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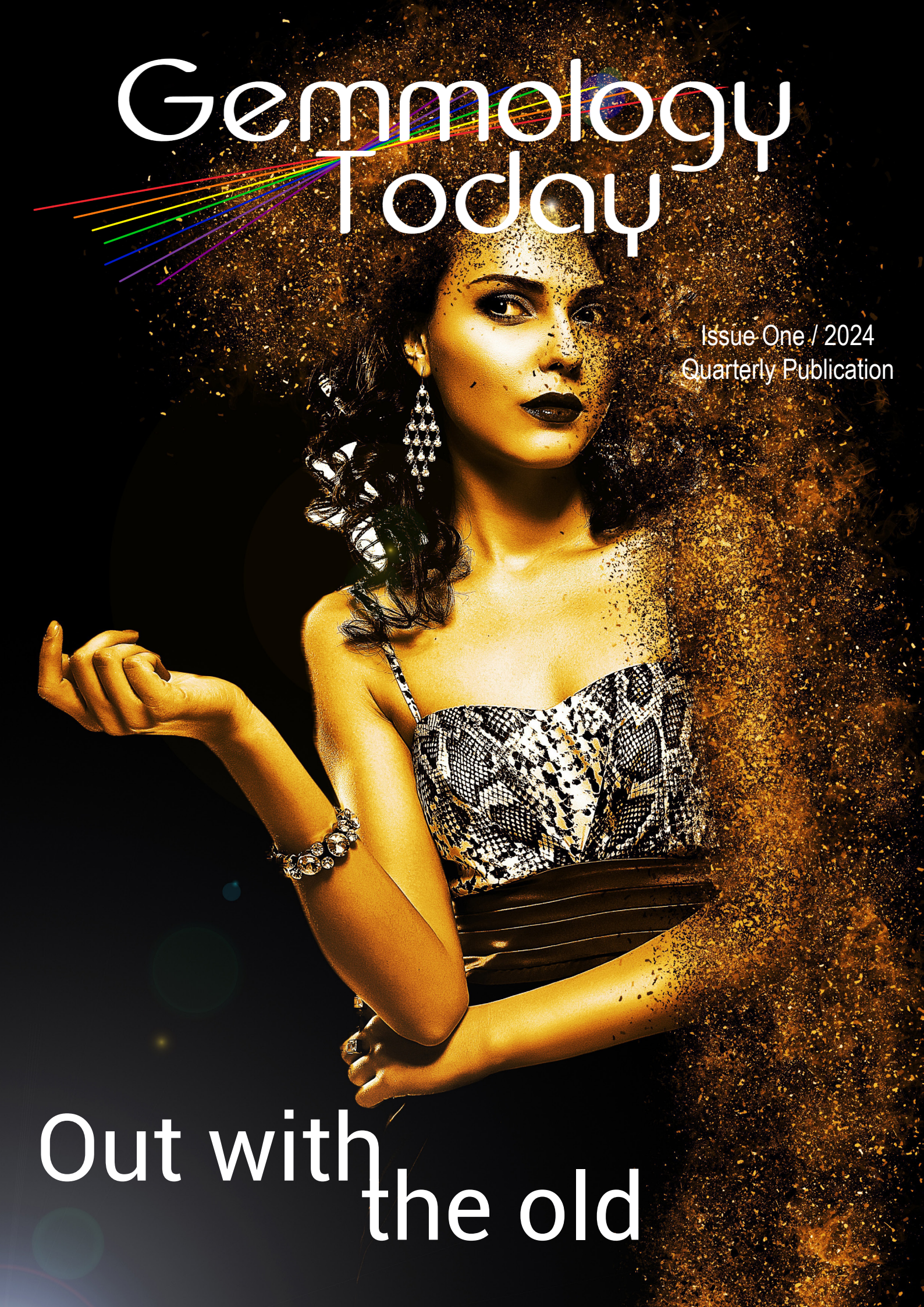

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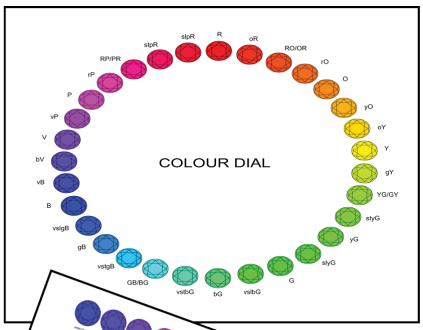

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Editor: Geoffrey M. Dominy

Associate Editor: Haimanot Sisay

Advisory Council: Leone Langeslag, Gérard Quintin, Marie-Hélène Corbin, Dr. Laurent Massi, Kyalo Kiilu, Barickeh Charles Kholifa Koroma, Deborah Mazza, Jack Ghazalian, Nina Zolotukhina and Salomon Lutumba.

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Click here to read the September 2023 Issue

Geoff Dominy - Founder / Editor

Well you might have been wondering what happened to the December 2023 issue.

Our four-set cycle used to start in December and end with the September issue. It was not ideal because basically we could not say the 2022 four-issue set or the 2023 four-issue set so we decided to fix it. This meant skipping the December 2023 issue so that the March 2024 issue would be the first issue of the 2024 four-issue set. It makes more sense to have the four-issue sets identified by 'year' rather than Set 1, Set 2 etc. We will also be dispensing with actual dates (i.e., March 2024). Instead we will identify each issue as Issue One (2024), Issue Two (2024) giving us more flexibility.

So, where to begin?

As we enter 2024, it is hard to believe how little Man has learned from past mistakes. Everywhere we look there is conflict. In an age where we need strong leadership, there are no leaders, simply politicians who will sell their souls to hold onto the power they have.

Editor at Work

The re-emergence of David Cameron in England is a classic case.

Often criticised by his admirers as more of a game-playing tactician than a serious-minded strategist, he decided to gamble with the lives of future generations of young Britons to try and secure his power base.

The decision to hold a referendum on being part of the EU was not because the country's population was clamouring for one but because a significant minority of his own MPs, many of them frustrated by the constraints of coalition, were demanding that he do so. Some MP's feared that UKIP (UK Independence Party) would cost them their seats (or the seats of too many of their colleagues) at the next election, while others simply wanted out of the European Union and were more than happy to leverage that fear to their advantage.

David Cameron lost the referendum. It was perhaps the finest example of 'politically shooting yourself in the foot' that the world has ever seen. A miscalculation so immense that the repercussions will be felt for generations to come.

What went wrong? Everything.

Firstly, the 'deal' he negotiated was far too complex and too much of a contrast with what he had earlier promised to extract from Brussels to persuade most Eurosceptics to back it.

Secondly, he underestimated the role immigration would play in the debate and how willing Conservatives in the 'Leave' campaign would be to tap into the concerns of 'identity conservatives' on the issue.

Thirdly, he underestimated the extent to which the Leave campaign would mobilise its supporters to turn out and

The man who sold out the youth of Britain

vote and how little Jeremy Corbyn (Eurosceptic Leader of the Opposition) would help the Remain campaign win over traditional Labour voters.

His belief that voters would be swayed by the economic arguments against withdrawal were also misguided.

David Bowie may have sung about 'The Man Who Sold The World' but David Cameron went one better. He sold out the futures of every young Briton. Not something a normal person would be proud of but then again, politicans are very different animals.

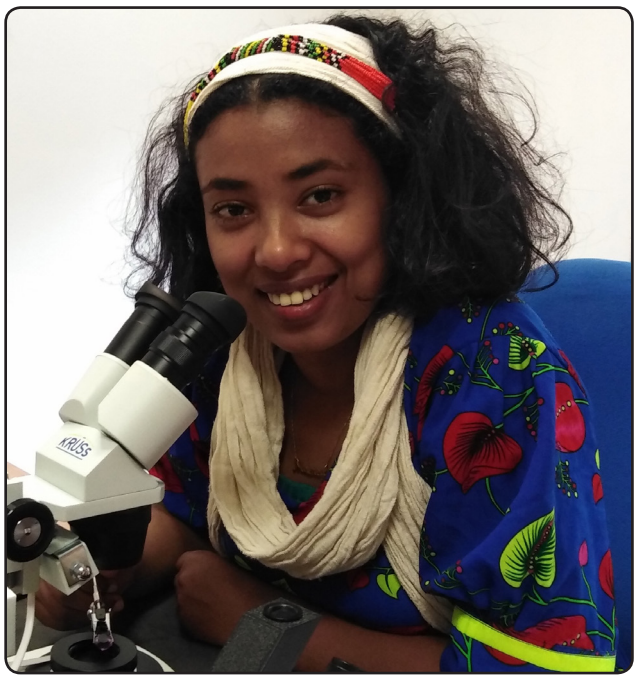
I think it is fair to say that the decision to leave the EU has not been a stunning success. The promises made by the 'Leavers' never materialised and according to data from YouGov's latest Brexit tracker survey, excluding those who said they would not vote or did not know, 58.2% of people in Britain would now vote to rejoin.

I, like many, was shocked when it was announced that Cameron had been appointed Secretary of State for Foreign, Commonwealth and Development Affairs of the United Kingdom. What was Rishi Sunak thinking? Mind you, if your wife were one of the richest women in the world (courtesy of her family's tech company Infosys, which is valued at around $73 billion / £59 billion), you can afford to make mistakes. When he is ousted (and with the Conservative back-stabbers it is always only a matter of time), he can use his government pension as pocket money.

Cameron's political gamble to quell unrest in his party devastated people's lives, not just Britons living abroad but also people would had made Britain their home for decades.

Just ask the long queues of British holidaymakers at Passport and Immigration controls throughout Europe if leaving the EU was such a good idea and I am sure they will say no.

So as we enter the New Year, it is hard to be optimistic. While some will view Cameron's 'Rise from the Ashes' miraculous, it simply reaffirms what is so wrong with the world. Our leaders care little about what is good for the people, simply what is good for themselves, content to feather their own nests either legally by using their position of authority or through corruption. The fact that Cameron is now 'Lord Cameron' only goes to show you how messed up the world is. His actions should have consigned him to the annals of history for his betrayal of British youth, instead he basks in the international limelight.



Haimanot Sisay - Associate Editor

Associate Editor at Work

WHAT'S IN THIS ISSUE?

It is interesting to note that when you google 'Amazon', you get Amazon.com not the most important ecosystem on the planet. How times change. I have to admit, I have a love/ hate relationship with Amazon.

On the one hand it is convenient to order online but what about the thousands of 'bricks and mortar' businesses Amazon have killed? Yes they have spawned a plethora of online vendors but the jobs lost certainly have not been replaced by the jobs created. Generally the items I have purchased have matched my expectations but this was the first time I have gone online looking for gemstones. I was shocked at what I found. Blatant misrepresentation of the goods being sold, bogus certificates, and factual inaccuracies.

The business model set up by Amazon makes third-party sellers responsible for setting pricing, packaging and shipping. It also requires them to comply with applicable laws. By agreeing to Amazon's 'Conditions

of Use', these third-party sellers absolve Amazon of any legal responsibility. In 'Jungle Stories - The Dark Side of Amazon', I look at some of the fraudulent gems being sold to unsuspecting consumers. In 'Ball Games - Meteorwrongs' we look at ceramic milling balls that are being sold as Lonsdaleite (also referred to as hexagonal diamond) along with bogus reports that are based on guesswork rather than scientific expertise. In 'Lab News', our new laboratory in Addis Abeba is already seeing some unusual things and each issue, we will highlight, the good, the bad and the ugly! I start a four-part series on 'Investing in Africa' where I apply the same investment criteria to four key producing areas to see if 'investing' is really viable. The ever expanding 'Chinese Sphere' is examined in 'Master Plan - In the Red', while Michael Cowing continues his work on what constitutes an ideal cut by arguing that regardless of R.I, all gemstones can be cut with pavilion angles in the 'Ideal Diamond Cut' range. Last but certainly not least, Nina Gold expands on her recent article on ground-breaking gem artisans by interviewing five cutters (Julia Maria Kunnap, Sergey Novoselov, Dmitriy Petrochenkov, John Dyer and Victor Tuzlukov who are changing the industry.

Special Guests

Over the last couple of weeks, we have had some very special visitors, interested in what we are doing here in Ethiopia. These included the Honourable Habtamu Tegegn, Ethiopian Minister of Mines, 4th generation French goldsmith Raphaël Griffon and Prince Beede-Mariam Mekonen Haileselassie, grandson to former Ethiopian Emperor Haile Selassie. Prince Beede told us that we are realising a long held dream his grandfather had to ensure that Ethiopians benefit from their mineral resources.

It was really wonderful for our students. Their presence in our classroom added credibility to what we are doing and also showed us that we are on the right track.

The next few months in Ethiopia will be very busy with the first gemmological graduation ceremony (the minister and Prince Beede-Mariam both assured us that they will be in attendance) and the start of the very first gem faceting apprenticeship program starting in mid-May.

There will be LOTS to see in the next issue! Stay safe and stay positive!

Prince Beede-Mariam Mekonen Haileselassie

Raphaël Griffon

Honourable Habtamu Tegegn, FDRE Minister of Mines

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GEM faceting

Design Discoveries

Figure 1a. Best/Ideal Round Brilliant Cut Diamond
Photo by Michael D. Cowing

Figure 1b. Best Round Brilliant Cut Purple Sapphire.
Faceting and photo by Gary Braun.

INTRODUCTION

Many discoveries await in this work written for the twin worlds of '**Diamond Cutting**' and '**Gemstone Faceting**'. Discover the attributes and properties of the most beautiful round brilliant diamond cut, the Ideal Round Brilliant, and the reasons it possesses the best optical light performance.

Discover that those properties also result in the best beauty and light performance in other round brilliant cut gems as well. Chief among these discoveries is that the best small range of pavilion angles of the Ideal Cut diamond is universally the best for all round brilliant cut gems. This work explains and demonstrates why. Also revealed is the all-important connection between round brilliant design angles, and the gemstone's illumination.

Find the reasons why the early Ideal Cut diamond, which is often mistaken for an Old European Cut, is seen as so fiery, even more so than the modern Ideal.

- Discover why diamond's Ideal crown and pavilion main angle combination near (34°, 41°) maximizes the potential in the round brilliant for all the gem's sought-after properties of brilliance, scintillation and fire.
- Discover the significance of the spectral reflection pattern, and its use in revealing a little-known feature of the gemstone interaction with illumination essential for fire to occur in diamonds and other gemstones.
- Discover the trade-off between fire and scintillation in the early Ideal and today's round brilliant cut, and the need for 'hearts and arrows' optical symmetry.
- Discover the advancement in gem faceting design by faceting design pioneer, Bruce Harding in 'Faceting Limits'.
- Discover through the 'eye of the round brilliant' why pavilion main angles any greater than 41° - 42° diminish the round brilliant's beauty/light performance, not only in diamond but colored gemstones as well.
- Discover how the table reflection percentage is used to accurately determine the pavilion main angle in round brilliant cut diamonds and other gemstones.
- Discover the essential role of illumination contrast in all three attributes of gemstone beauty.

Diamond and gemstone beauty, especially in colorless or light-colored gems, is judged in terms of the attributes of that beauty, which are:

- brilliance (aspects of brightness and contrast - bright-dark variation in reflections from the crown's facets);
- fire (rainbow colors from spectral dispersion); and
- scintillation (sparkle with movement).

It is important to recognize that there are several factors to bear in mind in diamond and colored stone cutting that often override cutting for maximum brilliance, fire and scintillation. We will see that chief among these is the necessity to cut the pavilion main angle a few degrees steeper than the gem's critical angle to avoid loss in brilliance due to 'windowing'. Other important considerations are 1. Cutting to obtain the best color. Of the colored gemstone's quality factors, it is often acknowledged that 'color is king'. 2. Cutting for best weight yield. With rare and expensive gem rough retaining every possible point of valuable weight may be an overriding goal. 3. Cutting to accommodate limitations in depth of facet rough. Cutting rough to obtain the largest face up size (called spread) often leaves insufficient depth necessitating a thinner crown or shallower than optimum pavilion. If the gem is purposefully cut with pavilion mains below the critical angle, with resulting windowing, for any of these reasons, the consequences are likely a lower appraised value and reduced salability. Appraisers valuing a cut gem take into consideration and report the percentage of windowing in a gemstone because of its mostly harmful effect on gem beauty.

The analysis tools and techniques used in this investigation, and in a series of four previous articles, are applicable to all gemstones, not only diamond. These tools and methods, reviewed below, are defined and their functions explained in the previous articles. They are:

- the spectral reflection pattern,
- reverse ray/beam tracing, and
- the 'eye of the round brilliant'.

REVIEW

Let us review these analysis tools and methods, and a few terms and concepts from the previous articles. This review can be skipped, especially by those who have read and are familiar with those articles.

THE GEMSTONE'S SPECTRAL REFLECTION PATTERN

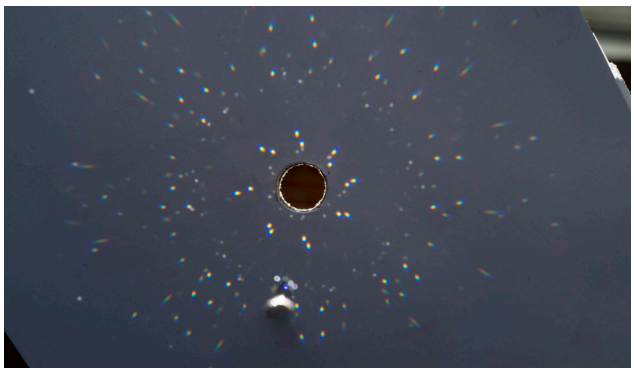


Figure 2. The spectral reflection pattern shown in this photo is generated by the narrow 0.53° beam of sunlight projected into the diamond (seen held below the hole), through the hole in the white board. Photo by Michael D. Cowing

A gemstone's spectral reflection pattern is produced by illuminating it with a narrow beam of light entering through a hole in a white card (or other flat screen). The Ideal cut diamond's spectral reflection pattern in Figure 2 utilized the narrow 0.53° beam of sunlight projected into the diamond through the hole in the white card. After two or more internal reflections the sunbeam emerged as a pattern of many tiny spectrums reflected and refracted back onto the white card.

The significance of the spectral reflection pattern is realized through understanding that it is identical to the reverse ray trace reflection pattern generated from the direction of an overhead viewer's eye.

REVERSE RAY TRACING

What is 'Reverse Ray Tracing'? Reverse ray or beam tracing is the analytical method used to discover and examine the properties of the 'virtual facets' that make up a gem's light performance. Unlike one dimensional mathematical rays, the rays in this work are three-dimensional bundles (beams) of parallel rays. The use of the word 'ray' in this article applies to both a ray and a beam.

