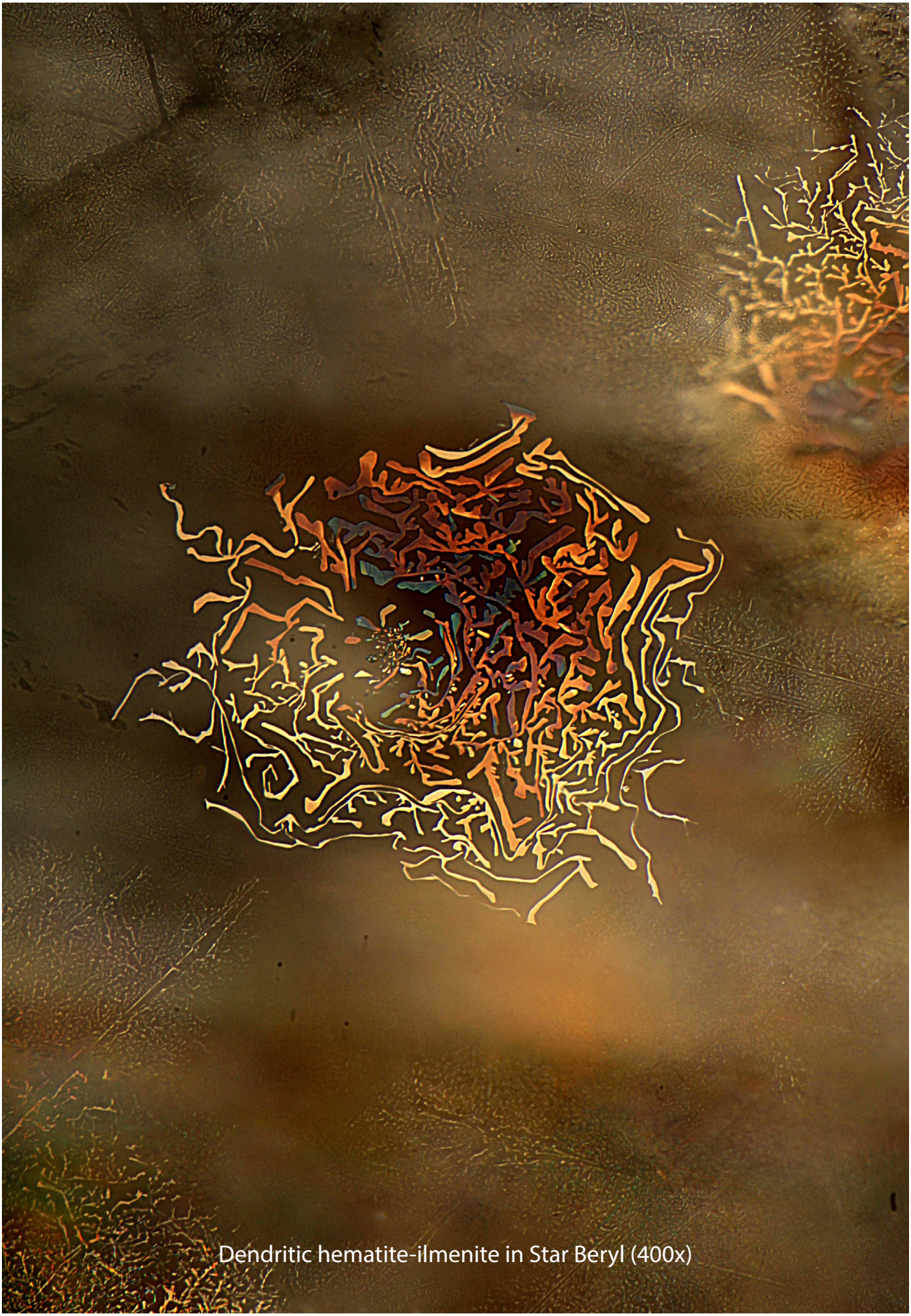
I think that we're going to see more and more gemologists taking an interest in photomicrography. We're at a point where cell phone cameras are very good, and shots taken through a microscope eyepiece can yield stunning results. It's also easier than ever to edit and share these photos on social media. For those who end up wanting to take it further there is a wealth of information online and an abundance of exceptional surplus optics available for those who want to build their own advanced photography scopes. I only hope people will proceed with some caution—once the second microscope is bought it is very difficult to not buy a third, and from there things can spiral out of control.

**If we were sitting here a year from now celebrating what a great year it's been for Stephen Challener professionally, what would you say was the reason?**

I have a tremendous amount of fun taking inclusion photos and sharing them, but I've been hoping to transition towards larger projects in the future. I hope that by the time next year rolls around I'll have started putting together a book of inclusion photos.

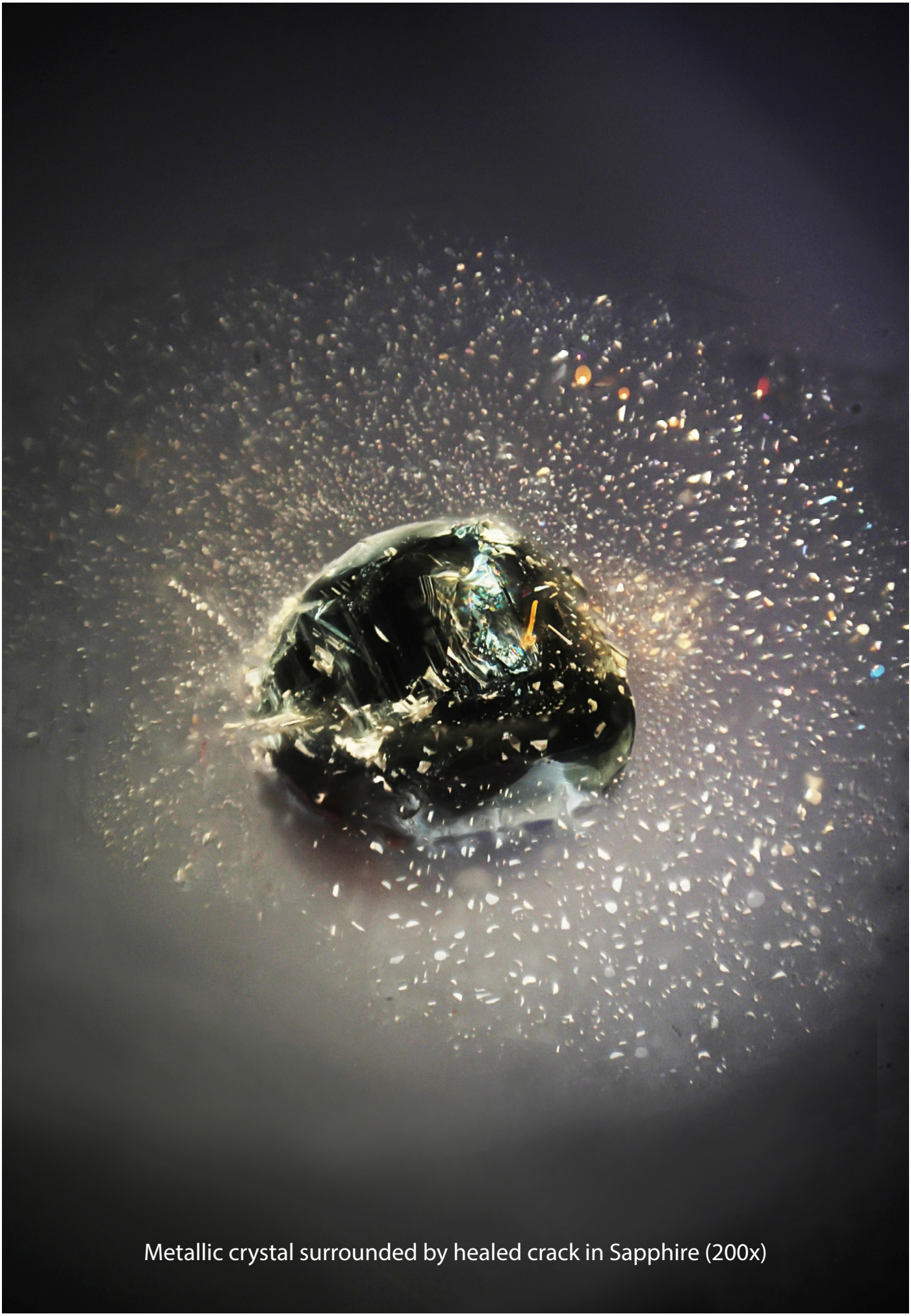


Beetle in Amber (100x)



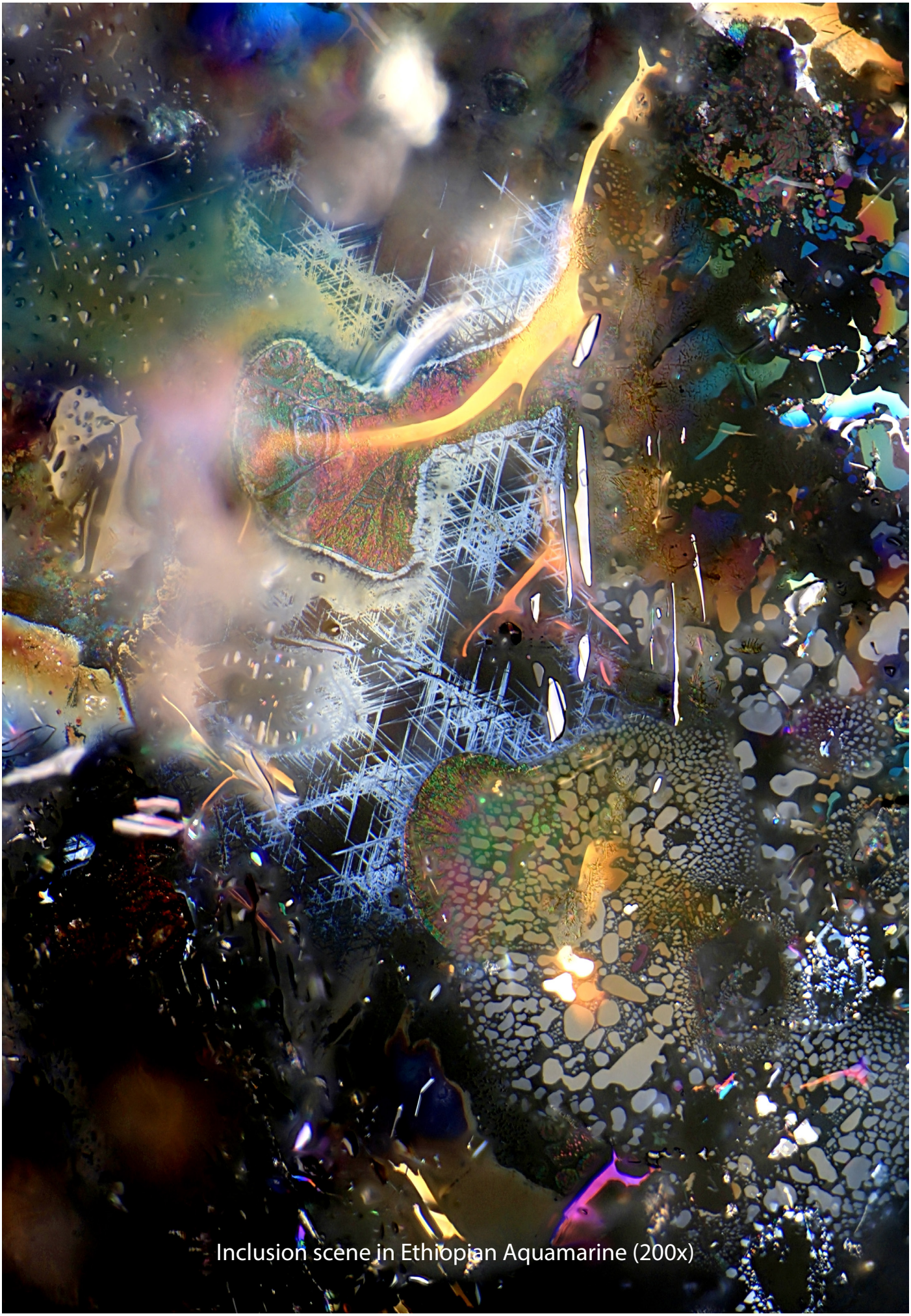
Dendritic hematite-ilmenite in Star Beryl (400x)

Hematite and fluid films in Beryl (400x)

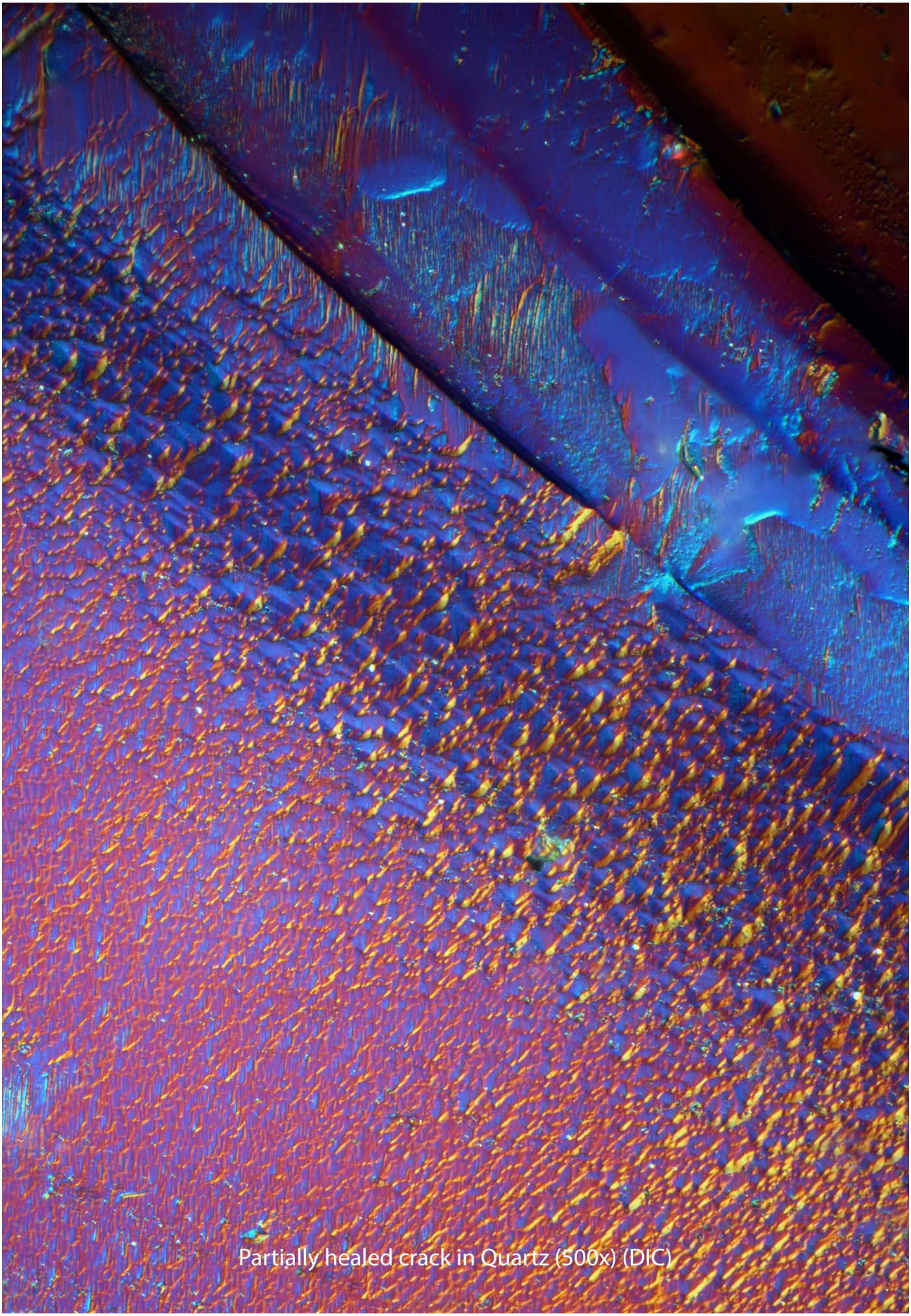


Metallic crystal surrounded by healed crack in Sapphire (200x)

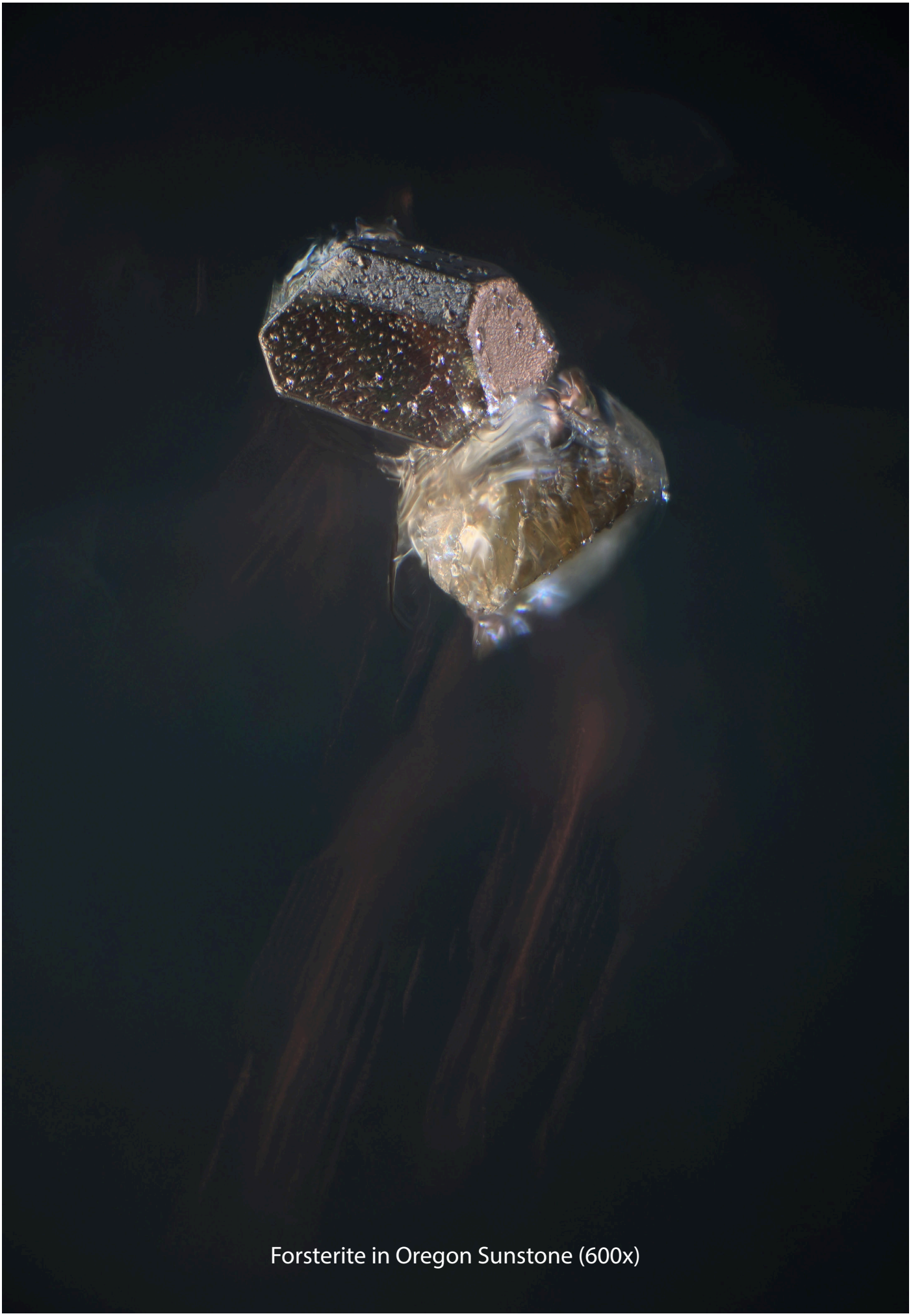
Negative crystal in Quartz hosting petroleum bitumen and methane (200x)



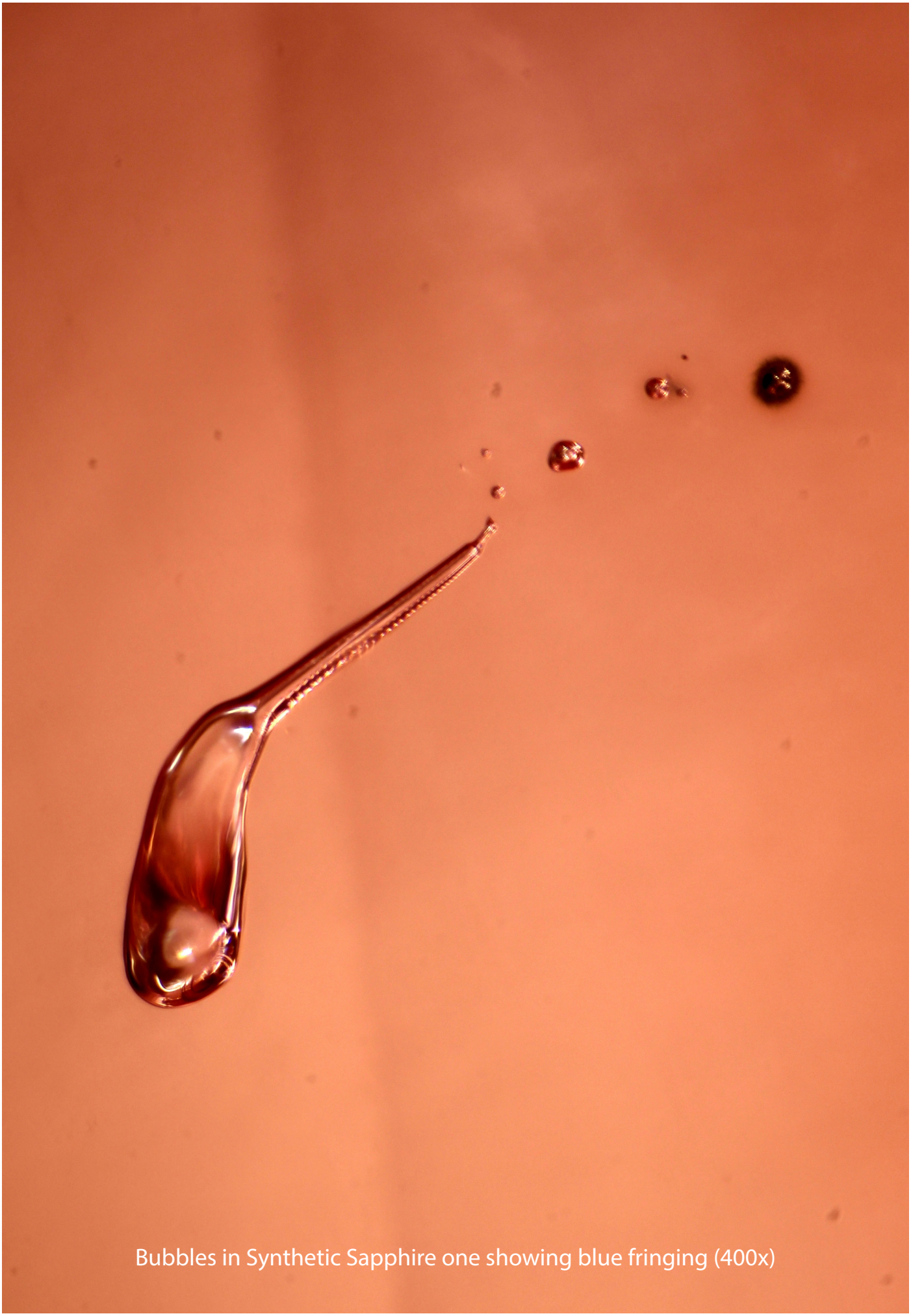
Inclusion scene in Ethiopian Aquamarine (200x)



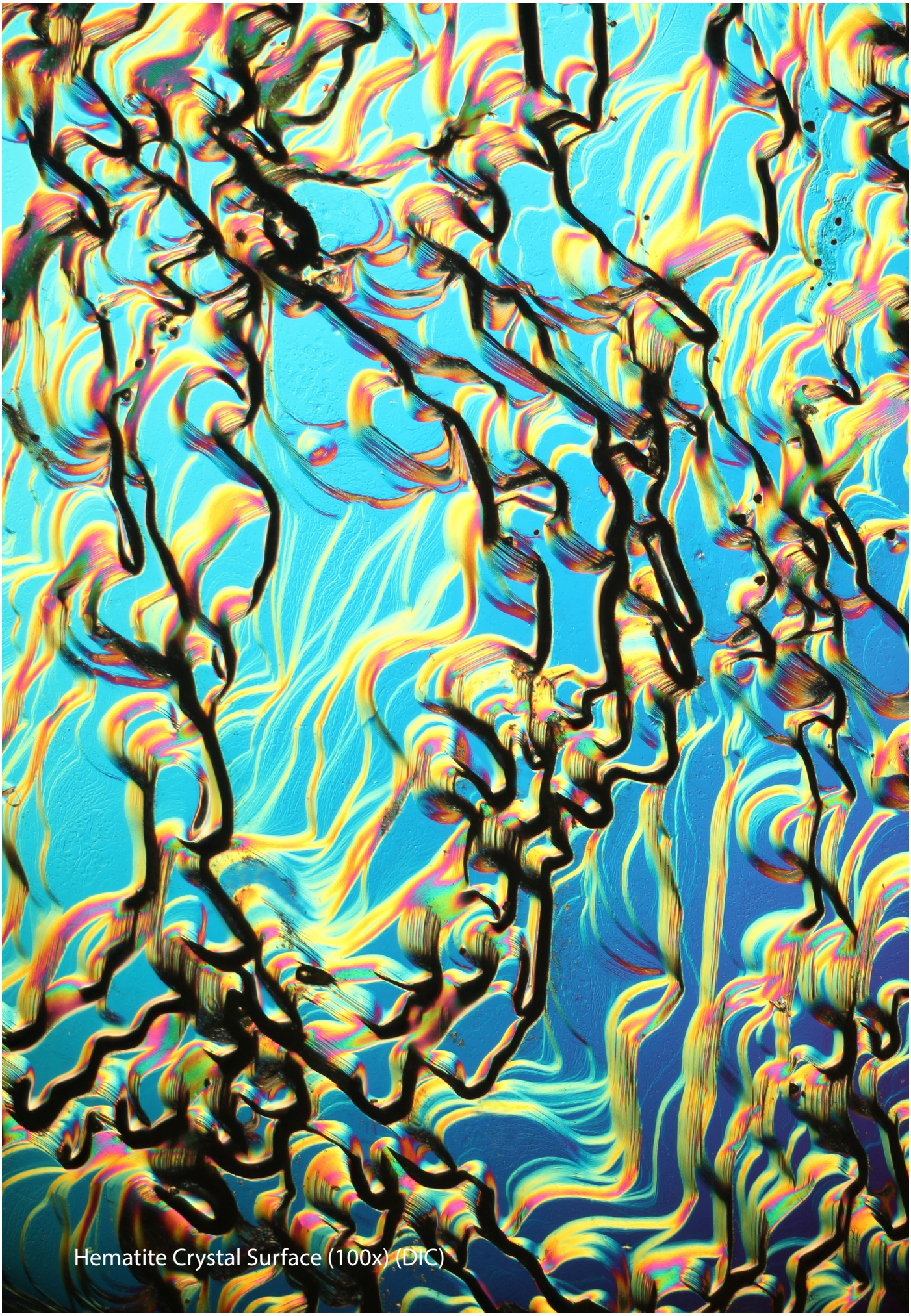
Partially healed crack in Quartz (500x) (DIC)



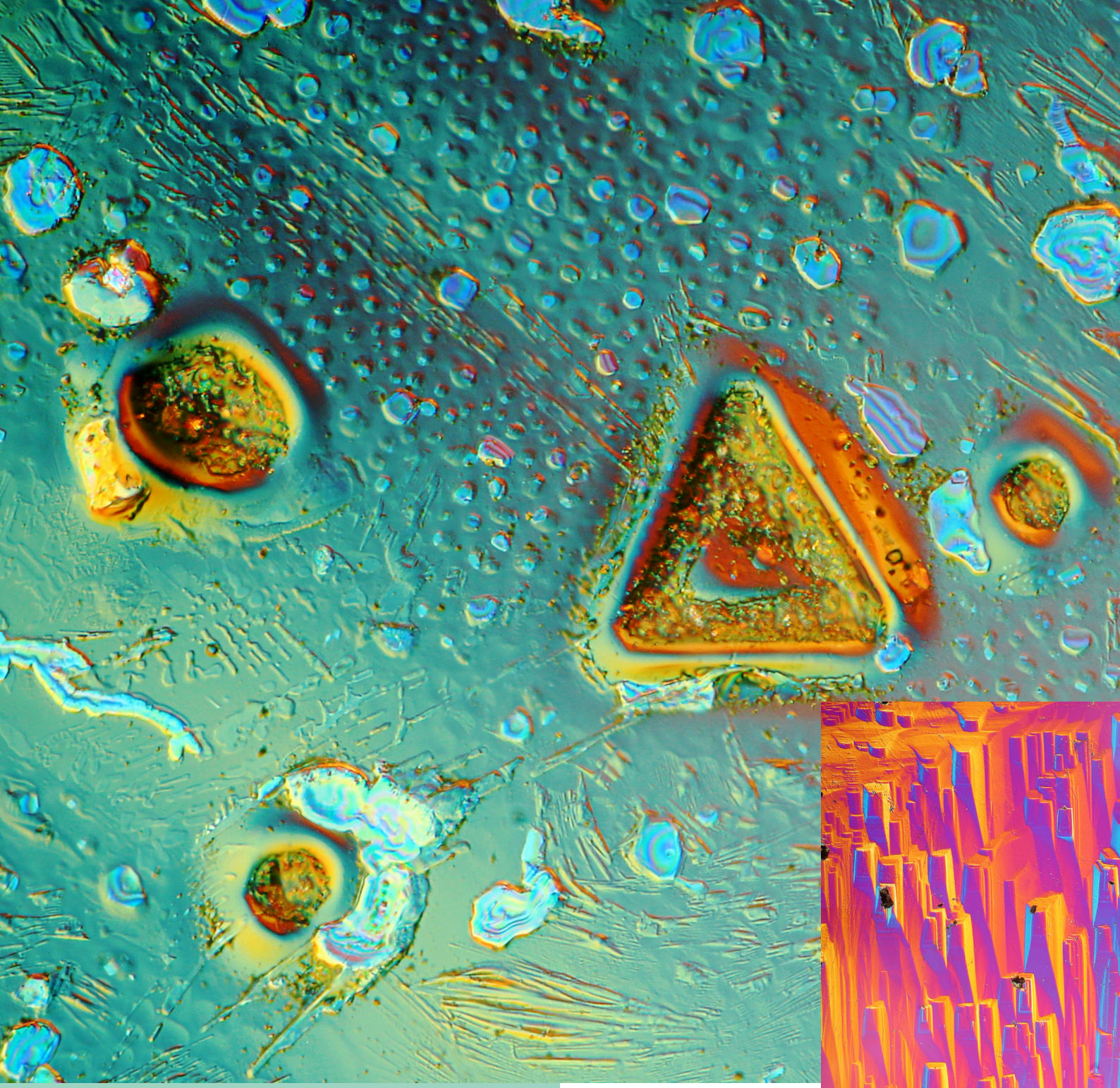
Forsterite in Oregon Sunstone (600x)