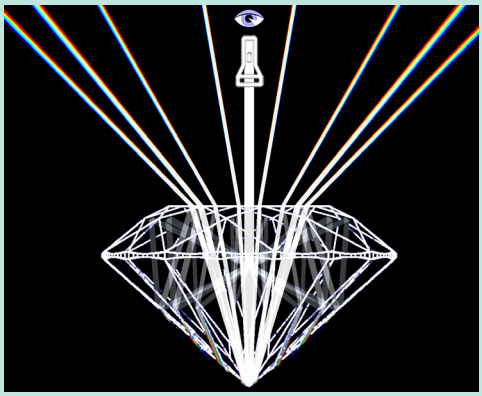


Figure 3. Example of reverse ray tracing the Ideal Cut (with Tolkowsky's 40.75° pavilion) using a light beam from the direction of the overhead viewer's eye, entering through the table reflection (TR) area. After two internal reflections from the 8 mains, the separated light emerges from the table at 45° in eight directions. Image by Michael D. Cowing using DiamCalc

The image in Figure 3 demonstrates the use of reverse ray/beam tracing to discover where in the diamond's surrounding, light is reflected to the overhead observer's eye from the 'virtual facets' that comprise the diamond's light performance. The reflection of the table seen inside the table (see Figure 4b & c) is composed of eight, small, pie-shaped 'virtual facets'. In the Figure 3 example, a beam the width of the diamond's table reflection is sent from the observer's eye position, entering within the table reflection. After two internal reflections from the 8 mains, the eight portions of the separated light beam emerge at 45° in eight directions. Those are the angular directions from where those 'virtual facets' reflect. There must be light in those directions for the eight 'virtual facets' in the table reflection to appear bright in the face up view.

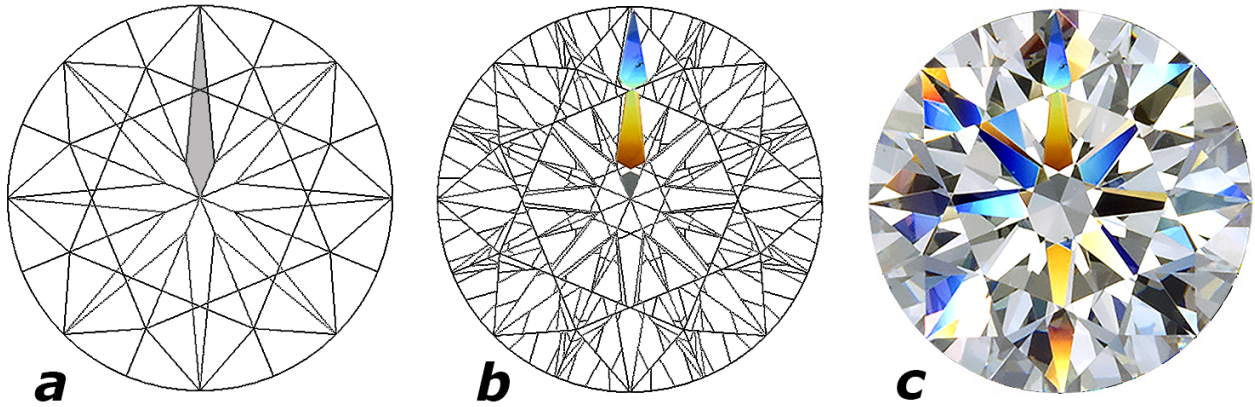


Figure 4. Face-up view of an 'Ideal' round brilliant. a. Wire frame outline of the diamonds 57 facets b. Outline of 'virtual facets' resulting from light interaction in doubly reflecting from the pavilion facets out through the crown. c. Photo of Ideal round brilliant displaying brilliance and fire emanating from these virtual facets.

VIRTUAL FACETS

What do we mean by 'Virtual Facets'? We can see from Figure 4 b and 4 c that there are many more reflections than there are facets. This is due to the breakup and division of light reaching the observer after twice reflecting from the diamond's pavilion. Because they give the appearance of more facets than are actually present, they are called 'virtual facets'. Each is a potential location of light, sparkle or fire as seen in the photo Figure 4c. These 'virtual facet' reflections are the fundamental elements of diamond beauty and light performance. An assessment of a diamond's light performance can be made through an examination of the individual and combined properties of these 'virtual facets'. Two main properties of these fundamental facet reflections are their size and the direction around the diamond from which they reflect. These properties are unique to each virtual facet.

EQUIVALENCE OF SPECTRAL REFLECTION PATTERN GENERATION AND REVERSE RAY TRACING

The spectral reflection pattern is the same pattern produced by reverse ray tracing. In reverse ray tracing a ray/beam is sent in reverse of normal light travel, from the position of an overhead observer's eye, along the gem's axis, and entering perpendicular to its table. This results in the same spectral reflection pattern radiating from the gem onto a flat or hemispherical white surface. We see that the spectral reflection pattern, and the reverse ray trace reflection pattern from an overhead viewer's eye are one and the same. As will be shown, this equivalence reveals the significance and usefulness of this pattern for gem facet design analysis.

IDEAL ROUND BRILLIANT CUT

Over the series of four previous articles, the analytical reasons were identified and demonstrated for the superior beauty and optical light performance of the Ideal round brilliant cut diamond. The proof of this best or ideal in round brilliant cutting is accomplished by demonstrating diminished beauty/light performance with deviations from the small range of angle combinations that historically are called Ideal. Today the facet angles of the sixteen pavilion and crown main facets, which have defined the Ideal in diamond cutting, are still the best, and are those that may attain both the top grades of Ideal 0 in the American Gem Society's (AGS) grading system, and Excellent in the Gemological Institute of America's (GIA) system. These articles reveal why the small range of Ideal round brilliant diamond design angles (of close to a 41° pavilion main angle and 34°-35° crown main angle), have not been surpassed in beauty and optical light performance, since they were first empirically found and cut over 150 years ago.

These previous articles on the Ideal or best 57-58 facet round brilliant cut design focused on diamond. However, where the goal is to maximize the attributes of gemstone beauty, this article demonstrates why the principal design elements, angles and proportions of the Ideal brilliant cut diamond also apply (with adjustment in crown angle for differing refractive indexes (R.I.'s) to the best round brilliant cutting in other gemstones. Information, demonstrations and discoveries from the four previous articles are included throughout this work. These articles are available on line to be referenced for further detail. They can be accessed and downloaded as printable pdfs at https://acagemlab.com/category/diamonds/cut-beauty-light-performance/

THE IDEAL ROUND BRILLIANT CUT FROM THE EARLY 20TH CENTURY AND TODAY

Figure 5. Early Ideal cut with its 16 dominant virtual facet reflections from the 8 large pavilion main facets. Photo by Michael D. Cowing

In studying the Ideal round brilliant's evolution starting in the 1860's with Henry Morse, and a half century later the contributions of Marcel Tolkowsky, we observe that the face up appearance of the early brilliant was dominated by 16 large virtual facet reflections from the eight pavilion main facets (Figure 5). Their large size was due to the shortness of the 16 pavilion halves (also called lower girdle or break facets) that make up the remainder of the pavilion. At that time the halves were cut 2° steeper than the mains, and extended 60% from the girdle toward the culet. This dominant influence of the mains on the diamond's appearance contributed to the Ideal being defined first and foremost by the crown and pavilion main angles. The beauty and light performance of the early ideal cut is largely due to the properties of the pavilion's 8 mains and their 16 large virtual facets, and their optical interaction with the crown mains (bezel facets). Those properties include their size and cutting angles, and their resulting optical interaction with the gemstone's illumination.

TRADE OFF BETWEEN FIRE AND SCINTILLATION DUE TO THE LENGTH OF THE 16 HALVES (LOWER GIRDLE FACETS)

During the 20th century the sixteen pavilion halves that constitute the remainder of the pavilion were gradually increased in length from 60% to 77% - 80% or more, with resultant increase in their area and influence on the diamond's beauty.

The appeal of this increase in the length of the halves was the increased amount of sparkle that larger/longer halves contribute to diamond beauty. However, a consequence of the increase in the halves was the resulting decrease in the size of the mains, and their desirable properties of larger flashes of sparkle and fire. This large flash fire and sparkle seen in the Figure 5 photo and the Figure 6 computer generated image was an important aspect of the appeal of the early round brilliant from the eras of Morse and Tolkowsky. A comparison of the diamond images of Figures 6 and 7 show the diminishment of fire, when only the lower half length is changed from the 60% of Morse and Tolkowsky to the 77% or more popular today. This is more apparent in the small inset images that are closer to typical sizes.

Notice that the early Ideal has the greater fire even though it has the same amount of dispersion and identical crown and pavilion main angles. Perception of greater fire in the early Ideal cut is due to the larger reflections from the sixteen main virtual facets. Retaining as much as possible the large flash fire and sparkle from the mains, despite their reduction in size, is accomplished in the modern Ideal cut by exact alignment of opposing mains. This optical symmetry results in what is today called 'hearts and arrows'

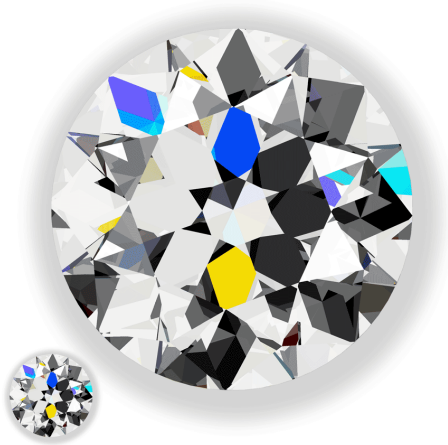


Figure 6. Computer image of the Ideal Cut diamond with 60% length of the lower halves. Image by Michael D. Cowing using DiamCalc

Figure 7. Computer image of the same Ideal Cut diamond of Figure 6, but with today's typical 77% lower halves. Image by Michael D. Cowing using DiamCalc

symmetry. Viewed face-up, as in the Figure 8 example, the eight rayed arrows pattern of exactly aligned reflections from the pavilion main facets is evidence of exceptional optical symmetry.

Figure 8. Ideal Cut diamond exhibiting exceptional optical symmetry, referred to as 'hearts and arrows', seen face up as the eight rayed arrows pattern of exactly aligned reflections from the pavilion main facets. Photo by Michael D. Cowing

The diminishment of the mains necessitates their optical alignment, so that the resulting facet reflections in the face-up view are not further reduced or broken up by misalignment. Fire occurs in the virtual facets from the halves, but it is smaller and less noticeable, coming from the halves' more numerous, but smaller facet reflections.

Tilting of the gemstone from face up changes the pattern of reflections. The article 'Round Brilliant Cut Beauty and Light Performance Part 2' makes the case that: 'Because diamonds are evaluated for beauty in the face-up viewing position, this normal viewing angle is of greatest importance. This most important viewpoint, looking at the diamond face-up, perpendicular to the table, is sufficient for analysis, as it is indicative of the quality of light performance as the gem is tilted and moved under examination by the viewer'. The superior brilliance of the 'Ideal Cut' is retained at typical tilts from the perpendicular, as seen in the Figure 9 photo.

Figure 9. Ideal Cut's retention of superior brilliance when tilted. Photo by Michael D. Cowing

Retention of superior brilliance at angles off the perpendicular is called superior 'tilt brilliance'. It is a property of the Ideal Cut owing to the Ideal's optimum combination of crown and pavilion main angles. Lesser quality round brilliants that face up with less than the Ideal's beauty fall off in light performance with tilting, remaining below the Ideal in beauty.

INNOVATIONS IN GEM FACET DESIGN

Early understanding of the best gemstone faceting angles centered around avoiding pavilion angles less than the gem's critical angle. Cutting below that angle results in light that enters the crown refracting out of the pavilion rather than doubly internally reflecting off the pavilion and back out of the crown to the overhead observer. Those pavilion facets cut below the gem's critical angle are darker areas of little or no brilliance. The observer sees a 'window' to under the stone rather than reflections of light from above, as the photo of an oval, pink sapphire with windowing in Figure 10 illustrates.

Figure 10. Example of 'windowing' in an oval, pink sapphire gemstone, where the background, not brilliance, is seen through the table area. Photo by Michael D. Cowing

This occurrence is best called windowing, but it is also referred to as light leakage. Avoidance of windowing was state of the art in faceting optics before 1975. An early exposition in the 1997 publication 'Color Encyclopedia of Gemstones' by Joel E. Arem explains the relationship between refractive index, critical angle, and pavilion main angle with the graph, Figure 11. He explains that to avoid windowing the pavilion angle must be a few degrees steeper than the critical angle. The critical angle (CA) is obtained from the gem's refractive index (R.I.) by the relationship, sin(CA) = 1/R.I., shown in the graph.

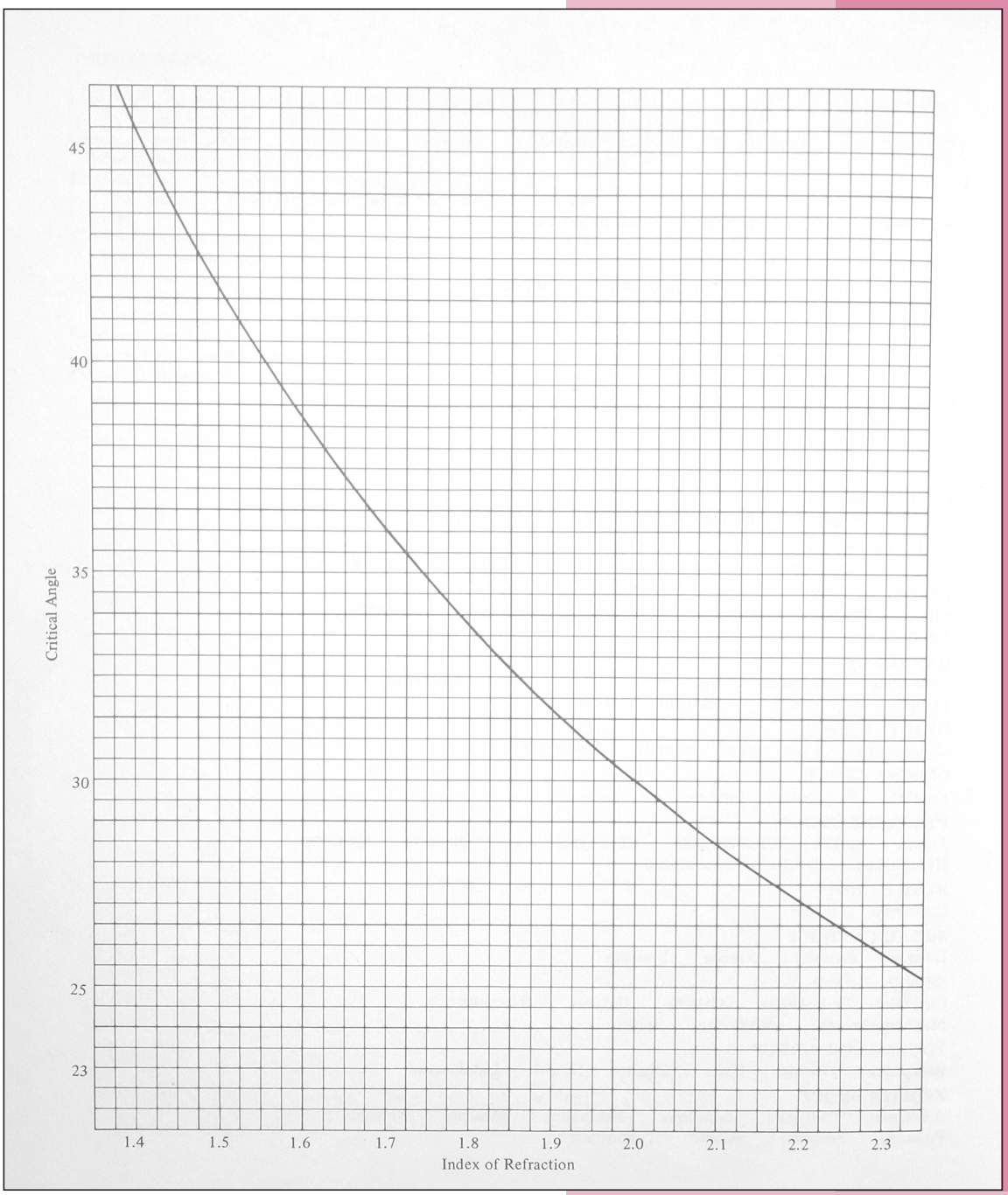


Figure 11. "Graph of index of refraction plotted against critical angle. ... This graph is most useful to the gem cutter for determining main pavilion angles. Maximum brilliance is achieved [by avoiding windowing] when the pavilion main angle is slightly greater [about 3 degrees] than the critical angle. This can be determined for any given gem material with a quick refractive index measurement on a polished surface prior to cutting the pavilion." Graph and explanation by Joel Arem from 'Color Encyclopedia of Gemstones'

In conclusion, it is necessary to cut pavilion main angles a few degrees above the gemstones critical angle in order to avoid the loss in brilliance due to windowing. But this is not sufficient for maximum beauty (maximum brilliance, fire, and scintillation). Further apparent limits on pavilion angle are discovered by studying the angles empirically found to be best through 'cut and try'. Since its publication in 1962 the 'Table of Facet Angles' in 'Facet Cutters Handbook by Edward J Soukup has been a primary source of the empirically found best angles for gemstones of various R.I.'s. Another source of these empirically found best angles for cutting the round brilliant is found in 'Faceting Made Easy' by Trevor Hannam. While substantially in agreement with Soukup's table there are differences that prove revealing about the underlying gemstone optics.

For ease of analysis both tables are combined and arranged by increasing R.I. in the table Figure 12.

Table of Facet Angles, Empirically Found Best by 'Cut and Try'

Gemstone	R.I.	Critical Angle	Bezel Main	Star	Upper Girdle	Pavilion Main	Lower Girdle	Source
Fluorite	1.43	**44**	43	28	48	45	47	Hannam
Opal	1.44/1.47	**43**	41	26	46	45	47	Hannam
Opal	1.45	43.5	41	26	45-47	45	47	Soukop
Glass	1.45 +	41	42	27	37	43	45	Hannam
Obsidian	1.48	**42.5**	42	27	46-48	43	45	Soukop
Feldspar	1.52	41	42	27	46-48	43	45	Soukop
Iolite	1.53/1.54	**40.4**	42	27	47	43	45	Hannam
Iolite	1.54	40.5	42	27	46-48	43	45	Soukop
Quartz	1.54/1.553	**40**	41	26	46	42	44	Hannam
Feldspars	1.56/1.57	**40**	42	27	47	43	45	Hannam
Amethyst	1.56	40	42	27	46-49	43	45	Soukop
Quartz	1.56	40	45	30	47-49	41	43	Soukop
Scapolite	1.56	40	42	27	46-48	43	45	Soukop
Beryl	1.56	**40**	42	27	47	43	45	Hannam
Beryl	1.57	39.5	42	27	46-48	43	45	Soukop
Lazulite	1.61	**38**	39	24	42	41	43	Hannam
Topaz	1.61/1.62	**38**	39	24	44	41	43	Hannam
Topaz	1.62	38	43	28	47-49	39	41	Soukop
Prehnite	1.62	38	43	28	47-49	39	41	Soukup
Tourmaline	1.63/1.65	**38**	39	24	44	42	44	Hannam
Apatite	1.63	**37**	39	24	44	42	44	Hannam
Tourmaline	1.64	37.5	43	28	47-49	39	41	Soukop
Andalusite	1.64	37.5	43	28	47-49	39	41	Soukop
Apatite	1.64	37.5	43	28	47-49	39	41	Soukop
Euclase	1.65	37.3	43	28	47-49	39	41	Soukop
Spodumene	1.65	37.31	43	28	47-49	39	41	Soukop
Peridot	1.65/1.69	**37**	39	24	44	42	44	Hannam
Peridot	1.65	37	43	28	47-49	39	41	Soukop
Phenakite	1.65	37	43	28	47-49	39	41	Soukop
Spodumene	1.66	**37**	39	24	44	41	43	Hannam
Spodumene	1.66	37	43	28	47-49	39	41	Soukop
Kornerupine	1.67	37	43	28	47-49	39	41	Soukop
Spinel	1.71/1.736	**36**	40	25	45	41	43	Hannam
Spinel	1.72	35.5	37	22	41-43	42	44	Soukop
Epidote	1.73	35	37	22	41-43	42	44	Soukop
Chrysoberyl	1.74	35	37	22	41-43	42	44	Soukop
Chrysoberyl	1.74	**34.5**	39	24	44	42	44	Hannam
Pyrope	1.74/1.75	**35**	38	23	43	41	43	Hannam
Grossular Garnet	1.742/1.748	**35.5**	38	23	43	41	43	Hannam
Garnet (Violet-Red)	1.75/1.76	**34.8**	35	20	40	39	41	Hannam
Corundum	1.76	34.5	38	23	43	42	44	Hannam
Corundum	1.76	34.5	37	22	41-43	42	44	Soukop

Gemstone	R.I.	Critical Angle	Bezel Main	Star	Upper Girdle	Pavilion Main	Lower Girdle	Source
Almandine Garnet	1.76/1.83	**33.5**	38	23	43	41	43	Hannam
Garnet	1.77	34.5	37	22	41-43	42	44	Soukop
Zircon (Low)	1.78-1.84	33	37	22	41 -43	42	44	Soukop
YAG	1.83	**33**	37	22	42	40	42	Hannam
Demantoid Garnet	1.88	32.13	43	28	45-49	40	42	Soukop
Zircon (High)	1.93-1.98	31	35	20	39-41	41	43	Soukop
Zircon (High)	1.99	**30.2**	35	20	40	41	43	Hannam
Cassiterite	1.99	30.2	35	20	39-41	41		Soukop
Cubic Zirconia	2.16	**27.4**	35	20	40	41	43	Hannam
Sphalerite	2.37	**25**	35	20	39-41	41	43	Soukop
Strontium Titanate	2.41	**24.5**	35	24	40	41	43	Hannam
Diamond	2.42	24.4	35	20	39-41	41	43	Soukop
Titania (Synthetic)	2.9	**20.2**	32	15	34-36	41	41.5	Soukop

The graph Figure 13 from the angle data in Figure 12 makes this analysis much clearer. The graph shows the critical angle, in orange, of the Figure 12 gems as their R.I. increases, as in Arem's graph in Figure 11. The best pavilion main angles for each gem are graphed in blue.

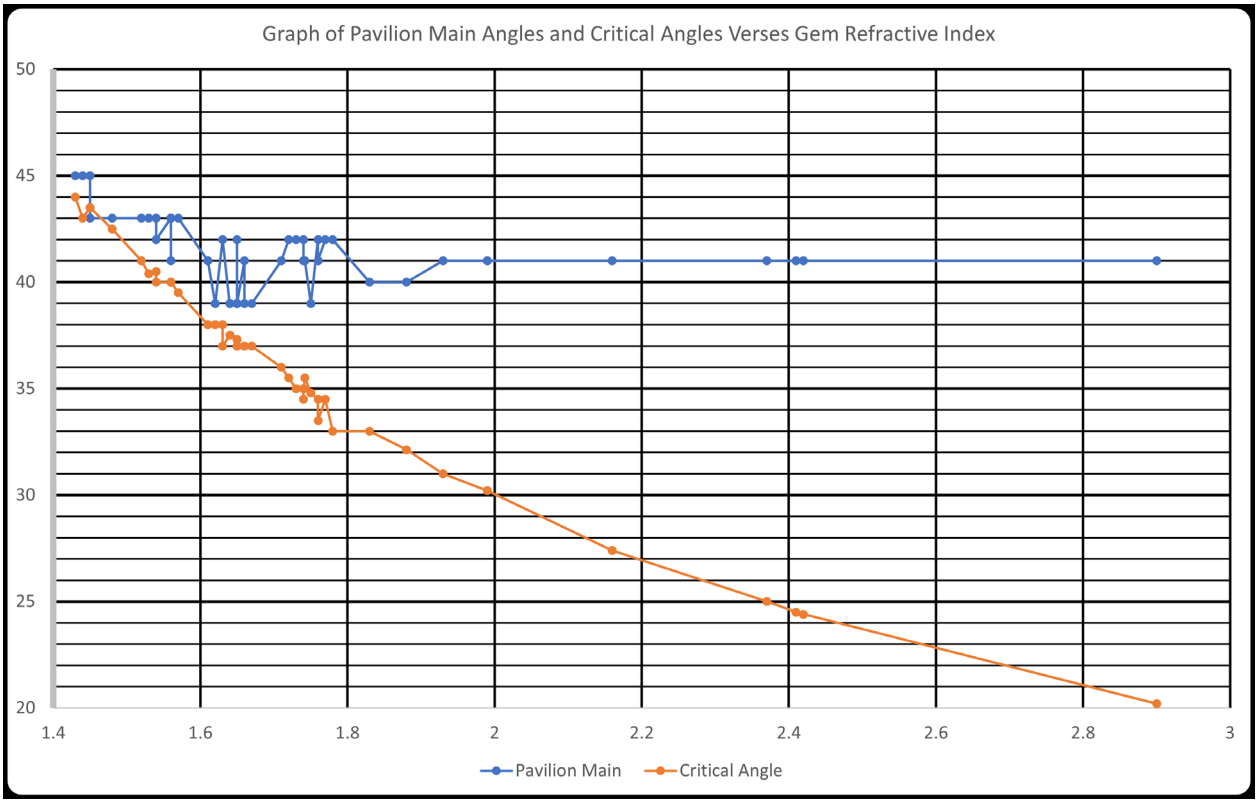


Figure 13. Graph of empirically found best pavilion main angles for gems of different R.I.'s.

We see through analysis of this Figure 13 graph from the Soukup and Hannam tabulated data that: After you get above the 1.62 R.I. of Topaz, with critical angle 38°, you find that the most often best pavilion main angle is 41°, and the next most often is 42°, with no angles above 42°. Below 1.62 R.I. the critical angle is within 3° of 41°, and avoiding major windowing becomes the overriding factor pushing the chosen pavilion main angle to 43°, and for fluorite and opal to 45°. Pavilion main angles 43 and above prove harmful to gemstone beauty. These non-optimal angles are an attempt to reduce the detrimental effect of windowing.

THE WHY BEHIND THE BEST PAVILION MAIN ANGLES FOR MAXIMUM GEM BEAUTY

We have seen that 'the empirically found best gem design angles have close to the same 41° - 42° pavilion main angle despite the various gemstone's differing refractive indices (RI's).'

Why is close to a 41° pavilion main angle best for both diamond and other gems?

To understand why a close to 41° pavilion angle is best requires the concept of the 'round brilliant's eye'. Originally formulated for diamond and called the 'diamond's eye', this concept holds true for all gems, because it is independent of a gem's refractive index (R.I.).

We observe from Figure 14 that the pattern of virtual facet reflections seen in the face-up view of the round brilliant cut naturally separates into three concentric rings with properties that resemble an eye, 'the eye of the round brilliant'. These eye-like rings are most easily observed in gems with excellent optical symmetry (each pair of main facets perfectly mirror each other, See photos Figure 14 and Figure 15 (Row a/Column 1)). With a little practice they usually become evident in the face-up view of the gem. (The table edge separating the iris from the whites is easily located. The sometimes difficult to identify border edge of the table's reflection can often be located by centering it in the table, and finding the butterfly shaped pairs of star facet reflections that surround and mark the table reflection boundary.)

THE ROUND BRILLIANT'S EYE

The significance of the analogy to an eye is that the center ring, which is the table's reflection (TR), dilates like the human eye's pupil when the round brilliant is cut with a pavilion that is steeper than 41°. When a brilliant cut's pavilion main angle is cut close to 41°, the gem's pupil (the table reflection), will be small, about a third the size of the table (ranging from about 29% to 35%). A steeper pavilion results in a dilation of the table reflection. The table reflection expands and begins to dominate the table area diminishing the important iris (blue ring) area. The properties of light return from the table reflection are inferior to those of the middle ring (iris).

Consequently, as the table reflection dilates with greater than 41° - 42° pavilion main angles, the brilliant cut's beauty/light performance diminishes.

ANALYSIS OF THE ROUND BRILLIANT'S LIGHT PERFORMANCE IN THE TABLE REFLECTION

Analysis of the table reflection (TR), the pupil of the brilliant's eye, is fundamental to an understanding of brilliant cut light performance, especially in regard to why 41° - 42° pavilion main angles are the best for diamond and other gemstones.

Figure 15 summarizes the analysis of effects on gem light performance due to the increasing table reflection (TR) when a pavilion is cut steeper than 41° - 42°. The reverse ray tracing in Figure 15 (Row c) analyzes the dilating table reflection area.

Dilation of the table reflection is seen in Figure 15 - row a and b, as the pavilion angle increases from 40.75° to 42.75° and 44.75°. By the time the pavilion angle reaches 44.75°, Figure 15 (Column 3), the table reflection has dilated to fill the table, which has turned dark due to reflecting from the observer's head. The important middle ring iris is gone.

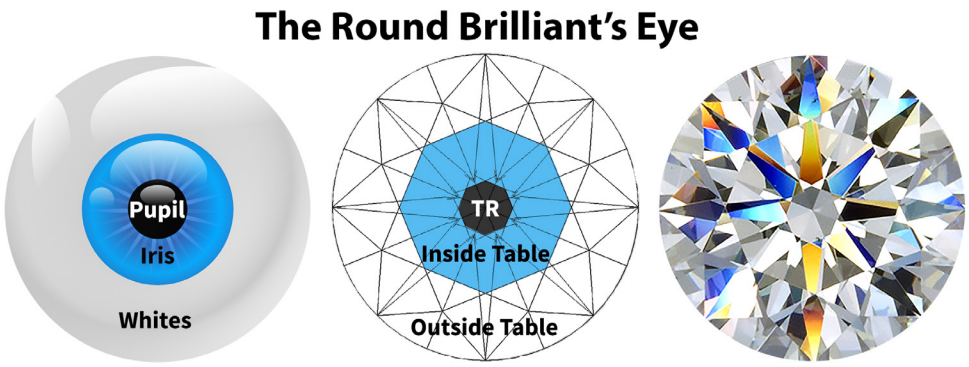


Figure 14: From the center to its girdle, the round brilliant reflection pattern has three identifiable rings of light reflection that have properties resembling an eye. In the center of the brilliant cut is an octagonal, grouping of 8 pie-shaped reflections (colored black.) This octagonal grouping is a reflection from the pavilion main facets of the octagonal table. This center table reflection (TR) is the pupil of the brilliant's eye. The remainder of the reflection pattern that is seen inside the table's edge is the middle ring and is colored blue. It corresponds to the iris. The third or outer ring is all the facet reflections seen outside the table. This corresponds to the 'white of the eye'. Photo and images by Michael D. Cowing

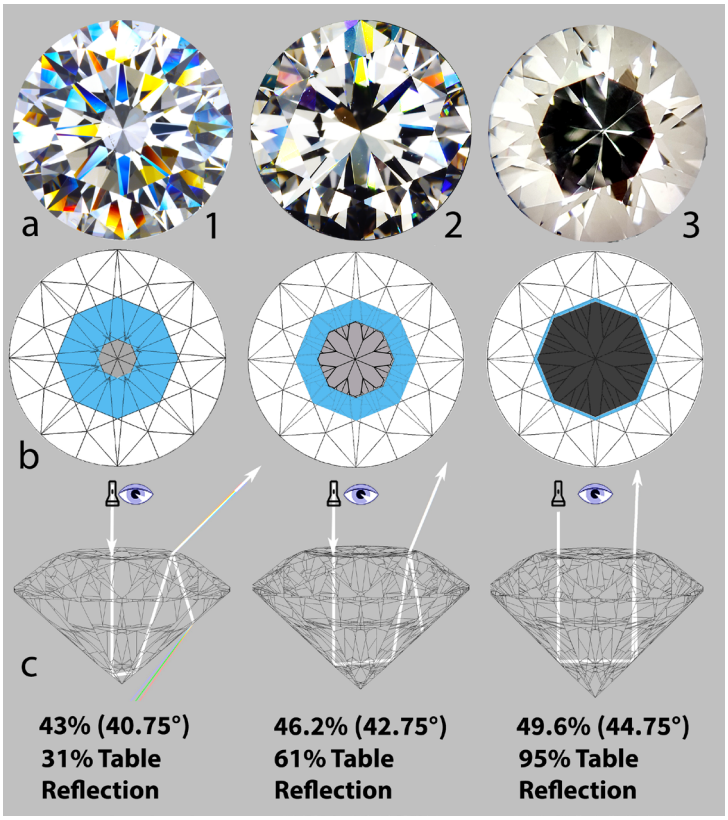


Figure 15. Analysis with photographs of effects on gem light performance due to a pavilion that is cut steeper than the narrow 41° - 42° range. Although shown with diamond, the TR dilation is the same for other gems, because this optical effect is independent of the gem's R.I. An example is the colorless chrysoberyl, (Row a/Column 3), which was cut with a pavilion angle near 45°. Row (a) diamond and gem photography by Michael D. Cowing. Rows (b) and (c) are images created by Michael D. Cowing using DiamCalc.

THE NAILHEAD ROUND BRILLIANT GEMSTONE

Gems with a dark table due to a deep pavilion are called nailheads. This same table reflection dilation occurs in gems of R.I. different from diamond, because this dilation occurs independent of a gems R.I. Examples are the colorless chrysoberyl, Figure 15 (Row a/Column 3), which was cut with a pavilion angle near 45°, and the peridot, Figure 16, cut with 45° pavilion main angle.

As the table reflection fills the table, instead of the light seen in it reflecting from the 45° direction, as in the Ideal, Figure 15 (Row c/Column 1), it instead reflects from high angles approaching 90° and the viewer's head, as in Figure 15 (Row c/Column 3). The viewer's head obstructs illumination from high angles resulting in a darkening of the whole table.

It is important to note that as the gem is tilted sufficiently, the nailhead effect goes away. The lower the R.I. the sooner it goes away. Also, in round brilliants cut with tables under 50%, as was the norm in the 1800's, the relative darkness of the small table is less apparent and goes away with less tilt than that of today's round brilliants with 53% - 59% and larger tables.

Figure 16. Nailhead round brilliant peridot cut with 45° pavilion main angle.

Well before a pavilion angle of 45°, and above 41.75°, the table reflection has dilated to a degree that reduces the important iris-like middle ring, diminishing its contribution to diamond beauty. By 42.75°, less than 2° steeper than Ideal, the table reflection has dilated to fill two-thirds of the table diameter. An example of the consequent reduced light performance can be observed in the diamond in Figure 15 (Row A/Column 2), which has roughly a 2/3 table reflection. The expanding table reflection with its poorer light return properties and the resulting reduction in iris area is a principal reason a diamond with pavilion angle greater than 41.75° is not graded an AGS 0 Ideal or a GIA Excellent.

This analysis of the 'eye of the round brilliant' has demonstrated why close to 41° and not over 42° is the small range for best round brilliant beauty/optical light performance for gemstones of all refractive indices.

The gemstone's eye analogy has shown why 41° - 42° pavilion main angles were found best by empirical, 'cut and try'. This optical effect is the same for gems of all R.I.'s, because table reflection dilation is independent of the gemstone's R.I.

DETERMINATION OF PAVILION MAIN ANGLE FROM THE TABLE REFLECTION PERCENTAGE

The dilation of the table reflection with increasing pavilion angle, because it is independent of R.I., is useful for determining the pavilion angle, not only in diamond, but other gems of different R.I.'s as well. When examining a diamond or other gem, measuring the table reflection percentage of the table diameter is a reliable indicator of pavilion main angle. Because the table reflection percentage is independent of a gem's R.I., the Figure 17 diamond chart is just as useful for estimating the pavilion angle of all gems from their table reflection. In addition to the pavilion main angle, the gem's overall depth has a smaller influence on the TR percentage. Because girdle thickness is part of the overall depth, variation in girdle percentage has a small effect on TR. The two rows of diamonds in Figure 17 have total depth differing by 7% showing the influence of depth on the TR. Greater total depth, shown in the second row, reduces the table reflection percentage. By using the row with

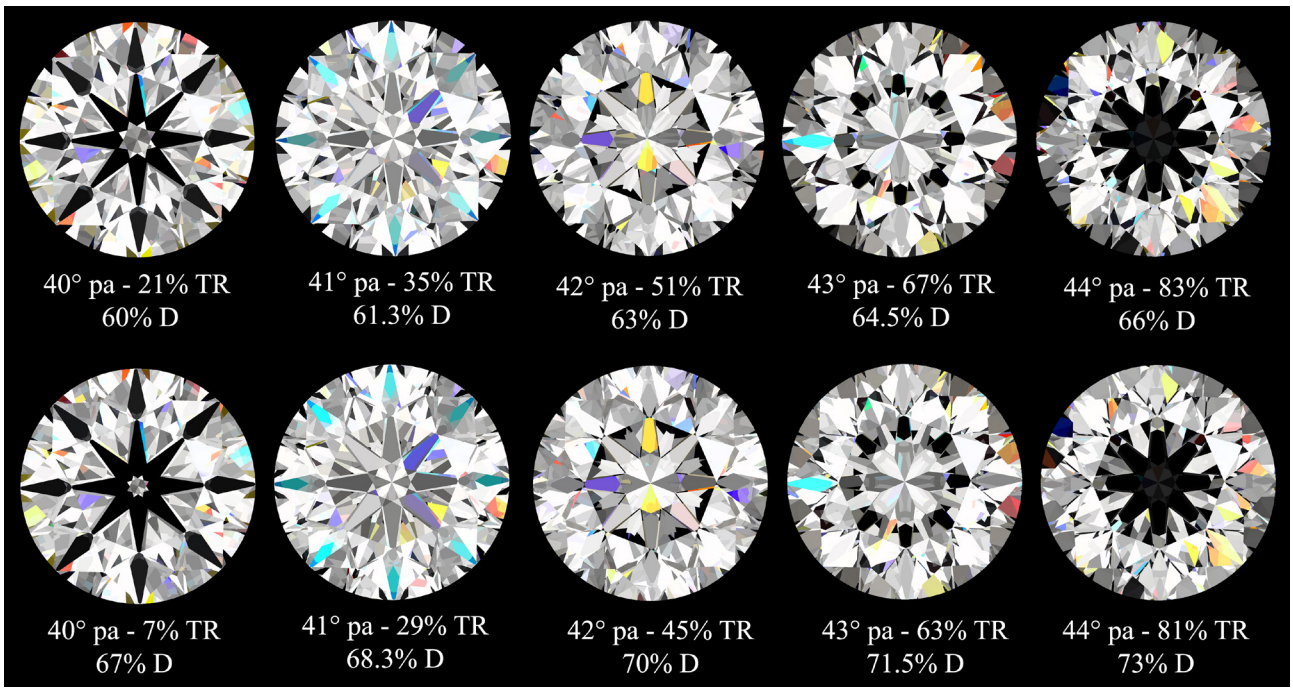


Figure 17. Chart relating table reflection percent to the pavilion main angle for diamond and all gems. This relationship is the same for all gem materials, because it is independent of the gem's R.I. There is a lesser influence on TR % by total depth, as shown by the second row of diamonds that have 7% greater depth. Diamond images by Michael D. Cowing using DiamCalc

depth percentage closest to that of the gem being measured, the angle estimation accuracy is improved.