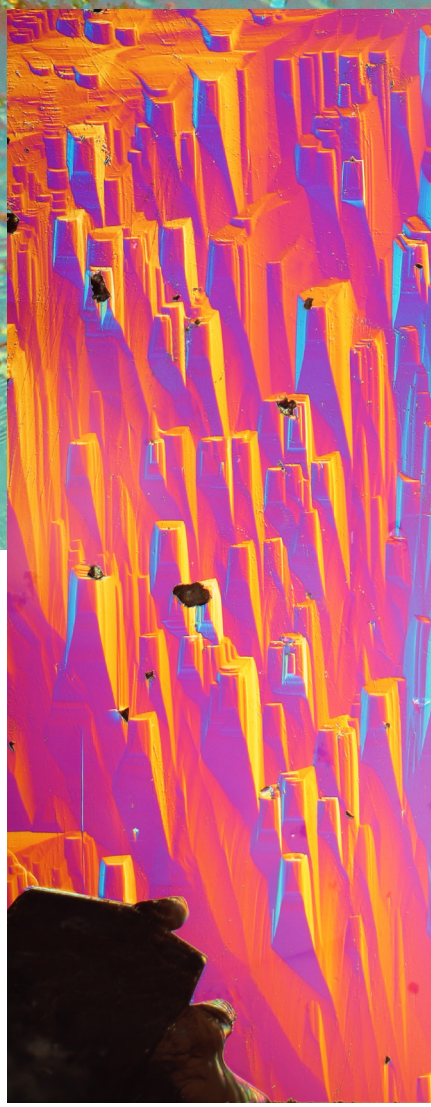


Bubbles in Synthetic Sapphire one showing blue fringing (400x)

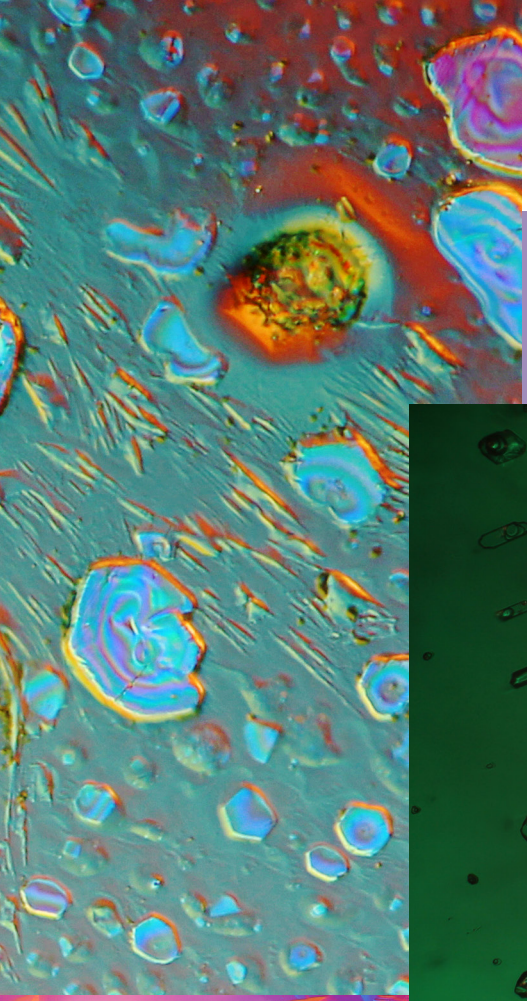


Hematite Crystal Surface (100x) (DIC)

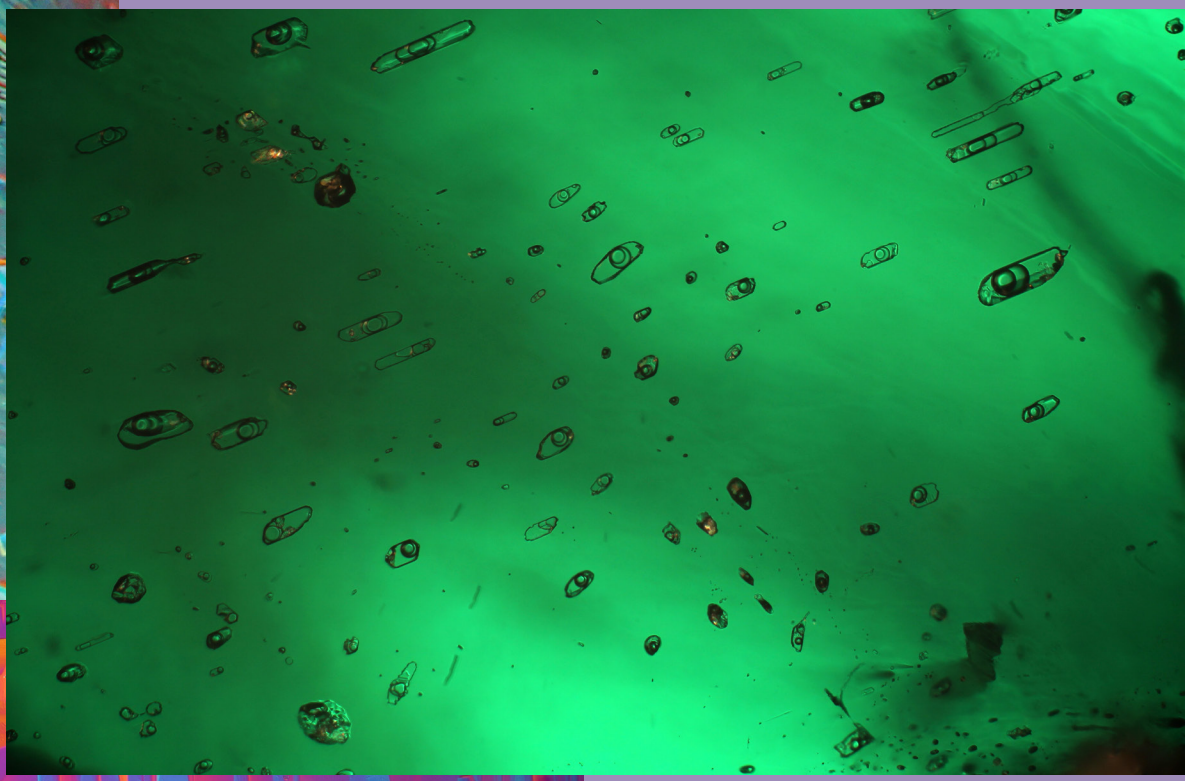


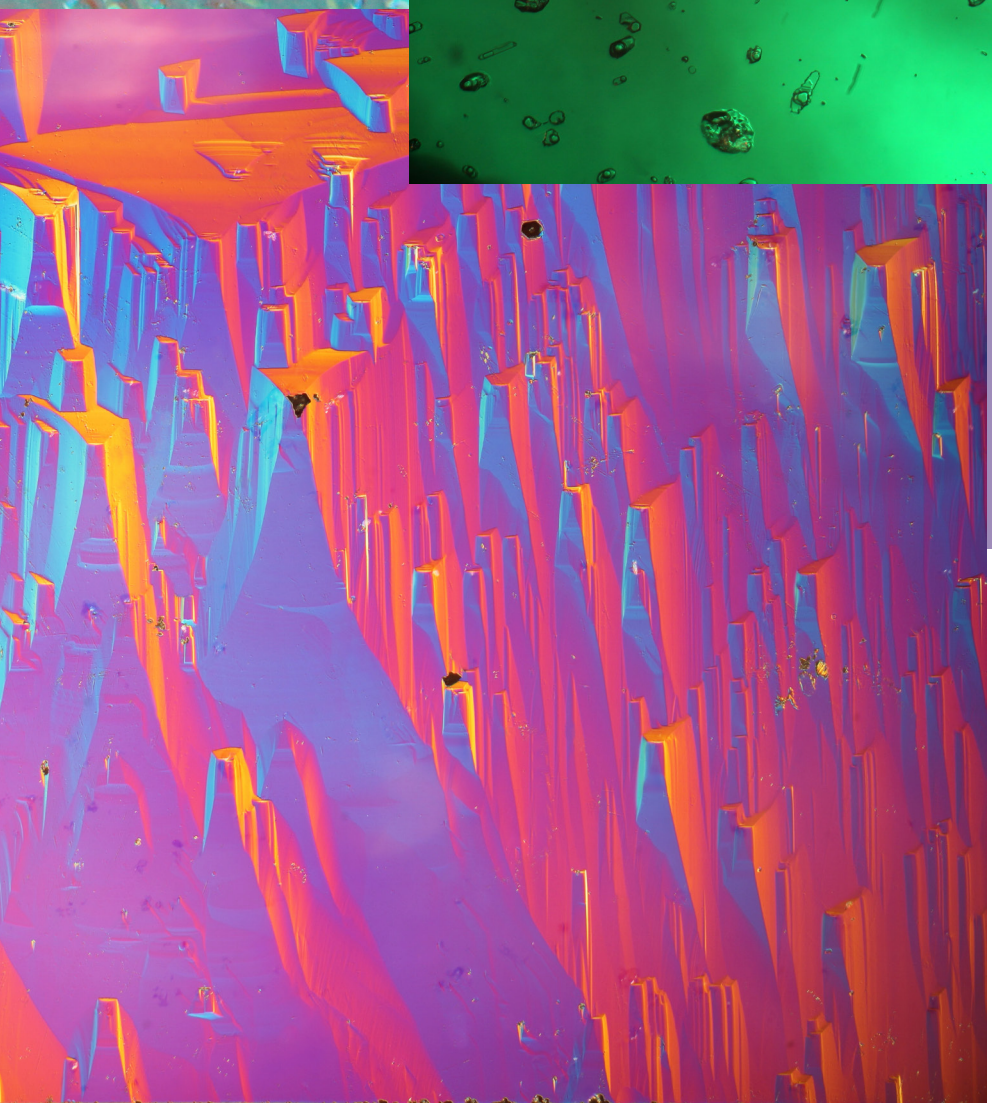


Surface Texture of Synthetic Garnet Boule with iridium platelets (500x) (DIC)

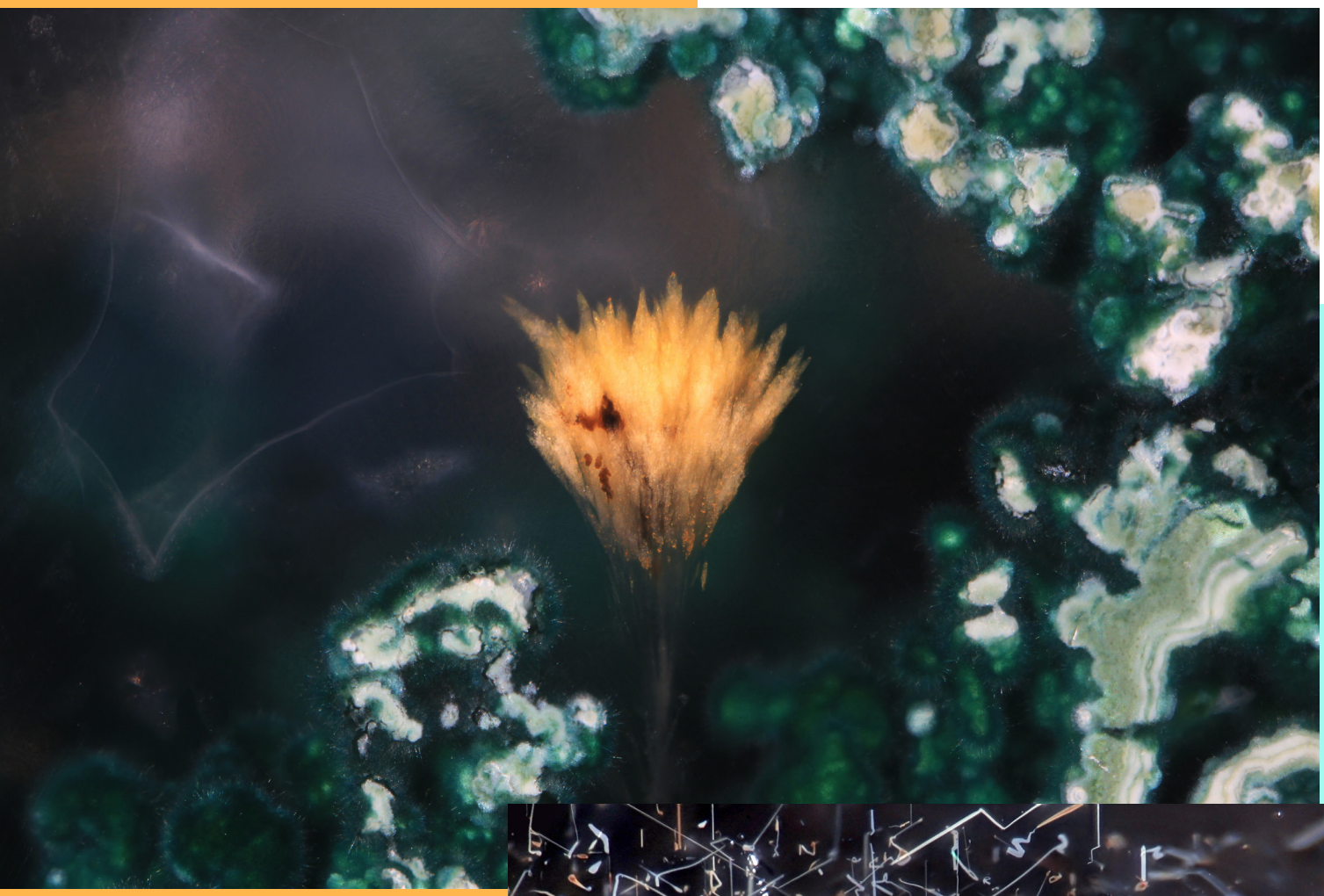


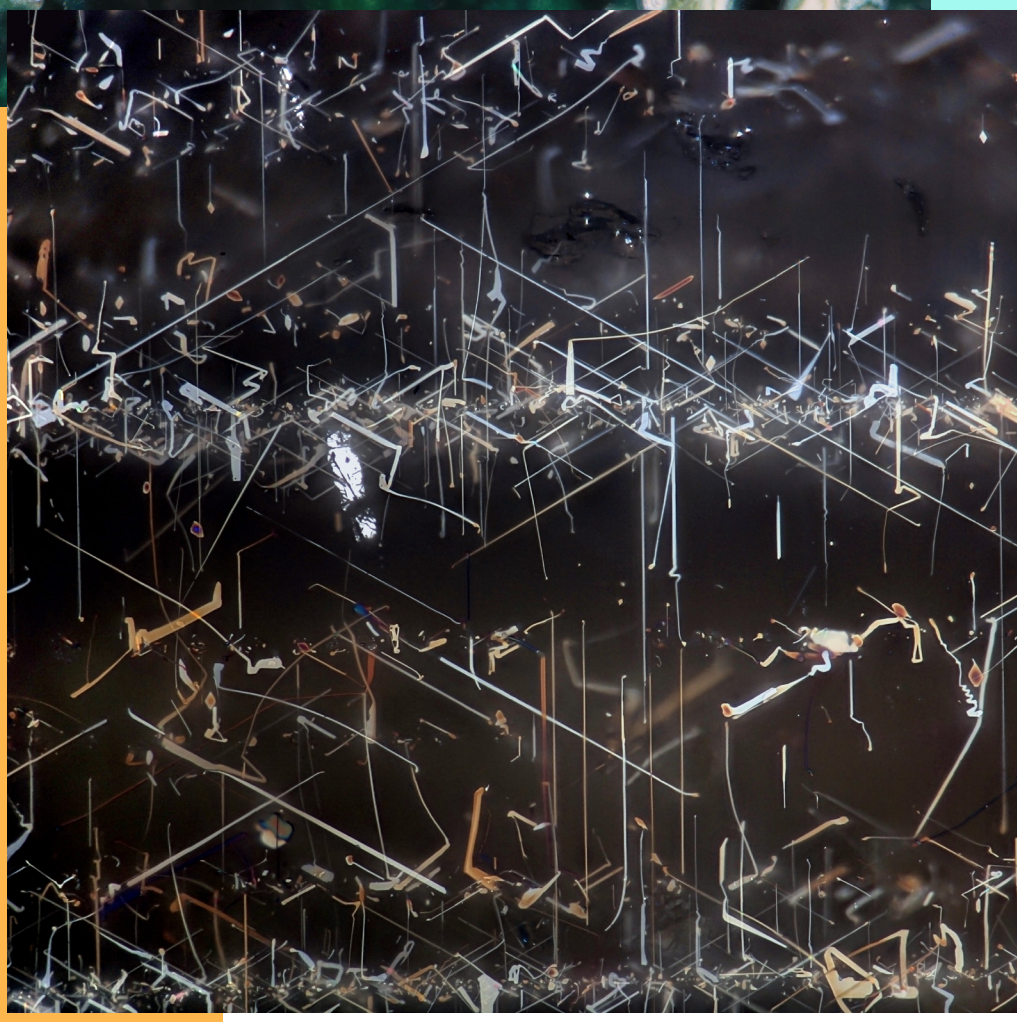
Three-phase inclusions in Ethiopian Emerald (200x)





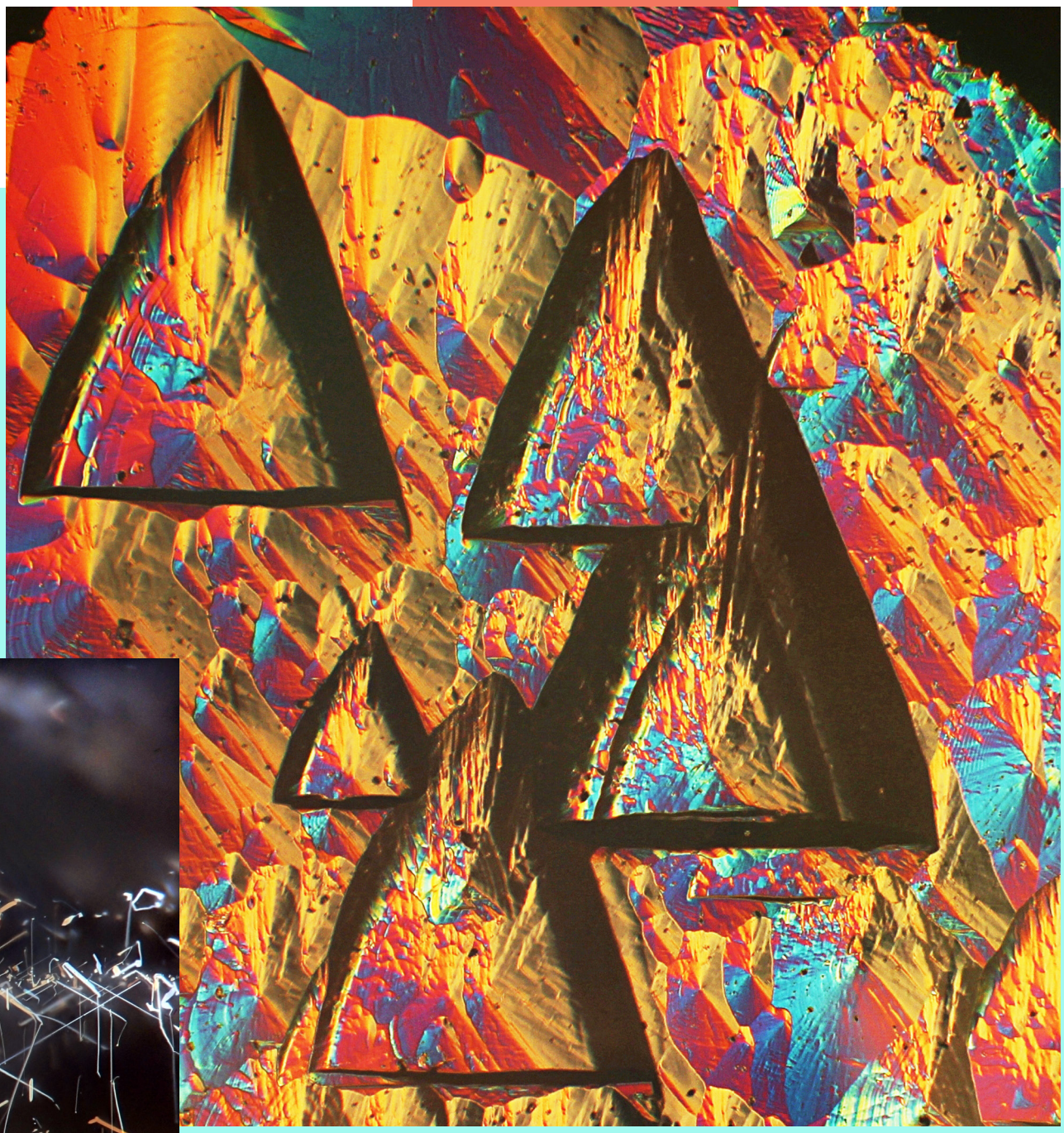
Topaz crystal surface (200x) (DIC)

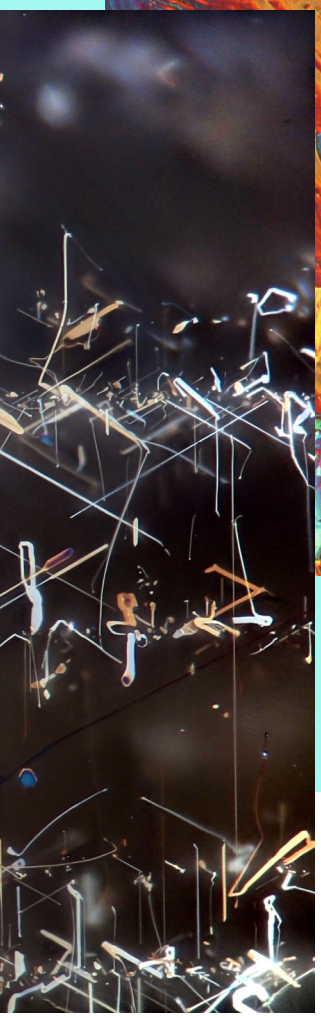




(Top) Floral plume in pom pom Agate (100x)

(Right) Hematite Needles in Star Sapphire (600x)





Surface trigons on a Quartz crystal (20x)

# AFRICA feeds

## Poverty & Diamonds

Over the past years, poverty reduction has been accelerating in the poorest countries of the world, but not so fast enough in the so-called continent of wealth, Africa.

According to recent estimates, the number of deprived people in the region has grown from 278 million to 413 million in the last 25 years, while the average skyrocketing poverty rate of 41% makes Africa the poorest of all time.

What's more depressing is that the continent is blessed with the rarest minerals like diamonds still more than 300 million Africans are living in extreme conditions with daily wage less than $1.90.

While everyone is singing to the tunes of Patrick Ssenyonjo (a.k.a Fresh Kid) an eight-year-old rapper from Uganda who sings about poverty, there is a lot more we need to know about the continent cursed by diamonds.

Despite the fact that few sub-Saharan nations are showing signs of improvement, most are stuck in scarcity. Here are the top ten reasons why Africans are poor despite having natural wealth.

### 1. Colonialism Of Modern Era

Arguably, the world's poorest continent lags because of modern age colonialism, which severely affects its economic growth and development. In simple words, colonialism is described as an act of practicing full or partial control over another country. The primary purpose is to exercise power and exploit the natural resources of the country so that it cannot grow economically.

This is precisely the case with Africa. The continent has abundant natural resources, including the most precious diamonds, but most Africans are still under the tight control of powerful nations, which hurts the economy. For example, the policies of colonialism forced Africa to rely on imported goods as all the natural resources are drawn away by the wealthy nations.

### 2. Lack Of Transparency

A critical factor that needs immediate attention is the lack of transparency. Official reports revealed that diamond production in overall Africa is twice as large as projected. The reason: Illegal trade, underreporting of production, corruption, and tax evasion. Initially, the former Prime Minister of Zimbabwe claims that a $15 billion missing diamond revenue story was 'all lies'.

However, the case is different for Botswana, the dominant role model in Africa. The diamond producer country has a robust governance system that enables the country to channel profits back into the communities. Instead of relying on industry giants, Botswana processes the raw diamonds domestically. The country exports rough diamonds and earn 75% foreign exchange revenue from it.

### 3. Bureaucratic Corruption

The wealth is concentrated at the top while the poor people are deprived of necessities like clean water, medical care, and food. This massive gap between the rich and poor has been widened over the years. In Africa, corruption exists almost at all levels of the political system and is the main reason behind slow economic development.

The corrupt behaviour of politicians and government officials negatively impact the poor people by preventing them from accessing funding, support, and services of government. For example, poor people rely heavily on public services, but they are more likely to be met by demands for bribes for obtaining support.

### 4. Lack Of Education

Increased access to education is believed to be a highly essential component of prosperous nations. The deficit in educational opportunities and instruction quality prevents people from learning and progressing. Evidence also suggests that schooling has a direct impact on poverty. The reason: people with reading, writing, and numeracy skills are more likely to get high paying jobs. Moreover, it equips individuals with the awareness necessary to thrive in a competitive world.

Although Africa is blessed with natural bounties and jewels, the citizens are incapable of making well-thought and informed decisions. Undoubtedly, natural resources are essential for economic development, but education is one of the greatest needs in Africa.

### 5. Rapid Population Growth

While growth in population causes poverty, there is also a direct effect of poverty on overpopulation. A country cannot experience economic development until it balances both conditions. However, humanitarian and health agencies like UNICEF and WHO have organized several campaigns to educate people on this matter; the birth rate and death are unstoppable. As a result, more people are forced to live in extreme conditions. A report by UNICEF indicates that the population of Africa is expected to be doubled to 2 million people by the end of 2050.

### 6. Inequalities In Health

Lack of income does not merely define being poor. Poverty is a multi-dimensional concept that also includes the well-being of humans. In Africa, health disparities continue to rise because of negative socio-economic factors. Lack of education, expensive healthcare services, unhygienic living condition, and lack of essential services means that the diseases spread quickly, and people will be left untreated.

Currently, there are 25 million adults, and 2.9 million children infected with a life-threatening illness like HIV, Ebola, and Malaria. Increasing mortality rates due to diseases are directly contributing to high rates of street youth, another emerging problem of the continent that can fuel crimes, sexual health issues, and psychological issues in adolescents.

### 7. Role Of Multinational Companies

The Western-based multinational mining companies are accused of stealing the natural wealth of sub-Saharan Africa. For a long time, these companies have been successfully getting away with tax evasion, environmental pollution, bribery, abusive transfer pricing, forced evictions, and lack of transparency regarding mining rights. Zambia has the largest mines of copper, and yet it is the poorest country of Africa.

The companies over-report the costs and under-report the production, which is led by the provision of tax incentives by the Government of Zambia. Similarly, companies are engaged in illegal capital flight to evade tax. As a result, the country makes a loss of $2 billion per year from tax avoidance, which is nearly 10% of the country's GDP.

### 8. Unskilled Labour

Trained and skilled labour is essential for any economy to succeed. Unlike other countries, the population of Africa is made up of a high proportion of unskilled individuals. Lack of education and the inability to get HND assignment help is the main reason. Moreover, poor technological infrastructure and lack of investments in training and development make Africa the home for low-skill people. Despite huge demand, the diamond mines are operated by unskilled personnel, which results in low-quality final products.

### 9. Serious Human Rights Violation

The exploitation of human rights is a constant phenomenon that persists in underdeveloped countries, and African countries are no exception. However, human rights abuse is far more significant in the mining sector. Mining firms are also one of the biggest culprits behind severe violations and engaged in unethical practices in the quest for higher profits at the expense of the environment and human health.

The fact that the agencies and government are too weak to regulate these firms makes mining bosses crueller. Mining is a highly dangerous and labour-intensive occupation, but people are forced to work in unsafe conditions. Not only this, but a large population of mining workers also made up of trafficked children who are exploited physically and sexually daily in small mines and quarries.

### 10. Lack Of Business Know-How

Business knowledge plays a pivotal role in making economies prosperous and flourishing, but it is a major cause of business failure in Africa. While industrial experts and scholars have recognized the true potential

of Africa, a lack of technical knowledge and business understanding is holding back small and medium-sized enterprises. Education is an essential ingredient of economic advancement as it helps countries to inform their policies and make sound decisions for the welfare of the people. Similarly, business-related knowledge is essential for countries to come up with innovative ideas for transforming valuable raw materials into products that can be used to meet the local demands as well as export to foreign countries to earn revenues. In conclusion, instead of more projects and funds, Africa needs more business knowledge to spotlight opportunities and help itself.

### What Needs To Be Done?

Now the question is how to fix this? To move forward as a continent and modernize the mining industry, a lot has to be done. The first and foremost that Africa should work on is improving its transparency. Countries need to be more open with their dealing.

At the same time, Governments should play an active role in regulating the mining industry, including the multinational companies that bring investment to the country.

More emphasis on technical education should be placed, such as farming techniques and processing of natural minerals as it would eliminate the skill-gap and enable small companies to come forward and produce export quality products. The profits from selling diamonds should be appropriately used for setting up more branches, improving technological infrastructure, and anti-poverty programs.

### FINAL THOUGHTS

Africa, the continent of wealth, is not poor, but it is being managed by people with poor management skills. It's not about blaming Africa, but it is about diagnosing the problem to find out the solution. More importantly, we need to change the way we talk about Africa.

### ABOUT AFRICA FEEDS

Africafeeds.com is a member of the Africa Feeds Media Limited that focuses on telling the story of Africa to the rest of the world. Their network of journalists has one objective, to tell the story of Africa accurately, objectively, fairly and in a balanced way.

The company was founded by Isaac Kaledzi who is an Award-winning African Journalist from Ghana.

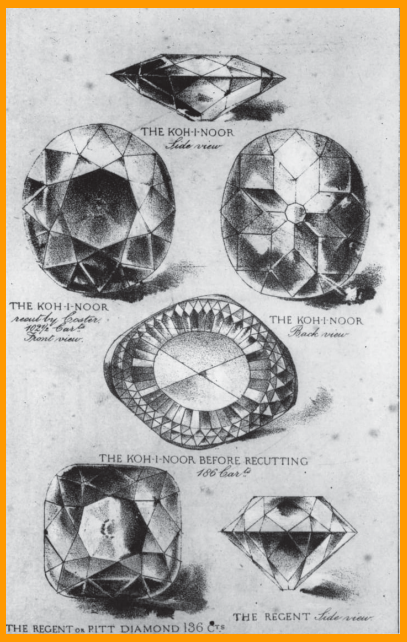

WIN a free Diamonds Course

# GT quiz

Over the years, many famous diamonds have been found. Let's see how much you know!

**DEADLINE:**

JULY 15TH, 2022




Everyone who answers the quiz correctly (100%) will be entered into the draw.

ENTER NOW!

CHANGING LIVES THROUGH AFFORDABLE GEMMOLOGICAL EDUCATION IN THE KEY GEM PRODUCING AREAS

Project

# AFRICA

FIND OUT MORE

POWERED BY THE WORLD GEM FOUNDATION

# GT viewpoint

## The Litmus Test

Albert Einstein once said 'In theory, theory and practice are the same. In practice, they are not'.

When the Kimberley Process was implemented, it was to combat the illicit trade of diamonds from a country (Sierra Leone) that accounted for less than 1% of the world's diamond production. How will the Kimberley Process handle the sanctions levied against their largest producer (Russia) who account for 32% of the worlds diamond production?

Did the KPCS ever envision this scenario? While you would hope that any initiative always includes a 'worst case scenario' provision, it is debatable if a scenario of this magnitude was ever contemplated.

In this acticle, we will look at the genesis of the Kimberley Process Certification Scheme, what it encompasses and the possible ramifications the sanctions will have on the world and the KPCS in particular.

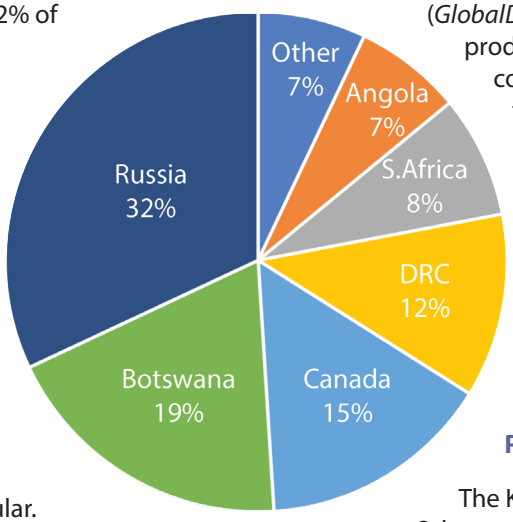
### LOOKING BACK

During the height of the war in Sierra Leone, the Revolutionary United Front (RUF) was financing the war with diamonds. Reports suggest that income from these diamonds was roughly 125 million USD a year. According to former RUF rebels, they targeted the diamond-rich areas in eastern Sierra Leone because they needed the gems to finance their war. In 2000, UN investigators found that diamonds from RUF- controlled areas were smuggled out into Liberia and from there onto the international market as if they were Liberian diamonds.

While diamond production figures between the conflict years of 1991 and 2002 are impossible to access, annual diamond production in Sierra Leone from 2004 to 2020 has averaged 0.55 million carats with the lowest 0.3 million in 2017 and the highest 0.8 million in 2019.

In terms of world production, in 2004, 181,672,000 carats of diamonds (gem and industrial quality) were produced. In Sierra Leone, production was 692,000 carats (318,000 carats or 45.95% being gem quality). That is less than 1% of annual diamond production.

In 2021, annual diamond production was 112.99 million carats (see chart), up 1.4% over the previous year after suffering a 19.4% decline to 111.40 million carats in 2020 due to the COVID-19 pandemic (*GlobalData*). Even with these lower production numbers, Sierra Leone's contribution would still be less than 1%.




Due to the concerns that diamonds were being used to finance the war, UN Security Council resolution 1459 (2003) set up the Kimberley Process Certification Scheme (KPCS).

### WHAT IS THE KIMBERLEY PROCESS?

The Kimberley Process Certification Scheme (KPCS) recognises that the trade in conflict diamonds is a matter of serious international concern that is directly linked to armed conflict, the undermining or overthrowing of legitimate governments, and the illicit trade of armaments.

To be a member, a country must ensure that any diamonds originating from their country are not used to finance rebel groups or other entities seeking to overthrow an UN-recognized government. Furthermore, every diamond exported must be accompanied by a Kimberley Process certificate and that no diamond is imported from, or exported to, a non-member of the scheme.

### SYSTEM OF WARRANTIES

Endorsed by all KPCS members, the World Diamond Council created a 'System of Warranties' for diamonds whereby all buyers and sellers of rough and polished diamonds must guarantee that all diamonds have been

acquired from legitimate sources that are not involved in the funding of conflict and comply with the United Nations resolutions. The warranty declaration must be corroborated by legitimate invoices and these invoices must be kept on file and audited annually by the company's auditors.

Furthermore, members agreed to the following conditions:

- to trade only with companies that include warranty declarations on their invoices.
- to not buy diamonds from suspect sources or unknown suppliers, or which originate in countries that have not implemented the Kimberley Process Certification Scheme.
- to not buy diamonds from any sources that, after a legally binding due process system, have been found to have violated government regulations restricting the trade in conflict diamonds.
- to not buy diamonds in or from any region that is subject to an advisory by a governmental authority indicating that conflict diamonds are emanating from or available for sale in such region, unless diamonds have been exported from such region in compliance with the Kimberley Process Certification Scheme.
- to not knowingly buy or sell or assist others to buy or sell conflict diamonds.
- to ensure that all company employees that buy or sell diamonds within the diamond trade are well informed regarding trade resolutions and government regulations restricting the trade in conflict diamonds.

Failure to follow these guidelines can result in a member being expelled from industry organizations.

## KPCS CERTIFICATES

The Kimberley Process Certification Scheme requires a 'certificate' to meet the following minimum standards:

- Each Certificate should bear the title 'Kimberley Process Certificate' and the following statement: 'The rough diamonds in this shipment have been handled in accordance with the provisions of the Kimberley Process Certification Scheme for rough diamonds'.
- Country of origin for shipment of parcels of unmixed (i.e., from the same) origin.
- Certificates may be issued in any language, provided that an English translation is incorporated.
- Unique numbering with the Alpha 2 country code, according to ISO 3166-1.
- Tamper and forgery resistant.
- Date of issuance.
- Date of expiry.
- Issuing authority.
- Identification of exporter and importer.
- Carat weight/mass.
- Value in US$.
- Number of parcels in shipment.
- Relevant Harmonised Commodity Description and Coding System.
- Validation of Certificate by the Exporting Authority.

Optional certificate elements include:

- Characteristics of a Certificate (for example as to form, additional data or security elements).
- Quality characteristics of the rough diamonds in the shipment.

A recommended import confirmation part should have the following elements:

- Country of destination.
- Identification of importer.
- Carat/weight and value in US$.
- Relevant Harmonised Commodity Description and Coding System Date of receipt by Importing Authority.
- Authentication by Importing Authority.

### Recommendations for Control over Diamond Mines

- Participants are encouraged to ensure that all diamond mines are licensed and to allow only those mines so licensed to mine diamonds.
- Participants are encouraged to ensure that prospecting and mining companies maintain effective security standards to ensure that conflict diamonds do not contaminate legitimate production.

### Recommendations for Participants with Small-scale Diamond Mining

- All artisanal and informal diamond miners should be licensed and only those persons so licensed should be allowed to mine diamonds.
- Licensing records should contain the following minimum information: name, address, nationality and/or residence status and the area of authorised diamond mining activity.

Rough Diamond (Photo by Tino Hammid)

### Recommendations for Rough Diamond Buyers, Sellers and Exporters

- All diamond buyers, sellers, exporters, agents and courier companies involved in carrying rough diamonds should be registered and licensed by each Participant's relevant authorities.
- Licensing records should contain the following minimum information: name, address and nationality and/or residence status.
- All rough diamond buyers, sellers and exporters should be required by law to keep for a period of five years daily buying, selling or exporting records listing the names of buying or selling clients, their license number and the amount and value of diamonds sold, exported or purchased.
- The information above should be entered into a computerised database, to facilitate the presentation of detailed information relating to the activities of individual rough diamond buyers and sellers.

### Recommendations for Export Processes

- A exporter should submit a rough diamond shipment to the relevant Exporting Authority.
- The Exporting Authority is encouraged, prior to validating a Certificate, to require an exporter to provide a declaration that the rough diamonds being exported are not conflict diamonds.
- Rough diamonds should be sealed in a tamper proof container together with the Certificate or a duly authenticated copy. The Exporting Authority should then transmit a detailed e-mail message to the relevant Importing Authority containing information on the carat weight, value, country of origin or provenance, importer and the serial number of the Certificate.
- The Exporting Authority should record all details of rough diamond shipments on a computerised database.

### Recommendations for Import Processes

- The Importing Authority should receive an e-mail message either before or upon arrival of a rough diamond shipment. The message should contain details such as the carat weight, value, country of origin or provenance, exporter and the serial number of the Certificate.
- The Importing Authority should inspect the shipment of rough diamonds to verify that the seals and the container have not been tampered with and that the export was performed in accordance with the Certification Scheme.
- The Importing Authority should open and inspect the contents of the shipment to verify the details declared on the Certificate.
- Where applicable and when requested, the Importing Authority should send the return slip or import confirmation coupon to the relevant Exporting Authority.
- The Importing Authority should record all details of rough diamond shipments on a computerised database.

### KPCS MEMBERS

The Kimberley Process (KP) has 56 participants, representing 82 countries, with the European Union and its Member States counting as a single participant. KP members account for approximately 99.8% of the global production of rough diamonds. In addition, the World Diamond Council, representing the international diamond industry, and civil society organisations, such as Partnership-Africa Canada, participate in the KP and have played a major role since its outset.

### ALL WELL AND GOOD?

If you visit the Kimberley Process website, you will find the following warnings under 'Enforcement'.

### Warning to the public concerning fake Congo (DRC) KP Certificates

The Kimberley Process (KP) is aware of a number of recent incidents where traders have been presented with fake documents purporting to be Kimberley Process certificates from Congo (DRC).

### Warning to the public concerning fake Angola & Malaysia KP Certificates

The Kimberley Process (KP) is aware of a number of recent incidents where traders have been presented with fake documents purporting to be Kimberley Process certificates from Angola & Malaysia.

### Warning to the public concerning fake Ghana KP Certificates

The Kimberley Process (KP) is aware of a number of recent incidents where traders have been presented with fake documents purporting to be Kimberley Process certificates from Ghana.

Of course we know that any regulatory procedure can be circumvented. Where there is a will, there is a way.

Global Witness is an international NGO established in 1993 that works to break the links between natural resource exploitation, conflict, poverty, corruption, and human rights abuses worldwide. The organisation has offices in London and Washington, D.C. Global Witness states that it does not have any political affiliation. They pulled out of the KPCS on 5 December 2011 claiming it had failed in its purpose and did not provide markets with assurance that the diamonds were not conflict diamonds.

However, on a broader scale, it is not only the illicit trade of diamonds that is of concern. Wherever there is money to be made, humans will find a way of exploiting it.

On their website, you will find a fascinating report entitled *The ITSCI laundromat - How an industry due diligence scheme appears to be laundering conflict minerals in DRC.*

The report focuses on the fact that the Democratic Republic of the Congo (DRC) and Rwanda produce nearly half the world's coltan, the main ore of tantalum, as well as large amounts of tin and tungsten ores – collectively known as 3T minerals. The metals obtained from the smelted 3T minerals are widely used in electronic equipment such as mobile phones, computers and automotive and aeronautical systems.

They report that the Congolese army and rival armed groups that dispute power over parts of eastern DRC have for decades viewed control of mines and the minerals trade as a vital source of income. Along with the lack of effective governance in DRC and neighbouring countries, this has led to the trade of minerals from DRC being linked to violent conflict and serious human rights abuses.

In an attempt to improve the sector's governance, the regions' governments, the UN, the International Conference on the Great Lakes Region (ICGLR) and the Organisation for Economic Co-operation and Development (OECD), in consultation with industry and civil society, drew up new guidelines and procedures over a decade ago. As part of this effort, industry interests set up traceability systems which, working alongside government validation of mines, were intended to establish a supply of 'conflict-free', responsibly sourced minerals.

In 2009 the International Tin Association (ITA), with the subsequent participation of the Tantalum-Niobium International Study Center (TIC), set up the International Tin Supply Chain Initiative (ITSCI) with the aim to provide a reliable chain of custody of minerals that are not linked to child labour or the influence of armed groups or the army. In DRC, this means that minerals must originate from mines validated by the government as free from these associations; in Rwanda, where armed groups are not known to be active, it means among other things that minerals have not been smuggled from DRC. In both countries, government agents acting on ITSCI's behalf seal and tag bags of legitimate minerals before they are transported for processing or export. In 2018, the OECD evaluated ITSCI's standard as fully aligned with its own due diligence guidance on mineral supply chains. However, an investigation by Global Witness revealed that the reality on the ground looked very different.

## ALROSA

Alrosa is a Russian group of diamond mining companies that specialize in exploration, mining, manufacture, and the sale of diamonds. Established in 1992, it is the largest diamond miner by volume worldwide as well as the largest vertically integrated company in the industry with all stages of the value chain in-house, from mining to cutting and polishing and jewelry creation. In 2021, the company mined approximately 37 million carats of rough diamonds (32% of global diamond production) with revenues of almost $3 billion.

## ALROSA AND AFRICA

### Republic of Angola

ALROSA is a co-founder of Catoca Ltd. Mining Co. with the 32.8% share in the authorized capital. Catoca mines rough diamonds in the Lunda Sul province with high potential of new discoveries of primary diamond deposits.

In 2014, ALROSA and the Angolan national diamond company ENDIAMA E.P. (also owns 32.8% share in Catoca) signed an agreement establishing an exploration joint venture in Angola.

Geologists continue working at Catoca kimberlite pipe, one of the largest primary diamond deposits and fourth

largest by size. As of today, Catoca produces more than 6 million carats of rough diamonds; reserves of the pipe are estimated at 60 million carats.

Catoca Ltd. Mining Co. is also a majority founder of Luemba company (Angola), with the Tchiuzo pipe, another large primary diamond deposit, located on its concession territory. ALROSA's Yakutniproalmaz institute developed technical design for the development of this pipe and feasibility study for investments.

### Republic of Zimbabwe

The Republic of Zimbabwe is also of interest for the geological exploration and, possibly, for the establishment of joint diamond-mining enterprises.

In 2012, ALROSA's geological service and Zimbabwean DTZ–OZGEO entered into an agreement on technical cooperation aiming to choose promising areas and assess their resource potential. Today, ALROSA considers the establishment of joint venture with DTZ–OZGEO and cooperation with the state Zimbabwean company ZMDC.

### SANCTIONS

On April 8th, 2022, Mining Technology reported:

'The US has designated Russian diamond miner Alrosa in the latest punitive action against Russia for its military attack on Ukraine.

This decision has been made pursuant to Executive Order (E.O.) 14024, which expands earlier sanctions imposed on the state-owned enterprise (SOE) by the US Department of the Treasury's Office of Foreign Assets Control (OFAC).

A Treasury statement stated: 'Today OFAC is expanding previous sanctions by designating Alrosa pursuant to E.O. 14024 for being owned or controlled by, or for having acted or purported to act for or on behalf of, directly or indirectly, the GoR.'

Entities owned 50% or more, directly or indirectly, by the miner have been blocked under the executive order.

The UK, Bahamas, New Zealand, and Canada have also sanctioned the company.

US Treasury Undersecretary for Terrorism and Financial Intelligence Brian Nelson said: 'These sanctions will continue to apply pressure to key entities that enable and fund Russia's unprovoked war against Ukraine'.

'These actions, taken with the Department of State and in coordination with our allies and partners, reflect our continued effort to restrict the Kremlin's access to assets, resources, and sectors of the economy that are essential to supplying and financing Putin's brutality.'

### THE LITMUS TEST....

These sanctions will truly test the resolve of the KPCS members. On March 31st, 2022, Tess McClure of The Guadian reported:

'Decisions over whether to truly pause trade of Alrosa's diamonds will therefore fall to the industry, and to key certification bodies. Within the sector, however, a storm has been brewing over 'responsible sourcing' groups that have remained quiet on sourcing of Russian diamonds, with multiple high-profile members resigning in protest.

The Responsible Jewellery Council (RJC) – one of the crucial jewellery watchdogs – was set up to help regulate the sector, improve its reputation, promote responsible sourcing, and eliminate 'conflict diamonds' from supply chains, however the council had been accused of silence over Russian diamonds although it has issued guidance that members should comply with sanctions. While Alrosa has stepped down from the organisation's board, it remains a member and has kept its 'responsible' certification. The council has a number of past or present long-term Alrosa customers on its board.

Now, the council is facing a wave of exits. Brands that have announced they are leaving over the Russian diamonds issue include Pandora, Richemont, the owner of Cartier, and Kering, the owner of high-fashion brands including Gucci and Saint Laurent. The organisation's executive director Iris Van der Veken resigned over its handling of the issue.

In a statement, Richemont, the owner of Cartier, said it was leaving the organisation in protest. 'Richemont and its maisons do not wish to be members of an industry organisation that includes companies that contribute to financing conflicts and wars.'

Pandora representatives said the company was leaving the council after 12 years as a member, over its 'failure to suspend Russian companies' memberships and responsible business certifications and urge its members to suspend business with Russia. Pandora had previously requested that RJC take such actions.'

'The war requires all businesses to act with the utmost responsibility regarding any interactions or business dealings with Russia and Belarus. Pandora cannot in good faith be a member of an association that does not share our values,' chief executive Alexander Lacik said.

Gucci and Balenciaga owner Kering said the brand 'does not want to be associated in any way with business practices that contribute to an endorsement of war.'

'The RJC is at a crucial crossroads,' said Cristina Villegas, director of the Mines to Markets program at development organisation Pact. 'The current definitions of responsibility are silent on what happens when a company's assets are being used to directly and indirectly fund an unprovoked conflict that's displaced millions of people.'

## WHAT NOW?

A very good question. Since Russia are members of KPCS, one wonders how this will all play out. With millions of carats in the pipeline and the severe financial repercussions caused by the sanctions, Russian diamonds remain a viable source of income. The question is, who will buy them?

A cursory glance at the KPCS membership shows that all the economic powerhouses (i.e., China) are members so this closes (or does it) a very viable avenue for Russia.

According to CNBC, China is quietly ramping up purchases of oil from Russia at bargain prices, according to shipping data and oil traders who spoke to Reuters.

The move by the world's biggest oil importer comes a month after it initially cut back on Russian supplies, for fear of appearing to openly support Moscow and potentially expose its state oil giants to sanctions.

Will they be tempted by a 'forbidden fruit' that may well be offered at prices far below the current market value?

Certainly one can see a similar scenario to what is happening with the 3T ores in the DRC and Rwanda. You see, unlike other gemstones, a diamond does not betray its origin.

The GIA (Gemological Institute of America) announced on their website that they would be offering a GIA Diamond Origin Report using scientific evaluation to provide confirmation of a diamond's geographic origin. However, they state that a GIA Diamond Origin Report will only be available for diamonds that have gone through their 'Rough Analysis Service' before polishing.

Furthermore, the origin service will not be available for diamonds previously graded by GIA that have not been through GIA's rough analysis.

As part of the report process, GIA require the following:

- All parcels must be submitted with their Kimberley Process (KP) Certificate if the diamonds have left their country of origin (for example, rough mined in Botswana submitted to GIA's Botswana laboratory location without having left the country at any time do not need a KP Certificate).
- Invoice from the mining company of the parcels mentioning invoice number, lot number, weight, quantity, and country of origin

Provided they are submitted in sealed parcels with the required paperwork, they can be accepted for the GIA Diamond Origin Service. If the parcel has been opened it will not be accepted for the GIA Diamond Origin Service unless it was opened in the physical presence of a GIA representative.

For rough diamond characterization, diamonds can be submitted to GIA laboratories located in Antwerp, Johannesburg, Botswana, Mumbai, Surat, New York, and Japan.

Polished diamonds can also be submitted provided they are accompanied by the GIA rough report number, at any GIA laboratory location around the world.

A GIA Diamond Origin Report service includes a printed report containing a full grading assessment, a plotted diagram of the polished diamond, confirmation of the diamond's geographic origin, with the country clearly stated on the report, a laser inscription of the report number on the diamond's girdle, full-colour digital images of the diamond in its rough and polished state, as well as an image-rich story of the diamond's country of origin.

A move in the right direction but flawed in so many ways because it relies solely on the integrity of the KPCS. Having seen many certified 'Canadian' diamonds that were not Canadian, it would not be difficult to smuggle diamonds into any diamond producing country (as the RUF did in Liberia) and then legitimately export them as being from that country. Government and Company Officials can be bribed and convinced to look the other way. History has shown us repeatedly how profitable war can be. It is part of Man's DNA. To profit from the misfortune of others. Socrates once said *'He who is not contented with what he has, would not be contented with what he would like to have.'*

No-one knows what lies ahead and quite frankly, you would be a fool to spectulate but once again the beauty of nature will sully our hands. That is the one 'certainty' in a world of so many uncertainties.

Diamond (Photo by Tino Hammid)

# PROJECT africa

## Sponsor a Teacher

One of the biggest misconceptions about gemstones is that their extraction from the earth is glamourous, almost romantic in nature. Nothing could be further from the truth. It is back breaking work, invariably dangerous and often futile. While in some areas of the world, miners have adopted more mechanized mining, in most parts of Africa, this is not the case. There, artisanal miners invariably use homemade tools. What the coloured gemstone industry lacks in Africa is structure. While there are co-operatives, there is no vertical integration and without this, it is almost impossible to create any cohesion in the production and marketing of the gems. Many producers know little about the value of the gemstones they are mining on the world stage. Without this knowledge, a seller will never get fair value for their stones. How can you create a level playing field when the buyers know more than the sellers?

The problem with mining is that few people appreciate the time spent finding the gemstones. It is an investment of one's time that only pays dividends if something of value is found. Of course, you can put a value on your time but how can that effectively translate into the final price. One miner in Sri Lanka reported that his 'base salary' was $ 500 USD a month plus a percentage of whatever he found. He worked eight to ten hours a day, seven days a week, fifty-two weeks a year. His 'hourly' salary (based on whether he worked eight to ten hours a day) would be anywhere from $ 1.65 USD to $ 2 USD. Most miners do not even receive a salary. Their income comes from what they find. It's a lottery but like all lotteries, the odds are stacked against them. When they do find something, their lack of knowledge invariably means that they will get far less than the true value. Foreign buyers profit from this ignorance.

The selling price is invariably based on what they need to survive. They will start high, full of optimism but eventually, they will sell for whatever they can get for their stones. Depressing? Certainly, but that is the reality of mining. If you need $ 5 a day to live and someone offers you $ 50 for your stone, would you take it? Of course, you would. But what if the actual value of that stone was $ 500?

In 2015, Tino Hammid and I met two miners in Lightning Ridge who had just found the largest opal find in decades. Sitting on the table, in a rundown bar was two million dollars of opal. They had not slept for three days. They had found the Promised Land that every miner dreams of, but their story is few and very far between. We talk all the time about starving artists but what about miners?

Education will change the current dynamic. It will open doors that will never be closed again. It will burst the bubble, a bubble that isolates people from the truth. The true value of what they are producing.

### MISSION STATEMENT

Project Africa is an initiative by the World Gem Foundation to change lives, to level the playing field, to make gemmological education accessible and affordable to those working in these gem producing areas. To help them become more knowledgeable about the quality of the products they are producing and their 'true value' on the world market.

It is our belief that everyone deserves the right to live with dignity, to earn a decent living and to be able to provide for their families. Project Africa will change lives, not just today but for generations to come.

## SPONSOR A TEACHER

In life, nothing is free. Everything has a cost attached to it. This cost may not be passed on to the end user but there is a still a cost involved. Education is no different. We can offer free courses, free study notes, provide a classroom full of equipment, a selection of study stones and a professional teacher but who bears this expense? It is a doubled-edged sword. On the one hand you want to help but on the other hand, some-one, somewhere must pay the costs.

We would love to provide free education to people in these gem producing areas so that they can improve their lives both economically and professionally. If we can, it will allow us to reach people who, up until now, may have only dreamed of studying gemmology. A dream that previously was unimaginable, unthinkable. We can do it but it requires a team effort. There is only so much we can do as an organization. We need like-minded people who want to make a difference.

According to research, teachers are the biggest influence on a person's life, behind their parents and friends. In fact, 64% of people surveyed say they are grateful to at least one teacher for inspiring the person they are today. Teachers not only educate but can become powerful role models. Teaching is not just a job but an opportunity to shape young minds and pave the way for a brighter future. That is a huge responsibility for any teacher but one that we hope our teachers will aspire to. Quality education requires quality educators. We want to provide the very best instructors possible but to do that, we need your help.

Like 'Crowd-funding', our 'Sponsor a Teacher' program allows individuals, like yourself, to play an important role without bearing the full costs. Many hands make light work. If everyone contributes a little, the sum total will make this dream a reality. It will change lives and create endless possibilities. Actions speak louder than words! Please contribute today!

€ 25 | € 50 | € 75

- The identification of red, white and blue gemstones
- Available in English, French or Spanish

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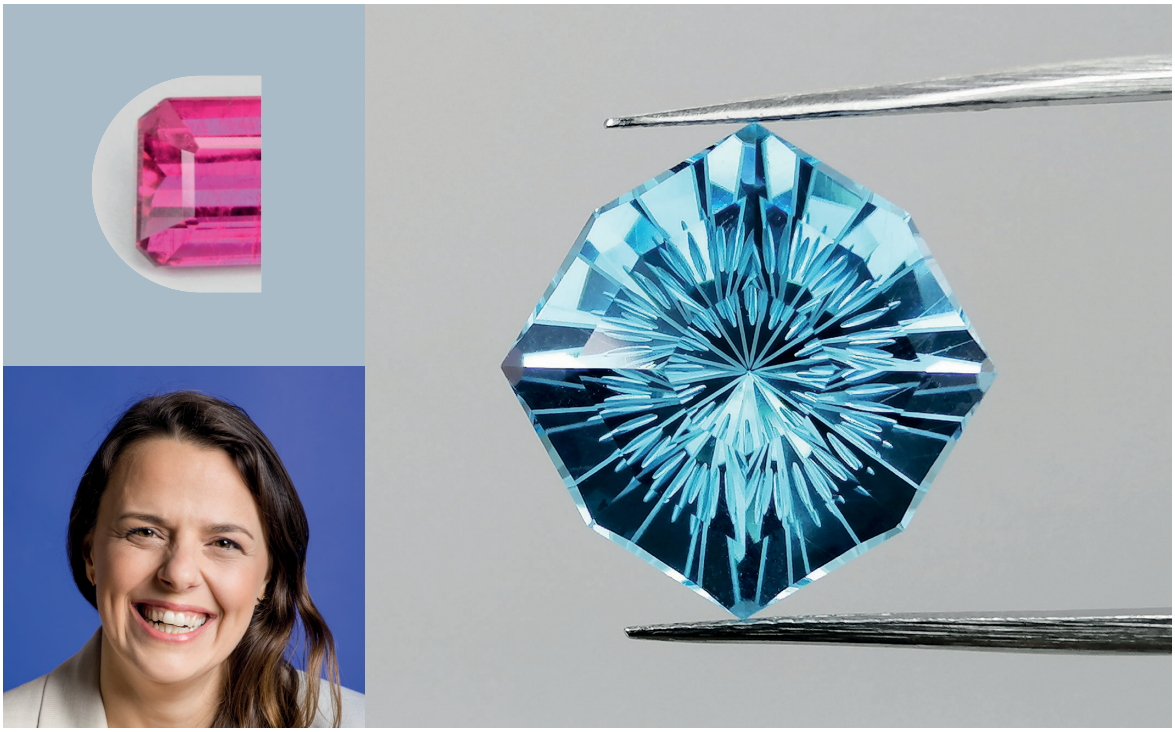

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What are you waiting for?

More Info

# Studying Gemmology with the World Gem Foundation

There's an expression 'different strokes for different folks' and this is certainly true in the case of gemmology. We are fortunate to work in an extremely diverse industry; one that provides unlimited opportunities in a broad range of disciplines.

Some people want to become a professional gemmologist; to forge a career for themselves working with gemstones. At the World Gem Foundation, gemmology is not just a job, it's a profession. This is why we opted for the 'Career Gemmologist' designation. We not only want to raise the level of consciousness with consumers but also within our industry. An awareness that gemmology is a science that demands a high level of theoretical knowledge and practical experience.

At the same token, we also understand that not everyone wants to become a fully fledged gemmologist. Many choose to specialise in a particular area, such as diamonds or coloured gemstones. To recognise this, we introduced two new 'Diploma' programs (Diamond Professional and Coloured Gemstone Professional) in 2018.

But what about gemmologists who may have completed their studies five, ten, fifteen or twenty years ago? Since gemmology is constantly evolving, it is important to continually upgrade your knowledge. You simply cannot afford to become complacent. One minute you may be 'up to speed', the next completely 'out of sync'. Each year brings new treatments and enhancements, new lab-created gemstones and new techniques to identify them. It is not the certificate that hangs on your wall that defines who you are as a gemmologist but the knowledge you possess. Our courses can be taken collectively or independent of each other, allowing our students to customise their own personal development programs based on their own specific needs.

Finally, there are many people who share a passion for gemstones but don't necessarily want to enrol in a gemmological program, they simply want to augment their existing knowledge and upgrade their level of understanding.

Regardless of your motivation to expand your knowledge, the World Gem Foundation has a variety of courses and programs that can help you reach your goal.

## CAREER GEMMOLOGIST PROGRAM

For students wishing to pursue a career in gemmology, our 'Career Gemmologist' program has been especially designed to give you the knowledge and experience required to work as a professional gemmologist. The World Gem Foundation and our affiliated gem academies offer you two options to earn your Career Gemmologist Diploma with our Gemmology Seven/ Eleven programs.

### Gemmology Seven

This option allows you to complete the entire theoretical requirements by enrolling in our Career Gemmology course (5 modules - 78 lessons) and completing the five practical workshops (Gem Identification #1, Gem Identification #2, Diamond Grading and Lab-created Diamonds, Coloured Gemstone Grading #1 and Lab-created and Treated Gems) and our 40 hour online Coloured Gemstone Grading course.

The theoretical component covers the chemical nature of gemstones, their physical and optical properties, basic crystallography, the absorption of light, the spectroscope, refraction and reflection, the refractometer, optical character and sign, dispersion, reflectivity meters, polarized light, the polariscope, pleochroism, the dichroscope, colour filters, specific gravity, luminescence, magnification and thermal conductivity.

From there we move into the most challenging and fluid areas of gemmology; imitation and composite gemstones, lab-created gemstones and the treatment and enhancement of gems.

In the lessons pertaining to lab-created gemstones you will not only learn about the various methods used to manufacture lab-created gemstones (including Verneuil Flame-Fusion, Czochralski Pulling Method, Flux Melt Method, the Hydrothermal Method, HPHT, CVD, Detonation, Ultrasonic Cavitation Skull Crucible, Zone Melt, Horizontally Oriented Crystallization, the Sublimation Method, and the Modified Stöber Method) but also the unique identifying features that allow us to separate them from their natural counterparts.

The use of treatments and enhancements is both demanding and depending on who you talk to, highly controversial. Here we look at not only the techniques used to treat and enhance gemstones (heat treatment, surface and sub-surface diffusion, lead glass fracture filling, flux assisted partial fissure healing, glass fracture filling, cobalt doped glass filled sapphires, clarity enhanced diamonds, HPHT, quench-crackling, surface modifications, coatings and foil backs, laser drilling and irradiation) but also how they can be detected. We also look at the advanced gem testing techniques that are often needed to identify many of these treatments.

The course then takes a slightly different direction, focusing on the identification of gemstones including the tests that are commonly used to identify them and an in-depth look at each of the ten gemstone groupings based on colour and transparency (colourless or white, red, pink, orange, yellow, blue, green, violet or purple, brown, black or grey). These lessons include the important varieties and species of gemstones that commonly occur within each colour grouping, how to distinguish gemstones that are commonly confused with each other (i.e., aquamarine and blue topaz, emerald and chrome green tourmaline, diamond and lab-created moissanite) or gemstones that have physical and optical properties that are similar (i.e. ,amethyst quartz and purple scapolite) to each other. This section also includes gemstones that either exhibit optical phenomena (i.e., asterism or chatoyancy) or are unusual by nature.

The next module looks specifically at diamonds, their physical and optical properties, geology, localities, principle mines, crystal system, chemical composition and classification, causes of colour (fancy coloured diamonds), absorption spectra, inclusions, fluorescence, diamond cutting and mining and a comprehensive examination of the 4 C's (colour, clarity, cut and carat weight) and how they are measured and assessed. The lesson on 'Cut' compares some of the most important and recognized 'Cut' grading systems used today including those pioneered by the Gemological Institute of America (GIA), the American Gem Society (AGS), Hoge Raad voor Diamant (HRD), the International Gemological Institute (IGI), the European Gemological Laboratory (EGL) and the Accredited Gem Appraisers (AGA).