Figure 18 contains six colored stones all with different R.I.'s. These gems were faceted by Gary Braun of Finewater Gems (www.finewatergems.com) with the highly accurate XS3 faceting head built by Jon Rolfe. The XS3's advertised accuracy, with proper calibration, is 1/100 degree. Gary is also the photographer of these gems.

These examples exhibit the accuracy obtainable in determining the pavilion main angle by measuring each gem's table reflection percentage and total depth. The Figure 17 chart of computer-generated diamond images was used to calculate pavilion angle from table reflection percentage with good accuracy in these 6 gemstone examples. The method, which is shown to produce accuracy within a third of a degree in these examples, is to interpolate the TR % and resulting pavilion angle using the row of diamonds with depth closest to that of the gem being measured. The estimates of a. 4.05ct spessartite garnet, b. 3.19ct spinel and c. 2.60 ct lab-created sapphire were exact. The estimates of e. 9.20ct YAG garnet, and f. 3.24ct citrine quartz were within 0.2° accuracy.

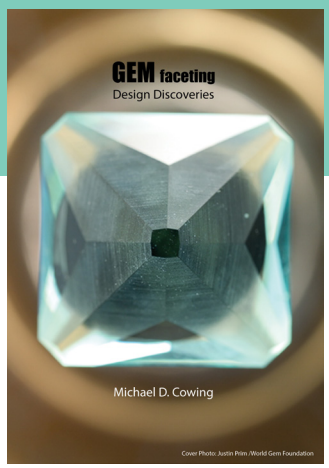
SUMMARY

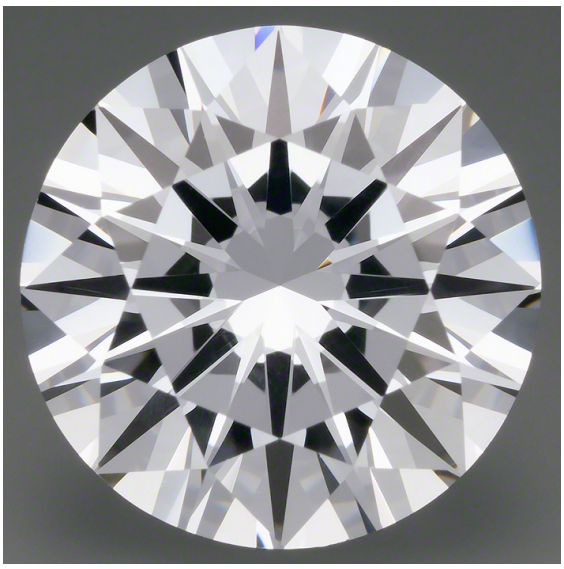
The analysis of the 'eye of the round brilliant' is the evidence demonstrating why close to 41° and not over 42° is the small range for best round brilliant beauty/ optical light performance for gemstones of all refractive indices.

Braun's real faceted gems along with the real nailheads in Figures 15 & 16, all with different R.I.'s, are further real-world validation supporting why this small range is best/Ideal.

EDITORS RECOMMENDATION

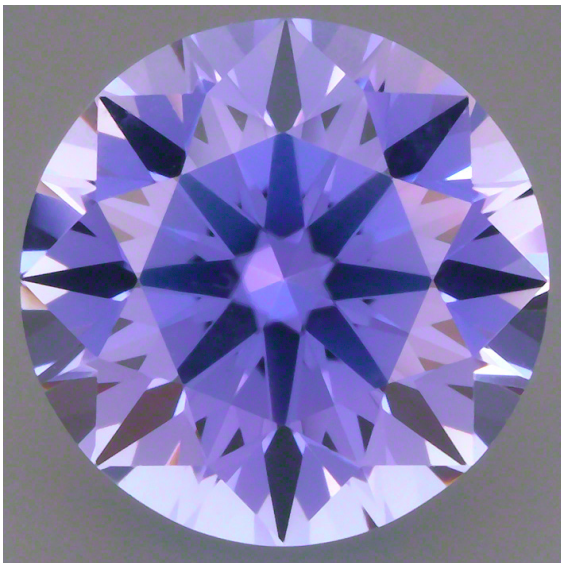
Due to space limitations, the preceding article is an excerpt from a larger article written by Michael. To download the full version, click on the image below.





Gemstone	YAG
Carat Weight	9.20 carats
Dimensions	12.00mm x 7.80mm
Refractive Index	1.83
Total Depth %	65%
Pavilion Angle	41.75 o
Crown Angle	35.5 o
Table Reflection	44% TR = 41.94 Pavilion Angle

Gemstone	Spessartite Garnet
Carat Weight	4.05 carats
Dimensions	9.40mm x 6.10mm
Refractive Index	1.81
Total Depth %	67.5%
Pavilion Angle	41.75 °
Crown Angle	35.5 °
Table Reflection	42% TR = 41.8 Pavilion Angle



Gemstone	Lab-created Sapphire
Carat Weight	2.60 carats
Dimensions	8.00mm x 5.50mm
Refractive Index	1.76 to 1.77
Total Depth %	69%
Pavilion Angle	41.0 °
Crown Angle	42.0 °
Table Reflection	28% TR = 41.0 Pavilion Angle

Gemstone	Spinel
Carat Weight	3.19 carats
Dimensions	8.90mm x 5.60mm
Refractive Index	1.72
Total Depth %	63%
Pavilion Angle	41.75 °
Crown Angle	35.5 °
Table Reflection	41% TR = 41.75 Pavilion Angle

Gemstone	Tourmaline
Carat Weight	1.74 carats
Dimensions	8.00mm x 5.00mm
Refractive Index	1.62 to 1.64
Total Depth %	62.5%
Pavilion Angle	41.75 °
Crown Angle	35.5 °
Table Reflection	42% TR = 41.44 Pavilion Angle

Gemstone	Citrine Quartz
Carat Weight	3.24 carats
Dimensions	10.00mm x 6.70mm
Refractive Index	1.54 to 1.55
Total Depth %	67%
Pavilion Angle	41.25 °
Crown Angle	35 °
Table Reflection	36% TR = 41.44 Pavilion Angle

Figure 18. The pavilion main angle is accurately estimated in these gems of different RI's from the table reflection percentage of table diameter using the Figure 17 chart for diamond. Faceting and photos by Gary Braun of Finewater Gems (www.finewatergems.com)

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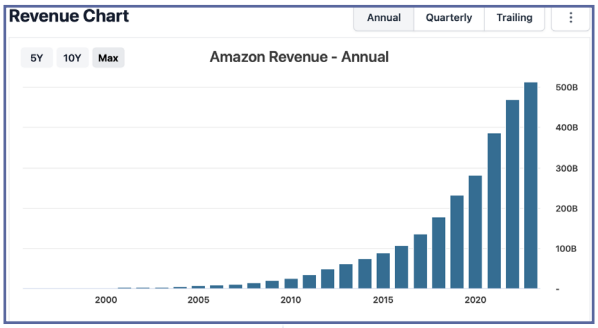
JUNGLE stories

The Dark Side of Amazon

It is hard not to be impressed by the phenomenon known as Amazon.com. Founded on July 5, 1994, in the garage of his rented home in Bellevue, Washington by Princeton graduate Jeff Bezos, Amazon is now the fifth largest company in the world with sales revenue of $ 554.03 billion (September 30th, 2023).

Along the way, Amazon has morphed into an e-commerce giant involved in a wide range of areas including retail, publishing, streaming services, web services, consumer technology, healthcare, food retail and grocery delivery services, third-party seller services, and subscription services.

Since its inception, Amazon has never posted negative sales growth and while 2022 marked Amazon's lowest growth rate (9.40%), it should be noted that this was based on sales of $ 469.82 billion the previous year.



While this is impressive by any standards, running a company of this size is fraught with potential problems, amplified by the fact that much of the 12 million products offered through their online platforms are supplied by third-party vendors.

While Amazon have made numerous statements regarding their commitment to combatting fraud, one would be naïve to believe that it is possible to police so many vendors.

In 2020, Amazon introduced a new system aimed at validating the identity of third-party sellers through video conferencing. The initiative was part of a wider range of seller-verification processes that included a proprietary machine learning system designed to vet sellers before they were allowed online. The system analyzes hundreds of different data points to identify potential risk, including verifying whether the account is related to another account that was previously removed from the marketplace. They also claim that sellers' applications are reviewed by trained investigators before being approved and that in 2019 alone, these combined safety measures prevented 2.5 million suspected bad actors from publishing their products to Amazon.

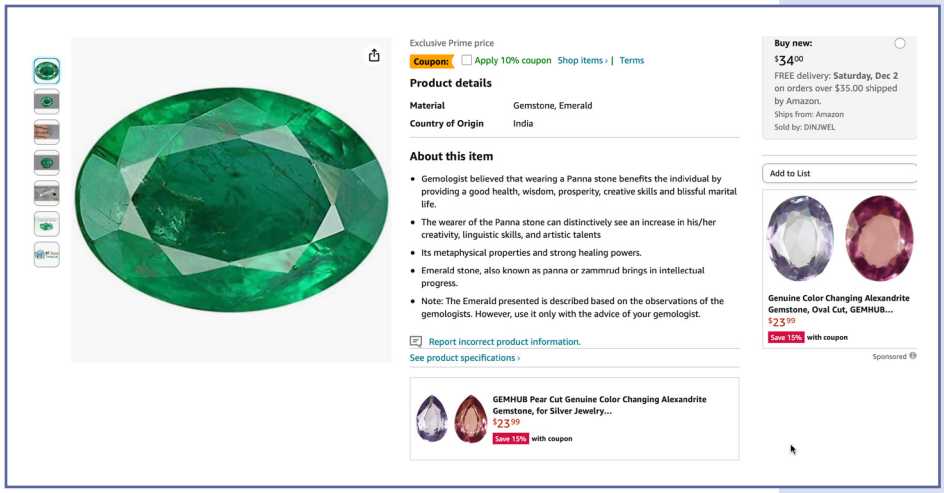
However, the issues of counterfeit and fake items, and consumer scams continue to haunt the online retailer. While in the past Amazon was accused of avoiding issues involving fraud, it has recently pledged to spend billions to address the problem and has inserted itself into legal battles with fraudulent sellers and counterfeiters in recent years. For example, it filed three lawsuits in 2018 in partnership with fashion designer Vera Bradley and mobile accessories maker Otterbox over counterfeits. It has also sued sellers buying fake reviews and others involved in the fake review industry.

Recently, Amazon announced an initiative called Project Zero, which introduced a range of tools for brands to use to help Amazon fight fraud. The brands can opt to provide Amazon with their logos, trademarks, and other key data, allowing the retailer to scan its billions of product listings to find suspected counterfeits more proactively.

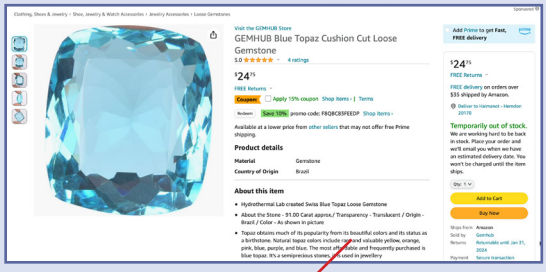
Another tool, serialization, allows brands to include a unique code on their products during manufacturing, which can later be scanned to verify that a purchase is authentic. This tool, now known as 'Transparency', expanded to other markets including Europe, Canada, and India.

WELCOME TO THE JUNGLE

While these initiatives can help combat fraud in certain situations, when it comes to buying gemstones, it is extremely difficult. Backed by 'fake' certificates, Amazon's only line of defence is consumer feedback and consumer fightback. With so many gems offered



Sadly, most the items were not only fraudulently misrepresented but also included information that was incorrect. For example, topaz is NOT commercially synthesized due to the low prices realised for natural stones that have been irradiated and heat treated. The 'About this Item' talks about hydrothermal lab created Swiss Blue Topaz but then states its' origin is Brazil.



In this posting, they honestly want us to believe that you can purchase an 8.65 carat star ruby for under $ 35 USD?

About this item

- Hydrothermal Lab created Swiss Blue Topaz Loose Gemstone
- About the Stone - 91.00 Carat approx./ Transparency - Translucent / Origin - Brazil / Color - As shown in picture

I am not sure who their 'Expert Gemologists are but clearly, they are not experts.

and a majority in the under $ 100 price point, few end-consumers will ever pay to have their purchases verified by a trained professional. This means that most of these fraudulent practices will go unnoticed, flying far below the 'Amazon' radar. The sellers know this and exploit it. How much time are you likely to invest complaining that a $ 10 blue sapphire is actually a piece of worthless blue glass? Product descriptions are also finely scripted to give the impression of openness and transparency while in reality, they are simply written to deceive (see above example).

Recently, we decided to test the waters to see not only what was being offered through Amazon.com but also if the items were authentic or not.

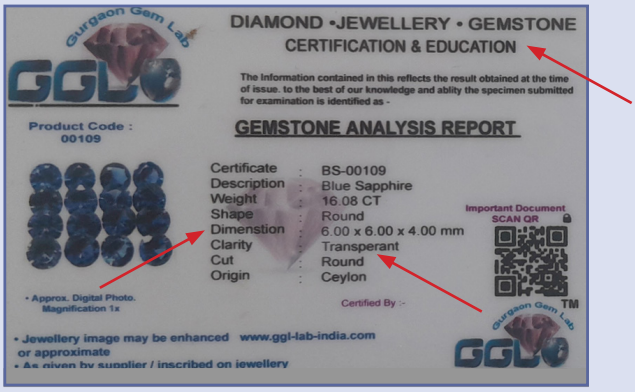
To the trained eye, it was not hard to spot the fraudulent vendors. The 4.25 carat natural emerald (described above) at $ 34 stood out immediately. When the stone arrived, it had a credit card size certificate from WORLDTRUST GEMs TESTING LABs and a QR code that went nowhere. Simple testing revealed that it was dyed green quartz. Attempts to alert other buyers by posting feedback were met with the following prompt from Amazon.com. Who is the wrongdoer here? Amazon never did respond to our emails!

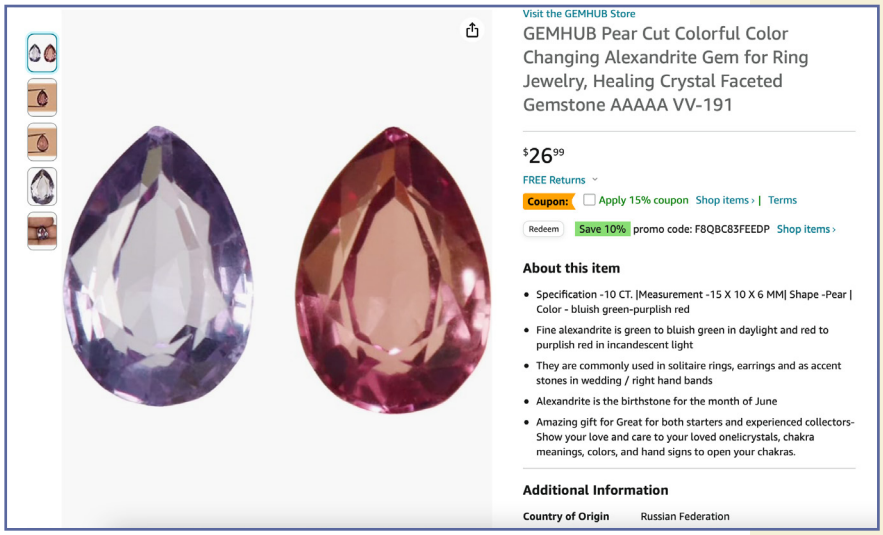
About this item

- Star ruby is a sub-variety of traditional ruby which is the red colored member of the corundum group. Ruby is closely related to sapphire and thus shares many gemological properties such as hardness, composition and double refraction. Many people like to keep these types of gemstones to improve their home decor which gives a great impression and always keeps positive vibes near you.
- The quality of a red star ruby is determined by its color, cut, and clarity, which, along with carat weight, affect its value. The brightest and most valuable shade of red called blood-red or pigeon blood, commands a large premium over other rubies of similar quality. Many craftsmen use this type of red star ruby to enhance the natural beauty of their ornaments and this gives a unique look to their crafts goods as well.
- There are some quite unique and beautiful pieces being sold at reasonable prices. It is highly beneficial to help relationships and this may benefit your love life. In addition its overall energy has many strong and useful qualities. These stones will calm upset emotions and create positive vibrations, to help you bypass blocks that are holding you back from your potential good.
- Our Expert gemologists verified this Red Star Ruby which passed many quality base tests and get stone certified through which we are completely assured of Top Quality Gemstone. Only after that, we deliver stones to you because we also, care about your loved ones.
- Perfect For: Jewelers, Jewelry makers, Goldsmiths, Designers, Craftsmen, Collectors or a gift for the special one. Each and every stone is unique and you will receive ones similar to the image shown.

We apologize but Amazon has noticed some unusual reviewing activity on this account. As a result, all reviews submitted by this account have been removed and this account will no longer be able to contribute reviews and other content on Amazon. If you would like to learn more, please see our community guidelines. To contact us about this decision, please email community-help@amazon.com

Knowing full well that they were not going to be real blue sapphires, we purchased this lot of ten blue stones to see exactly what they were. Interestingly, four were synthetic blue spinels while the other six were blue glass! Clearly the seller does not even know what they are buying!