The final twenty-nine lessons (29) are devoted to coloured gemstones and covers their physical properties, geology, localities, crystal system, chemical composition and causes of colour, varieties, absorption spectra, pleochroism, inclusions, fluorescence, pricing and care guidelines. Gemstones covered include corundum, beryl, chrysoberyl, spinel, zircon, topaz, tourmaline, peridot, quartz, garnet, tanzanite, lapis lazuli, turquoise, spodumene, feldspars, iolite, andalusite, diopside, apatite, and organic gems (pearls, coral, jet, ivory, and amber). You will also learn about the various colour grading systems currently used in gemmology (GIA, Gemewizard, ColourWise, GemDialogue and the World of Color), how to accurately describe colour based on hue, tone and saturation, the clarity classification of gemstones, how cut is assessed, opal, jadeite and pearl grading, and how to estimate the weight of 'mounted' stones.

The study of gemmology simply would not be complete without a comprehensive program of practical instruction. This involves five practical workshops (Gem Identification #1 & #2, Diamond Grading and Lab-created Diamonds, Lab-created and Treated Gems and Coloured Gemstone Grading #1) totalling twenty-eight days of in-class instruction and our online / practical Coloured Gemstone Grading #2 course where you will work with the Gemewizard and ColourWise Colour Grading systems.

### Gemmology Eleven

While the information is the same, the theoretical portion of this program is divided into five free-standing courses (Basic Gemmology, Advanced Gemmology, Gem Identification, Diamonds and Coloured Gemstones). This option allows you to take each course separately giving you greater flexibility in terms of time and how you can pay for the courses.

Like the 'Gemmology Seven' program, there are five practical workshops and one 40 hour online course.

## DIAMOND PROFESSIONAL PROGRAM

Designed specifically for those engaged in the diamond trade, this program covers the same theoretical information covered in our 'Diamonds' course plus our eight-day Diamond Grading and Lab-created Workshop.

## COLOURED GEMSTONE PROFESSIONAL PROGRAM

If your area of expertise is coloured gemstones, this program is ideally suited for you. The Coloured Gemstone Professional program involves the completion of four theoretical courses (Basic Gemmology, Advanced Gemmology, Gem Identification and Coloured Gemstones) plus our two five-day practical Gem Identification workshops, our five-day Coloured Gemstone Grading #1 workshop, our five-day Lab-created and Treated Gems workshop plus our online / practical Coloured Gemstone Grading #2 course.

## RESIDENCY PROGRAMS

We are delighted to announce that our Career Gemmologist, Diamond Professional and Coloured Gemstone Professional Diploma Programs are available as a full-time residency program through the Gem Academy of Canada in Montreal, Canada.

Integrating the theoretical and practical components of these programs, students can earn their Career Gemmologist Diploma in six-months, their Diamond Professional in one month and their Coloured Gemstone Professional Diploma in five months.

## COURSES IN OTHER LANGUAGES

All of our diploma and general interest courses are now available in English, Spanish & French. We are currently translating all the courses into Russian. These will be available in 2023.

Mining and exploration, gem cutting, jewellery manufacturing and goldsmithing, valuations, laboratory work, education and the wholesale/retail trade

# GEMMOLOGY OPENS DOORS

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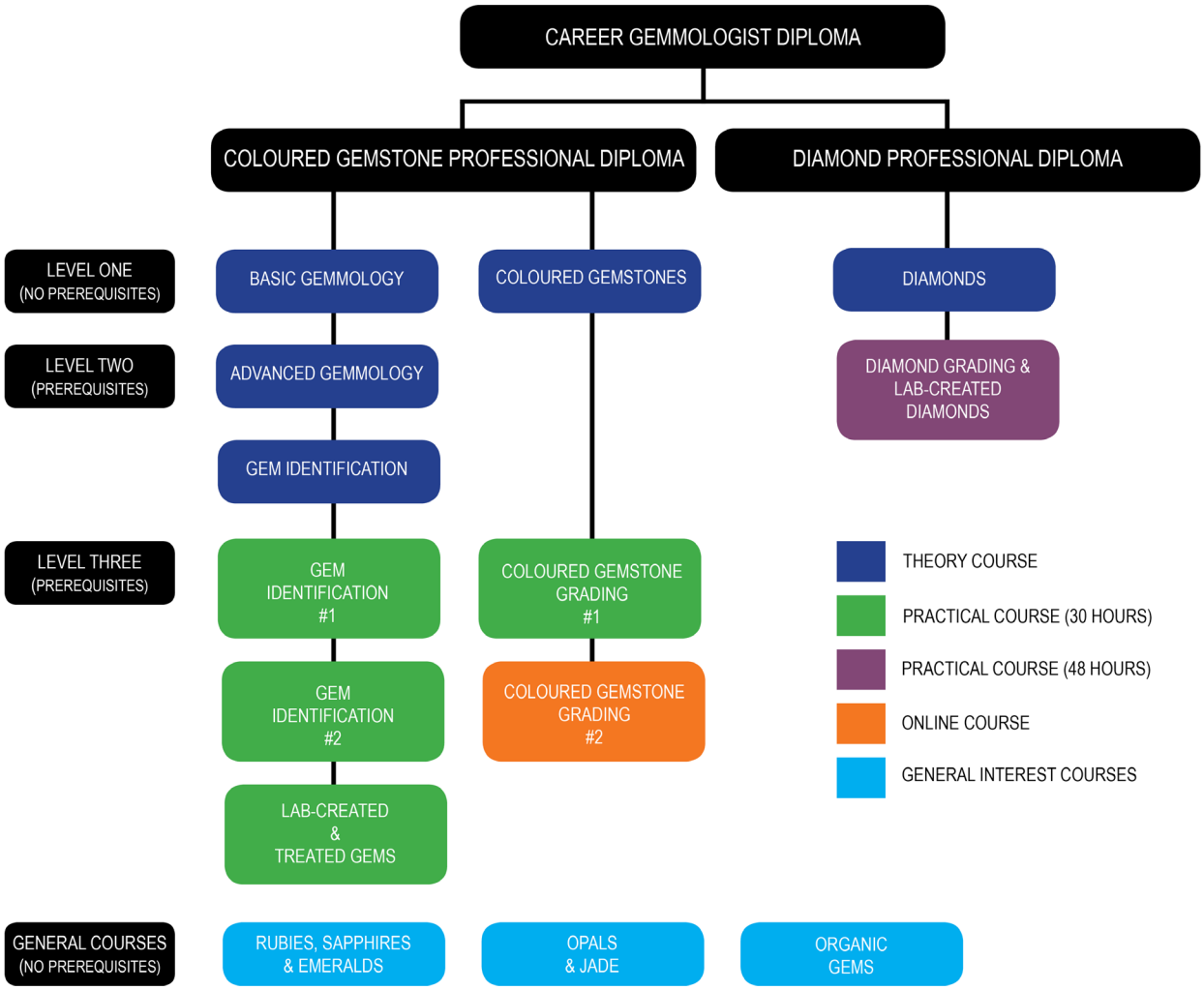
diverse and exciting
opportunities




## GENERAL INTEREST COURSES

For those interested in gemstones but not wishing to take our 'Diploma' programs, all of our theory courses can be taken independently without prerequisites. In addition to the five theoretical courses (Basic Gemmology, Advanced Gemmology, Gem Identification, Diamonds and Coloured Gemstones) that make up our Career Gemmologist, Diamond Professional and Coloured Gemstone Professional 'Diploma' programs, we also offer three 'General Interest' courses (Rubies, Sapphires and Emeralds, Opals and Jade and Organic Gems). Students taking any of the three 'General Interest' courses will receive a credit equal to the cost of the course if they upgrade to our Coloured Gemstones course.

### Rubies, Sapphires & Emeralds

This course focuses on three coloured gemstones (rubies, sapphires and emeralds) that individually and collectively are considered the cornerstones of the coloured gemstone trade.

Lessons include a complete overview of their physical and optical properties, principal sources, mining, how they can be identified from gemstones that can be deceptively similar in appearance and their lab-created counterparts, common treatments and enhancements, pricing guidelines, what constitutes the best quality and how to properly care for them.

### Opals and Jade

This course looks at two of the most fascinating and complex gemstones in the world of gemmology. The lessons on opal cover their physical and optical properties, their geology, localities, crystal system, chemical composition and classification, varieties, cause of colour, absorption spectra and pleochroism, inclusions, fluorescence, principal mines, opal mining in Australia, opal grading, synthesis of opal, gem identification, common treatments and enhancements, opal doublets and triplets, cleaning and care and pricing.

The section on jade follows a similar format with lessons covering their physical and optical properties, their geology, localities, crystal system, chemical composition, absorption spectra and pleochroism, inclusions, fluorescence, mining, principal mines, evaluating the rough, jadeite cutting, jadeite nomenclature, grading jadeite, synthesis of jadeite, gem identification, common treatments and enhancements, cleaning and care and pricing.

### Organic Gems

This course explores a very select group of gemstones (coral, jet, amber, ivory and pearls), formed through organic processes rather than through geological forces deep within the earth's surface. Lessons cover their physical and optical properties, geological formation, crystal systems, chemical composition, varieties and classification, causes of colour, common inclusions and internal characteristics, fluorescence, pearl grading criteria, methods of synthesis, gem identification, common treatments and enhancements, and cleaning and care instructions.

## ONLINE TUTORING

While clearly the ideal way to learn a particular subject is in a classroom or with one-on-one tutoring, we appreciate that this is difficult when you enrol in a long distance study program. Fortunately, new distance learning technologies are changing. Now teachers can connect with their students virtually using a variety of virtual tutoring tools, such as Skype.

| Course Name | Hours |
|---|---|
| Basic Gemmology - Theory | 2 |
| Advanced Gemmology - Theory | 4 |
| Gem Identification - Theory | 2 |
| Diamonds - Theory | 2 |
| Coloured Gemstones - Theory | 5 |
| Career Gemmology - Theory | 14 |

The chart outlines the number of online tutoring hours that are included in our courses. If you require additional tutoring, you can talk to your tutor to discuss availability and pricing.

## ONCE A STUDENT, ALWAYS A STUDENT

We appreciate that the science of gemmology is constantly evolving. Every year new lab-created gemstones and treatments and enhancements are emerging in the market place along with new techniques and advanced technology to detect them. While your knowledge in certain areas may be relevant today, it may be obsolete tomorrow.

To meet this challenge, the World Gem Foundation has introduced our 'One a Student, Always a Student' policy, an innovative program that is unique to the World Gem Foundation and our affiliated gem academies.

Once you register for one of our courses or programs, we provide you with lifetime access to your student page so that every two years when we update our courses, you will receive the latest digital course notes free of charge.

## FLEXIBLE STUDY SCHEDULES

Benjamin Franklin once said 'An investment in knowledge pays the best interest' and this is as true today as it was back then. But how can we achieve this when we all lead such busy lives?

At the World Gem Foundation, we appreciate that we all have responsibilities and commitments that can make studying a challenge.

To meet this challenge, we offer a flexible study schedule that allows you to register at any time and study at your own pace.

Enrol in one of our three diploma programs, take the theory and practical diploma courses separately and receive course credits or take our general interest courses. The choice is yours! Our goal is to help you devise a study schedule that works for you!

Whether you are taking our online tests, writing our final theoretical examinations or taking a practical test, we provide you with the flexibility to make it possible. Our students are our major stakeholders and we believe it is our responsibility to offer them every opportunity to achieve their educational goals.

## AVAILABLE IN PRINT

All our diploma theoretical courses are available in print. When you purchase the printed course notes, you will automatically receive online access. Since we regularly update all our courses, all course notes are printed on demand.

## COURSE FEES

Fees charged by the individual gem academies are charged in the prevailing currency for that particular area (i.e., Euros in Europe, Pounds Sterling in Britain). Please note that shipping charges apply to any courses provided in print.

# Internationally Recognized Diplomas

# Practical Workshops

## Gemstone Identification #1 (5 Days)

This workshop covers the identification of red, pink, orange, yellow and green gemstones plus a section on crystallography.

**Prerequisites:** World Gem Foundation Gem Identification (Theory) or equivalent

## Gemstone Identification #2 (5 Days)

This workshop covers the identification of blue, violet/purple, brown, black and phenomenal/unusual stones.

**Prerequisites:** World Gem Foundation Gem Identification #1 (Practical)

## Coloured Gemstone Grading #1 (5 Days)

This workshop includes practical instruction on how to access the hue, tone and saturation of coloured gemstones and how to grade pearls, jadeite and opals. During this practical class three colour grading systems; GIA, GemDialogue and World of Color will be discussed.

**Prerequisites:** None

## Coloured Gemstone Grading #2 (40 Hours Online)

This online coloured gemstone course consists of a comprehensive overview of the GemeWizard and ColourWise Colour Grading Systems and includes practical exercises that are completed online, glass study samples and a lifetime subscription to ColourWise.

**Prerequisites:** None

## Diamond Grading & Lab-created Diamonds (8 Days)

This workshop includes practical instruction on how to clarity and colour grade diamonds, techniques to determine table percentage, crown angle, girdle thickness and pavilion depth percentage, how to access polish and symmetry and the identification of lab-created and treated diamonds.

**Prerequisites:** None

## Lab-created and Treated Gemstones (5 Days)

This workshop focuses on coloured gemstones produced synthetically or treated to improve their appearance.

**Prerequisites:** World Gem Foundation Advanced Gemmology (Theory) or equivalent

| PROGRAM OR COURSE NAME | EUROS | POUNDS STERLING | USD |
|---|---|---|---|
| **CAREER GEMMOLOGY SEVEN** | | | |
| Career Gemmology (Theory) | 1400 | 1250 | 1600 |
| Gem Identification #1 | 500 | 450 | 550 |
| Gem Identification #2 | 500 | 450 | 550 |
| Coloured Gemstone Grading #1 | 500 | 450 | 550 |
| Coloured Gemstone Grading #2 | 1000 | 900 | 1150 |
| Diamond Grading/Lab-created Diamonds | 1750 | 1575 | 2000 |
| Lab-created & Treated Gems | 500 | 450 | 550 |
| Examinations Fees (Final Exam) | 250 | 225 | 280 |
| **Total Cost** | 6400 | 5750 | 7230 |
| **CAREER GEMMOLOGY ELEVEN** | | | |
| Basic Gemmology (Theory) | 200 | 180 | 225 |
| Advanced Gemmology (Theory) | 400 | 360 | 450 |
| Gem Identification (Theory) | 225 | 200 | 250 |
| Diamonds (Theory) | 225 | 200 | 250 |
| Coloured Gemstones (Theory) | 500 | 450 | 550 |
| Gem Identification #1 | 500 | 450 | 550 |
| Gem Identification #2 | 500 | 450 | 550 |
| Coloured Gemstone Grading #1 | 500 | 450 | 550 |
| Coloured Gemstone Grading #2 | 1000 | 900 | 1150 |
| Diamond Grading/Lab-created Diamonds | 1750 | 1575 | 2000 |
| Lab-created & Treated Gems | 500 | 450 | 550 |
| Examinations Fees (Final Exam) | 250 | 225 | 280 |
| **Total Cost** | 6550 | 5890 | 7355 |
| **DIAMOND PROFESSIONAL** | | | |
| Diamonds (Theory) | 225 | 200 | 250 |
| Diamond Grading/Lab-created Diamonds | 1750 | 1575 | 2000 |
| Examinations Fees ( Final Exam) | 250 | 225 | 280 |
| **Total Cost** | 2225 | 2000 | 2530 |
| **COLOURED GEMSTONE PROFESSIONAL** | | | |
| Basic Gemmology (Theory) | 200 | 180 | 225 |
| Advanced Gemmology (Theory) | 400 | 360 | 450 |
| Gem Identification (Theory) | 225 | 200 | 250 |
| Coloured Gemstones (Theory) | 500 | 450 | 550 |
| Gem Identification #1 | 500 | 450 | 550 |
| Gem Identification #2 | 500 | 450 | 550 |
| Coloured Gemstone Grading #1 | 500 | 450 | 550 |
| Coloured Gemstone Grading #2 | 1000 | 900 | 1150 |
| Lab-created & Treated Gems | 500 | 450 | 550 |
| Examinations Fees (Final Exam) | 250 | 225 | 280 |
| **Total Cost** | 4575 | 4115 | 5105 |

| PROGRAM OR COURSE NAME | EUROS | POUNDS STERLING | USD |
|---|---|---|---|
| **INDIVIDUAL THEORY** | | | |
| Basic Gemmology | 200 | 180 | 225 |
| Advanced Gemmology | 400 | 360 | 450 |
| Gem Identification | 225 | 200 | 250 |
| Diamonds | 225 | 200 | 250 |
| Coloured Gemstones | 500 | 450 | 550 |
| **INDIVIDUAL PRACTICAL** | | | |
| Gem Identification #1 | 500 | 450 | 550 |
| Gem Identification #2 | 500 | 450 | 550 |
| Coloured Gemstone Grading #1 | 500 | 450 | 550 |
| Coloured Gemstone Grading #2 | 1000 | 900 | 1150 |
| Diamond Grading/Lab-created Diamonds | 1750 | 1575 | 2000 |
| Lab-created & Treated Gems | 500 | 450 | 550 |
| **EXAMINATION FEES** | | | |
| Theory / Practical Final Examinations Fees | 250 | 225 | 280 |
| **GENERAL INTEREST** | | | |
| Rubies, Sapphires & Emeralds | 95 | 85 | 105 |
| Opals & Jade | 75 | 65 | 85 |
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# TOUCHING history

## The King of Diamonds

### THE EARLY YEARS

Cecil John Rhodes was born on 5 July 1853 in the small hamlet of Bishops Stortford, England. He was the fifth son of Francis William Rhodes and his second wife, Louisa Peacock. A priest of the Church of England, his father served as curate of Brentwood Essex for fifteen years, until 1849, when he became the vicar of Bishop's Stortford, where he remained until 1876. Rhodes had nine brothers and two sisters and attended the grammar school at Bishop's Stortford. When he was growing up Rhodes read voraciously but vicariously, his favourite book being The Meditations by Marcus Aurelius, but he equally adored the highly esteemed historian Edward Gibbon and his works on the great Roman Empire.

Rhodes fell ill shortly after leaving school and, as his lungs were affected, it was decided that he should visit his brother, Herbert, who had recently immigrated to Natal. It was also believed, by both Rhodes and his father, that the business opportunities offered in South Africa would be able to provide Rhodes with a more promising future than staying in England. At the tender age of 17 Rhodes arrived in Durban on 1 September 1870. He brought with him three thousand pounds that his aunt had lent him and used it to invest in diamond diggings in Kimberley.

After a brief stay with the Surveyor-General of Natal, Dr. P. C. Sutherland, in Pietermaritzburg, Rhodes joined his brother on his cotton farm in the Umkomaas valley in Natal. By the time Rhodes arrived at the farm his brother had already left the farm to travel 650 kilometres north, to the diamond fields in Kimberley. Left on his own Rhodes began to work his brother's farm, growing and selling its cotton, proving himself to be an astute businessman despite his young age. Cotton farming was not Rhodes' passion and the diamond mines beckoned. At 18, in October 1871, Rhodes left the Natal colony to follow his brother to the diamond fields of Kimberley. In Kimberley he supervised the working of his brother's claim and speculated on his behalf. Among his associates in the early days were John X Merriman and Charles D. Rudd, of the infamous Rudd Concession, who later became his partner in the De Beers Mining Company and the British South Africa Company.

In 1872 Rhodes suffered a slight heart attack. Partly to recuperate, but also to investigate the prospects of finding gold in the interior, the Rhodes brothers trekked north by ox wagon. Their trek took them along the missionary road in Bechuanaland as far north as Mafeking, then eastwards through the Transvaal as far as the Murchison range. The journey inspired a love of the country in Rhodes and marked the beginning of his interest in the road to the north and the northern interior itself.

In 1873 Rhodes left his diamond fields in the care of his partner, Rudd, and sailed for England to complete his studies. He was admitted to Oriel College Oxford, but only stayed for one term in 1873 and only returned for his second term in 1876. He was greatly influenced by John Ruskin's inaugural lecture at Oxford, which reinforced his own attachment to the cause of British Imperialism. Among his Oxford associates were Rochefort Maguire, later a fellow of All Souls and a director of the British South Africa Company, and Charles Metcalfe. At university Rhodes was also taken up with the idea of creating a 'secret society' of British men who would be able to lead the world, and spread to all corners of the globe the spirit of the Englishman that Rhodes so admired. He wrote of this society,

Why should we not form a secret society with but one object the furtherance of the British Empire and the bringing of the whole uncivilised world under British rule for the recovery of the United States for the making the Anglo-Saxon race but one Empire.'

His university career engendered in Rhodes his admiration for the Oxford 'system' which was eventually to mature in his scholarship scheme: 'Wherever you turn your eye - except in science - an Oxford man is at the top of the tree'.

## AN ARCH IMPERIALIST

One of Rhodes' guiding principles throughout his life, that underpinned almost all of his actions, was his firm belief that the Englishman was the greatest human specimen in the world and that his rule would be a benefit to all. Rhodes was the ultimate imperialist, he believed, above all else, in the glory of the British Empire and the superiority of the Englishman and British Rule, and saw it as his God given task to expand the Empire, not only for the good of that Empire, but, as he believed, for the good of all peoples over whom she would rule. At the age of 24 he had already shared this vision with his fellows in a tiny shack in a mining town in Kimberley, when he told them,

*'The object of which I intend to devote my life is the defence and extension of the British Empire. I think that object a worthy one because the British Empire stands for the protection of all the inhabitants of a country in life, liberty, property, fair play and happiness and it is the greatest platform the world has ever seen for these purposes and for human enjoyment'.*

A few months later, in a confession written at Oxford in 1877, Rhodes articulated this same imperial vision, but with words that clearly showed his disdain for the people whom the British Empire should rule:

*"I contend that we are the first race in the world, and that the more of the world we inhabit the better it is for the human race. Just fancy those parts that are at present inhabited by the most despicable specimen of human being, what an alteration there would be in them if they were brought under Anglo-Saxon influence...if there be a God, I think that what he would like me to do is paint as much of the map of Africa British Red as possible..."*

One of Rhodes' greatest dreams was a ribbon of red, demarcating British territory, which would cross the whole of Africa, from South Africa to Egypt. Part of this vision was his desire to construct a Cape to Cairo railway, one of his most famous projects. It was this expansive vision of British Imperial control, and the great lengths that Rhodes went to in order to fulfil this vision, which led many of his contemporaries and his biographers to mark him as a great visionary and leader.

Rhodes was both ruthless and incredibly successful in his pursuit of this scheme of a great British Empire. His contemporaries marvelled both at his prowess and incredible energy and capacity, but they also shuddered at his callousness and depravity in all his pursuit. His contemporaries, both awed and appalled by the man, wrote of him as a man of original ideas who sought more than the mere 'getting and spending which limits the ambitions and lays waste the powers of the average

man'. Yet although many people at the time saw Rhodes as a man of great vision, an unconquerable leader with the ability to pursue his aims across the vast African continent, there were nonetheless dissident voices who were shocked by Rhodes' actions and those of his British South Africa Company. One such voice was that of Olive Schreiner, who, initially awed by Rhodes, had come to abhor him. In April of 1897 she wrote, in a letter to her friend, John Merriman:

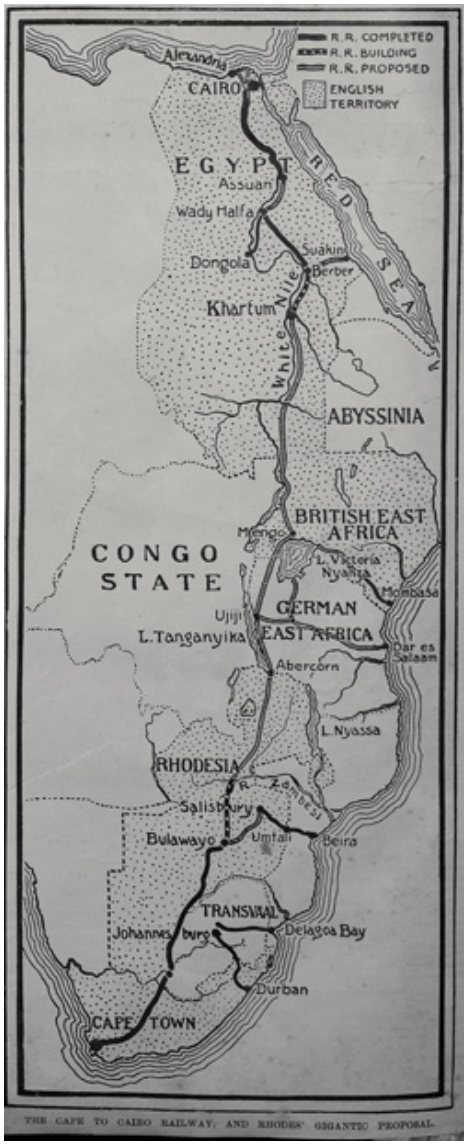
*"We fight Rhodes because he means so much of oppression, injustice, & moral degradation to South Africa; - but if he passed away tomorrow there still remains the terrible fact that something in our society has formed the matrix which has fed, nourished, built up such a man!"*

## THE KING OF DIAMONDS

Whilst at Oxford, Rhodes continued to prosper in Kimberley. Before his departure for Oxford, Rhodes had realised that the changing laws in the Kimberley area would force the 'small man' out of the diamond fields and would only leave larger companies able to operate in the mines. In light of this he sought to consolidate a number of mines with his partner, Charles Rudd. Rhodes had also decided to move away from the 'New Rush' Kimberley mine fields, that were higher in the ground and thus more accessible, back to the lower yielding 'Old Rush' area. Here Rhodes and Rudd bought the costly claim of what was known as old De Beers (Vooruitzicht Farm) which owed its name to Johannes Nicolaas de Beer and his brother, Diederik Arnoldus de Beer, the original owners of the farm Vooruitzicht. It was this farm that would lend its name to Rhodes and Rudd's ever growing diamond company.

In 1874 and 1875 the diamond fields were in the grip of depression, but Rhodes and Rudd were among those who stayed to consolidate their interests. They believed that diamonds would be numerous in the hard blue ground that had been exposed after the softer, yellow layer near the surface had been worked out. During this time the technical problem of clearing out the water that was flooding the mines became serious and he and Rudd obtained the contract for pumping the water out of the three main mines.

Rhodes had come to the realisation that the only way to avoid the cyclical boom and bust of the diamond industry was to have far greater control over the production and distribution of diamonds. And so, in April 1888, in search of an oligopoly over diamond production, Rhodes and Rudd launched the De Beers Consolidated Mines mining company. With 200 000 pounds capital the Company, of which Rhodes was secretary, owned the largest interest in mines in South Africa. Rhodes greatest coup was to get Barney Barnato, owner of the Kimberley mine, to go into partnership with Rhodes' De Beers Company. Of the encounter Barnato later wrote:



THE CAPE TO CAIRO RAILWAY, AND RHODES' GIGANTIC PROPOSAL.

*"When you have been with him half an hour you not only agree with him, but come to believe you have always held his opinion. No one else in the world could have induced me to into this partnership. But Rhodes had an extraordinary ascendancy over men: he tied them up, as he ties up everybody. It is his way. You can't resist him; you must be with him."*

With his acquisition of most of the world's diamond mines Rhodes became an incredibly rich man. But Rhodes was not after wealth for wealth's sake, he was acutely aware of the relationship between money and power, and it was power which he sought. Hans Sauer wrote of a conversation he had had with Rhodes whilst looking over the Kimberley diamond mine, where Sauer had asked Rhodes, 'what do you see here?', and, Sauer writes, 'with a slow sweep of his hand, Rhodes answered with the single word: "Power"'.

In the early 1880s gold was discovered in the Transvaal, sparking the Witwatersrand Gold Rush. Rhodes considered joining the rush to open gold mines in the region, but Rudd, convinced him that the Witwatersrand was merely the beginning, and that far greater gold fields lay to the north, in present

day Zimbabwe and Zambia. As a result Rhodes held back while other Kimberley capitalists hastened to the Transvaal to stake the best claims. In 1887 when Rhodes finally did act and formed the Goldfields of South Africa Company with his brother Frank, most of the best claims were already taken. Goldfields South Africa performed very poorly, prompting Rhodes to look towards the north for the gold fields that Rudd had assured him were lying in wait.

### THE STATESMAN

In 1880 Rhodes prepared to enter public life at the Cape. With the incorporation of Griqualand West into the Cape Colony in 1877 the area obtained six seats in the Cape House of Assembly. Rhodes chose the constituency of Barkley West, a rural constituency in which Boer voters predominated, and at age 29 was elected as its parliamentary representative. Barkley West remained faithful to Rhodes even after the Jameson Raid and he continued as its member until his death.

The chief preoccupation of the Cape Parliament when Rhodes became a member was the future of Basutoland, where the ministry of Sir Gordon Sprigg was trying to restore order after a rebellion in 1880. The ministry had precipitated the revolt by applying its policy of disarmament to the Basuto. Seeking expansion to the north and with prospects of building his great dream of a Cape to Cairo railway, Rhodes persuaded Britain to establish a protectorate over Bechuanaland (now Botswana) in 1884, eventually leading to Britain annexing this territory.

Rhodes seemed to have immense influence in Parliament despite the fact that he was acknowledged to be a poor speaker, with a thin, high pitched voice, with little aptitude for oration and a poor physical presence. What made Rhodes nonetheless so incredibly convincing to his contemporaries has remained much of a mystery to his biographers.

### THE PUSH FOR MASHONALAND

Rhodes' imperial vision for Africa was never far from his mind. In 1888 Rhodes looked further north towards Matabeleland and Mashonaland, in present day Zimbabwe. Matabeleland fell squarely in the territory which Rhodes hoped to conquer, from the Cape to Cairo, in the name of the British Empire. It also was believed to hold vast, untapped gold fields, which Rudd believed would be of far greater value than those discovered in the Witwatersrand.

In pursuit of his imperial dream and in his desire to make up for the failure of his Gold Fields Mining Company, Rhodes began to explore ways in which to exploit the mineral wealth of Matabeleland and Mahsonaland. The King of Matabeleland, King Lobengula, who was believed by the British to also rule over Mashonaland, had already allowed a number of British miners mineral rights in his kingdom. He had also sent a number of his men to labour in the diamond mines, thus setting a precedence for engagement with him. However, the King had consistently stated quite clearly that he wanted no British interference in his own territory.

In 1887 Lobengula signed a treaty with the Transvaal Government, an act that convinced Rhodes that the Boere were trying to steal 'his north'. By this stage the 'scramble for Africa' was also already well under way and Rhodes became convinced that the Germans, French and Portuguese were going to try to take Matabeleland. These fears made Rhodes rapidly mobilise in order to get Matabeleland under British control. Although the British government at the time was against further colonial expansion to the north of South Africa, Rhodes was able to use the threat of other imperial powers, such as Germany, taking over the land to push the British Government to take action.

The Government sent John Smith Moffat, the then Assistant Commissioner to Sir Sidney Shippard in Bechuanaland (now Botswana) who was well known to the Matabele Chief Lobengula as their fathers were friends, to negotiate a treaty with Lobengula. The result was the Moffat Treaty of February 1888, essentially a relaxed British protection treaty. The Moffat Treaty was however between Lobengula and the British Government, Rhodes himself was hardly a relevant player in this. Worried that the Moffat Treaty was too weak to hold Matabeleland, and convinced that the Dutch and Germans were making plans to take the territory and desperate for exclusive mining rights in the region, Rhodes concocted his own plan to take control of the territory. With his business partner Rudd, Rhodes formed the British South Africa Company (BSAC), crafted on the British and Dutch East India company models. The BSAC was a commercial-political entity aiming at exploiting economic resources and political power to advance British finance capital.

Shortly after the Moffat Treaty, in March 1888, Rhodes sent his business partner Charles Rudd to get Lobengula to sign an exclusive mining concession to the British South Africa Company. When Rudd arrived at Lobengula's kraal however, there were a number of other British concession hunters already there, seeking to undertake the exact same manoeuvre as Rhodes' BSAC. Through Rhodes influence however, Rudd was able to win over the support of the local British officials staying with Lobengula, a move which ultimately convinced Lobengula that Rudd had more power and influence than any of the other petitioners seeking concessions from him.

After much negotiation Rudd was eventually able to get Lobengula to sign a concession giving exclusive mining rights to the BSAC in exchange for protection against the Boere and neighbouring tribes. This concession became known as the Rudd Concession. Lobengula's young warriors were angry and inflamed and were itching to kill the white men who were entering their lands. Lobengula however feared his people would be defeated if they attacked the whites, and so it is likely that he signed the Rudd Concession in the hopes of gaining British protection and thereby preventing a Boer migration into his lands which would then incite his warriors to battle. For Lobengula his options were essentially to either concede to the British or to the Dutch. In the belief that he was protecting his interests, he sided with the seemingly more lenient and liberal British. Like so many documents signed by Africans during the colonial period, the Rudd Concession was however not what it claimed to be, but rather became a justifying document for the colonisation of the Ndebele and the Shona.

Using the Rudd Concession, despite initial protests by the British Government, Rhodes managed to acquire a Royal Charter (approval from the British monarch) for his British South Africa Company. The Royal Charter allowed Rhodes to act on behalf of British interests in Matabeleland. It gave the company full imperial and colonial powers as it was allowed to create a police force, fly its own flag, construct roads, railways, telegraphs, engage in mining operations, settle on acquired territories and create financial institutions.

Rhodes convinced the British Government to give his company the right to control those parts of Matabeleland and Mashonaland that were 'not in use' by the African residents there and to provide 'protection' for the Africans on the land that was reserved for them. This proposal, which would cost the British taxpayer nothing but would extend the reaches of the British Empire, eventually found favour in London. The charter was officially granted on 29 October 1889. For Rhodes, his BSAC with its Royal charter was the means whereby which to expand the British Empire, which a timid government and penurious British treasury were not about to accomplish.

After gaining his charter from the British Government Rhodes and his compatriots in the BSAC essentially felt that Matabeleland and Mashonaland were now under their control. Rhodes felt that war with the Ndebele was inevitable and would not allow his plans for extending the British Empire to be thwarted by 'a savage chief with about 8 000 warriors'. Rhodes was determined that white settlers would soon occupy Matabeleland and Mashonaland, and the Ndebele could not resist them.

To gain power over Matabeleland and Mashonaland Rhodes hired Frank Johnson and Maurice Heany, two mercenaries, to raise a force of 500 white men who would support BammaNgwato, enemies of Lobengula's, in an attack on Lobengula's kraal. Johnson offered to deliver to Rhodes the Ndebele and Shona territory in nine months for £87 500. Johnson was joined by Frederick Selous, a hunter with professed close knowledge of Mashonaland. Rhodes advised Johnson to select as recruits primarily the sons of rich families, with the intention that, if the attack did fail and the British were captured, the British Government would be left with no choice but to send armed forces into Matabeleland to rescue the sons of Britain's elite. In the end Johnson's attack was called off because Rhodes had received news that Lobengula was going to allow Rhodes' men into Matabele and Mashonaland without any opposition.

Despite Lobengula capitulating and giving permission for vast numbers of BSAC miners to enter his territory, Rhodes calculated a new plan to gain power in the region. In 1890 Rhodes sent a 'Pioneer Column' into Mashonaland, a column consisting of around 192 prospecting miners and around 480 armed troopers of the newly formed British South Africa Company Police, who were ostensibly there to 'protect' the miners. By sending in this column, Rhodes had deviously planned a move which would either force Lobengula to attack the settlers and then be crushed, or force him to allow a vast military force to take seat in his country. In the words of Rutherfoord Harris, a compatriot of Rhodes:

*"....if he attack us, he is doomed, if he does not, his fangs will be drawn and the pressure of civilisation on all his border will press more and more heavily upon him, and the desired result, the disappearance of the Matabele as a power, if delayed is yet the more certain."*

The men who formed part of the Pioneer Column were all promised both gold concessions and land if they were successful in settling in Mashonaland.

On 13 September 1890, a day after the Pioneer Column arrived in Mashonaland, Rhodes' BSAC invaded and occupied Mashonaland without any resistance from Lobengula. They settled at the site of what was later to become the town of Salisbury, present day Harare, marking the beginning of white settler occupation on the Zimbabwean plateau. They raised the Union Jack (the British national flag) in Salisbury, proclaiming it British territory.

The prospectors and the company had hoped to find a 'second Rand' from the ancient gold mines of the Mashona, but the gold had been worked out of the ground long before. After failing to find this perceived 'Second Rand', Rhodes, instead of allowing the settlers mining rights, as had been agreed to by Lobengula, granted farming land to settler pioneers, something which went expressly against the Rudd Concession.

## THE END OF THE MATABELE

In conceding Mashonaland to the BSAC, Lobengula had avoided going to war with the British and had kept his people alive, and much of his territory intact. But unfortunately he had only been able to delay the inevitable. With no gold found in Mashonaland, Rhodes' BSAC was facing complete financial ruin. Leander Jameson suggested to Rhodes that 'getting Matabeleland open would give us a tremendous life in shares and everything else'. Gaining the Matabeleland territory would also play directly into Rhodes megalomaniac vision of expanding the British Empire across Africa.

And so, in 1893, the BSAC eventually clashed with the Ndebele, in what Rhodes had perceived as an inevitable war. The settlers justified their initial attacks against the Ndebele to the British Government by arguing that they were protecting the Shona against the 'vicious' and 'savage' Ndebele impis. This was however a ploy, consciously concucted by Jameson in conjunction with Rhodes, in order to ensure that the British Government would not object to their further intrusions into Matabeleland by creating the impression that the Ndebele were the first aggressors. To fight their war the company recruited large bands of young mercenaries who were promised land and gold in exchange for their fighting power.

The final blow any hopes that the Ndebele might avoid war, came when Jameson was able to convince the British Government that Lobengula had sent a massive impi of 7 000 men into Mashonaland, who then gave Jameson leave to engage in defensive tactics. There is no indication that the impi Jamseon reported on had ever existed. Lobengula himself, in a last appeal to the legal/rational system the British seemed to so fervently uphold, wrote to the British High Commissioner saying, "Every day I hear from you reports which are nothing but lies. I am tired of hearing nothing but lies. What Impi of mine have your people seen and where do they come from? I know nothing of them."

It was however far too late for Lobengula. With the permission to engage in defensive action from the British Government, Rhodes joined Jameson in Matabeleland and his group of mercenary soldiers struck a quick and fatal blow at the Ndebele. Rhodes' mercenaries were in possession of the latest in munitions technology, carrying with them into the veld maxim guns, which, like machine guns, could fire rapid rounds. The Ndebele Impis were helpless in the face of this brutal killing technology and were slaughtered in their thousands. Lobengula himself realised he could not face the British in open combat and so he burnt down his own capital and fled with a few warriors. He is presumed to have died shortly afterwards in January of 1894 from ill health.

The war against the Matabele, fought mostly by voluntary mercenaries, cost around £66 000. Most of the money to pay for this war came directly from Rhodes Consolidated Goldfields Company, which by this point had begun to produce excellent yields from the deeper lying gold fields. The conquered lands were named Southern and Northern Rhodesia, to honour Rhodes. Today, these are the countries of Zimbabwe and Zambia. By the 1890s these conquered territories were being called Southern and Nothern Rhodesia.

## THE PRECURSOR TO APARTHEID

In July 1890 Rhodes became the Prime Minister of the Cape colony, after getting support from the English-speaking white and non-white voters and a number of Afrikaner-bond, whom he had offered shares in the British South Africa Company. One of Rhodes most notorious and infamous undertakings as Prime Minister in South Africa, was his institution of the Glen Grey Act, a document that is often seen as the blueprint for the Apartheid regime that was to come.

On 27 July 1894, Rhodes gave a rousing speech, full of arrogance and optimism, to the Parliament of Cape Town that lasted more than 100 minutes. In this speech Rhodes was opening debate on the 'Native' Bill that he had been working on for two years. The bill had initially been intended merely as an administrative act to bring more order to the overcrowded eastern Cape district of Glen Grey, but in his typical fashion Rhodes had turned this routine administrative task into something far bigger, the formulation of what he described as a 'Native Bill for Africa'. In much of his speech Rhodes set out, in clear cut terms, the chief purpose of his 'Native Bill', to force more Africans into the wage-labour market, a pursuit which would undoubtedly also help Rhodes in his own mining claims in Kimberley and the Transvaal.

Rhodes opened his speech on the Glen Grey Act with the following words:

*'There is, I think, a general feeling that the natives are a distinct source of trouble and loss to the country. Now, I take a different view. When I see the labour troubles that are occurring in the United States, and when I see the troubles that are going to occur with the English people in their own country on the social question and the labour question, I feel rather glad that the labour question here is connected with the native question.'*

He then continued,

*'The proposition that I would wish to put to the House is this, that I do not feel that the fact of our having to live with the natives in this country is a reason for serious anxiety. In fact, I think the natives should be a source of great assistance to most of us. At any rate, if the whites maintain their position as the supreme race, the day may come when we shall all be thankful that we have the natives with us in their proper position..... I feel that I am responsible for about two millions of human beings. The question which has submitted itself to my mind with regard to the natives is this 'What is their present state? I find that they are increasing enormously. I find that there are certain locations for them where, without any right or title to the land, they are herded together. They are multiplying to an enormous extent, and these locations are becoming too small.... The natives there are increasing at an enormous rate. The old diminutions by war and pestilence do not occur... W e have given them no share in the government' and I think rightly, too 'and no interest in the local development of their country. What one feels is that there are questions like bridges, roads, education, plantations of trees, and various local questions, to which the natives might devote themselves with good results. At present we give them nothing to do, because we have taken away their power of making war' an excellent pursuit in its way 'which once employed their minds.... We do not teach them the dignity of labour, and they simply loaf about in sloth and laziness. They never go out and work. This is what we have failed to consider with reference to our native population... What I would like in regard to a native area is that there should be no white men in its midst. I hold that the natives should be apart from white men, and not mixed up with them... The Government looks upon them as living in a native reserve, and desires to make the transfer and alienation of land as simple as possible... We fail utterly when we put natives on an equality with ourselves. If we deal with them differently and say, 'Yes, these people have their own ideas,' and so on, then we are all right ; but when once we depart from that position and put them on an equality with ourselves, we may give the matter up... As to the question of voting, we say that the natives are in a sense citizens, but not altogether citizens' they are still children....'*

The Glen Grey Act was to pressure Africans to enter the labour market firstly by severely restricting African access to land and landownership rights so that they could not become owners of the means of production, and secondly by imposing a 10 shilling labour tax on all Africans who could not prove that they had been in 'bona fide' wage employment for at least three months in a year. This land shortage coupled with a tax for not engaging in wage labour would push thousands of Africans into the migrant labour market. These were all measures essentially designed to ensure a system of labour migration which would feed the mines in both Kimberley and the Rand with cheap migrant labour. This section of the act instigated the terrible migrant-labour system that was to be so destructive in 20th century South Africa.

Another pernicious outcome of the Glen Grey Act was its affect on African land rights claims and restricted and controlled where they could live. According to the act 'natives', as African peoples were then termed, were no longer allowed to sell land without the permission of the governor, nor where they allowed to divide or sublet the land or give it as inheritance to more than one heir. The act also laid out that the Glen Grey area and the Transkei should remain 'purely native territories' This act was eventually to become the foundation of the 1913 Natives Land Act, a precursor to much of the Apartheid policy of separate development and the creation of the Bantustans.

Lastly the Glen Grey Act radically reduced the voting franchise for Africans. One of Rhodes primary policies as Prime Minister was to aim for the creation of a South African Federation under the British flag. A unified South Africa was an incredibly important political goal for Rhodes, and so when the Afrikaner Bondsmen came to Rhodes to complain about the number and rise of propertied Africans, who were competing with the Afrikaners and characteristically voted for English, rather than Afrikaans, representative. In response to the Afrikaners' complaints, Rhodes decided to give them, in

the Glen Grey Act, a policy which would disenfranchise the Africans competing with Afrikaners whilst also ensuring Africans could not own farms which would compete with the Afrikaners.

To disenfranchise Africans the Act raised the property requirements for the franchise and required each voter to be able to write his own name, address and occupation before being allowed to vote. This radically curtailed the number of Africans who could vote, essentially marking the beginning of the end for the African franchise. This new law allowed for the voter-less annexation of Pondoland. The Glen Grey Act also denied the vote to Africans from Pondoland no matter their education or property. Through the adoption of the Act, Rhodes managed to gradually persuade Parliament to abandon Britain's priceless nineteenth-century ideal that in principle all persons, irrespective of colour, were equal before the law.

The Glen Grey Act was vigorously opposed by the English speaking members of the Cape Parliament, but Rhodes, with his forceful character, was able to push the act through Parliament, and in August 1984 Rhodes' Glen Grey Act became law. The Glen Grey Act, which created the migrant labour system, formalised the 'native reserves' and removed the franchise of almost all Africans, is seen by many as lying the ground work for the Apartheid system of the 20th century.

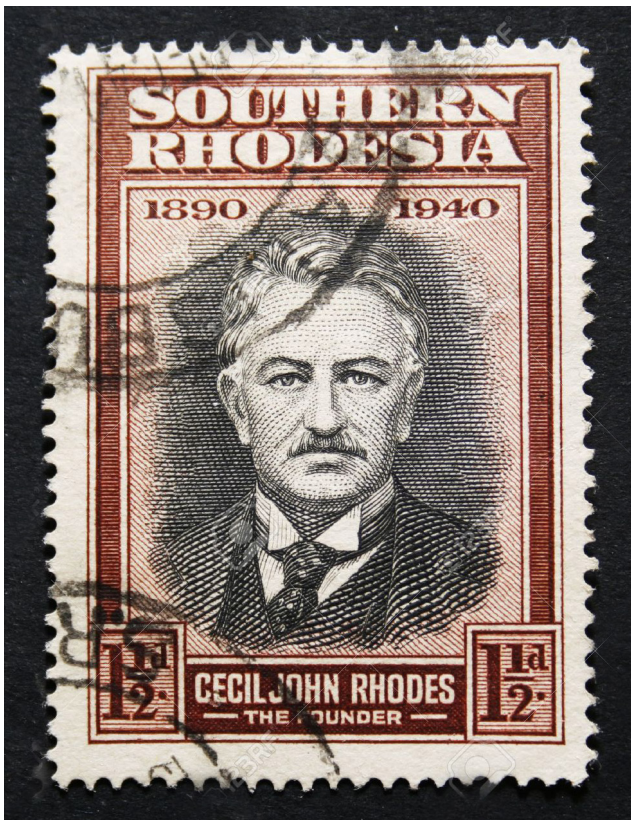
## THE FALL OF GIANTS

By 1895, at the height of his powers, Rhodes was the unquestioned master of South Africa, ruling over the destiny of the Cape and its white and African subjects, controlling nearly all of the world's diamonds and much of its gold, and effectively ruling over three colonial dependencies in the heart of Africa.

Although Rhodes' policies were instrumental in the development of British imperial policies in South Africa, he did not, however, have direct political power over the Boer Republic of the Transvaal. He often disagreed with the Transvaal government's policies and felt he could use his money and his power to overthrow the Boer government and install a British colonial government supporting mine-owners' interests in its place. In 1895, Rhodes precipitated his own spectacular fall from power when he supported an attack on the Transvaal under the leadership of his old friend, Leander Jameson. It was a complete failure and Rhodes had to resign as Prime Minister of the Cape and head of the British South Africa Company in January 1896. After having befriended the Afrikaners for so many years, Rhodes' support of the Jameson Raid and his attempts to get the miners in Johannesburg to rise up in a coup against the leaders of the Transvaal, were seen by the Bondsmen and Afrikaners as a complete betrayal, and Rhodes' hopes of ever uniting South Africa under one flag were dashed against the rocks.

Despite his meteoric loss of power and prestige Rhodes nonetheless continued his political activities. In mid 1896 the Shona and Ndebele people in Southern

Rhodesia, present day Zimbabwe, rose up against their colonial oppressors in a bid for freedom. Rhodes personally travelled to the region to take charge of the colonial response. In his attacks on the Ndebele and Shona he was vindictive, resorting to a scorched earth policy and destroying all their villages and crops.




After months of fighting Rhodes decided that conciliation was the only option. Looking to negotiate a peace settlement with the Ndebele and Shona he headed into the Matopo Mountains where a great indaba was held. Rhodes asked the chiefs why the Africans had risen up in war against the colonisers. The chiefs replied that the Africans had for decades been humiliated by the white settlers, subjected to police brutality and pushed into forced labour. Rhodes listened to the complaints and told the chiefs, 'All that is over'. The chiefs saw this as a promise that the conditions for them and their countrymen would be improved, and so they agreed with Rhodes that they would end their hostilities. As a part of their agreement, Rhodes spent many days in the Matopo hills, and every day the Ndebele would come to him and voice all their complaints. In belief that their worries and complaints would be given just recognition, the Ndebele and Shona chiefs laid down their arms and returned to their fields. When he left Rhodes was lauded by the people whose suffering by the hands of colonists was only to increase in the next century, as the 'Umlamulanmkunzi', the peacemaker.

Thereafter, Rhodes was in ill-health, but he began concentrating on developing Rhodesia and especially in extending the railway, which he dreamed would one day reach Cairo, Egypt.

After the Anglo-Boer war that broke out in October 1899, Rhodes rushed to Kimberley to organise the defence of the town. However, his health was worsened by the siege, and after travelling to Europe he returned to the Cape in February 1902. He died on 26 March 1902 at Muizenberg in the Cape Colony (now Cape Town). Reportedly some of his last words were, 'so little done, so much to do'. Rhodes was buried at the Matopos Hills, Rhodesia (Zimbabwe). He left £6 million (approx USD 960 million in 2015), most of which went to Oxford University to establish the Rhodes scholarships to provide places at Oxford for students from the United States, the British colonies, and Germany.

Rhodes never married and he did not have any known children.

## SOURCES IN OUR ARCHIVE

1. Imperial Duty by John Ruskin, Oxford 8 February 1870

2. Rhodes said he would build UCT 'Out of the Kafirs' Stomach' by David Johnson for Varsity 30 August 1967

3. The Fall of Cecil Rhodes and the Rise of Black Power in Africa by Veli Mbele, 3-5 April 2015

4. Cecil John Rhodes, warts and all by Tim Crowe (Politics Web), 22 December 2015

5. Rudd Concession by King Lobengula of Matabeleland (1888)

6. Charter of the British South Africa Company, (London Gazette), 20 December 1889

7. Glen Grey Act (The Native Issue) by Cecil John Rhodes, July 30 1894, Cape House Parliament

### ABOUT SAHO

South African History Online (SAHO) was established in 1998 and registered in June 2000 as a not-for-profit Section 21 organisation. SAHO has over two decades become the largest and most comprehensive online website on South African and African history and culture.

The SAHO website is linked to a partnership programme with universities, schools and community based history projects. It has become an integral part of the higher education landscape and the go to website for information on South African and African history with just over 6m visitors a year.

Protesters gathered in Oxford's High Street outside Oriel College in June 2020 (BBC News)

The 'Rhodes Must Fall' movement started on March 9th, 2015, with a protest movement at the University of Cape Town. It quickly spread to other university campuses in South Africa.

Cecil John Rhodes has been described by some as a racist who was associated with genocide, slavery, murder, conquest, land appropriation, and concentration camps. Others have described him as a man of vision, an innovative entrepreneur who laid the groundwork for the mining industry, who left a sizable fortune in Britain and South Africa for the public good.

History shows us that his political career was defined by his 'ruthless imperialism' and 'blatant racism' against the native population. His assertions that Black Africans of the Cape Colony should be 'treated as a child and denied franchise' proved the notion that he viewed them as 'an engine of labour'. He was a staunch believer in an Anglo-Saxon master race, who believed that the 'British' were the 'first race' in the world and that the world would be a better place if it were inhabited by more British. The fact that he leveraged his enormous wealth derived from the De Beers Diamond Mining Company, to extend the British Empire would seem to confirm this belief.

When Rhodes died in 1902, he made two separate endowments to Oxford. One in the amount of £60,000 that was to be used to fund the scholarships and a smaller one (£40,000) to Oriel College, to finance a new building on the High Street. A sizeable sum at the time that in today's money would equate to approximately £12.5m. There was no obligation for the College to erect a statue. When the building was erected in 1910 – 1911, the College commissioned a statue from Henry Alfred Pegram who had already been commissioned for a statue and bust of Rhodes in Cape Town.

(Photo by Richard Pohle)

At the entrance, there are in fact seven statues, arranged in two tiers. Cecil John Rhodes is at the top, with King Edward VII and King George V immediately below, flanked by four former heads; Cardinal William Allen (1532–94, Fellow 1550, Principal of St Mary's Hall), Walter Hart (also known as Walter Lyhert) (Provost 1435–46), John Hales (Provost 1446–9) and Henry Sampson (Provost 1449–76). It is strange that approval would have been given for the statue of Rhodes to be placed higher than royalty. It is also odd that Queen Victoria is not part of the assemblage since Rhodes lived during her reign and clearly made important decisions in her name. As William Beinart wrote 'Are the religious men sanctifying the precedence of money over birth, or of empire builders over kings?'

The presence of the Rhodes statue on High Street brought Oxford University into the crosshairs of the 'Rhodes Must Fall' movement. Their campaign to have his statue removed ultimately failed with many believing that the decision by the College was an act of institutional racism, a slap in the face with the hand of white supremacy. Oriel's assertion that it would not seek to move the statue 'due to the process potentially taking years with no certainty of the outcome' seems convenient. As the recipient of such a large endowment, one can imagine the dilemma they faced. Money buys influence but when it is left in the form of endowments, clearly the agenda is one of legacy building. Clearly in life and in death, Rhodes set out to memorialise himself. The college certainly knew how Rhodes accumulated his riches but chose to turn a blind eye. Sadly, nothing has changed.

Whether you agree or disagree that controversial statues and monuments should be removed, we should all agree that we must not forget the past. In July 2013, Lucy Sherriff of the Huffington Post UK lamented that 'Germany has been left reeling after it was revealed half of its schoolchildren did not realise that Hitler was a dictator, while a third believed he protected human rights. The shocking statistics also revealed a further two thirds were unsure as to whether the socialist East German Government, which was established by the USSR and collapsed in 1989, was a totalitarian one.'

On a positive note, the Rhodes Must Fall campaign has triggered a historical debate with challenging questions about the relationship between the past and the present and whether these posthumous homages are in fact a pat on the back or a slap in the face.


# Article Submissions

- We do not accept highly scientific articles.
- All articles should be a minimum of one page.
- All accompanying photographs must be high resolution and must be accompanied by written permission to use the images unless the author owns the rights.
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# GRADE school

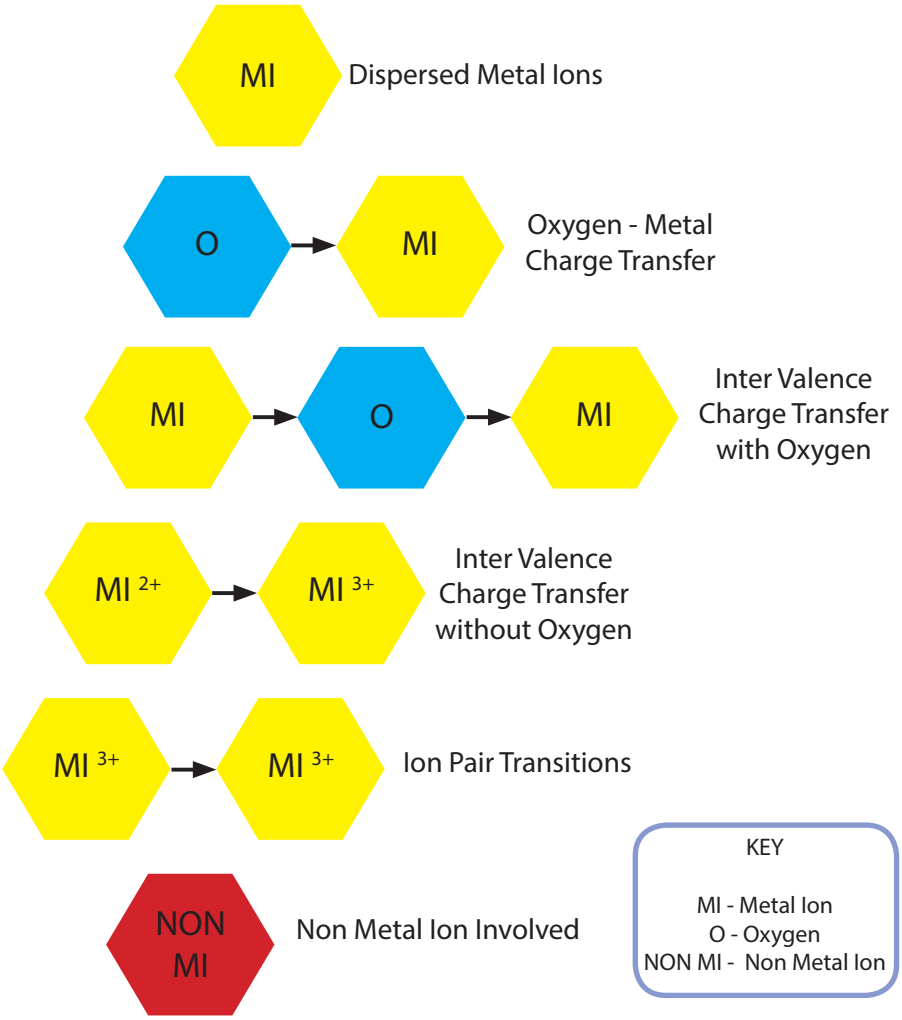
## The Color of Gemstones - Simply about Complex

The cause of color in gemstones is one of the most complicated, mysterious, and interesting questions in gemmology. Most people, involved in gemstone business, know that the coloration of gemstones is due to the presence of various dispersed metal ions in their crystal lattice. For example: the presence of cobalt (Co) and titanium (Ti) can produce a blue color, copper (Cu) bluish green to green, manganese (Mn) pink, chromium (Cr) red or green, while the presence of iron (Fe) under different conditions can produce a wide range of colors that range from red to yellow or Green.

However, the actual chemical processes involved are far more complicated than they might appear at first glance. There are many variables to consider. In this article I will try to describe these complex processes in a language that is easier to understand.

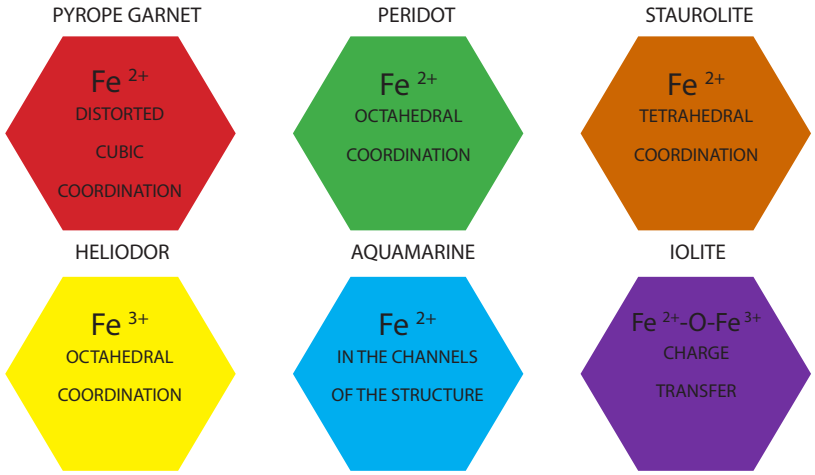
### THE GAMES OF IONS

The position of the metal ions, its neighbors, activity, behavior, and even the distance between ions can completely change the color of a mineral. The diagram illustrates the various types of ionic behavior that can be responsible for the coloration in gemstones.




Color is often a consequence of the number of atoms an ion is directly bonded to and their geometrical arrangement (referred to as ion coordination) or the distance between the central ion and its neighboring atoms (referred to as coordination environment). Three types of ion coordination are commonly found in gemstones: octahedral (where six neighbors are bonded to the central metal ion), tetrahedral (where four neighbors are bonded) and distorted cubic (eight neighbors). Unless distortion occurs, they are equidistant from the central ion.

In coordination environment, the varying distances of the neighboring atoms can result in the same metal ion producing different colors. This is the case with red corundum and green zoisite. Both are colored by $Cr^{3+}$ but in the case of red corundum, the distance is much shorter than in green zoisite. This causes the $Cr^{3+}$ ion to experience more electrostatic repulsion that shifts it to higher energies than zoisite (*Fritsch / Rossman – GIA Gems & Gemology Fall 1987*)



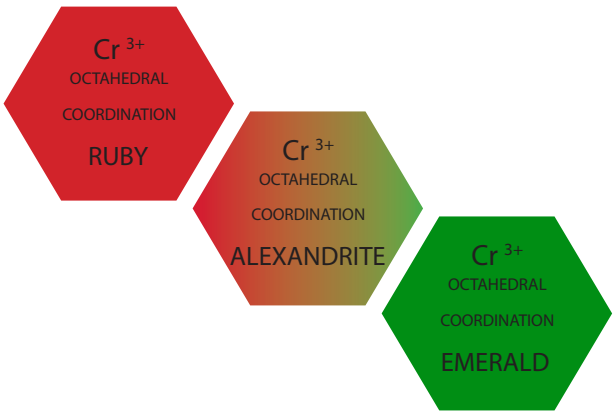

In Alexandrite the $Cr^{3+}$ is intermediate between those of ruby and emerald. A major absorption band around 550-600nm cuts the visible range in two transmission windows: one at the blue end (dominant in daylight), and the other at the red end (dominant in incandescent light). It transmits both bluish green and red. In sunlight it will appear mostly green, because solar light has its maximum intensity and the human eye has its maximum sensitivity, while under incandescent light it will appear red because this light contains a relatively larger proportion of red than solar light.

Since ion coordination and coordination environment are not connected to each other, they can independently affect the color of a gemstone. For example, glass is isomorphic and does not have any crystal lattice, but metal ions in various coordination could paint it in different colors: $Fe^{2+}$ in octahedral coordination gives yellowish green to Moldavite, while $Co^{2+}$ in tetrahedral coordination gives a vivid blue color to artificial glass.

The diagrams illustrate how the iron metal ion (Fe) can produce different colors or variations of color in different gemstones.

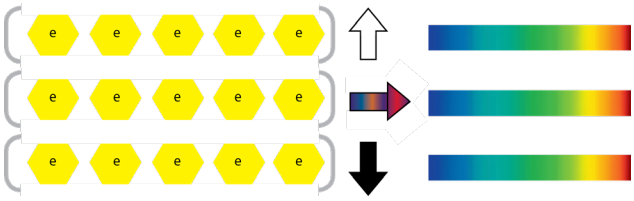
## THE ALEXANDRITE PHENOMENON

$Cr^{3+}$ (chromium) in an octahedral coordination gives RED to ruby, GREEN to emerald and GREEN/RED to alexandrite. This is because ruby has transmission windows in the blue (480nm) and the red (610nm), but the human eye is more sensitive in the red and so we see it as RED. Emerald has a large transmission window in the green, where the human eye is most sensitive and so it appears green. The differences between ruby and emerald can be explained by the particulars of the crystallographic environment around chromium.