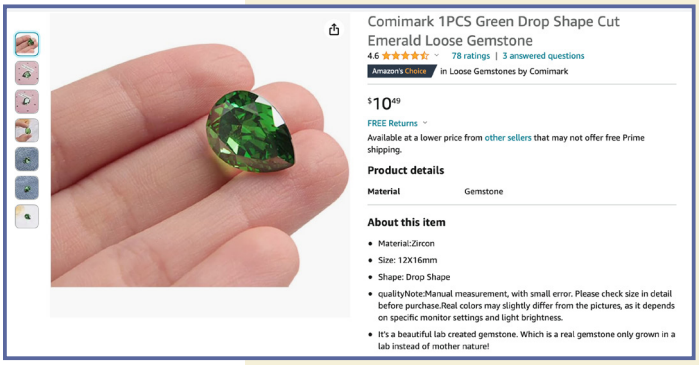




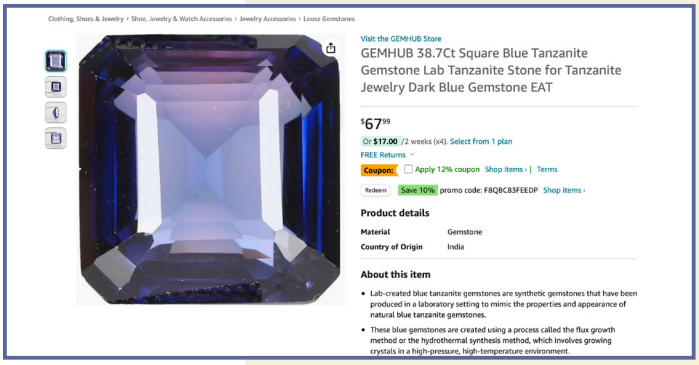
What about a 67.60 carat Brazilian alexandrite for $ 13 USD? Funnily enough, they tug at your heart strings by noting that alexandrite is a 'gift stone' for a 55th wedding anniversary. That translates to 23 cents a year! Now that is TRUE LOVE!

A 'knowledge' of the price of natural alexandrite will easily help you to spot this fake. A 4.99 carat natural alexandrite will wholesale for between $ 5,000 USD per carat (Good) to $ 60,000 USD (Extra Fine) per carat! The one featured in this posting is 10 carats!

Comimark really are not sure what they are selling. Is the emerald a zircon or is the emerald a cubic zirconia? I love the caption ' It's a beautiful lab created gemstone. Which is a real gemstone only grown in a lab instead of mother nature!'

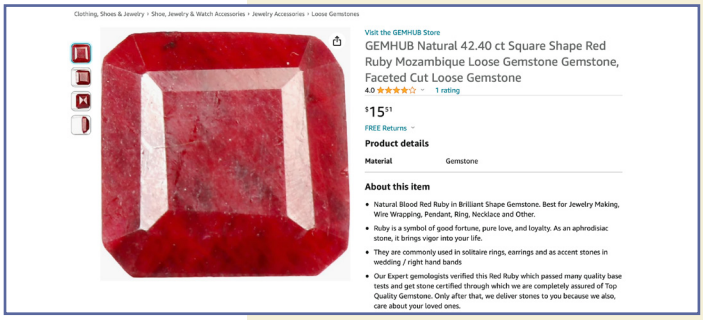


How about a 38.70 carat lab tanzanite? First of all, while it correctly identifies it as a lab created stone, there is no lab created tanzanite so there notation in the 'About this Item' regarding lab-grown tanzanite having the same properties as natural tanzanite is false. If we are lucky, it will be lab created forsterite but it could also be cubic zirconia.



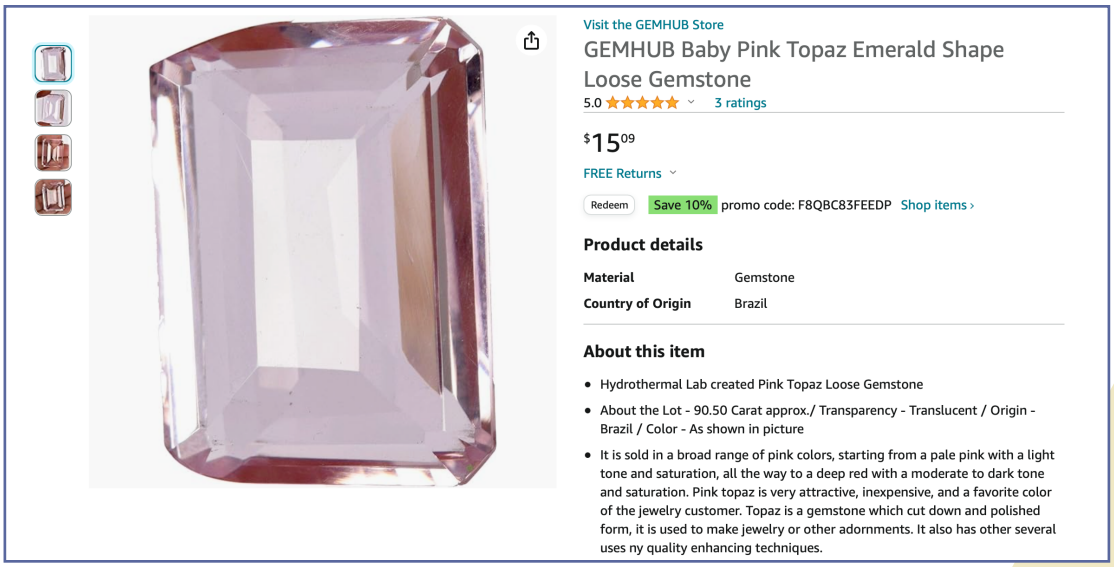
- Lab-grown blue tanzanite stones or lab grown gemstones have the same chemical composition, crystal structure, and physical properties as natural blue tanzanite gemstones. However, tanzanites are usually less expensive than natural blue tanzanite gemstones, since they can be produced in large

How about a 42.40 carat Mozambique ruby for $ 15.51 USD and the completely ridiculous notation in the 'About this Item' that claims their 'Expert' gemologists have certified this stone as a TOP QUALITY gemstone. I can only imagine how much 'glass' is in this stone. It is probably the only thing holding it together.



If you are in the market for a 90.50 carat hydrothermally grown pink topaz, then this stunning stone can be yours for only $ 15.09 USD. Again, topaz is not commercially available synthetically grown so what is it? Glass?

We love the fact that they really do want you to pay the additional 9 cents!



SUMMARY

All of these 'steals' were found within one hour of surfing the amazon.com website. Clearly, these companies know no shame when it comes to ripping off their customers. Do Amazon care? Apparently not. Where there is money to be made, morals often fly right out of the window. It is a shame that consumers are being fooled by these fraudsters but then again, there is a reason some wise person coined the phrase 'Buyer Beware'

From our standpoint, these treasures make wonderful study stones but that still does not absolve the sellers or Amazon from their responsibility to provide accurate and concise information for their customers.

Finally, a 96.10 carat Brazilian hydrothermal red topaz for $ 35 USD. According to the seller, this stone would make a perfect gift for your best friend. As the saying goes 'with friends like you, who needs enemies!

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.

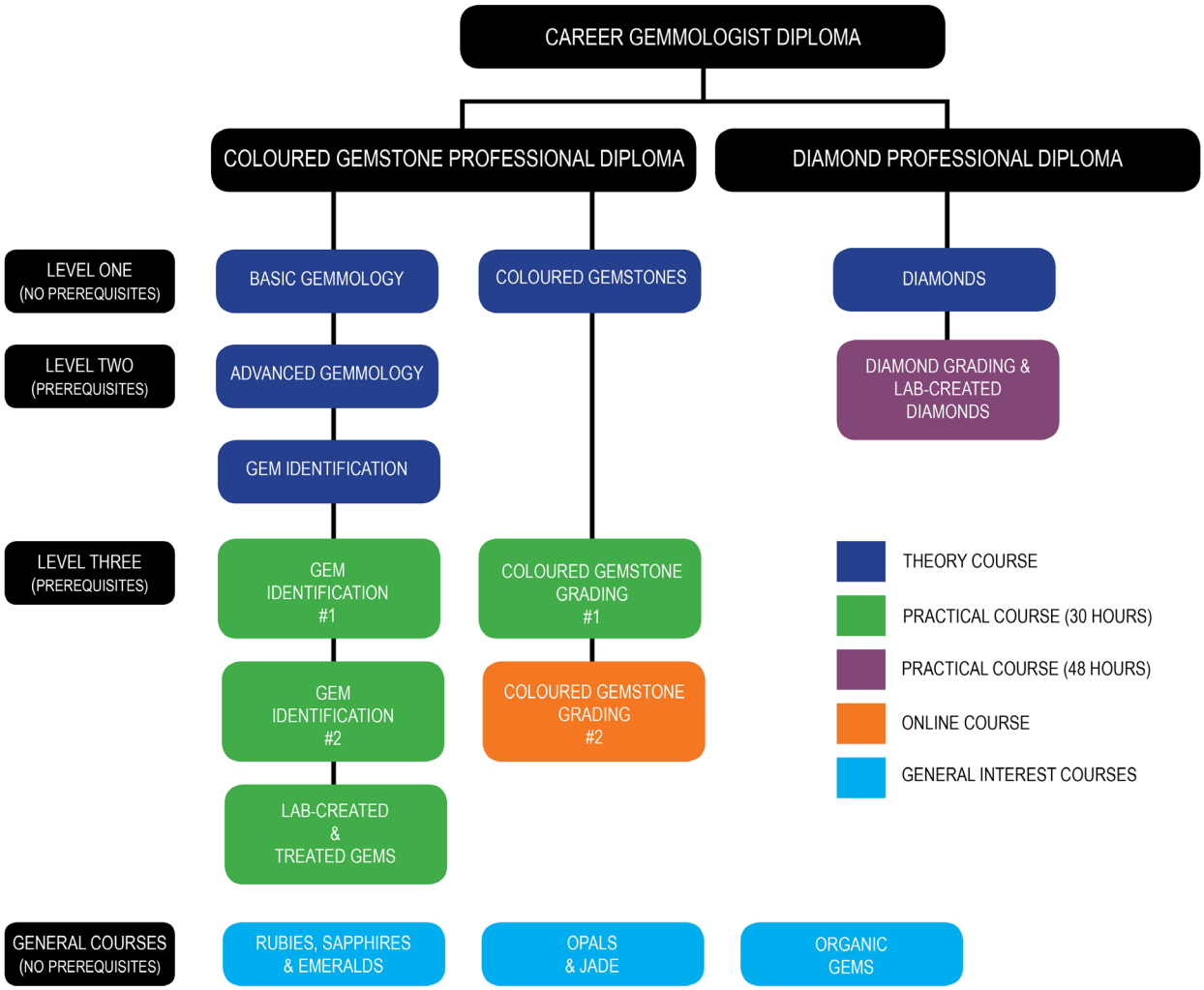
COURSES IN OTHER LANGUAGES

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

Your
passport
to explore
the world, offering
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.

CAREER GEMMOLOGIST RESIDENCY PROGRAM CURRICULUM

For more information, please click here

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
Organic Gems	50	45	55

ALL PRICES QUOTED FOR THEORICAL COURSES ARE FOR DIGITAL ACCESS

REMEMBER.....Studying should also be FUN!

Article Submissions

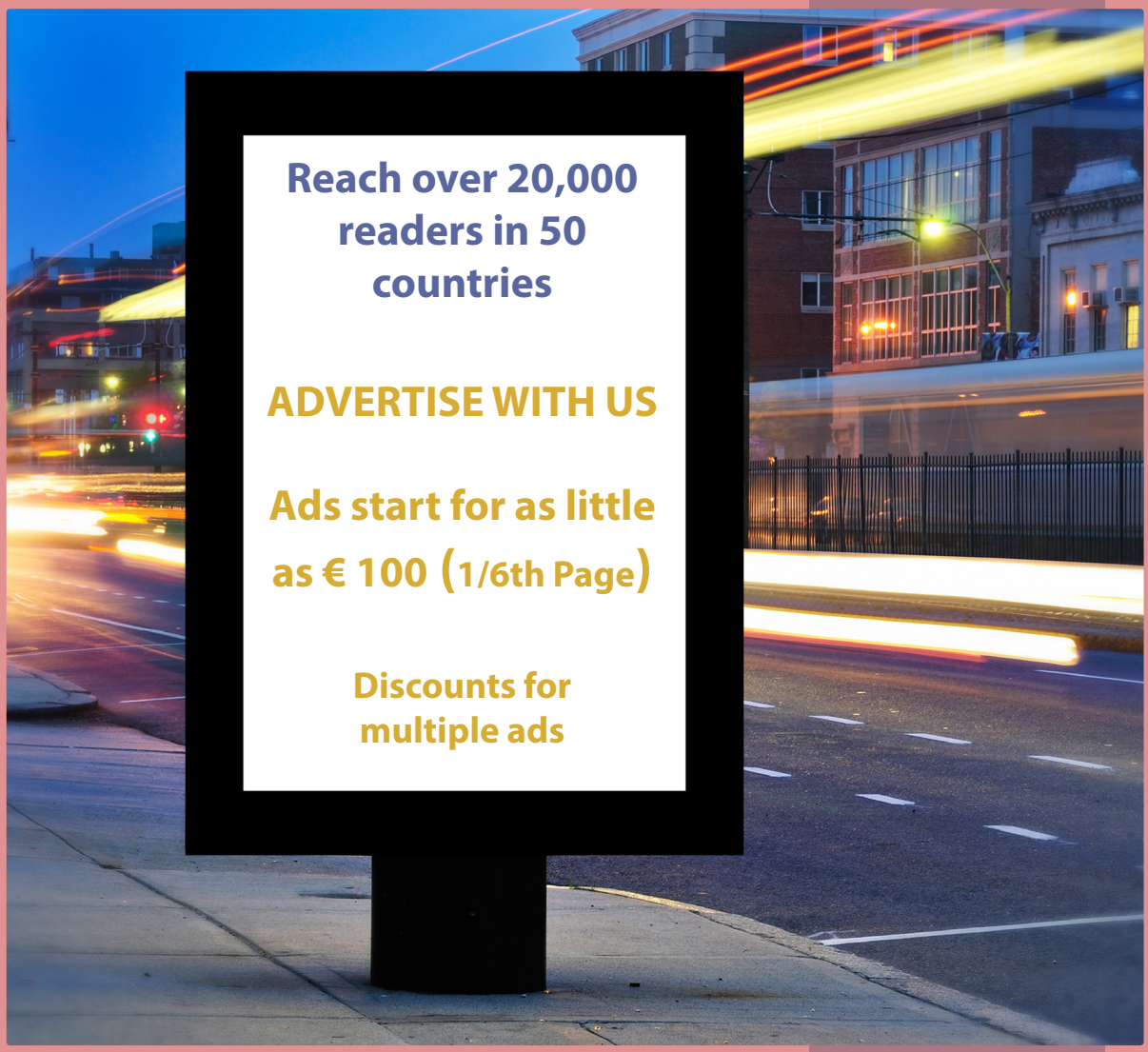
- We do not accept highly scientific articles.
- Articles should be submitted as a Word document.
- Articles must be a minimum of one page. Lengthy articles will be considered for publication but may be published in instalments depending on their subject matter.
- Please ensure that all articles are formatted in accordance with recent issues (two-column layout with text wrapped imagery).
- Font: Myriad Pro Regular
- Font Size: 10
- Tables: All tables must be formatted in Word or Excel.
- Images: High-resolution digital files (TIF or JPG format), at 300 dpi and sized to at least 10 x 15cm.
- All images must be accompanied by written permission from the original source unless the author owns the rights.
- Unless authorized by Gemmology Today Editorial Board, there is a limit of twenty photographs per article.
- If English is not your first language, manuscripts should be checked by an expert translator before they are submitted to us for consideration.
- Upon receipt, the article will be reviewed by our editorial staff. Upon completion, authors will receive a proof of their article for final approval.
- The decisions of the editors are final.
- We reserve the right to refuse articles

E-mail all submissions to:

information@worldgemfoundation.com

New Deadlines Dates for Submissions

Issue Two 2024: March 31st, 2024
Issue Three 2024: June 30th, 2024
Issue Four 2024: September 30th, 2024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To register, contact GCS Laboratory at:
contact@gcslab.co.uk

SUOS CULTORES SCIENTIA CORONAT
WORLD GEM FOUNDATION

AUTHORIZED LICENSEE

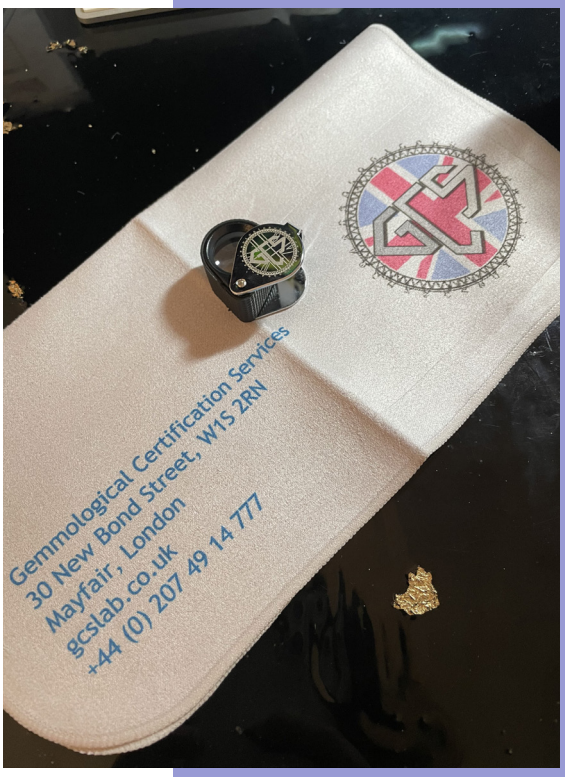
DEFINE YOUR JOURNEY
- CREATE YOUR DESTINATION

Gemmological Certification Services was established in the heart of London's Mayfair in 2014. We are the UK's leading gemmological laboratory for the origin determination of coloured gemstones; identification of synthetic material, including laboratory grown diamonds; differentiating natural and cultured pearls; and detecting treatment in all the major gemstones. Working in collaboration with Claude Bernard University in Lyon, France, we uphold a high academic standard, with a fully trained team of gemmologists and the most up-to-date technology. We are proud to provide gemmological certification services to the most prestigious jewellers and auction houses in the UK and worldwide.

Our parent company, the antique jewellery specialists, Gemroad had been established on the premises a decade earlier by Stephane Cohen-Scali, whose interest in gemstones stems back to his childhood, having grown up in the family jewellery business in Paris. France. As an interest in gemstones can only take one so far, Stephane went on to pursue his gemmological studies at the Institut National de Gemmologie and Claude Bernard University, obtaining a gemmological degree and diploma respectively. After founding Gemroad, Stephane, recognising a need for such a service, set up a gemmological laboratory in London.