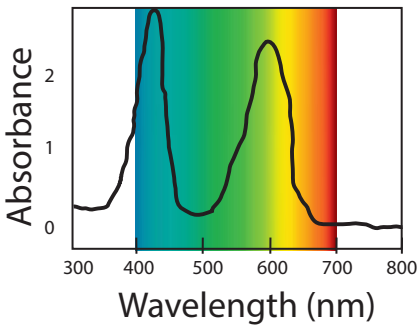

## THE BAND GAP

The electrons in some gem minerals can be delocalized over the entire crystal and produce color through their interaction with visible light. When the energy of the band gap is greater than the maximum energy of the visible range, all of the visible spectrum is transmitted (none is absorbed) and the mineral will appear colorless (i.e. colorless beryl, corundum, quartz, diamond and topaz).



When the band gap is in the visible range, only the high energy part of the spectrum (violet, blue and green) is absorbed, and the stone appears yellow to red. The red color in cuprite and cinnabar is due to 'Band Gap'.

When the energy of the band gap is less than the minimum energy of the visible range, all the visible spectrum is absorbed (none is transmitted), and the mineral will appear black and opaque. All metals either have a very small band gap or no band gap at all. They appear to be shiny (metallic luster), because their electrons quickly return to their original energy level, emitting the exact same energy (light) that they



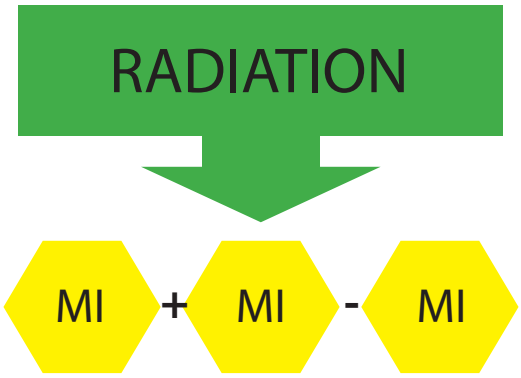
Alexandrite Spectrum

Reference: http://www.chemistry-blog.com

previously absorbed. In some metals, the number of available excited states may vary throughout the conduction band, so that some wavelengths are absorbed and re-emitted more efficiently than others, thus producing color. Silver and platinum absorb and emit all wavelengths with about the same efficiency and appear WHITE. But why is gold and pyrite yellow? This is because they absorb and emit more YELLOW than the other wavelengths and so this gives them a golden coloration.

## RADIATION AND COLOR CENTERS

### Radiation



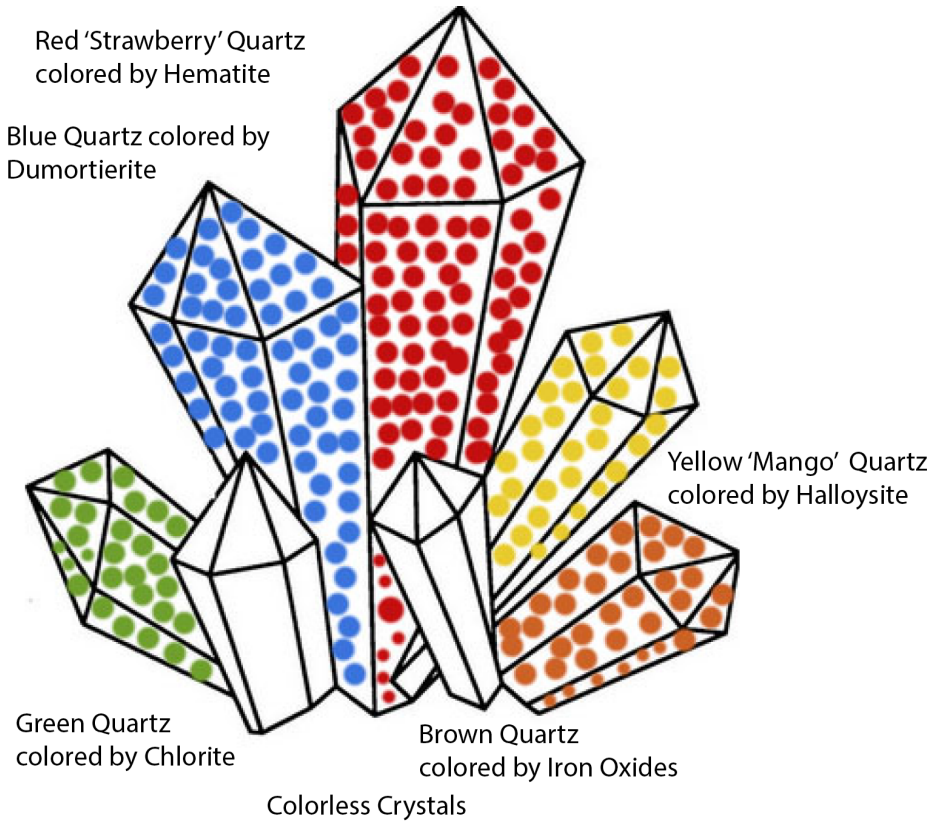

Color can result from natural radiation, caused by the widespread occurrence of low concentrations of naturally radioactive isotopes of uranium (U), thorium (Th) and potassium (K) or through artificial radiation in a laboratory. Radiation can change the oxidation state of metal ions and interact with defects in the crystal. These defects may, for example, be missing atoms (vacancies) or additional atoms (interstitials). Examples of natural radiation can be found in smoky quartz, blue topaz, fluorite and amethyst due to the $O^{2}$-->$Fe^{4+}$ charge transfer, where $Fe^{3+}$ had been changed to $Fe^{4+}$ in its structure by irradiation. Artificial radiation is used to enhance the color of topaz, quartz, and diamonds.

## INCLUSIONS

Heavily included minerals can often appear opaque and colored due to the color and quantity of the inclusions. If a colorless mineral is heavy included with colored micro-minerals, this will give the observer the perception of color. Examples are BLUE caused by dumortierite in quartz, GREEN by nickel bearing clays in chrysoprase and prase opal, hydrous iron oxides in carnelian agate and fire opal, and hematite or copper platelets in sunstone feldspar and aventurine quartz.

## PHYSICAL PHENOMENA

Physical phenomena can also influence the color of a gemstone. Light scattering can produce a bluish or whitish glow under the surface of the stone, labradorescence produces a wide range of colors from blue (most common) to yellow, orange and even purple, opalescence gives us a milky or pearly light, while aventurescence and the schiller effect can give a gold, copper, or silver 'sparkle' to a gemstone due to reflection and refraction of the light while passing through the multiple inclusions that are oriented in one plane or in random order.



Multi-colored Cubic Zirconia

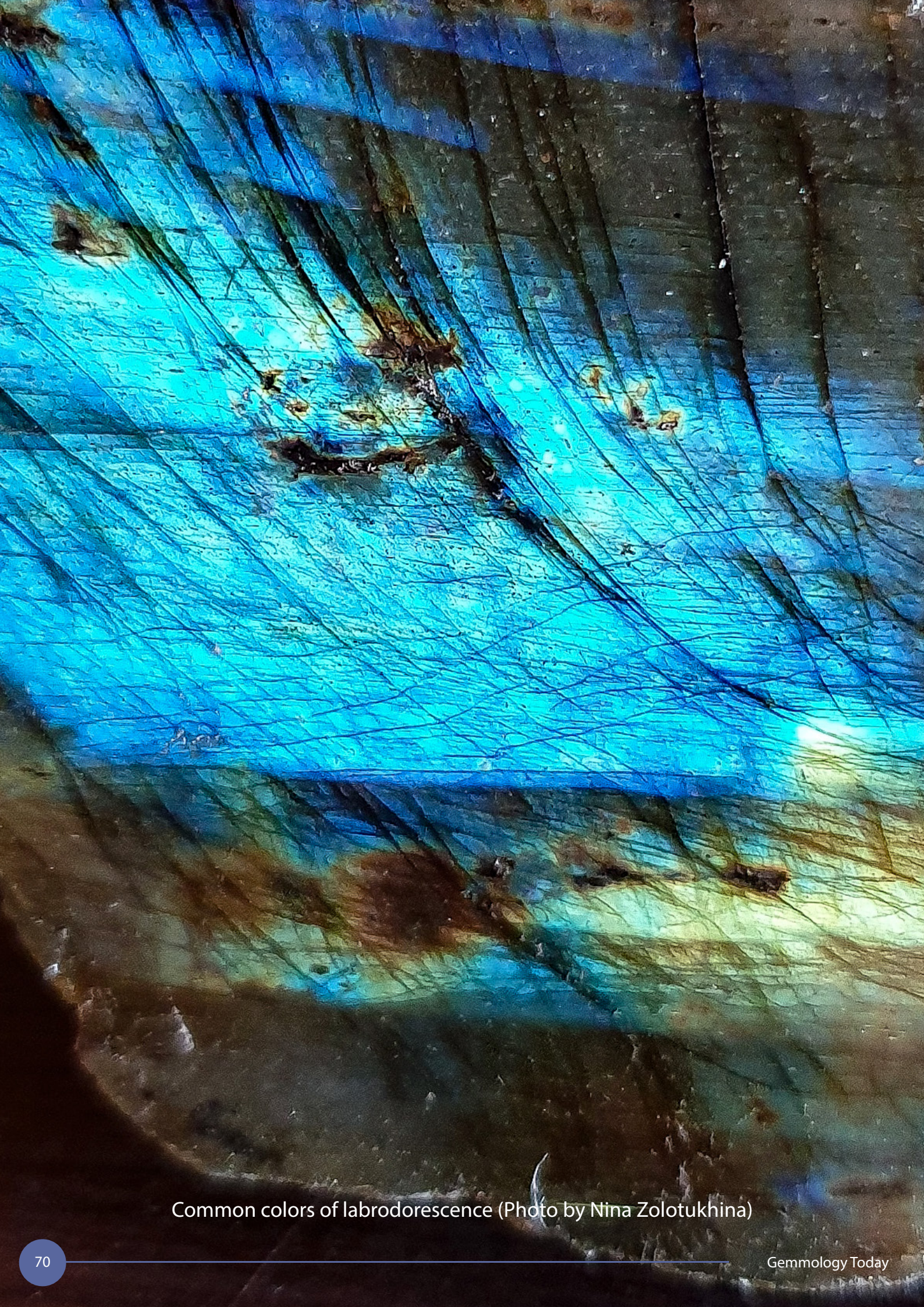
Mystic quartz faceted from the rough titanium covered quartz

Photos by Nina Zolotukhina

## ARTIFICIAL COLORATION

Finally, color can be created artificially through color enhancement techniques that are not connected to the processes mentioned earlier. These include coating, diffusion (surface and sub-surface) and impregnation. Examples include the coating of topaz (pink or mystic), sapphire and quartz (aqua aura quartz), beryllium or titanium diffusion to enhance the color of sapphires and impregnation using colored oils or waxes (emeralds, rubies, sapphires, and turquoise).

Quartz colored by hematite, chporite and other inclusions



Common colors of labrodorescence (Photo by Nina Zolotukhina)

## CONCLUSION

As you can see there are a lot of factors that can affect the color of a gemstone. There is no single rule for every gemstone, instead there are unique factors for each gemstone that determines its color.

To summarize, the following factors play an important role on the color of a gemstone, either singly or in combination with others:

1. Dispersed metal ions: Fe, Cr, V, Cu, Co, Ni, Mn, Ti, Zn.

- Changes in the valance state (lower by heating and higher by radiation).
- The presence of oxygen neighbors and the metal-oxygen distance.
- Ion coordination (Tetrahedral/Octahedral/Distorted cubic/ all of them (Garnet).
- Pleochroism
- Differences in the Coordination environment.

2. Charge transfer where an electron jumps from one atom to another.

- Due to Oxygen --> Metal Charge Transfer
- Due to IVCT (Inter valence charge transfer) Metal --> Oxygen --> Metal or Metal --> Metal
- Due to Ion Pair Transitions
- Due to Processes not involving Metal Ions

3. Color Centers that can appear because of natural radiation, caused by U, Th and K, or artificial radiation created in a laboratory. Radiation can change the oxidation state of metal ions and interact with defects in the crystal. These defects may be, for example, missing atoms (vacancies) or additional atoms (interstitials).

4. Band Gap when electrons in some gem minerals can be delocalized over the entire crystal and produce color through their interaction with visible light.

5. Physical Phenomena

- Schiller Effect
- Labradorescence
- Opalescence
- Mie Scattering
- Raleigh Scattering
- Aventurescence

6. Presence of Colored Inclusions

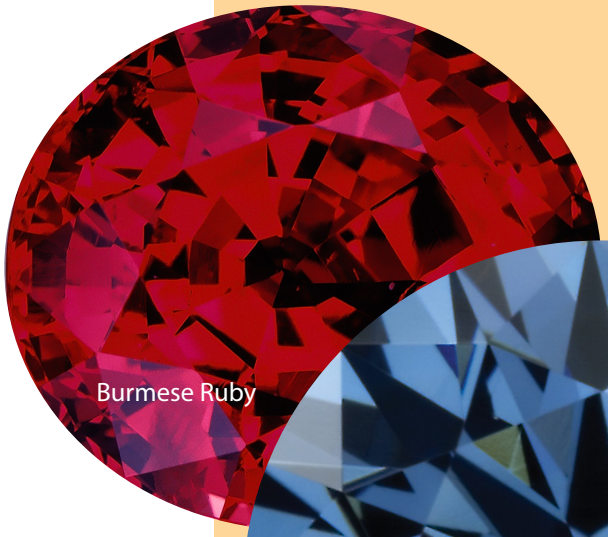
This mechanism of gemstone coloration is quite complicated but is no less exciting!

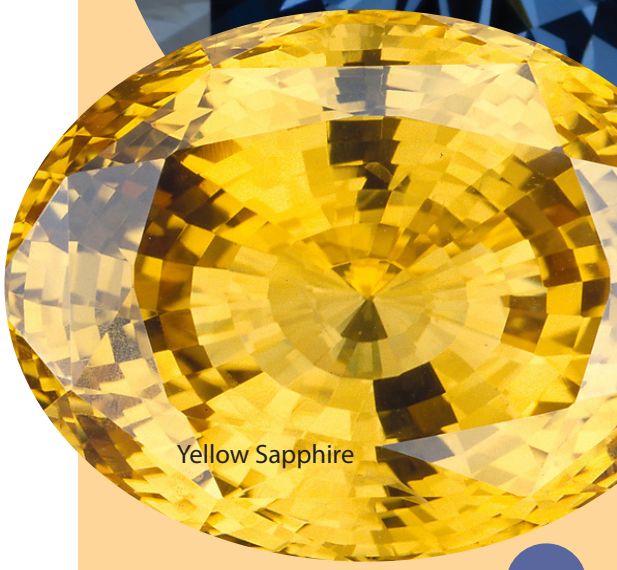
While there is a huge amount of information and research on this topic, we still do not fully understand everything about what causes color in gemstones. Every year, new information comes to light that invites new theories and different angles.

I hope you will find this information useful and that I have succeeded in opening the door a little into this complex subject. Hopefully now you will have a greater appreciation of color and the complexities of how it is produced.

### ABOUT THE AUTHOR

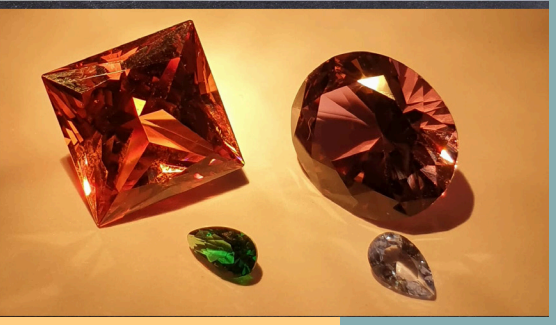
Nina Zolotukhina is an Expert Gemmologist through the MSU who is now based in Bulgaria. She is an avid mineral and gemstone collector, a photographer of minerals and inclusions (photomicrography) and Director of Corporate & Career Development for the WGF in Eastern Europe (Eastern Europe and Russia Gem Academy).





Aqua Aura Quartz
(Quartz covered with Gold)





Nanosital is an optically transparent polycrystalline material (ceramic glass) that consists of $SiO_2$ and $Al_2O_3$.

It has a hardness of 7, a refractive index range of 1.65 to 1.70, a specific gravity range of 3.5 to 4.0, a dispersion of 0.015 and a melting point of 1700 C.

It is produced in a variety of colors including red, blue and green (to imitate ruby, sapphire and emerald) and a color-change variety that is used to imitate zultanite and alexandrite.

Photos by Nina Zolotukhina

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# GLOBAL initiative

## A Rough Cut Trade - Madagascar

Madagascar plays a significant role in the global coloured-gemstone trade. Its vast deposits hold an array of precious and semi-precious gemstones, including some of the world's finest sapphires, as well as high-quality rubies and emeralds. In fact, it is estimated that only 10% of the country is not gem bearing. Reportedly, most of the blue sapphires that find their way to Thailand's gemstone industry are from Madagascar. (Malagasy blue sapphires may be smuggled through Sri Lanka, where they are heat-modified and rebranded as Sri Lankan, before being shipped on to Thailand.) One trader also reported that 'Guinean ruby' for sale in Thailand is known to come from Madagascar.

Large quantities of high-quality sapphire were first discovered in the early 1990s. Madagascar continues to be one of the largest producers of quality sapphires in the world, mostly mined by ASM (Artisanal Small Mining) operations. More recent finds of fine sapphire in the south-west and the north-east of the country maintain Madagascar's reputation as a premier source of sapphire.

A wide range of semi-precious coloured gemstones can also be found. For example, high-quality aquamarine and morganite (popular forms of beryl) are found in significant quantities. Furthermore, fine blue spinel and rarer gemstones, such as granodiorite, as well as large quantities of ornamental stone, such as agate and peacock blue labradorite, are also exported to be used in luxury fittings in wealthy homes, notably in China and the US.

While possessing a wealth of high-quality gemstones, the Madagascar coloured gemstone sector is thought to be undervalued. In an industry where provenance plays an important role in the value of a stone, Madagascar's reputation as a gemstone producer has been undermined, sometimes justifiably but other times in an unfair fashion, by reports of environmental destruction, corruption, and unregulated rush activity.

Also, Madagascar is thought to be losing out on millions of dollars of unpaid royalties and untaxed trade annually to illicit trade in its ASM sector. As with most of the country's economy as a whole, the coloured gemstone sector is largely informal, operating in an institutional void left by the state's failure to create a system and a regulatory framework for the purchase and valuing of stones. This gap is exploited by illegal actors, who are reported to smuggle vast quantities of stones out of the country. This is often done by under-reporting both the quantity and the value of the gemstones.

This has direct implications for the development of the sector and thwarts efforts to establish responsible supply chains that could support sustainable livelihoods and maximize local development. Madagascar has a young and rapidly growing population of over 27 million. Half the population are under 20 and it is

**Estimates of Madagascar Gemstone Production (kilograms), 2015**

| | |
|---|---|
| Amethyst | 76 000 |
| Emerald | 15 |
| Garnet | 1 300 |
| Ruby | 120 |
| Sapphire | 5 000 |
| Tourmaline (gem and ornamental) | 350 000 |
| Agate | 670 |
| Amazonite | 350 |
| Labradorite | 11 000 |

**NOTE:** These figures do not include informal production, so actual production is likely to be much higher.

**SOURCE:** Thomas R. Yager, The mineral industry of Madagascar, in US Geological Survey Minerals Yearbook, 2015.

Massimo Rumi / Barcroft Images

The Swiss Bank in Ilakaka, Madagascar.
Photo by Rippana Inc.

Is this a Blue Sapphire from Sri Lanka or Madagascar?

Photo by Tino Hammid

growing at about 600,000 people a year. Poverty is extremely high, with 70% of the population living in poverty.

In this context, ASM of coloured gemstones and gold provides an important economic lifeline with few barriers to entry for many thousands of Malagasy people. In 2019, it was estimated that there were 1,300 ASM licences and up to a million miners. More than any other gemstone, sapphires are mined by hand, and provide a particularly accessible livelihood for many, including youths and women in gem-bearing nations.

It can be argued that state systemic voids have permitted the growth of informal groups, such as women traders. However, the abandonment of the sector by the authorities means that an opportunity has also been missed to generate rents from these natural resources that could be capitalized on to improve the overall level of local economic development and establish formal support systems.

## THE SAPPHIRE TRADE

There is great asymmetry in terms of power, networks, and knowledge among the various players along the Malagasy sapphire supply chain, often to the detriment of vulnerable miners upstream in the supply chain. According to a 2010 estimate, miners are paid only 10% of the value of stones. (For comparison, African gold miners often collect 70% or more of the value of gold.) The result is that buyers and traders, who are likely to be engaged in some form of smuggling, are reaping substantial profits while thwarting efforts to minimize the negative impacts of ASM and sustainable development of the sector.

The sapphire trade in Madagascar is dominated by foreign buyers, mostly Sri Lankans, who have little interest in any value addition in the country. It is alleged the traders maintain a cartel system to ensure local prices are suppressed, maximizing profits for traders, who are thought to under- declare or smuggle most coloured gemstone exports. More valuable Malagasy stones are purchased and then traded in Thailand or Sri Lanka, where they may be processed and even rebranded as Sri Lankan. There are some Malagasy traders who operate in Thailand, but their stones are typically semi-precious, such as low-value corundum (mostly sapphire).

Miners may or may not be working on registered mining claims. Many of them, including men and women, are from the south of Madagascar, and some are drawn to the mining areas because of poverty and drought. Others have had family experience of sapphire mining. Often, miners work without legal licences and sell their rough stones freely to buyers. Other types of arrangements are sponsorships or the first right to purchase. If sponsored, a miner will receive a small salary from a permit-holder for gemstones they find. In a sponsorship arrangement, a regular breakdown is that the permit-holder will keep two-thirds of the proceeds

### WOMEN IN SEARCH OF SAPPHIRE WEALTH

A 20-hour bus ride south from Madagascar's capital, Antananarivo, takes you to Ilakaka. In 1998, a sapphire rush of 100,000 people transformed this sparsely populated area into the sapphire trading hub it is today. At first sight, it seems like a masculine frontier, but upon closer inspection the women in hats draw your attention. These are traders of small sapphires who work the edges of the main market. These women, who have worked their way up the economic ladder so that they can now afford hats, are a stark visual representation of the economic prosperity and hope that fuels the sapphire trade in the area. As they say in Ilakaka, 'dreams are free'.

It is here where Tantley and Jeane trade in rough stones, buying small stones from women miners and selling them to Sri Lankan and African buyers. The two are close partners, working and attending church together, supporting their children and other family members, who sell coffee by the side of the road. The two have been trading sapphires for 18 years and, since their miner husbands left them for younger women, have been left to fend for their families on their own.

Originally from farming communities in southern Madagascar, Tantley and Jeane learned about sapphires when they were young girls searching for stones. Two drops in a much bigger flood washing over the country in search of sapphire wealth. As droughts became more frequent, they found they could make money more easily in sapphires than farming. After the theft of their cattle, they moved to Ilakaka, where they have made their home. When there is money to be made, they work individually but when the market is less buoyant, they work as a group of up to 10 women. 'We divide the profits among the group. If we don't have enough money to buy, we share.'

The women have found relative success, a reflection of the hope the sapphire trade brings to a country with few other options. They are now building a house on a piece of land they bought and have gained a certain level of economic independence. However, the coloured gemstone trade continues to be deeply controlled by gender norms and traditions, restricting their hopes for further economic gain. They explain that the men are allowed to sell large stones, while women are confined to trading in smaller gems: 'Men sell to men, and women sell to women.'

and distribute the remaining third among the miners. In a first right to purchase arrangement, miners are required to sell any finds to the permit-holder, often at unfavourable prices.

Women miners are an overlooked part of the supply chain. Women work in rivers with sieves, picking through gravel brought from the mines by male relatives. It is rare to find women working underground, where the best stones are found. Some women become trapped in 'sapphire marriages', forming a relationship with a male miner and trading sexual favours to gain access to revenue from mining. Although they earn less than their male counter- parts, many women report being able to earn enough from sapphire mining to provide for their families.

In the sapphire towns of Ilakaka and Sakaraha, Sri Lankan traders dominate the sapphire market through their ownership of mines and other businesses. They have acquired mines and control the industry by working, sometimes fraudulently, with local and traditional authorities. The role of Sri Lankan exporters has been entrenched through networks among the male Muslim community and through carefully cultivated relationships with local authorities. Marriages with local women also provides them with market support and long-term business and value-addition strategies.

Each morning in the sapphire towns, miners gather to sell their stones to foreign buyers. The trading houses, cars, equipment, and access to funds are largely in the hands of foreign buyers and those who support them.

In these rural areas, where the government has failed to enforce the mining code, almost the entire rough-gemstone stone market is controlled by Sri Lankan, and to a lesser extent Thai and African, traders. Thai traders have played a less dominant role in recent years. Networks of African traders, notably Guineans, still work both in rural areas and in the capital, but in recent times they have been displaced by powerful Sri Lankan operators. This foreign control of the market means that only a handful of local Malagasies are able to access the most valuable stones.

A hierarchy of Malagasy middlemen support the oligopoly imposed by the Sri Lankan and Thai traders, who engage in price fixing, spread misinformation about the stones and manipulate the market. Such middlemen buy stones at a Malagasy market (where foreigners are not welcome) and sell them to foreign buyers and exporters.

A unique characteristic of the Madagascan sapphire trade is the role of women traders, the 'ladies in hats' – so-called because they have a small amount of disposable income, enabling them to buy a hat and a bag to carry gems. They buy and sell smaller stones, mostly sapphires, which they buy directly from miners at the mining sites or in town. Some have their own market booths but most move from place to place around the sapphire towns, selling in small groups. Like most of the miners in this area, these women are from the south of Madagascar, and they operate in clan groups supporting each other with funds. The ladies in hats are highly entrepreneurial; a number have their own mines and aspire to become independent businesspeople, able to save their stock and make a profit. However, some are controlled by Sri Lankan interests through Malagasy women who have married Sri Lankan men.

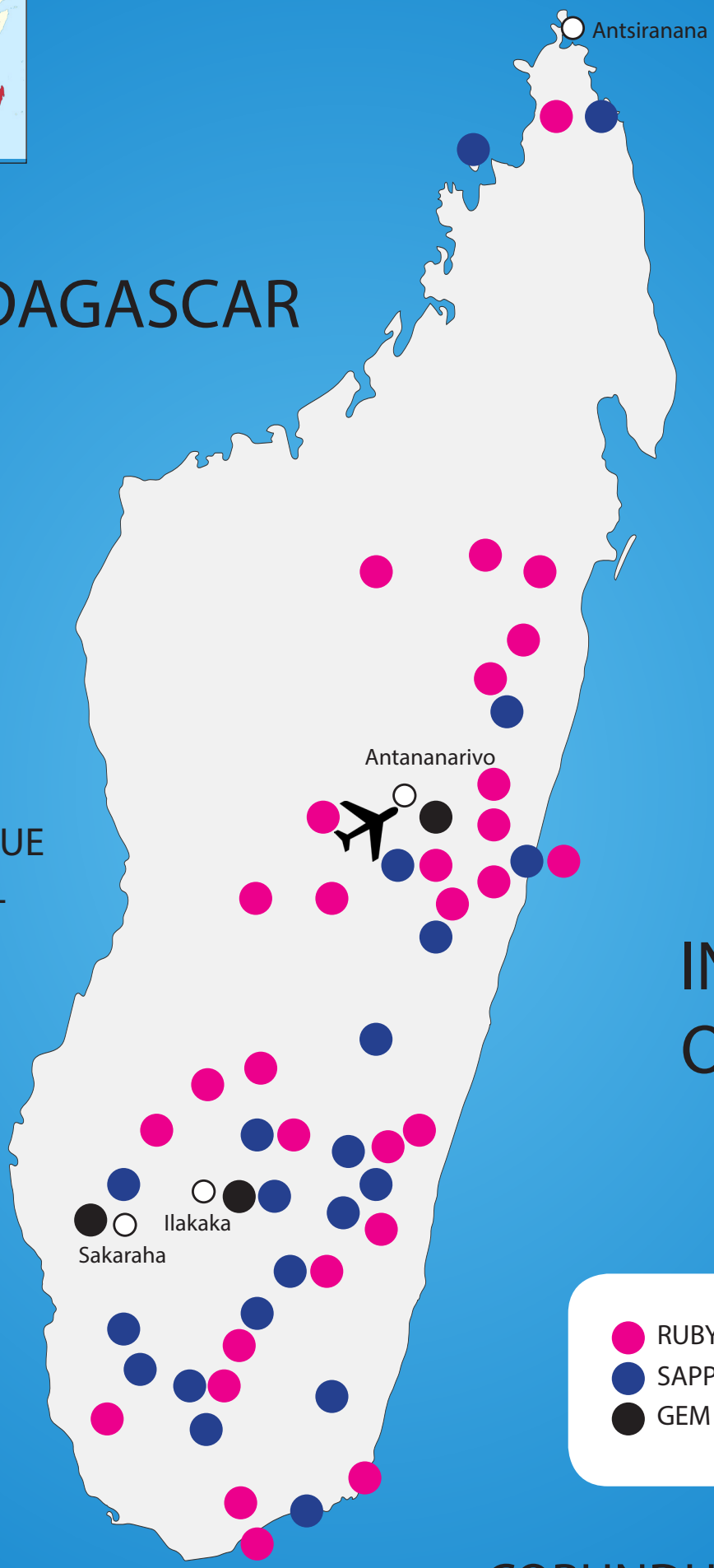
## INSTITUTIONAL FAILURE

Systems regulating the mining sector continue to stagnate in Madagascar; reforms to the Mining Code and permit arrangements have been on hold since 2009.Although there are laws for obtaining permits and operating mines, they have not been enacted or enforced because of political crises, uncertainty, and the lack of even the most basic mining resources, such as vehicles and staff. Mining offices (known as bureaux d'administration minière) have been constructed with funds from donors in the mining towns, but to date they are not operational.

To operate in full compliance with the laws is too costly and complex for most miners, and the offices are located too far away for the majority of miners and traders to access. This is also a barrier to access the formal financing necessary to improve and upscale operations. For Malagasy informal traders, women in particular, there is little hope that they will be able to access assistance and finance, even if it were available.

Furthermore, local traders have no recourse to any benchmarking of prices. Unlike gold, which has a standard international spot price, understanding the market price of precious stones requires understanding and experience. The ministry's value schedule, particularly for sapphires, does not provide a realistic appraisal of the stone's worth, and customs administrative staff are not well equipped to do this work.

The failure of the state must in part be attributed to a long history of political instability and crises, the most recent being the coup of 2009, which left the country in a political hiatus for four years followed by a series of governments seemingly unable to make decisions to move the industry forward. Although the current government has promised to issue 500 new licences for small-scale mining, it has also reorganized mining ministry staff, which has created voids in technical expertise and leadership, while there are key roles in the mining regions remaining unfilled. Similarly, the Mining Business Centre, proudly built close to the airport with resource rents, is yet to live up to its potential of a one-stop shop for all those seeking to export stones.