The company is now managed by his daughter, Stephanie Seror, who has grown the team to three times its original size over the past year. With an experienced tutor on staff, we are now in a position to deliver gemmological education to the those with an interest in pursuing this fascinating and ever evolving subject.

Our pooled knowledge, coupled with our day-to-day operations as a laboratory, place us in a prime position to offer the most comprehensive level of gemmological education in the UK. We are looking forward to working with the World Gem Foundation.



GIMME gimme

Investing in Africa (Part One)

Africa is blessed with enormous gem resources but are they doing enough to maximize the potential? Over the next four issues we are going to take a hard look at some of the key gem producing areas in Africa to see exactly what the governments are doing to achieve the goals of the African Mining Vision. Are their policies working or simply compounding the problems that have plagued this great continent for more than 150 years?

INTRODUCTION

We all know that foreign investment can be a key factor in driving economic growth and development especially here in Africa, however, attracting such investment is not always easy.

Central to any success is the need to provide a stable and predictable business environment, offer incentives and tax breaks, a skilled workforce, an established infrastructure, and strong international relationships.

A country must have a clear strategy that is investor friendly. Investors do not like unpleasant surprises. The process should be transparent, logical, and free of any monetary incentives paid to 'smooth the wheels of commerce'. In Africa, the latter is not always possible and is often unavoidable. To some, it is a necessary evil, to others it is a distasteful consequence of doing business. Regardless, if countries want foreign investment, they must be prepared to provide investors with some assurance that their investment will be protected. Sadly Africa has a long history of properties and businesses being seized.

According to S&P Global Market Intelligence, a recent wave of coups d'état in seven mineral-rich countries in sub-Saharan Africa has raised the risk of resource nationalism and other geopolitical issues for mining companies operating in the region.

Since 2020, rebels and military juntas have overthrown the governments of Sudan, Mali, Burkina Faso, Guinea, Niger, Chad and, most recently, Gabon. The political turmoil has affected important gold, uranium, bauxite and manganese operations, and in the case of Guinea, one of the world's largest undeveloped iron ore projects.

The seven countries' share of global gold production totaled 7.2% in 2022, led by skyrocketing output in Burkina Faso, Mali and Sudan over the past decade, according to an S&P Global Commodity Insights analysis. Gabon accounted for 23.0% of global production of manganese, an increasingly important element in electric vehicle batteries, Niger produced 4.1% of the world's uranium, and Guinea produced 22.6% of the world's bauxite, an aluminum ore.

The increasing risk of unrest spreading across the African continent makes it more difficult for international mining companies to work in the region while opening the door for others to exploit the situation.

'Once embedded, recent history tells us that military governments rarely make it easier for foreign miners to operate,' states Hugo Brennan, a research director at Verisk Maplecroft, a global risk intelligence company.

'Coups bring risk and creeping nationalism,' says Joe Mazumdar, a mining analyst and publisher of Exploration Insights. 'When a new coup leader comes in, they look at what makes them the most money. So they might say, 'Oh. It's gold. I'll just crank up our ownership of it.'

Additionally, foreign mining companies have faced renewed pressure to give up a greater share of their profits, even from stable governments in other regions.

CREATE A STABLE AND PREDICTABLE BUSINESS ENVIRONMENT

It sounds easy but in fact, it is not. Investors look for a stable and predictable business environment when considering investing in a country. This means having a transparent regulatory framework, clear laws and policies, and consistent implementation of those policies. Countries should also ensure that there is political stability and minimal corruption to build trust with investors.

OFFER INCENTIVES AND TAX BREAKS

People hate to hear wealthy companies being offered incentives and tax breaks as an enticement but fail to understand that a business often has many investment options and the only way to encourage them to invest is to give them a financial package that makes sense.

Incentives can include tax holidays, reduced tariffs, exemptions from certain taxes, and grants and subsidies to support investment in specific industries or regions.

A SKILLED WORKFORCE

A skilled workforce is critical for attracting foreign investment, as investors look for a pool of talent that can support their operations. Countries should invest in education and training programs to develop their workforce and ensure they have the skills needed to compete in the global marketplace.

INVEST IN INFRASTRUCTURE

Infrastructure is a key consideration for investors when deciding where to invest. Countries should invest in critical infrastructure such as transportation networks, energy and water supply, and communication technologies to create an attractive environment for investors. This can also improve the quality of life for citizens, making the country a more attractive place to live and work.

STRONG INTERNATIONAL RELATIONSHIPS

Building strong international relationships can help countries attract foreign investment. Countries can develop partnerships with other countries, international organizations, and global investors to promote their business environment and attract investment. This can also provide access to new markets and technologies, which can drive economic growth.

In Part One, we look at Ethiopia, a land-locked country situated in the 'Horn of Africa'. Known as the 'Cradle of Civiliization', it is primarily known for its opals, emeralds, and sapphires.

ETHIOPIA

It is certainly no secret that this country desperately needs foreign currency and sees foreign investment as the 'ideal solution'. However, in a country that is struggling with internal conflict, travel restrictions, reams of bureaucratic red tape, a challenging new 'Investment' law and a punitive foreign currency policy, is it reasonable to think Ethiopia can compete with other potential suitors.

War - What is it good for?

While Ethiopia has never been colonised it has been plagued with wars. According to Wikipedia, there have been sixty (60) wars in modern times (starting with the Ethiopian-Adal War from 1529 to 1543).

More recently, The Ethiopian Civil War (September 12th, 1974, to May 28th, 1991) fought in Ethiopia and present-day Eritrea, between the Ethiopian military junta known as the Derg and Ethiopian-Eritrean anti-government rebels saw the Derg overthrew the Ethiopian Empire and Emperor Haile Selassie in a coup d'état, establishing Ethiopia as a Marxist-Leninist state under a military junta and provisional government.

In the late 1970s, the junta introduced Soviet-style political terror together with nationalization and collectivization, leading the country into economic crisis and contributing to the 1980s famine that caused up to one million hunger deaths. Hundreds of thousands fled from poverty, communist experiments, forced mobilization, Biblical population transfers, and repressions.

The defeat of the Derg by the rebel coalition Ethiopian People's Revolutionary Democratic Front (EPRDF) on May 28th, 1991, not only ended the Ethiopian Civil War but also communism.

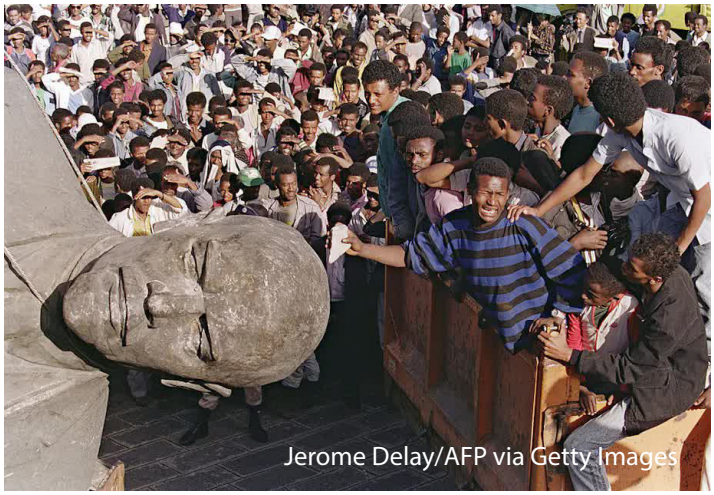
The Eritrean–Ethiopian War, also known as the Badme War, was a major armed conflict between Ethiopia and Eritrea that took place from May 1998 to June 2000.

While relations were initially friendly after Eritrea gained independence from Ethiopia in 1993, disagreements over where the newly created international border should be caused relations to deteriorate significantly, eventually leading to full scale war. The war officially came to an end with the signing of the Algiers

Amanuel Sileshi/AFP/Getty Images

Agreement on December 12th, 2000; however, the ensuing border conflict would continue for nearly two decades.

The Tigray War was an armed conflict that lasted from November 3rd, 2020, to November 3rd, 2022. The war was primarily fought in the Tigray Region of Ethiopia between forces allied to the Ethiopian federal government and Eritrea on one side, and the Tigray People's Liberation Front (TPLF) on the other.


Jerome Delay/AFP via Getty Images

Although an indefinite humanitarian truce was declared on March 24th, 2022, in order to allow the delivery of humanitarian aid into Tigray, fighting dramatically re-escalated in late August 2022, after peace talks broke down. Rapid mobilization of troops soon followed, with Ethiopia, Eritrea and Tigray reportedly organizing hundreds of thousands of troops against each other by October the same year. After a number of peace and mediation proposals, Ethiopia and the Tigrayan rebel forces agreed to a cessation of hostilities on November 2nd, which went into effect the day after; Eritrea was not a party to the agreement, however, and they largely continued to occupy parts of Tigray as of 2023.

The loss of the common TPLF enemy brought to the fore the acrimony between Amhara and Oromo (Ethiopia's two largest ethnic groups).

While the Amhara militias fought alongside federal troops in the 2020-2022 Tigray war, that alliance collapsed when the federal government and Tigrayan leaders reached a deal that ended the conflict. As Prime Minister Abiy Ahmed moved to rein in the Amhara militias, relations worsened. Now the country finds itself plunged into yet another revolt. This time, militants are engaged in hostilities with federal forces in Amhara, the country's second-most populous region. After tensions escalated last year, insurgents briefly seized control of major towns in August and remain active in much of the countryside.

This creates enormous instability and makes travel, by land, extremely dangerous. While it is true that investors are often opportunistic and will speculate in times of war and general unrest, this does not apply when it comes to the mining of gemstones. War and unrest kills more than innocent people, it kills any type of investment in this sector.

Restricted travel also deters foreign buyers with fistfuls of foreign currency from travelling to the key gem producing areas in Ethiopia (Tigray - sapphires, Delanta - opals and Shakiso - emeralds). It is simply too dangerous. This is not a great advertisement for Tourism Ethiopia.

New Investment Law

On January 30th, 2020, Ethiopia's House of Peoples' Representatives, the legislative organ of the government approved a new investment bill (New Investment Proclamation). This law repeals the Investment Proclamation No. 769/2012 (as amended).

The new investment law is part of the broader initiative by the government to increase private sector participation in the country's economy. Even before the approval of the New Investment Proclamation, the government had undertaken significant liberalization measures, including the enactment of a new proclamation liberalizing the telecom sector, the announcement to privatize several state-owned enterprises and the engagement of the private sector through a public-private partnership arrangement in major infrastructure and development projects.

While the new investment law does not make a significant departure from its predecessor on the fundamentals of entry requirements and the substantive test of what 'investment' and 'capital' constitute, it has raised the minimum capital requirements to 200,000 USD for foreign investors and 150,000 USD if it is a joint venture between foreign and domestic investors. While I am sure the architects of this 'new law', saw this as a

giant step forward, in my opinion, it is clearly a giant step backwards. If you want to attract investment into an unstable environment, the last thing you want to do is raise the 'price of admission'.

While the new law maintains the capital requirement waiver for foreign investors reinvesting their profits and dividends, it has now explicitly provided that foreign investors buying shares from an existing foreign investor and foreign nationals holding shares as nominees in the context of a share company will benefit from a similar waiver.

The new investment law also extends the definition of 'brownfield' investments (an investment where a company or government entity purchases or leases existing production facilities to launch a new production activity) even when the new investor does not have an expansion or upgrading plan.

Advocates of the 'New Law' state that it has taken significant steps in opening up investment areas for foreign participation by allowing foreign investors to invest in any investment area except those that are expressly reserved; (a) for domestic investors; or (b) for joint investment with domestic investors or the government.

Some of the areas of investment which were exclusively reserved for Ethiopian nationals under the previous law are likely to be opened for foreign investments with the condition that foreign investors undertake these investments in joint venture with the government and/or domestic investors.

The maximum percentage allocation for foreign investors in the context of these joint investments is generally set at forty nine (49) per cent. However, the draft regulation allows foreign investors to hold up to a maximum of seventy five (75) per cent of equity participation in certain investment areas such as forwarding and shipping agency services.

Investment areas that are likely to remain closed to foreign investors include banking, insurance and micro-credit and saving services, retail trade, import trade (except liquefied petroleum gas and bitumen) and other selected areas of investment aimed at protecting small and medium enterprises and domestic investors.

It is important to note that unlike the repealed law, the new investment law does not distinguish between areas of investment reserved for 'Ethiopian nationals' and 'domestic investors' In the new law, 'domestic investor' is broadly defined to include Ethiopian nationals, foreign nationals of Ethiopian origin, the government, enterprises incorporated in Ethiopia and wholly owned by Ethiopian nationals, public enterprises, cooperative societies, and foreign nationals or foreign enterprises treated as domestic investors under a treaty or domestic law. In addition, foreign nationals or enterprises with heritage investment permits, and descendants of foreign nationals with heritage investments have been included under the definition of domestic investors. This suggests that for sectors open for joint venture investments, foreign investors' potential list of partners can be any one or more of the persons or enterprises falling under the 'domestic investor' definition. Further, investment areas, including banking and insurance, that were exclusively reserved for Ethiopian nationals in the previous law are now open to any person falling within the definition of domestic investor, including foreign nationals of Ethiopian origin.

The recent Customs Amendment Proclamation No. 1160/2019 took back powers formerly given to different government bodies including the EIC in relation to permitting duty free imports.

Foreign Currency

While the new investment law maintains the right of foreign investors to repatriate funds in convertible foreign currency, severe foreign currency shortages continue to challenge an investors' right to repatriate these funds. This means that investors must revert to the black market to convert Ethiopian Birr into US dollars and herein lies the problem.

The official bank rate, at the time of writing, is 56.42 Ethiopian Birr to one US dollar, while the black market rate is 120 Ethiopian Birr. This will 'wipe out' 53% of any profits.

If an Ethiopian company makes a sale in US dollars, the Ethiopian banks will only allow the recipient to take 50% in foreign currency. The balance must be converted into Ethiopian Birr at the official rate. This means that for every $ 1,000 USD in sales, the seller will lose $ 264.92 USD on the transaction.

The current 'foreign currency' policy also diminishes the buying power of Ethiopian's. Since there is no lapidary sector here (with the exception of those who cab stones), faceted gemstones must be purchased outside of Ethiopia. This automatically doubles the cost.

Coupled with customs regulations that are complicated, time consuming and often punitive, it makes the importation of goods almost impossible. This is a land of paperwork where often support letters are required to support the support letters.

Skilled Workforce

While Ethiopia is a gem producing country, there is no skilled workforce in the gem sector to drive the country forward. This is a situation that urgently needs to be addressed. So too is the applying and renewing of work permits. If you love red tape, you will encounter reams of it. Challenging and frustrating to say the least and completely unnecessary.

Infrastructure

Even in peaceful times, access to the gem producing areas is not easy. The Ministry of Mines and Petroleum is trying to develop centralized formal market centres close to mining areas that are legally connected with regional, national and international markets but how do you get the buyers to these centres?

Quality of Life

In terms of the quality of life for foreign workers, life in Addis Abeba is extremely expensive. Home to the African Union, the city is full of diplomats who are bled dry by greedy landlords and the high cost of living caused by the restrictive foreign exchange policy and the rampant black market. While electricity is cheap, constant power outages make life very difficult. Some buildings have generators but most do not and this again creates problems.

The capital is full of construction sites that may never be finished. Those that are active add to the 'noise' pollution that is fueled by streets clogged by cars. While there is a light rail system (funded by the Chinese), there are not enough trains and maintenance can only be carried out by Chinese technicans. As a consequence, few use it, preferring to use cars, buses or minivans. Getting around Addis (other than on Sundays) is challenging, involving long commutes.

Internet is better than one would expect but due to the power outages, 'Mobile' hotspots need to be used as a back-up especially if important meetings are scheduled. A good rule of thumb is to charge any electronic devices when you can so that when the power goes out (and it will), you can use them.

Church versus the State

Conflicts between church and state are not new. Going back to 1534 and the Reformation in England, the Pope's refusal to grant King Henry VIII a divorce from his wife Catherine of Aragon caused a split from the Catholic church and the replacement of the Pope as the Head of the Church in England.

In Ethiopia, church and state have been intertwined since Orthodox Christianity became Ethiopia's state religion in A.D. 340. Even today, the clergy wields immense power with church leaders involved in everything from facilitating peace talks to documenting war crimes.

The current friction started in 2018 with the return of 24 bishops who had been forced into exile during the previous change of government in 1991. The bishops who stayed and those who fled excommunicated each other.

In 2023, rebel bishops from the southern Oromia region, home to the Oromo ethnic group, tried to install new clergy they had ordained as bishops in defiance of Abune Matthias, who heads the country's church as its patriarch. This caused a 'stand-off' with both opposing sides threatening to hold competing demonstrations in Addis during an African Union heads of state summit. The bishops' rebellion came against the backdrop of fierce competition for power and resources among the country's different regions after Abiy's government sped up political changes.

Clearly the church plays an important role here in Ethiopia and is instrumental in maintaining a 'conservatism' that is refreshing compared to the west. However, since they now feel their position is under

threat, they have resorted to broadcasting over loudspeakers at all hours of the day and night. It is not uncommon for broadcasts to last more than 12 hours, often lasting throughout the night or starting in the middle of the night. This makes sleeping almost impossible. While these broadcasts are designed to prove that the church is 'untouchable', the lack of sensitivity to those living in the immediate areas, including people of other faiths (only 43.8% of the population are Orthodox Christian) and non-believers, speaks volumes. Churches are supposed to bring people together and draw them into the fold, not drive them away.

International Relations

Ethiopia's former ties to communism still plague the country. Many foreign countries are active here but the major player is China. Following a policy of indebting countries to gain economic advantage, it is disheartening to see so many countries fall into this deadly trap. This is clearly a case of short-term gain and long-term pain.

In Ethiopia, the Chinese are investing heavily but at what cost? The new main building of the African Union was funded by a $ 200 million donation from the Chinese Government.

With a height of the 99.9 m (328 ft), the main tower is the second tallest building in Addis. Construction took three years with a workforce of 1,200, roughly half of whom were Ethiopian and half of whom were Chinese with the majority of the construction materials coming from China including the artwork on the walls.

Sun Ruibo/Sun Ruibo/Xinhua Press/Corbis

Construction Ethiopian-style with the wooden access ladder

Conclusion

It is obvious that the FDRE Goverment needs to rethink some of its policies. Based on the factors needed to entice investors, at this particular moment in time, investment in Ethiopia would be deemed extremely risky. If the FDRE Government is serious about attracting foreign investment and badly needed foreign currency, they must work very hard to create a more investor-friendly enivironment.

Ethiopia is a country of enormous potential but that potential will only be fully exploited when they realise that in order to attract investors, you must make them feel welcome, provide clear and logical policies that encourage investment, revamp customs and immigration and rid all areas of commerce from corruption. A tall order that is perhaps even taller than the main tower of the AU building but achievable if everyone works together.

REFERENCES:

Aman and Partners - Ethiopia Introduces New Investment Law

FDRE Ministry of Mines - ASM in Ethiopia

Communist Crimes - Communist Dictatorship in Ethiopia (1974-1991)

International Crisis Group - Ethiopia's Ominous New War in Amhara

S&P Global Market Intelligence

Washington Post

The views expressed in this article are those of the author and the references stated above. They do not represent the views of the World Gem Foundation, Gemmology Today or any individuals connected with these organizations.

African Union

Friendship Park

Orthodox Christian Priests

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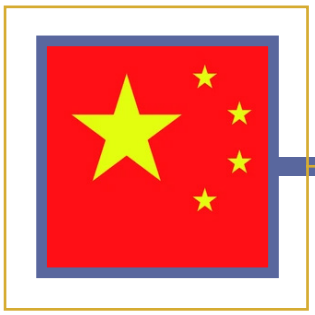


MASTER plan

In the RED

As global demand for critical rare earth elements rises, many countries have looked to Africa's abundant stores of cobalt, lithium, copper and other minerals vital to the manufacturing of modern technologies. China is among the largest players on the continent with billions invested in the African mining and mineral extraction sectors. In 2019 alone, China imported nearly $10 billion worth of minerals from sub-Saharan Africa.

In 2018, China raised eyebrows when it announced that it would give the Economic Community of West African States (ECOWAS) a $31.6 million grant to build their new headquarters in Abuja, Nigeria.

In his acceptance of the grant, ECOWAS President Jean-Claude Brou thanked China and confirmed the organization's commitment to promoting future ECOWAS-China cooperation. In the press release, Brou called this a mark of goodwill from China, however, critics of the grant and China's involvement in Africa questioned China's motives for the donation, a move that positioned them right at the heart of West African politics.

While some may have interpreted the grant as a symbolic expression of China's growing presence in Africa, others questioned why 60 years after independence (for most member states), did ECOWAS think it was acceptable for a foreign power to build its headquarters?

So why did ECOWAS accept the money from China?

Established in 1975, ECOWAS was established to foster economic integration and collective self-sufficiency in West Africa. Consisting of fifteen member states including Nigeria that represented Africa's biggest economy, many asked why ECOWAS was not self-funding the facility by asking each member state to pay $ 2 million each.

Its' 15 member states include one of Africa's biggest economies by GDP, Nigeria, causing Taylor and others to ask why ECOWAS isn't self-funding the facility. Had the members split the bill, it would have cost just over $2 million each.

No-one questioned the need for a new facility. With ECOWAS' operations spread across three outdated buildings in the Nigerian capital, something needed to be done but why accept a gift that clearly had strings attached?

Gambia's President Adama Barrow with China's President Xi Jinping at the end of a signing ceremony at the Great Hall of the People in Beijing on December 21, 2017. The two countries re-established diplomatic relations in 2016. Photo by Nicolas Asfouri/Afp/Afp/Getty Images

'There's no such thing as a free gift'

It's not the first time China has constructed buildings at the heart of Sub-Saharan African politics for free.

In 2012, it handed over the ultra-modern African Union headquarters in Addis Ababa, Ethiopia. With a price-tag of $200 million, it was China's largest aid construction project since the 1970s.

In 2018, the French daily Le Monde, alleged that Beijing spied on the African Union through the computer systems it helped install. Citing anonymous sources, Le Monde reported that data was transferred from the AU systems in Ethiopia to its servers in Shanghai. China's foreign ministry called the Le Monde report 'groundless accusations.' The AU called the report 'baseless.' But where they?

While China would like to position itself as a trusted friend of African presidents, acceptance of these 'gifts' raise the question 'what is China's end game?' Will this give them the power to influence the decision-making processes?

While Beijing defended its aid practices on the grounds they were neutral and respect recipient nations' sovereignty, Chinese money is not wholly unpolitical.

For example, African nations have long been a battle ground for China and Taiwan, officially the Republic of China, with Beijing providing aid and economic deals to nations that were prepared to ostracize Taipei and recognize the People's Republic of China instead. Today, in Africa, only Burkina Faso and Swaziland officially recognize Taiwan.

China becoming an aid power?

As China grows as a world power, its aid programs in general are expanding globally, too. A study published in 2017 by AidData, a research lab at the College of William & Mary, found the size of Chinese aid assistance to be much larger than previously believed.

In 2018, China announced plans to form an international development cooperation agency to coordinate its global aid program. Previously China had no dedicated agency devoted to foreign aid, despite giving tens of billions of dollars in overseas assistance since 2000.

According to AidData executive director Brad Parks, the Chinese government actually considers the details of its overseas development programs to be a state secret. Interesting.

The AidData study found that at least 70% of China's overseas aid was sent to Africa from 2000 to 2014. While the report noted that 'Chinese aid substantially improves economic growth,' it also deemed the majority of spending less than effective and warned it may undermine Western efforts to use aid to promote democracy and political reform, at a time when the US is pulling back on overseas spending.

Aaron Tesfaye, a professor in political science at William Paterson University, New Jersey, stated 'Giving developing nations buildings designed to help their political institutions prosper is part of that expanded aid program'.

With China trying to appear as a responsible nation, with peacekeeping forces that were deployed in Darfur and Mali, their master plan seems to be working.

In Ethiopia, many people see Chinese construction projects in a positive light. The Chinese built metro and Friendship Park in Addis Abeba, and the Addis-Abeba-Djibouti Railway are prime examples of China's ever-expanding influence in this former communist state.

CONCLUSION

There is no question that China is an economic powerhouse. Clearly, they have a plan, and they are implementing it with military precision. While some believe that war is the the only way to grab power and influence, China is far more savvy, opting to accomplish their goal through economic channels.

Sadly, Africa is a continent that relies on hand-outs and while the Chinese seem only too willing to be the 'hand that gives', we all know that whoever 'giveth' can easily take away. In this case it will be a Chinese take-away that is going to be very hard to digest.

REFERENCE

Report by Jenni Marsh, CNN (March 30, 2018) and James Griffiths.

https://edition.cnn.com/2018/03/27/asia/ecowas-china-headquarters-intl/index.html

BALL games

Meteorwrongs

Since the World Gem Foundation Gem Testing Laboratory opened in Addis Abeba in September 2023, we have received three 'lonsdaleite' diamonds for testing. These 'diamonds' resemble golf balls.

While it was a simple task to prove that they were not diamonds, we were curious to see exactly what they were and what they were used for.

Our research led us to Randy L. Korotev with the Department of Earth, Environmental, and Planetary Sciences at Washington University in St. Louis. He too had been questioned about these 'mystery balls' with some believing they were meteorites.

Here in Addis, they are being sold as 'Hexagonal Diamond' for as much as 10,000 ETB ($ 175 USD). Elsewhere, Randy's research has unearthed (no pun intended) lonsdaleite diamonds being sold on the Internet for anywhere from $ 50 USD to as much as $ 195,000 USD although in the latter case, it was advertised as a 'Lonsdaleite Meterorite [sic] Diamond' (note the incorrect spelling of meteorite).

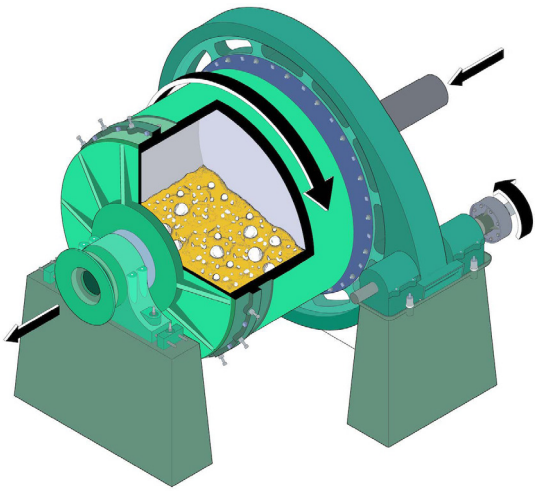
One of our clients presented a report from the GIE Laboratory (Geological Institute of Ethiopia) here in Addis Abeba that stated the ball was 'Synthetic Lonsdaleite'.

We asked him if he would agree to let us cut it open. With the assistance of one of the local opal cutters, it took no more than three minutes to cut the 'sphere' in half (see video link on the next page).

In our case, and in the case of the sample submitted to GIE, the 'mystery' balls proved to be ceramic milling balls.

Mill or Grinding balls

A common way of grinding and pulverizing solid material is with a ball mill. The ball mill consists of a hollow cylindrical shell rotating about its axis. The cylinder is rotated, which cause the balls to tumble and reduce the grain size of the solid material by impact abrasion. The inner surface of the cylindrical shell is usually lined with an abrasion-resistant material such as manganese steel or rubber lining. The length of the mill is approximately equal to its diameter. Mill balls can be made of a variety of materials such as steel, tungsten carbide, glass, plastic, aluminum oxide (alumina) ceramic, and zirconium oxide or silicate.



The general idea behind the ball mill is an ancient one, but it was not until the industrial revolution and the invention of steam power that an effective ball milling machine could be built. It is reported to have been used for grinding flint for pottery in 1870.

Lonsdaleite

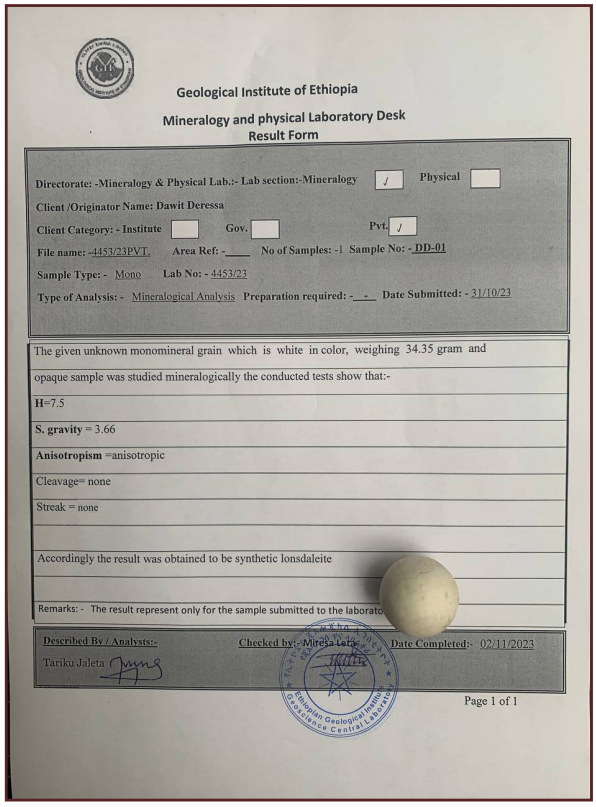
Lonsdaleite is an allotrope of carbon with a hexagonal crystal structure (unit cell). It is sometimes called 'hexagonal diamond' but this moniker is misleading and technically incorrect since diamonds have a cubic crystal structure.

Lonsdaleite was first found in meteorites where it occurs only as microscopic crystals, usually less than a micrometre (0.00004 inches) in size.

While a number of people claim to have seen 'lonsdaleite' in rocks and therefore assume that it must be a meteorite, this is simply not true. Due to the microscopic size of lonsdaleite, it is not possible to 'see them'. Secondly, lonsdaleite can only be identified by using X-ray diffraction or other advanced testing methods.

CONCLUSION

Save yourself time, money, and potential heartache by remembering these simple guidelines; if it is spherical and white, it is not a meteorite, it is not a diamond and it is certainly not lonsdaleite.



Geological Institute of Ethiopia

Mineralogy and physical Laboratory Desk

Result Form

Directorate: -Mineralogy & Physical Lab.:- Lab section:-Mineralogy [✓] Physical [ ]

Client /Originator Name: Dawit Deressa

Client Category: - Institute [ ] Gov. [ ] Pvt. [✓]

File name: -4453/23PVT, Area Ref: -____ No of Samples: -1 Sample No: - DD-01

Sample Type: - Mono Lab No: - 4453/23

Type of Analysis: - Mineralogical Analysis Preparation required: -_-_ Date Submitted: - 31/10/23

The given unknown monomineral grain which is white in color, weighing 34.35 gram and opaque sample was studied mineralogically the conducted tests show that:-

H=7.5

S. gravity = 3.66

Anisotropism =anisotropic

Cleavage= none

Streak = none

Accordingly the result was obtained to be synthetic lonsdaleite

Remarks: - The result represent only for the sample submitted to the laborato

Described By / Analysts:- Checked by:- Mirela Letta Date Completed:- 02/11/2023

Tariku Jaleta

Page 1 of 1

Getting to the heart of the matter

Mystery solved....
Ceramic Mill Ball

Attributions:

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Original Article by Randy L. Korotev
https://sites.wustl.edu/meteoritesite/items/mill_balls/

Wikipedia

Video and Photos by World Gem Foundation

LAB news

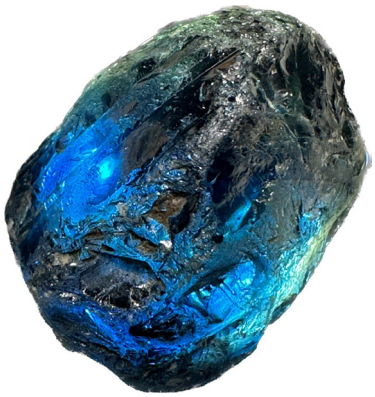
WGF Gem Testing Laboratory (Addis Abeba - Ethiopia)

While Ethiopia is a gem producing country, little has been done to develop the sector. Culturally, Ethiopians value gold but know little about diamonds and other coloured gemstones. Consequently, other than opal, jewellery stores do not sell gemstones. If you are getting engaged in Ethiopia, expect to find glass or if you are lucky a cubic zirconia set into your engagement ring.

So why are there no cut gemstones in Ethiopia?

Firstly, there is no lapidary sector here that provides a cutting service. Secondly, there is no government policy that allows rough to be exported, cut abroad and then re-imported into the country. Gemstones could be purchased outside of the country but with the prohibitive currency policy of the FDRE, it makes everything too expensive and while there is money here, gemstones and jewellery are not valued the way they are in other parts of ther world.

Even more alarming is the general lack of knowledge when it comes to gemstones. Since the laboratory opened last September, we have met many clients who clearly do not understand what they are buying or selling and this is truly worrying. This has lead to foreigners taking advantage of this by passing off lab-created 'rough' as natural material. While one could certainly understand a buyer being fooled by some of the more sophisticated (flux or hydrothermal) lab-created stones, all to often we are seeing Verneuil flame-fusion boules that have been crudely broken up with a hammer and then tumbled to give it a more 'natural' appearance.



In one case, a client lost one million Ethiopian Birr (roughly $ 18,000 USD) when his european client discovered that the six pieces of rough sapphire he had purchased were man-made. In another instance, a client asked us for a verbal opinion on a 53.99 carat rough ruby that was clearly flame-fusion while an 18Kt yellow gold ruby and diamond pendant also contained a 14 carat plus Verneuil ruby.

Even with a 20% yield, the 53.99 carat ruby would have produced a 10 to 11 carat ruby and with the combination of exceptional colour and clarity, the finished stone would have commanded a per carat price ranging anywhere from $ 19,000 USD to $ 37,500 USD. Had the buyer been aware of lab-created rubies and the value of rubies outside of Ethiopia, I am sure he would have questioned the seller but without this experience and knowledge, it is impossible to 'sniff out' potential fraudsters. Perhaps the seller purchased it in good faith, it is hard to tell.

On the other side, we are seeing some exceptional sapphires coming from the Tigray region such as this 96.685 carat blue-green sapphire, beautiful aquamarines, amethyst, pyrope and spessartite garnets, emeralds from Shakiso, and of course opals (black, brown and white).

Running a laboratory is both challenging and exciting. You simply do not know what will walk through the door. Education will remain a focal point of our work here, so that we can help buyers and sellers understand the true value and nature of what they are trading. Gemstones remain one of the most complex consumer products and without the necessary knowledge and experience, the potential for things to go horribly wrong always exists. Yes you can make money buying and selling but you can also lose. Our new client who lost one million Birr has decided to keep the sapphires so he can remind himself of the value of education.

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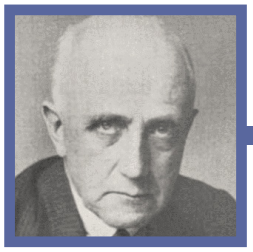


TIME capsule

A History of Gemmology: 1912-1972

In reviewing the fourteen editions of Gemstones, the incremental development of gemmology can be traced over the majority of the 20th century.

EDITION 1, 1912

The early 20th century was a formative period for the study of gemmology and George Herbert Smith was at the centre of it. In 1908, the National Association of Goldsmiths of Great Britain had begun work on a new course in gemmology for the jewellery trade. Herbert Smith's work on crystallography at the Natural History Museum (London) and his development of the Herbert Smith refractometer (first released 1905 and updated 1907) made him a prudent choice for the role of principal examiner. With the first diploma exam held in 1913, it's no surprise that students regarded the examiner's new book as their gemmological "bible" (Anderson, 1973, p.236).

The first edition of Gemstones covered the majority of a modern gemmologist's toolkit, including the refractometer, polariscope, dichroscope, hydrostatic scales, and spectroscope (albeit with diagrams for just five partial spectra). Notable for their absence were:

Electrical items: The goniometer was recommended for measuring the R.I. of highly refractive stones (in the absence of reflectivity meters); heavy liquids were recommended for measuring S.G. (in the absence of electronic scales); the thermal properties of gemstones were mentioned only for the outlying case of amber (in the absence of thermal probes); electrical properties were mentioned only in relation to static electricity, and fluorescence under ultraviolet light wasn't mentioned at all.

Items based on plastic: This includes the polarizing dichroscope and colour filters (though this is as much a result of the limited application of spectroscopy). The only plastic gemstones to be mentioned were amber and kauri-gum.

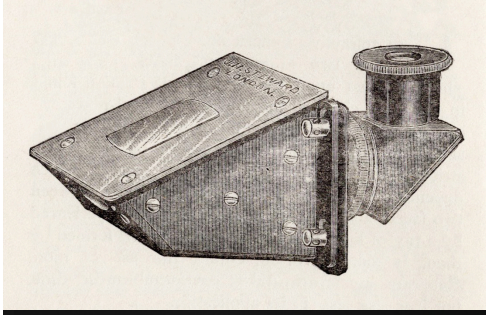
A short chapter on manufactured (i.e. created) stones focussed on flame-fusion corundum and spinel. Curiously, Henri Moissan was mentioned within this chapter as having manufactured diamond, despite the earlier claim of James Hannay (some of whose crystals were held by the Natural History Museum) [1]. An even shorter chapter on imitation stones then covered composite and artificial glass gemstones – including the imitation pearls consisting of glass spheres lined with Essence d'Orient (a preparation of fish scales).