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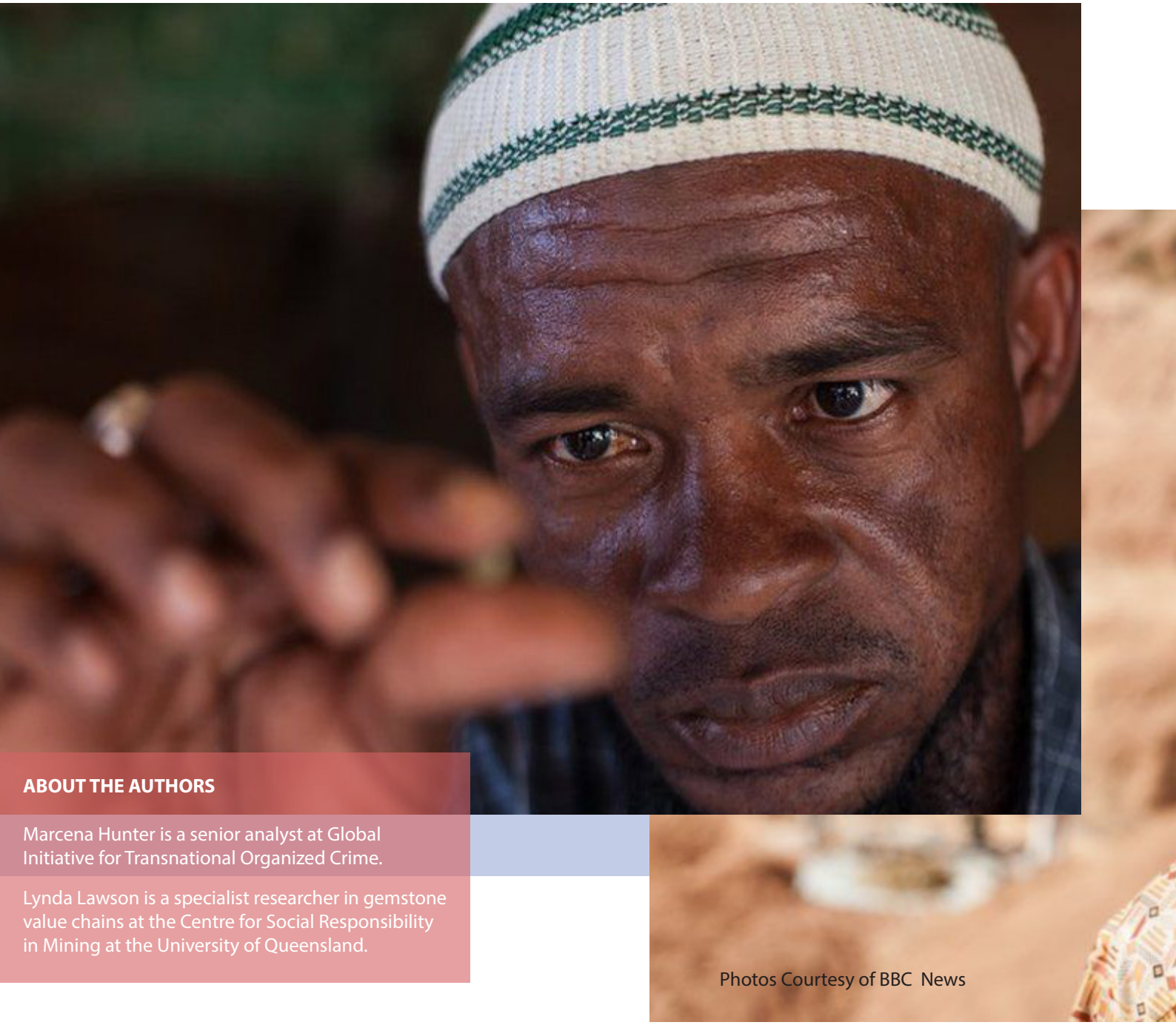
# CORUNDUM DEPOSITS

Government policy and institutions for the sector are, at best, inefficient and incongruent, and, at worst, corrupt. This has created institutional voids that have enabled the marketplace to be dominated and controlled by foreign traders. For example, export permits (laissez passers) are reported to be sold to traders who have bought illegally mined stones, effectively enabling the laundering of illicit stones and economic elites are alleged to move and launder money abroad through the coloured-gemstone trade. If conditions are to improve for miners, then more effective action to curb criminality in supply chains is needed.

**ABOUT GLOBAL INITIATIVE**

An independent civil-society organization, headquartered in Geneva, Switzerland, with a globally dispersed Secretariat and a high-level advisory board.

Its network members include prominent law-enforcement, governance and development practitioners who are dedicated to seeking new and innovative strategies and responses to organized crime.

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Photos Courtesy of BBC News

# DIAMOND mind

## The Liberian Project

In April 2022, the NGO Diamonds for Peace organised a basic training in the grading and valuation of rough diamonds for 17 artisanal diamond mining communities in rural Liberia. This challenging project, funded by the World Bank's EGPS Trust Fund, was run in collaboration with Empowerment Works Incorporated and the International Gemological Institute. Beth West FGA DGA EG was the trainer for the workshop. In the following article, Beth offers us a personal insight into how her first-hand experience of the trip categorically consolidated for her just how important projects such as this are.

I had never been to Liberia, and as the plane came into land in the capital city of Monrovia and the lightening chalked through the purple twilight, I saw nothing but beauty. The tar black river, the dense forests and the scarce winks of electric light enthralled me. But I knew that set me apart from most of the people on that flight - Liberian residents returning home.

From a citizen of a developed country looking into the developing world, it can be very easy to romanticise these regions of the planet. We have the privilege of distance, which allows us to see these countries at a remove, as something that we can 'experience' but then step away from. Such a position obscures the truth because, ultimately, what we are often seeing is abject poverty. There is no romance to it. It is the dry heat and dust claggy on the heels of societies scavenging for existence.

Road to Monrovia (Photo by Beth West)

Liberia is extremely poor. A quality that is easily measurable. Half of the population live below the national poverty line, which simply translates as an inability to meet their basic living needs. The majority of those who fall into that statistic can also be classified as living in extreme poverty, with an average income of less than $1.90 a day. And around 70% of the population live in the rural areas, where measurable poverty is even higher. It is in these regions that you will find the artisanal diamond miners.

To exemplify the point, whilst staying in the village of Weasua, the principal community supported by Diamonds for Peace, I was offered an insight into the general standard of living. It is incredibly

Landing in Monrovia (Photo by Beth West)

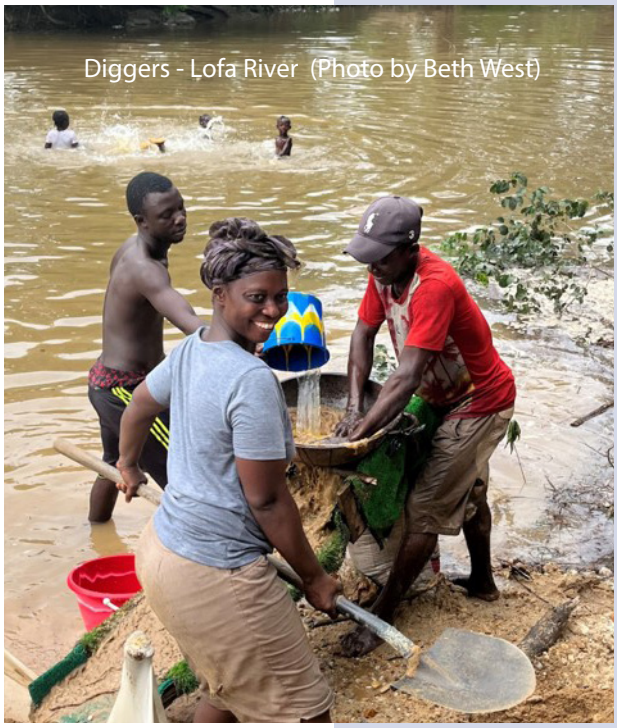
Community Toilet (Photo by Beth West)

Victoria's House (Photo by Beth West)

Shopping Centre at Weasua (Photo by Beth West)

Road to Weasua (Photo by Beth West)

basic. Most of houses do not have any facilities, so the local toilet is, without embellishment, a hole in the ground surrounded by corrugated iron for the sake of modesty. They rely heavily on the Lofa river and the surrounding bush for food because travel beyond the village is limited due to the ludicrously poor conditions of the roads. Weasua is over seven hours away from the capital city by car. There is certainly no doctor or dentist in residence.


Diggers - Lofa River (Photo by Beth West)

Again, for a Westerner, it could be easy to reframe such poverty as an antidote for greed and the trappings of materialism, as if the poverty experienced by these people somehow preserves their integrity, and don't get me wrong, there is something to be said for the above. On the face of it, the strength of community encountered within Weasua was palpable. And it was wonderful to witness. But beneath it all, you would be hard pushed to find one of the residents in these communities telling you they are happy with their lot.

The image below is the house of one of the diamond diggers, Victoria – when I say house, I mean a small room divided by a curtain where she lives alongside her family. She is 50 years old and has been a digger all her life. Whilst we were there, I formed a particular attachment to Victoria. She had an enormous amount of strength, but I could also see she was suffering. She had a headache for most of the time she was out there, and I could see a cataract forming in one eye – probably due to the glare of the sun on the river water in which she worked. But that can't be avoided. Victoria relies on diamonds for an income.

Briefly, let us look at diamond mining in Liberia.

The first major diamond deposit was found in the country in 1957, along the Lofa River – one of the most northern rivers in Liberia, close to the border of neighbouring Sierra Leone.

Diamond production is not nearly as high as its neighbour. Currently, figures stand at around 50,000 carats per annum. In the mid-20th century, when diamonds were first found, it was obviously a lot higher, peaking at 600,000 carats in the 1970s (although the reality is that most of those diamonds were smuggled material coming in from the countries with which Liberia shares a border). The advent of two Civil Wars in the country, starting with the military coup in 1980, however, resulted in export sanctions being imposed on the country by the UN. In 2007, the country joined the Kimberley Process, and diamond has subsequently been re-established as an important mineral resource, particularly on the back of the recent discovery of diamond bearing kimberlites, with one cluster particularly close to Weasua. These deposits have not been commercially exploited. Instead, the mining remains artisanal, and the material is primarily found in alluvial (river-sourced) placers along the Lofa river.

The miners and diggers that work these deposits, like Victoria, are the first link in the complex diamond supply chain. As is so often the case, however, they are the ones that see very little of the benefits of their country's mineral resource.

As a matter of interest, all the kids in Weasua with whom I spoke have been taught to understand that diamonds are their 'future', that they will bring money to their people. They understand that diamond is a mineral. They do not know what that means, but they know that a mineral is a resource and a mineral resource equals money. They get that. But such teaching does not incorporate the fact that, for them to benefit directly, their parents need to receive a just price for the diamonds they sell.

Parcel of Victoria's Diamonds (Photo by Beth West)

Currently, this isn't happening. The parcel, pictured, is Victoria's. The diamond highlighted by the arrow weighs 80 points. You can see from the image that they are good quality alluvial stones. Some potentially fancy in colour. She received $600 for that entire parcel, which is approximately half of what she should have received.

For these miners to get that fair price, they need to understand what they are selling. More than anyone in the supply chain, they need and have a right to this knowledge. As it stands, however, there is little to no knowledge of diamonds amongst these communities.

It was for this reason that Diamonds for Peace facilitated this first-step training.

We recognised our limitations from the outset. This had to be a basic training. We only had two days to cover a complex subject. That, and we were working without any rough material due to problems accessing it. The goal was, therefore, simplified. We needed to help these miners understand, as best as we could, what it is the buyer is seeing when they are pricing up that rough, and bottom line, that is what grade of polished diamond or diamonds could be produced from that rough. This fundamental fact, as obvious as it may be to us, was a genuine revelation to most of the participants, most of whom did not even realise that a rough diamond could be cut and polished.

To achieve this goal, the topics I covered were as follows:

What is a diamond

What are the qualities that make it valuable (the 4 Cs)

How to look at a rough diamond and interpret the grade of polished diamond or diamonds that could be produced from that rough, which I explained using a six-step process covering

- the difference between gem and industrial quality
- the weighing of the rough
- its fluorescence
- it colour
- whether it is a makeable or a sawable (i.e. how many polished diamonds the shape of the rough could produce) and what that can tell you about its potential yield
- and how the clarity of the rough diamond can also affect the yield.

Throughout the process described above, I was sure to underline the fact that there will never be one way to cut and polish a diamond and that the cutter will consider a variety of outcomes before they decide on what to produce. These above steps, however, gave them the information they needed to go on to work out a very approximate price for the rough using reverse price engineering based on the B2B price of the potential polished stone (taken from current RAP prices) – which was the outcome of the second day.

Again, this teaching was caveated with the fact that there are so many variables – which the students understood – but what we had given them was a valuable insight into the mindset of a diamond buyer and the processes involved in pricing at the most basic level. This was knowledge that they did not previously possess and knowledge they felt was being denied them, which is true to a point - by denying certain actors such knowledge allows other to retain control - something that needs to change.

Knowledge – or the sharing of it - is the key to building a stronger and fairer supply chain. It is one thing for it to be traceable,

but it is quite another for it to be equitable and ethical. For it be the latter, there can be no information asymmetry. Each player must be as empowered as the next. One thing that allows for such empowerment. Knowledge. It is a simple right.

Admittedly, possessing this knowledge is not going to change these miners' lives suddenly and significantly. I recognised that we were, in this first basic level training, simply throwing a small pebble into an ocean. The knowledge that they now possess, however, will slightly strengthen their position in the supply chain and,

Classroom prior to Workshop (Photo by Beth West)

Demonstrating understanding of yield (Photo by Tomo)

eventually, as these miners insist on fairer prices for their diamonds, it will hopefully go towards improving their basic standards of living.

To conclude this article, though, I want to share with you one of the hardest questions I had to address. When I asked the participants what diamonds are used for, several of the miners and diggers

Moment of Celebration (Photo by Tomo)

Matilde and her Family (Photo by Beth West)

replied that they believed they were used to fly planes. Whilst there is an element of truth in that, as synthetic polycrystalline diamonds can be used to machine components used in airplanes, it is not in any way in line with the miners and diggers interpretation. I queried the response with one of the Diamonds for Peace Liberia team at the end of the trip, and his reply has stayed with me.

His conversations with the miners revealed that such a belief derives from the fact that diamonds, with the value they hold, had to be responsible for something incredibly important – or at least something useful. On the revelation that most natural diamonds were used in jewellery, I was confronted with the question 'so, it is only because of jewellery that we are suffering to find diamonds?' And I had to say, fundamentally, yes.

It was a hard pill to swallow – having to admit to that. But, as much as that paints the consumer of jewellery in a less than favourable light, ultimately, our vanity and our craving for sentiment can help these people. The luxury of being able to satisfy our wants as well as our needs can contribute to the welfare of these communities. It may well be worthwhile accepting the benefits our position of privilege can bring, as opposed to rejecting them by taking a misguided moral stance. What needs to happen now is for us to recognise how best to implement those benefits.

So I end with a request to the reader to not only appreciate and support the work organisations such as Diamonds for Peace are doing but, equally, to acknowledge just how significant a role natural diamonds can play in the shaping of these miners and diggers lives, because the fact stands - if there is diamond, there will still be miners. If there is a chance, they will take it. It is, therefore, up to the consumer to keep that demand in place. We created it. Our desires fuel hope.

## DIAMONDS FOR PEACE

### VISION

A world in which diamonds are mined, cut and processed with humanitarian and environmental considerations.

### MISSION

1. To improve the working conditions and social status of the workers in the diamond supply chain.

2. To promote ethics and fairness in the diamond industry.

### WHAT WE DO

1. Awareness-Raising:

Raise awareness of the issues in the diamond industry.

2. Self-Reliance Support:

Provide support to improve the working conditions and social status of artisanal diamond workers in developing countries, especially in Africa.

3. Emergency Assistance:

Provide assistance in the event of disasters or epidemics in the targeted countries.

# SCHOLARSHIPS

## Tino Hammid Memorial Gemmological Scholarship

In every industry there are iconic individuals, giants who stand head and shoulders above the rest. In the field of jewellery and gemstone photography, there is little debate that Tino Hammid was a visionary, a rare talent who possessed the unique ability to capture the true beauty of gemstones. For almost forty years his photography adorned the pages of every important publication around the world, showcasing his unrivalled ability to inject realism into his work.

Tino started his career as a staff gem photographer at the Gemological Institute of America (GIA) in Santa Monica, California (1980 to 1982). In 1983 he started his freelance career in gem and jewellery photography and began a 25-year association with David Federman providing photographs for Modern Jeweler's monthly Gem Profile column. During this period they jointly won two Jesse H. Neal awards from the Association of Business Publishers. In 1987 he acquired Christie's Auction house as a client and photographed more than a hundred of their jewellery sales catalogues. In 2012, Tino joined forces with gemmologist Geoffrey M. Dominy and provided the exquisite photographs for The Handbook of Gemmology, the first digitized gemmological textbook released in 2013.

Sadly, Tino passed away in 2015 after a two-year battle with cancer, however through the Handbook of Gemmology and now the World Gem Foundation courses, his legacy and monumental contribution to our industry will live on for future generations to appreciate and admire.

In 2023, the World Gem Foundation will award five scholarships allowing deserving students to take the World Gem Foundation theoretical 'Career Gemmology' course.

The deadline for submitting your application is December 31st, 2022. All applications will be judged by Tino's wife Petra and his oldest daughter Evelyn with the mandate to select those five candidates who, in their opinion, best epitomize the spirit of Tino.

## W.E. Hunn Memorial Gemmological Scholarship

Each recipient of the Tino Hammid Memorial Gemmological Scholarship will also automatically receive the W.E. Hunn Memorial Gemmological Scholarship that will provide funding equivalent to 50% of the cost of the practical workshops and final examinations.

To download the application form, please click on the image

APPLY NOW!
SCHOLARSHIP
APPLICATION

# OUT in the field

## My El Dorado

'Over the Mountains
the Valley of the Shad
ride,'The shade replie
Eldorado!' (Edgar Alla

'My quests fuel my dr
fuel my quests!!' AJ Vo

Ethiopia is over one million sq kms

Only country in the world to have 13 months

Ethiopia is known as the cradle of human kind

Due to the ETH calendar, it is not 2022, it is 2014!

Official Language Amharic

Ethiopia is situated in the Horn of Africa and lies between the 3rd parallel north and the 15th parallel north and longitudes 33rd meridian east and 48th meridian east. With a population of 117 million, it is the second most populated country in Africa and twelfth largest in the world. It is a multi-ethnic state with over 80 ethnic groups and 90 individual languages spoken.

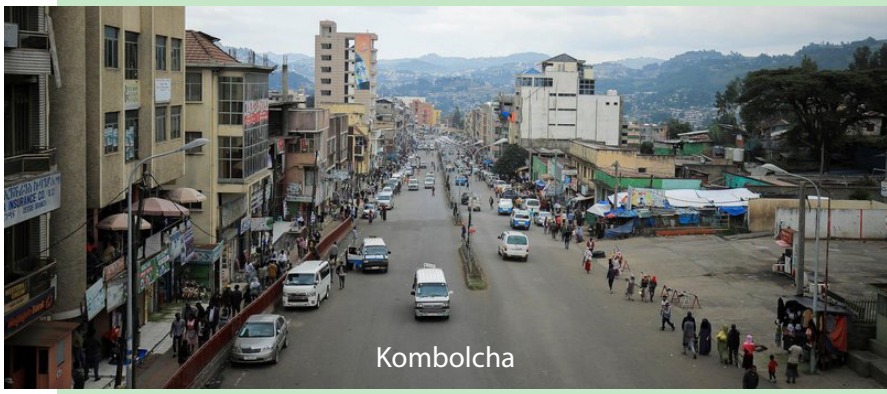
It is a country of extremes. Blessed with beautiful gemstones (most notably opals and emeralds) but plagued by continual conflict caused by political unrest, a refugee crisis brought on by war-torn countries surrounding Ethiopia and famine.

POPULATION 117 MILLION

80 ETHNIC GROUPS

90 LANGUAGES

Most of you may remember the Live Aid concerts in 1985 prompted by the great famine in Ethiopia. However, the absence of rain was not the only cause for the hundreds of thousands of deaths. From a religious and cultural aspect, the consumption of certain foods was forbidden. For example, religiously, many meats are prohibited while culturally, the cow provides milk but cannot be eaten for its meat because it is considered part of the family. This poses a very profound question. If you found yourself with nothing to eat, would you break your religious or cultural beliefs? Sadly, during the great famine, many chose not to and died with their cows or other forbidden foods surrounding them.


Kombolcha

of the Moon, Down
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oss

While Ethiopia was viewed in the western world as emblematic of poverty, things are improving, in fact, over the past 15 years, the Ethiopian economy has been among the fastest growing in the world (at an average of 9.5 percent per year). Agriculture is still the largest sector contributing almost half of the annual GDP and employing close to 70% of the workforce.

In March 2022, I travelled to Delanta, in the Amhara region, to visit the opal mines and to see first-hand the challenges facing the mining community.

I have often wondered why gemstones are found in the most remote and inhospitable areas of the world, areas that are politically unstable, dangerous, and challenging to access. What drives the human spirit to endure such hardships? To risk their lives.

The thought of venturing into an area of my country that was locked in a brutal conflict scared me. While the history of Ethiopia is one of war and conflict, this is the first time in my lifetime that I have experienced it.

The journey from Addis Ababa (capital of Ethiopia) to Kombolcha normally takes between 7 and 8 hours (378 km) using public transport. I decided instead to take the 45-minute flight and spend the night there before heading on to Desse and then Wegel Tena.

Kombolcha is in the South Wollo Zone of the Amhara Region. Like Desse, it had recently been liberated by the government forces (December 6th, 2021). I was unsure what awaited me but I knew that I had limited options to get to Wegel Tena.

Desse is a 45-minute taxi ride from Kombolcha where we planned to take the bus to Wegel Tena. In 2010, Ethiopia had one of the lowest road densities in Africa (44.4 km per 1000 square kilometres up from 24.4 km in 1970). However, this started to change in 1991 when the Ethiopian People's Revolutionary Democratic Front (EPRDF) came to power. Road building became a priority. In 2020, Ethiopia had 144,024 kilometres of all-weather roads – about 41% of the required road network in the country.

The bus ride from Desse to Wegel Tena (185 km) took 3 hours with a brief stop for breakfast. Wegel Tena is

Opals from Wegel Tena

situated at an elevation of 3,010 meters above sea level. At roughly $ 2 USD, it seems like a bargain. When I studied in Palma, Mallorca, I would have paid this just to ride a city bus from one stop to another but in rural Ethiopia, many people earn less than $ 1 USD a day so it is understandable why for many, riding a bus is a luxury borne out of necessity.

Rural buses are often subject to 'creative' seating, overcrowding, frequent examples of travel sickness and a lack of safety measures. Since the majority of people do not own cars, the roads are empty, the sole domain of buses that provide a lifeline for people who require medical attention, need to travel for work or want to visit their families.

We were greeted by our guide (a relative) who took us to his home in Tsehay Mewcha (30 minutes in a tuk tuk) for lunch / coffee. In Ethiopia, as in other parts of the world, much of the selling is done informally, either on the street or in people´s homes.

Opal is one of the hardest stones to grade and cut. Unlike other gemstones, it is not just a question of the colour, clarity, and yield, it's a question of stability. If an opal cracks, there is nothing you can do about it other than treat it but this needs to be disclosed. Assessing the risk factor and factoring this into the price of rough opal is not easy.

It was strange. I was surrounded by sellers who were so knowledgeable about their opals yet oblivious to their true value. Many have never ventured outside of their own communities. Their asking prices were not based on the true market value but what they imagined they were worth.

Typically, the viability of a mine is based on the projected revenue minus the projected costs. In some cases, the costs are simply too high, and this makes the mine economically unviable. In Ethiopia, especially in Wegel Tena, mining is primitive. It is not mechanized; it is all done by hand using the most basic tools. A miner´s only investment is his time. There is no reverse price engineering because they do not know what a fair price is. I expected the sellers to start high and then lower their prices but, in this case, there was a reluctance to come down. With the uncertainty due to the conflict, and the absence of foreign buyers, I thought they would be more flexible, but you see, their lack of knowledge regarding pricing worked against them. It put them at a disadvantage although I doubt, they realised it.

Later we went to one of the mines. The terrain is challenging, and the work is dangerous. I am sure that people would be shocked at the working conditions, the

complete lack of safety equipment and the physicality of the work. It is a hard life and perhaps this is why they ask such high prices in the hope they will earn enough money to stop. They say that mining is in your blood, but I am not sure I agree.

I went to the market where there were women selling smaller stones, but the story was no different. High prices and little or no room for negotiation. I was discouraged by what I saw and the asking prices. We returned to Wegel Tena empty handed.

TSEHAY MEWCHA & TIKURWUHA

PHOTOS BY
HAIMANOT SISAY

Hotels in Wegel Tena are basic with prices ranging from $ 2 USD to $ 6 USD a night. Again, for foreign buyers, this is nothing but it's a different story for Ethiopians. All things are relative. We had a private room with a bathroom but these rooms are not built for comfort. Because there is no demand, building better hotels in this area is just not viable. It is the reality of life.

The next day we went back to Tsehay Mewcha to look at more opals but again found sellers who were asking too much for their stones. We decided to go back to Wegel Tena and visit some of the lapidaries who purchased opal rough from the local miners, farmers and priests. Finally, the prices seemed more reasonable, and I was able to buy some rough.

The following day we walked from Wegel Tena to Tikurwuha (one hour). Initially the ground was flat but soon we began to climb down into the valley. Again, we encountered miners using rudimentary equipment and working without any safety measures.

In Ethiopia, there are many holidays where mining and farming (among other things) is forbidden.

Before we took the 2pm bus back to Desse, I decided to buy more stones from our guide and some of the local cutters.

From Desse, we travelled back to Kombolcha, stayed overnight and then flew back to Addis Ababa.

The opal industry in Ethiopia is still relatively young. Unlike Australia, opals are not ingrained in our psyche or in our culture. They have however, had a profound impact on the area around Wegel Tena, transforming it from an economy that relied solely on agriculture to one that is more diverse. This has had a positive effect on the quality of life by providing better incomes. It has also changed the traditional role women play in rural Ethiopian society. Up until the discovery of opal (2008), women, were mainly consigned to domestic duties. Now they are playing an active role in the buying and selling of opals.

Haimanot in Tsehay Mewcha

Even though it was a brief visit, I learned so much from the opal miners and dealers. Information that you can only truly get working out in the field, handling the stones.

Due to the active role women now play in the opal industry, I never felt that I was treated differently although perhaps some men felt that because I am a 'city girl', I was not up to the challenge. They were wrong!

I experienced wonderful hospitality from warm and generous people who were very open about what they were doing.

I did realise that as a country, we need to do more. There is no infrastructure, no supply chain, no education available and limited opportunities to benefit economically from the opal resources. There is a complete imbalance between the role the miners play and the role the brokers play. Opal mining is incredibly hard and dangerous work, yet it is the brokers who benefit the most financially. While there are no official figures, many lives are lost each year because of a total lack of safety measures. There are no helmets, there is no proper lighting and no safe 'excavation' methods such as the 'post-pillar' technique. They simply dig until they find opal, oblivious to the risks.

The Ethiopian government needs to take more interest in the production of opals, install proper guidelines and ensure that miners receive fair compensation because ultimately, opals can provide the people of this area with a better way of life and that should be the goal of every government.

Deep crack from the basalt terrace to the rhyolite where the opal occurs.

During our visit to this region, we noticed this deep crack. Upon our return to Addis, my uncle, a mining engineer, notified the authorities who subsequently sent out a team of geologists to conduct field work. According to their report, it has developed between 300 and 375 m from the Old Kok Wuha drift onset point. It seems that after the miners had gone over 300m along the underground opal drift, they could not find any more opals and experienced frequent cave-ins. They decided to start excavating from the other side of the Kok Wuha gorge (they named the new site New Kok Wuha). Along one of the drifts they drove the excavations until they intersected the old long drift at 350 m from the New Kok Wuha-the exact same location where they stoped from the old point.

This crack poses a serious threat to the safety of the miners.

**ABOUT THE AUTHOR**

Haimanot Sisay is an Ethiopian gemmologist, a graduate of the World Gem Foundation, an opal cutter and Associate Editor of Gemmology Today.

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ETHIOPIAN OPALS FROM DELANTA VIDEO

# SPICE of life

## Emeralds from Africa

When we talk about emeralds, most people immediately think of the vivid green emeralds that come from Colombia. While Colombia is still the world's largest producer with major mines at Muzo, Chivor and Coscuez, for the last twenty years, Africa has emerged as a prominent player in the emerald market. While diamonds are still the 'gem' Africa is known for, the continent is blessed with an abundance of gemstones that many predict will make Africa a key gem source for many years to come.

Emerald is one of the most storied gemstones in history, long treasured by past civilizations with the earliest recorded mines located by the Red Sea in Egypt around 2000 BCE.

The name is derived from the Greek 'smaragdos', meaning green. Emerald was associated with the Greek goddess Venus and symbolizes immortality, faith and by changing colour, it could predict inconsistency of lovers. The ancients also believed that emeralds could aid eyesight.

### General characteristics

Emerald is the most famous member of the beryl group and has a chemical composition of beryllium aluminium cyclosilicate $Al_2Be_3(SiO_3)_6$. It belongs to the hexagonal crystal system and is commonly found as six-sided prisms.

| PHYSICAL & OPTICAL PROPERTY | EMERALD |
|---|---|
| Crystal System | Hexagonal |
| Chemical Composition | $Al_2Be_3(SiO_3)_6$ |
| Colour Range | Green |
| Refractive Index | 1.565 – 1.602 |
| Birefringence | .006 |
| Dispersion | .014 |
| Optic Character | Uniaxial |
| Optic Sign | Negative |
| Pleochroism | Yes |
| Specific Gravity | 2.67 – 2.78 |
| Hardness | 7 ½ – 8 |
| Cleavage | Poor (Basal) |
| Fracture | Conchoidal to Uneven |
| Lustre | Vitreous |
| Transparency | Transparent to Opaque |
| Colour Streak | White |

While emeralds are formed when chromium, vanadium, and iron are present, the final colour depends on the 'varying presence' of these transition elements. Chromium and vanadium produce a more intense green colour while iron gives stones a bluish tint.

Emeralds can be distinguished from 'Green' beryl since the latter does not contain chromium.

Emeralds are mined from primary deposits formed by magma and subsequent metamorphism. Typically, they are found in biotite schists, black carbonaceous limestones, clay shales and pegmatites.

### Colour

In general, their colour ranges from yellowish green to bluish green. Stones with a bright pure green hue are preferred by consumers. Emeralds with a medium to darker tone (lightness) are more valuable than ones with lighter tones, while higher levels of saturation (how vivid the colour is) command higher prices than stones with lower levels of saturation.

### Cut

Due to the shape of the rough and the need to retain as much weight as possible, the oval or 'emerald' cut (rectangular in shape) are most seen but other cuts are also found, depending on the rough crystal size and the quality. Emeralds that are more heavily included are typically cut en cabochon or in beads.

Zambian Emerald (Photo by Tino Hammid)

### Inclusions

Emerald's form under a wide variety of geological conditions. Very often it is not only the rate of crystallization that determines whether the resulting crystal will form with or without inclusions but also the environment in which it forms.

Typical inclusions include biotite mica, three-phase inclusions consisting of a liquid, a gas bubble, and either a salt crystal (all mines), albite and pyrite (Chivor mines), or rhombs of calcite and yellow/brown parisite (Muzo mines), phenakite, green chrome mica flakes of fushsite, green actinolite or tourmaline crystals, two-phase inclusions or hair-like tremolite fibres.

### Absorption spectrum

Emerald often shows a distinct 'chromium' absorption spectrum with doublet lines in the red (at 683 and 680), two lines in the orange red, a weak band in the yellow (from 625 to 580 nm) and a line in the blue.

It should be noted that emerald is known to show different absorption spectra along the ordinary and the extraordinary vibrational directions.

### Chelsea Colour Filter

The Chelsea Colour Filter was invented in the 1930's to distinguish emerald from its simulants by detecting the chromium in Colombian and Siberian emeralds. Unfortunately, the effectiveness of this instrument has been diminished over the years due to the emergence of lab-created emeralds (also coloured by chromium) and emeralds coloured by vanadium and iron

### Fluorescence

Natural emeralds will appear red to green under both long-wave and short-wave UV light and red under X-Rays while emeralds that have been oiled will appear yellow under long-wave.

Earlier made lab-created emeralds, due to their chromium-rich composition and freedom from other impurities, typically appear a strong red to orange under long-wave, red under short-wave and a strong red under X-Rays. However, many lab-created emeralds produced today exhibit subdued fluorescence due to the introduction of iron oxides.

### Treatments

Emeralds are normally enhanced using either coloured or colourless oils, dyes, resins, or polymers to improve their colour and / or clarity. While the treatment of emeralds is so widespread today, with the assumption that most have been treated, it still needs to be disclosed.

Be aware that strong light can cause oils, dyes, resins, and polymers used to fill surface-reaching fractures to change colour and deteriorate over time.

### Synthesis

Man-made emeralds have been produced since the mid-1930's. Today, the principal methods used are flux-melt and hydrothermal. Notable flux-melt manufactures include Chatham, Gilson, Lennix, Seiko, Zerfass, and Inamori, while Regency, Linde and Tairus have all been involved in the manufacture of hydrothermal stones.

### Clean and Care

Since emeralds can be enhanced with oils, dyes, resins, and polymers, the recommended cleaning procedure involves the use of warm water and a mild detergent. Emeralds should never be steamed or cleaned ultrasonically.

## AFRICAN EMERALDS

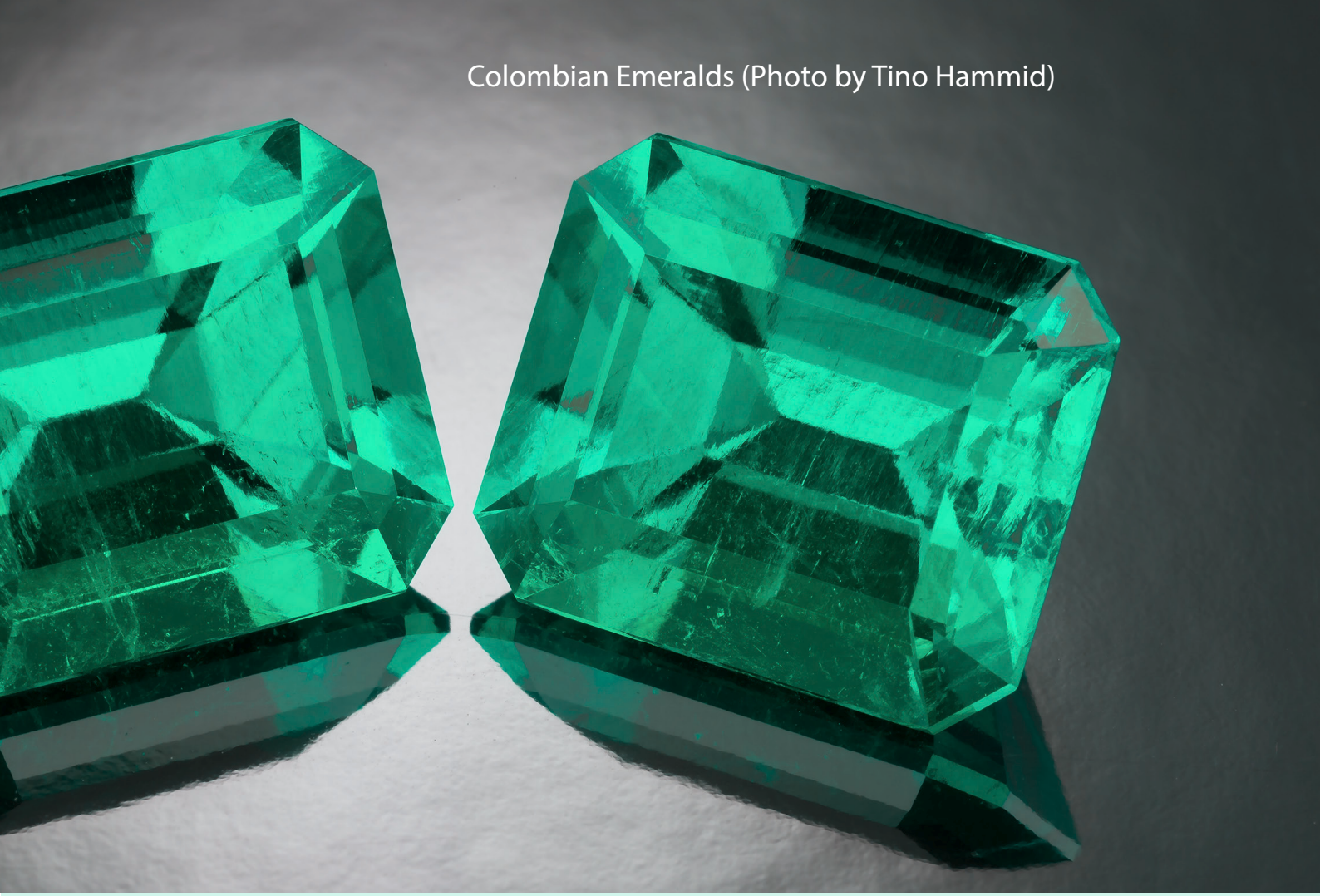
Emeralds have been found in Zambia, Zimbabwe, Mozambique, Tanzania, Egypt, South Africa, Nigeria, Ethiopia, and Madagascar. Like Colombian stones, in terms of the wide array of colours, tones, and saturations, the main difference is that the African emeralds are generally not as dark in colour (more blue green in appearance), often have more inclusions, are far more abundant and therefore less rare. This makes them a more affordable option.

### ZAMBIA

The first emeralds were discovered in the 1920's.

Today, the Kagem emerald mine is the world's single largest producer of emeralds and accounts for approximately 20% of global emerald production. It was acquired in 2008 and is a partnership between Gemfields (75%) and the Zambian Government (25%).

The Kafubu emerald deposits are situated in the Ndola Rural Emerald Restricted Area (NRERA), which is in the



Colombian Emeralds (Photo by Tino Hammid)

Copperbelt Province in northern Zambia, and covers an area of approximately 700 square kilometres. The NRERA encompasses over 520 licences, of which the Kagem licence, 14105-HQ-LGM (GL713), is the largest at 41 square kilometres.

The Zambian emeralds match the beauty of Colombian emeralds but also show some unique qualities such as a pure green body colour, without the bluish tint and fewer inclusions. This is because Zambian emeralds contain more iron than the Colombian emeralds. As a result they have a higher refractive index and a higher hardness (7.5 to 8 on the Mohs scale of hardness). Most stones are strongly dichroic with some exhibiting subtle colour zoning.

Typically, Zambian emeralds contain fluid inclusions that appear in different forms. These fluid inclusions often contain a high volume of gas, and most will show solid crystals but never large transparent solids. Small mica crystals are also frequently found.

In 2018, Gemfields unearthed a world-famous emerald of 5,625 carats (1,1 kilograms) with exceptional clarity and a perfectly balanced green hue with a hint of yellow. This wonderful emerald was named 'Inkalamu' meaning 'lion' in Bemba. It was auctioned in Singapore in 2018 and sold for $ 28.4 million USD or $ 68,03 USD per carat. This reinforces the belief that Zambian emeralds can become a major player in the world emerald market.

## MADAGASCAR

Fifteen emerald deposits were discovered near Mananjary on the Eastern coast of Madagascar between 1970 and 1980 by Jeannot Andrianjafy, a local gem merchant and entrepreneur. Pioneers in social responsibility, Jeannot and his family created the Le Quartz Company that allows artisanal small-scale miners to work in the gem fields under the Le Quartz company licenses. Since Jeannot and his family are only interested in emeralds, they let the local people mine for gold and other minerals and to work the trailings. While the Le Quartz family has tried to create a positive relationship with the local communities in the mining areas by building a school, and a medical center, working in developing gem producing areas is never easy. Security concerns, political instability, corruption, and jealousy are never far away. For example, in 2008, the Andrianjafy family were faced with the seizure of a 250 kg specimen by the President, the banning of all gemstone exports and even the arrest and detention of Jeannot's wife (*Pardieu*).

In Mananjary, like most other known emerald deposits, mining is mainly in hard rocks. Since most of the

deposits located closer to the surface or on the hilltops have now been depleted, they will need to dig deeper to reach the emeralds. This will require more investment to finance the geological and mining expertise, the heavy machinery, and the ongoing maintenance.

Research by Vincent Pardieu (2019) in Ambodivandrika (located in the northern part of the area) and Ambotomaneno (located in the southern part) revealed that emeralds from Ambodivandrika were relatively cleaner and a more intense bluish green than those from Ambotomaneno. Based on his field observations, the emerald deposits appear to be of the 'schist-amphibole associated with pegmatite' type. This is quite like the geology of the Kafubu area in Zambia where emeralds are found in a reaction zone between the beryllium-rich pegmatite and the chromium-rich schist.

Typical inclusions include platelets of biotite / phlogopite mica, needles of actinolite and feldspar crystals.

## ETHIOPIA

The emerald deposit was discovered in 2016 and is located 20 km south from Shakiso town, in the south-central part of Ethiopia. This whole area is situated on the Mozambique Metamorphic Belt, extending from the Red Sea to Mozambique and to the eastern and southern part of Madagascar. Through metasomatism, mineralization occurred near the contact zones.

The Ethiopian emeralds have optical and physical properties that are consistent with other schist-hosted emeralds, such as those from Minas Gerais in Brazil and Zambia. This region has produced rough emerald crystals up to 30ct, but high-quality emeralds exceeding 10 carats are very rare.

The colour is due to chromium and ranges from very pale green to a very intense green. The more saturated emeralds often have a slight bluish secondary colour. Ethiopian emeralds also have trace amounts of iron but in lower concentrations compared to Zambian and most Brazilian emeralds.

Ethiopian emeralds have an average density of 2.72 g/cm$^3$, a refractive index range of 1.580 to 1.590, with an average birefringence of 0.008. None of the samples examined by GIA showed any reaction under long-wave or short-wave UV light or the Chelsea filter. Growth patterns such as color zoning, hexagonal growth zones, or even roiled growth features are frequently observed (*GIA*).

In the more intensely coloured emeralds, the growth zones are more pronounced which can reduce the overall transparency. Typical inclusions include growth tubes, primary and secondary fluid inclusions, and biotite flakes (dark colour).

## ZIMBABWE

Emeralds from the Mweza Greenstone Belt in the Sandawana Valley in Zimbabwe date back to 1955. Geologically the belt consists of a series of intensely deformed and moderately metamorphosed ultramafic-to-mafic volcanic rocks and metasediments thought to date back almost 2.6 billion years. The emeralds were likely formed during a major deformation event where small beryllium and lithium-bearing pegmatites intruded into chromium and magnesium rich greenstones, providing the right environment for the emeralds to crystallize.

The Sandawana Mine is located approximately one hundred kilometres south of Zvishavane, in the Mberengwa District in the southern part of Zimbabwe.

| WEIGHT CATEGORY | COLOMBIAN | BRAZILIAN | ZAMBIAN |
|---|---|---|---|
| 1.00 to 1.99 carat | Base | -25.00% | -16.67% |
| 2.00 to 2.99 carat | Base | -23.07% | -15.38% |
| 3.00 to 3.99 carat | Base | -21.43% | -14.29% |

Price difference between Colombian, Brazilian and Zambian Emeralds

Reference: GemGuide May/June 2022

Over the years the mine has been owned by several companies including Rio Tinto Zimbabwe and Gemstone Resources Limited, a British owned company. It is currently operated by the Zimbabwe Mining Development Corporation (ZMDC), a wholly owned government mining investment vehicle that incorporates five mining ventures (Jena Mine, Sabi Gold Mine, Sandawana Mines, Elvington Gold Mine, and investments in the Marange diamond fields).

The mine consists of several emerald deposits including Ceres, Athene, Eros, Marmaid, Junc, Zeus, Atom, Plato, and Vulcan.

'Inkalamu' emerald courtesy of Gemfields

Originally the Zeus mine, nicknamed the 'Bank of England' due to its rich deposits was an open cast mine however once it reached fifteen metres in depth, it was developed into a modern underground mine with depths reaching over 152 metres.

Sadly, due to financial constraints and a downturn in the market, production was suspended in 2011 with ZMDC turning their attention to the mining of chrome after an exploration exercise revealed a proven resource of at least 600 million tonnes of chrome and traces of tantalite.

The chemical composition of Zimbabwean emeralds is characterized by very high contents of chromium, sodium, and magnesium. Chromium contents in some samples were substantially higher than in specimens reported from other deposits.

The typical colour of Zimbabwean emeralds is green with a delicate yellowish-green nuance. These emeralds are mainly small but deeply saturated and can show a certain blandness, caused by inclusions or by the turbidity of the colour itself.

While chemically, emeralds from Pakistan are closest to those analyzed from Zimbabwe, the latter are relatively easy to distinguish because of their inclusions. Amphibole fibers (actinolite and cummingtonite) are abundant in Sandawana stones, as well as phlogopite, albite and apatite. There is a relative absence of fluid inclusions, due to decrepitation of these inclusions during geologic history, but remnants of fluid-inclusion trails are common features.

The specific gravity of Sandawana emeralds is higher compared to other localities (between 2.73 and 2.80). This can be explained by the inaccuracy due to the small size of the stones and the greater influence the inclusions have on smaller sized stones.

## TANZANIA

The Tanzanian emerald mine was discovered in 1972 and is located alongside Lake Manyara near the village of Maji-Moto in the Arusha region.

These emeralds display a yellowish-green colour, resembling the quality of emeralds from Sandawana or Colombia. The properties of Lake Manyara emeralds are consistent with those of other biotite schist localities.

Large crystals, up to 100 carats have been found but these were cloudy and yielded less valuable gemstones.

## NIGERIA

Although the bluish green beryl found in Nigeria was initially debated as to whether it was emerald or green beryl, further testing confirmed they were emeralds due to the presence of iron with trace amounts of chromium (and vanadium) and a chromium absorption line (SSEF Professor Hänni 1992).

These Nigerian blue-green emeralds show spiky multiphase inclusions which resemble those found in Colombian emeralds. But in addition, these Nigerian gems show more than one of a kind of crystal inclusions as well as liquid and gas bubble inclusions.

## Conclusion

Due to the similarity in the internal characteristics in emeralds from Africa and those from other parts of the world, it is becoming increasingly harder to confirm the country of origin.

This makes African emeralds very attractive price wise but also increases the risk of unscrupulous dealers passing them off as Colombian stones. With future developments in exploration, mining and education, it is hoped that Africa will provide an ongoing source of emeralds and that the people living in these gem rich areas will benefit socially and economically.

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**ABOUT THE AUTHOR**

Leone Langeslag is a Dutch gemmologist, CEO of the Dutch Gem Academy and owner of Sole Leone. She received her European Gemmologist (E.G.) diploma from the Federation for European Education in Gemmology (FEEG) in 2006.

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# WGF team

## Professionals at Work

**Geoffrey Dominy (World Gem Foundation)** is an author, independent gemmologist and former jewellery appraiser who appeared on the Canadian Antiques Roadshow for four seasons. He received his F.G.A through the Gemmological Association of Great Britain (Gem-A) in 1987 passing the diploma examinations with distinction.

Throughout the 1990's, Geoff developed and taught the 'Gemmology' program at Red River Community College and The University of Manitoba in Winnipeg, Canada, worked for the Canadian Institute of Gemmology, was President and Founder of the Jewellery Appraisers Association of Canada and was a contributing author for the 5th & 6th Editions of Robert Webster's 'Gems' which even today is considered one of the most authoritative textbooks in Gemmology.

In 2013, he released the first digital gemmological textbook entitled 'The Handbook of Gemmology' in collaboration with world famous gem photographer Tino Hammid. Now in its fourth edition, the handbook has been sold or downloaded in fifty-three countries, is used by fourteen schools, colleges, universities and gemmological organizations as their recommended textbook and now features photographic contributions by other award winning photographers including Jeff Scovil.

In 2018, Geoff released a 5th Anniversary Printed Edition (Two Volumes) and on December 14th, 2019, released his first book in Spanish 'Gemología Para Todos' (the first 14 chapters of the Handbook of Gemmology).

He currently lives in Palma, Mallorca, Spain and in addition to lecturing and promoting his books, is the founder of the World Gem Foundation and creator of ColourWise.

**Leone Langeslag (Dutch Gem Academy)** is a graduate of the Federation for European Education in Gemmology (FEEG) (2006), an independent gemmological consultant and is actively involved with the Gemma Association in Holland offering lectures and workshops. Her desire to provide accessible gemmological training in the Netherlands has lead to the formation of the Dutch Gem Academy.

Leone is a frequent visitor to international symposiums, exhibitions and trade shows where she continues her own gemmological education and passion for collecting gemstones and minerals.

**Deborah Mazza (British Gem Academy)** is half Italian and half British, and started her journey through the world of gemstones in Germany in 1984, where she studied at the Deutsche Gemmologische Gesellschaft attaining her gemmology and diamond diploma; she subsequently gained her FGA in 1986.

Deborah then went to work for the trade in Idar-Oberstein, buying and selling wholesale gems and diamonds, working as a gemmologist and teaching gemmology at the DGemG, this lead on to carrying out jewellery valuations for an insurance company in Germany. She later got a Bachelor in Business in Germany, and returned to the UK in 2010, where she became a tutor for the Gem-A's online courses. Deborah, keen to add to her knowledge, started to study again and passed the NAJ/IRV's CAT jewellery valuation diploma, and is now studying History of Art at Goldsmiths University. Deborah has her own valuation business and works part-time for an online auction house. She contributed several written pieces for Yavorskyy's new book, Terra Connoisseur: Gemstones.

**Jan Asplund (Scandinavian Gem Academy)** is a gemmological consultant specializing primarily in the identification and valuation of diamonds, both cut and rough, as well as coloured gemstones and jewellery.

He received his FGA & DGA (Gem Diamond Diploma) through Gem-A in 2011, his BA in History from the Mälardalens University in 2000 and studied geology and gemmology at Luleå Technical University (2005 - 2007), cultural and industrial history at the Uppsala University (1998 - 2000), and archival science at Karlstads University (1998 - 1999). Jan also took his Accredited Jewelry Professional - AJP (Gemological Institute of America 2011), Introduction to Watches (International School of Gemology 2012), Jewellers Education Foundation - Graduate Sales Associate (American Gem Society 2011), Blacksmithing (Säterglantan 2002) and Silversmithing (Tärna Folkhögskola 1996).

He is a board member of the Swedish Gemmological Association, fellow and diamond member of Gem-A and initiator and organizer of the Scandinavian Gem Symposium.

**Gérard Raphaël Quintin (South American Gem Academy)** was born in Paris France where he studied Art and Design and graduated from Ecole Boulle. His taste for the diamond world may have been inherited from an uncle who worked in the diamond business.

In 1978 he took the gemology colored stone and diamond course with GIA while he was mining diamonds in the Sewa River in Sierra Leone and where he started the first diamond cutting center in West Africa.

In Abidjan Côte d'Ivoire in 1992 Gérard founded the diamond cutting formation center with a gemological laboratory 'Hardy's', followed by the installation of the colored stone and diamond cutting facilities in the jewelry school EIBMA.

Continuing his tour in the world of gemstones, Gérard went to Madagascar as an expert for a French Government project to develop the organization and skill of the gems sector.

Professor of Gemology in the Jean Guehenno Jewelry School in Saint-Amand-Montrond France, he then moved to Bolivia to fund and manage the 'Instituto Gemologico Boliviano' where students learn gemology and the art of gem cutting.

Since 1997 Gérard has been a member of the Organisation Internationale des Experts based in Geneva, Switzerland.

**Marie-Hélène Corbin (Gem Academy of Canada & Gem Academy of Belgium)** is an FGA gemmologist and accredited Senior Gemmologist through the AGA.

Following a busy career in real estate, she wanted to change her professional path and became interested in gemmology. This discovery of gemstones turned into a passion. Marie-Hélène studied at the EGM and successfully passed her Gemmology Diploma.

Guided by the desire to pass on her love for gems, she became the new Director of EGM in 2016, with a strong desire to modernize the school. As a teacher, she instills in her students the desire to learn more about the world of gemstones.

This passion for gems does not stop there, and Marie-Hélène created Quebec's first independent gem identification laboratory, Lelièvre Laboratoire de Gemmologie (LLG) in 2018. In order to offer the most complete service to her clients, she created the Gems and Jewelry Appraisal Center in 2019, also in Montreal.

**Kyalo Kiilu (East African Gem Academy)** is a fellow of the Gemmological Association of Great Britain (Gem-A) and an Alumnus of Birmingham City University where he obtained his BSc with honours in Gemmology and Jewellery Studies in 2017.

His passion for gemstones can be traced back forty years to his late grandmother's village in rural Kenya and the prospecting trench dug by the first British gemstone explorers in the early part of the 20th Century.

While pursuing his pharmaceutical studies, his interest in gemstones never diminished. Unfortunately in 2003 there were no colleges in Kenya offering gemmological courses so he decided to relocate to England and enrolled in Gem-A's Diamond Diploma program in 2004; the start of his gemmological journey.

Kyalo is a licenced gemstone prospector in Kenya and in 2015 made a discovery of a very unique sapphire, resembling another Kenyan sapphire marketed as 'Goldsheen Sapphire' that he will hopefully share with the gemmological community very soon.

He comes to the World Gem Foundation and specifically the East African Gem Academy with a strong desire and ambition to share his knowledge of gemstones with his fellow East Africans, particularly those involved in the production of gemstones, gemstone lovers and aspiring gemmologists, to provide support and encouragement that was so lacking in the industry when he was growing up in Kenya.

**Salomon Lutumba (South Central African Gem Academy)** is an alumnus of Birmingham City University where he graduated with a Bachelor in Science with honours in Gemmology and Jewellery studies in 2016. He also holds a Diamond Diploma and Gemmology certificate from Gem-A. He is originally from the Democratic Republic of Congo.

In 2002 he relocated to England where, ten years later, he found the opportunity to fulfil his dream of studying gemmology at the Birmingham City University. In 2012, he started his High National Diploma in Gemmology combined with Gem-A's Diamond and Gemmology program which led to a degree program, introduced for the first time in 2015, at the BCU.

Today, by embracing the World Gem Foundation's concept and philosophy of gemmological education, and through the Gem Academy of DR Congo, he would like to share his passion and knowledge of gems with his fellow Congolese; particularly jewellers, aspiring gemmologist and gemstone lovers.

His personal goal is to promote the science of gemmology in his country, by providing information and support to empower people in the jewellery business and those trading in stones.

**Jack Ghazalian (American Gem Academy)** has thirty-eight years of experience in the jewelry industry. He is a graduate gemologist through the Gemological Institute of America (1992), was an instructor for GIA (1993) and was officially Certified-by-the-State of California Education Code 94311(a) to teach Gemology & Jewelry Manufacturing-Arts (1993).

In October 2015, he was honored by the International Distinguished Scholars – Academic Honor Society as an 'International Distinguished Scholar' and in 2017 was granted membership in Kappa Delta Pi. He is currently the owner of Isometric Gemological Appraisal Services in Southern California: IsometricGems.com, speaks five languages and is passionate about education.

**Barickeh Charles Kholifa Koroma (West African Gem Academy)** is a freelance gemmologist, diamond grader/valuer, a member of the Gemmological Association of Great Britain and a member of the Scottish Gemmological Association. He was born in Liberia to Sierra Leonean parents and raised in the mineral rich country of Sierra Leone where he survived a devastating brutal civil war which lasted for almost 12 years.

He relocated to the United Kingdom in 2004 and received help on how to cope with Post Traumatic Stress Disorder (PTSD), which now proves pivotal in his approach to life.

He attended the coveted School of Jewellery, Birmingham City University (BCU) where he studied a diploma in diamonds (Gem-A) and a BSc (Hons) in Gemmology and Jewellery Studies. He graduated with a first-class degree in 2018 and was awarded the prestigious Scottish Gemmological Association Prize for Gemmology. He then moved back to Sierra Leone to pursue his dreams. His greatest achievement so far is working as a student mentor during his time at the university, he was able to give advice and guidance to some students that were struggling to cope with the demands of higher education and being away from home.

Like Kyalo, he comes to the World Gem Foundation and specifically the West African Gem Academy with a strong desire and ambition to share his knowledge of gemstones with his fellow West Africans, particularly those involved in the production of gemstones, gemstone lovers and aspiring gemmologists, to provide support and encouragement that was so lacking in the industry when he was growing up in Sierra Leone.

**Dr. Laurent Massi (French-Swiss Gem Academy)** completed his PhD studies on 'Atomic-scale Defects in Brown and Hydrogen-rich Diamonds' at the Department of Physics at Nantes University in France under the direction of Professor Emmanuel Fritsch. During his studies he also taught gemology in Paris at the French National Gemological Institute. Dr. Massi subsequently taught gemology and gave presentations at conferences in numerous countries all around the world. During his career he has also had the opportunity to publish a variety of scientific and educational articles on color-change corundum, hydrogen- and CO2-related optical centers in diamond, chameleon diamonds, clinohumite, color-change bastnäsite and on a new gem mineral: hibonite, one of the rarest gems on Earth.

Dr. Massi was the Director of the Asian Institute of Gemological Sciences (AIGS) Gem Laboratory and Gem School based in Bangkok - Thailand. He subsequently completed his Graduate Gemologist (GG) studies at the Gemological Institute of America (GIA) headquarters in Carlsbad, USA and then became the Director of the new GIA Thailand Campus located in Bangkok - Thailand.

With more than 20 years of experience in the Gems & Jewelry industry, Dr. Massi is now the head of both the new international gem academy AGAT (for 'Academy of Applied & Technical Gemology') as well as the co-founder of the French-Swiss Gem Academy (from the World Gem Foundation), both housed in the Majestic building - a former palace from the Belle Epoque - located on the French Riviera, in Nice - France.

**Nina Zolotukhina (Eastern Europe & Russia)** studied gemmology at Moscow State University, is an independent gemmologist, now based in Bulgaria, founder of Gemlab Europe Project, researcher, gem expert and author of reviews and articles about gemstones, research methods and gemmological equipment. She is an avid mineral and gemstone collector and photographer of minerals and inclusions (photomicrography).

**Haimanot Sisay (Ethiopia)** is a graduate of the World Gem Foundation and an opal cutter based in Addis Ababa. She is the Associate Editor of Gemmology Today and an instructor / tutor for the World Gem Foundation.

**Wilma van der Giessen (Belgium)** received her first diamond education from Mr. S. Asscher in 1980 and in 1983 graduated at the German DGemG in Idar Oberstein as a diamond professional. At the age of 18, she was introduced to the diamond world in Antwerp where she learned all about rough and polished diamonds. Two years later, in 1985, she received her FGA diploma and in 1991 graduated as a GG at GIA's headquarters in Santa Monica, USA. Traveling is one of her great passions and her teaching space is a true paradise for gemmology students because they have access to a great collection of both natural and synthetic gemstones. Wilma is an avid photographer of gemstone inclusions and nature.

# MEET OUR TEAM OF PROFESSIONALS

**Gamini Zoysa (Sri Lanka)** is the Managing Director of Mincraft Company, a member of the Congress Committee and Communications Committee of the International Colored Gemstone Association (ICA), as well as serving as the organization's Ambassador to Sri Lanka, Executive Committee Member of the Sri Lanka Gem & Jewellery Association, Former President and current Executive Committee Member of the Gemmologists Association of Sri Lanka (GASL), Board member for the International Gemmological Conference (IGC), he holds a Master's Degree in Geology from the University of Moscow and Doctorate in Mineral Exploration from Delft University, Netherlands and is an FGA (Gem-A) and G.G. (GIA) gemological graduate.

## WGF FACT FILE

**Date Founded: 2015**

**Country of Incorporation: Canada**

**Corporate Structure: Not-for-Profit**

**Board of Directors: Yes**

**Executive Council: Yes (5 Members)**

**Head Office: Palma, Mallorca, Spain**

**Number of countries where our students live: 85**

**FB Followers: 17,702**

**Instagram Followers: 1,000**

**LinkedIn Followers: 1,227**

**Total Value of Scholarships Awarded: € 124.800**

# Stand out from the crowd

"Education inflames our intellect and makes us grow. It widens our horizons, adds value to our name and instills in our clients, staff, management and industry colleagues, a confidence in our ability that can only be gained from being assessed to the highest of standards by our peers."

Kym Hughes
President NCJV

So become enlightened

and

Stand out from the crowd

ncjv - EDU

ncjv.com.au I edu@ncjv.com.au

# WGF directory

## Who we are and how to find us

| Academy Name | Website Portal | E-mail Addresses |
|---|---|---|
| World Gem Foundation | www.worldgemfoundation.com | information@worldgemfoundation.com |
| American | www.worldgemfoundation.com/aga | aga@worldgemfoundation.com |
| Belgian | www.worldgemfoundation.com/gab | infogembelgium@egmtl.com<br>wilma@worldgemfoundation.com |
| British | www.worldgemfoundation.com/bga | bga@worldgemfoundation.com |
| Canadian | www.worldgemfoundation.com/gac | infogemcanada@egmtl.com |
| Caribbean | www.worldgemfoundation.com/cbga | cbga@worldgemfoundation.com |
| Central American | www.worldgemfoundation.com/caga | caga@worldgemfoundation.comm |
| Dutch | www.worldgemfoundation.com/dga | dga@worldgemfoundation.com |
| Eastern Europe / Russia | www.worldgemfoundation.com/eega | ninagold@worldgemfoundation.com |
| French-Swiss | www.worldgemfoundation.com/fsga | fsga@agat-gemology.com |
| East African | www.worldgemfoundation.com/eaga | eaga@worldgemfoundation.com |
| Indian | www.worldgemfoundation.com/iga | iga@worldgemfoundation.com |
| Scandinavian | www.worldgemfoundation.com/scga | scga@worldgemfoundation.com |
| South American | www.worldgemfoundation.com/saga | saga@worldgemfoundation.com |
| South Central African | www.worldgemfoundation.com/scaga | scaga@worldgemfoundation.com |
| Spanish | www.worldgemfoundation.com/sga | sga@worldgemfoundation.com |
| Sri Lanka | www.worldgemfoundation.com/slga | gaminiz@worldgemfoundation.com |
| West African | www.worldgemfoundation.com/waga | waga@worldgemfoundation.com |

# Australian Opal Centre

The Australian Opal Centre (AOC) is a not-for-profit facility dedicated to opal-related scientific research, education, training, heritage, arts, travel, cultural and economic development. Based in the classic opal mining locality of Lightning Ridge, Australia, the AOC has developed its public collection and programs since 2004, while working towards construction of an innovative building that will be an international hub for opal-related knowledge and activity.

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