Basil Anderson (Herbert Smith's successor as principal examiner) would later state that, since its first publication, Gemstones has been the standard work on the subject in the English language (Anderson, 1955, p.166). The caveat here likely relates to the second edition of Max Bauer's work Edelsteinkunde (Gemmology). The first edition of this work was published in parts between 1895 and 1986, with an English translation published in 1904. Having translated the work, Leonard Spencer [2] noted that:

'In the original scarcely enough importance is attached to the optical characters of minerals, to their examination in convergent polarised light and to the measurement of refractive indices, which are of the greatest practical value in the determination of faceted stones. It was felt, however, that the such matter would considerably alter the scope and plan of the work, which it has been the aim of the translator to preserve unaltered throughout.' (Bauer, 1904, v).

This criticism of Bauer's first edition was seemingly unfair, given the limited use being made of refractivity at the time of its publication. The second (untranslated) edition, published in 1909, did make use of refractivity as a determinative test for gemstones.

One of the highlights of Bauer's work was his method of grouping gemstones by colour, before outlining how the stones within each group could be distinguished. But from this method it was apparent that, even in the second edition of Edelsteinkunde, Bauer was still treating refractivity as a supplementary test. Herbert Smith's work – on his refractometer, his book, and the diploma exams he set – would bring refractivity to the forefront of practical gemmology.



The Herbert Smith refractometer, as illustrated, and from the collection of Nicolas Francfort.

EDITION 4, 1923

Few changes were made to Gemmology until the fourth edition, when:

- Three minerals were admitted to the ranks of 'semi-precious stones': fibrolite (aka sillimanite); willemite; and scapolite (the only one that was newly discovered).
- The pearl section was expanded to cover the newly developed 'culture' pearl. These had previously consisted of a blister pearl backed with mother-of-pearl but were now completely coated in nacre. Herbert Smith and Edward Hopkins were credited with the discovery of the culture pearl's greenish-yellow fluorescence under ultra-violet light (the first mention of ultra-violet light as a diagnostic test).
- The decimal carat had finally been adopted in London, bringing to an end 'one of the eccentricities of the jewellery trade that for so long the unit of weight should not [...] only [...] vary at most of the trade centres of the world, but it was not even always constant at each centre' (Herbert Smith, 1923, p.85). Basil Anderon would later attribute Herbert Smith's 'tactful, authoritative, and persistent advocacy' as having brought this change about! (Anderson, 1953, p.148).

EDITION 9, 1940

The ninth edition marked the first time Gemstones was substantially rewritten – quite possibly spurred by Spencer having published his own work on the topic in 1936.

The range of tools available to the gemmologist had now grown to include:

- The Chelsea filter (developed in 1934 by Anderson alongside Cecil Payne, his colleague at the Gem Testing Laboratory of the London Chamber of Commerce, and diploma students at the Chelsea College of Science and Technology).
- Improved refractometers (developed by Tully and by Rayner).
- Ultra-violet light boxes.
- Three additional heavy liquids: clerici solution; bromoform; and acetylene tetrabromide (all of which are toxic).

Furthermore, Herbert Smith noted that a polaroid plate, when rotated, could be used as a dichroscope – surely the predecessor to the polarizing dichroscope [3].

Some of the most notable changes would relate to terminology. A number of previously 'semi-precious' stones were relegated to a new 'miscellaneous' category, whilst a chapter on 'manufactured' stones was now relabelled as 'synthetic' (despite Spencer's scientific objection that 'the artificial production of ruby', for example, 'is not one of synthesis by the combination of aluminium and oxygen') (Spencer, 1936, p.101).

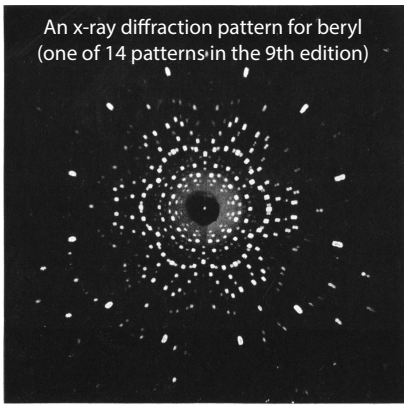
A marketing term that was resisted was 'padparadscha' (for 'reddish-yellow' corundum; named from the Sinhalese word for lotus-colour). Herbert Smith considered this a fantastic term of no real use. Presumably it was the Indo-Aryan root of the word which he objected to, for he raised no such qualms in relation to 'kunzite' (for lilac-coloured spodumene; named after the gemmologist George Kunz) nor 'morganite' (for rose-coloured beryl; pictured named by Kunz in honour of the banker John Morgan).

The chapter on imitation stones was expanded to include garnet-topped doublets (which had become prominent

Faceted Morganite [4]

by around 1923); whilst the chapter on 'synthetic' stones referenced the flux-grown emeralds released by the German company I.G. Farbenindustry in 1935.

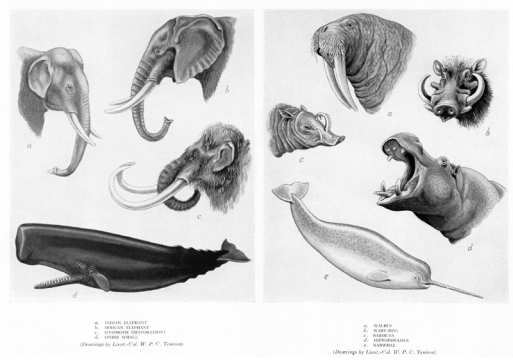
Some of the most practical additions were provided by Anderson and Payne, including: a new set of gemmological constants; a description of various diagnostic spectra; and several photographs of corundum inclusions. In contrast, the addition of fourteen x-ray diffraction patterns was of questionable value to practical gemmology, whilst a new appendix on the Greek alphabet avoided the question of practical relevance entirely. Herbert Smith had pushed forward the methods of practical gemmology in the early 20th century. But this role would soon be taken over by Anderson, with the publication of his own book – Gem Testing for Jewellers – in 1942.


An x-ray diffraction pattern for beryl (one of 14 patterns in the 9th edition)

EDITION 10, 1949

By the time of the tenth edition, Herbert Smith had become President of the newly incorporated Gemmological Association of Great Britain (the organisation having initially emerged from the National Association of Goldsmiths in 1931, shortly after the founding of the Gemological Institute of America, GIA).

Two major changes were made to the text. Firstly, the chapter on 'crystal form and structure' was so greatly expanded that Herbert Smith himself admitted it largely constituted a separate treatise on crystal morphology. Secondly, the scope of the work was widened to include ivory (and tortoiseshell) [5]. This second change was the highlight of the edition. Alongside ivory, Herbert Smith had included celluloid as an ivory imitation, together with a twenty-page discourse on both natural and manufactured plastics. More amusingly, two new plates were provided to help identify the ivory-bearing animals (in fairness, few gemmologists would be aware of the babirusa deer-pig of Indonesia!).



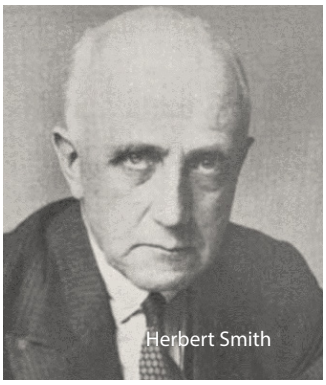
The ivory-bearing animals (with the babirusa labelled as 'c' within the second page).

Minor changes included the addition of rutile as a newly created gemstone [6], with brazilianite and zincite being added to the text as natural gemstones (the discovery of man-made zincite would occur in the 1970s as an accidental by-product of zinc smelting).

EDITION 12, 1952

The twelfth edition was the final version of Gemstones to be published within Herbert Smith's lifetime. Having contributed so much to the emergence of modern gemmology, he died suddenly in 1953 whilst still undertaking the role of President of the Gemmological Association.

Two new gemstones were added to the edition. The first was taaffeite; a gemstone most famous for being discovered in an already facetted state (by the Irish nobleman Richard Taaffe). Having been perplexed by its identity, Taaffe had sent the stone to Anderson (at the London Gem Testing Laboratory). Anderson, alongside his colleague Payne (as well as Frank Claringbull and Max Hey of the Natural History Museum), confirmed the specimen as both a new mineral and a new gemstone in 1951 (six years after receiving Taaffe's stone!). The second new gemstone was sinhalite; a brownish gemstone that had long masqueraded as olivine (discovered by Claringbull and Hey in 1952) [7].


Herbert Smith

EDITION 13, 1958

For the thirteenth edition, the reins of Gemstones were handed to Frank Phillips; a lecturer on mineralogy and petrology at the University of Bristol.

Phillips' great skill as a teacher was evident from his revisions [8]. The text was consistently pared back to expose the material of greatest relevance to practical gemmology. The six crystal systems and thirty-two sub-classes described in the tenth edition were thus replaced by the seven crystal systems now being taught (with the trigonal system split out from the hexagonal). A new chapter on 'The Microscope' was added, in order to highlight the significance of gem inclusions (in distinguishing natural stones; in determining a stone's original locality; and in providing information on paragenesis – how a stone had been formed). Images of inclusions were provided by Eduard Gübelin, who would go on to publish his Internal World of Gemstones book in 1974.

Several new gemstones were added, including: painite (a rare gemstone whose discovery had been announced by Claringbull, Hey and Payne in 1956); stichtite; amblygonite; created star-ruby & star-sapphire; and strontium titanate (aka 'starilian').

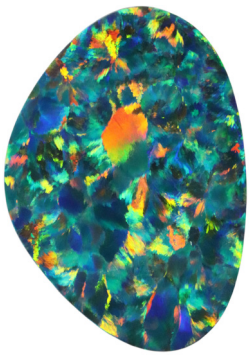
Elsewhere, the varying effects of 'short-wave' and 'longer wave-length' ultra-violet light were briefly considered (though not in relation to the tiny diamonds that were now being manufactured by General Electric) [9].

Salmon Pink Linde Star Sapphire

EDITION 14, 1972

For the final edition of Gemstones, Phillips would report on the newly-understood structure of precious opal (which had been discovered through electron microscopy in the 1960s), but not on the newly-created opals produced by Pierre Gilson (revealed by GIA in 1972). Created gemstones were now being developed at a phenomenal pace, to the great concern of the jewellery industry:

- Gem-quality diamonds weighing roughly a carat had now been grown, but at a cost far greater than for natural stones.
- Corundum could now be grown from a solution; both by flux-fusion (as practiced by Bell Telephone Laboratories) and hydrothermally.
- Hydrothermal emerald had been developed; first by Johann Lechleitner as an overgrowth of emerald atop a pale beryl, and later with the removal of the natural seed crystal (as practiced by Linde).
- Created periclase was noted, though without any outstanding properties.
- Strontium titanite (now known as 'fabulite') was moved to a new section for created gemstones lacking a natural counterpart, where it was joined by lithium niobate (aka 'linobate') and 'garnet-like structures'. This latter category included the diamond simulant YAG (yttrium-aluminium garnet, aka 'Diamonair'), which was grown through the newly-mentioned Czochralski method (aka 'crystal pulling') [10].



Gilson Opal Doublet

Elsewhere, opal doublets and triplets were explained, as was the newly-passed Trade Description Act (UK) – which placed a greater significance on disclosing such creations.

In terms of natural gemstones, ekanite made its first appearance, alongside the newly-discovered tugtupite (known for its phosphorescence and tenebrescence). Meanwhile, zoisite was upgraded from the section on 'ornamental stones' to that of 'gemstones', with the discovery of blue-violet crystals of zoisite in 1967. It took just a year for these crystals to be discovered in Northern Tanzania, rebranded by Tiffany's, then unveiled to the world as 'tanzanite'. No less remarkable was the green variety of grossular garnet that was found nearby (and in the same year) [11]. Tiffany's would similarly introduce the world to green grossular, having rebranded the stone as 'tsavorite' [12]. However, this would not occur until 1974. So, for the purposed of Gemstones, tsavorite was simply mentioned as a transparent green, yellow and brown grossular that was reported recently from Tanzania.

Tsavorite Garnet Crystal [14]

SUMMARY

In the sixty years covered by Gemstones, the greatest change to the gemmologist's toolkit had occurred at the outset, with Herbert Smith's newly-released refractometer. Less conspicuous were the gradually increasing prominence of the microscope and the slow shift in social attitudes, such that the thirteenth edition finally devoted a chapter to the microscope, whilst the fourteenth would remove the last overt reference to 'Kaffirs' (an offensive term for black Africans).

The remainder of the twentieth century would see further shifts in social attitudes (especially in relation to ivory); the discovery of a vibrant blue-green elbaite tourmaline from Paraíba (Brazil); the introduction of new created diamond simulants; and the emergence of spectroscopic equipment so powerful that the methods described in Gemstones would be increasingly regarded as 'classical'!

Footnotes

[1] In reality, the first manufacture of diamond would take place in 1953: first by William Eversole and the Union Carbide Corporation using a 'chemical vapour deposition' technique; then by Erik Lundblad and the Swedish company ASEA using a 'high pressure, high temperature' approach (Evans, 2022). Herbert Smith's

overestimation of Moissan's success was corrected for the ninth edition of Gemstones (published 1940), which concluded that 'it is generally accepted to-day that diamond has never yet been artificially formed' (Herbert Smith, 1940, p.138). The tenth edition (published 1949) then outlined Hannay's earlier experiments – whilst removing the clear conclusion from the previous edition and noting that Hannay's work had been 'all but forgotten except by those few who ventured to prospect in the same field of research' (Herbert Smith, 1949, p.180). The fourteenth edition (published 1972) finally stated that 'diamonds could not possibly have crystallized in the conditions attained in Hannay's experiments' (Phillips & Herbert Smith, 1972, p.177). But of course, by this point, created diamonds were indeed a reality.

[2] Spencer also worked in the Minerals Department of the Natural History Museum and would later precede Herbert Smith in the role of Keeper of Minerals.

[3] Within the following edition (published 1949), Herbert Smith would describe two small polaroid plates 'which are optically at right angles to each other', as the polarizing dichroscope crept further towards existence (Herbert Smith, 1949, p.101).

[4] Image of morganite by Finesell / Shutterstock.com. The colour of morganite is not dissimilar to that of padparadscha!

[5] Anderson considered this expansion an amusing over-reaction to Robert Webster's Research Diploma on Ivory and its substitutes (Anderson, 1976, p.155).

[6] Rutile was described by Herbert Smith as an 'astonishing object' on account of 'its high refractivity and enormous double refraction' (Herbert Smith, 1949, p.194). In reality, it's the gem's extreme dispersion that makes it a wonder to behold (an error corrected by Frank Phillips within the thirteenth edition of Gemstones – published 1958).

[7] Claringbull had served as an examiner at the Gemmological Association since 1938. He would go on to become Director of the Natural History Museum from 1968 to 1978, and president of the Gemmological Association from 1972 to 1990. Aside from his expertise in gemstones, Claringbull had worked as an explosives expert for the Special Operations Executive during the second world war, and was reported to have grown the largest ever crystal of nitro-glycerine – assuring colleagues it was probably not dangerous unless they dropped it! (Radford, 2004).

[8] An example of this skill is provided by Phillips' explanation of the polaroid plate and its development from microscopic crystals of herapathite (Phillips & Herbert Smith, 1958, p.119).

[9] The earlier success of the Swedish company ASEA would be acknowledged in the fourteenth edition (published 1972).

[10] Phillips deemed such material to be 'garnet-like structures' rather than 'garnet', as he considered the material to be lacking in silica (which was present in natural garnet).

[11] Zoisite and grossular are often found together, due to their similar chemical formulas (Bridges, 2009).

[12] Tsavorite was named after Tsavo National Park in neighbouring Kenya.

[13] Image by Albert Russ.

Bibliography

The following works were referenced in addition to the fourteen editions of Gemstones.

Anderson, B., 1942. Gem testing for jewellers. London: Heywood & Company, Ltd. Available at: https://archive.org/details/gemtestingforjew0000bwan/

Anderson, B., 1953. Dr. G. F. Herbert Smith – An appreciation. The Journal of Gemmology, 4(3), pp.148-149. Available at:

https://gem-a.com/wp-content/uploads/2023/11/JoG1953_4_3.pdf

Anderson, B., 1955. The refractometer and other refractive index methods. The Journal of Gemmology, 5(3), pp.166-178. Available at:

https://gem-a.com/wp-content/uploads/2023/11/JoG1955_5_3.pdf

Anderson, B., 1973. Review of Gemstones (14th edition). The Journal of Gemmology, 13(6), pp.236-238. Available at:

https://gem-a.com/wp-content/uploads/2023/11/JoG1973_13_6.pdf

Anderson, B., 1976. Robert Webster – an appreciation. The Journal of Gemmology, 15(3), pp.153-157. Available at:

https://gem-a.com/wp-content/uploads/2023/11/JoG1976_15_3.pdf

Bauer, M., 1904. Precious stones (translated by Spencer, L.). London: Charles Griffin and Company Ltd. Available at: https://www.biodiversitylibrary.org/item/115989/

Bauer, M., 1909. Edelsteinkunde (Gemmology). Leipzig: Chr. Herm. Tauchnitz. Available at: https://archive.org/details/edelsteinkundeei00baueuoft/

Bridges, C., 2009. Tanzanite. Available at:

http://www.tsavorite.com/history/tanzanite.html

Bridges, C., 2009. The history of tsavorite. Available at:

http://www.tsavorite.com/history/history.html

Campbell Smith, W., 1950. L. J. Spencer's work at the British Museum. Mineralogical Magazine, 29(211), pp.256-270. Available at:

https://rruff.info/doclib/MinMag/Volume_29/29-211-256.pdf

Carlsbad Chamber of Commerce, 2006. Gemological Institute rings in the New Year. Available at:

https://carlsbad.org/Gemological-Institute-Rings-in-the-New-Year-for-the-75th-Time/

Evans, J., 2021. Gemstones First Discovered as Cut Stones: Taaffeite vs. Tourmaline. Gemmology Bulletin, Spring 2021. Available at:

https://lustregemmology.com/spring-2021

Evans, J., 2022. The early history of synthetic diamond. The Australian Gemmologist, 28(2), pp.90-95. A later version of the article is available at:

https://lustregemmology.com/spring-2023

ExtraLapis, 2002. Tourmaline. East Hampton: Lapit International, LLC.

Gem-A, 1947. The Journal of Gemmology, 1(1). Available at:

https://gem-a.com/wp-content/uploads/2023/11/JoG1947_1_1.pdf

Gem-A, 1968. Sixty years of gemmology in Great Britain. The Journal of Gemmology, 11(3), pp.69-80. Available at:

https://gem-a.com/wp-content/uploads/2023/11/JoG1968_11_3.pdf

Gem-A, 2018. Dr Herbert Smith: Innovator, Inventor, Gem-A President. Available at:

https://gem-a.com/herbert-smith-history/

Gem-A, 2018. Leading the world's first gemstone testing laboratory: Gem-A's Basil Anderson. Available at: https://gem-a.com/basil-anderson-history/

Jobbins, E., 1991. Sir Frank Claringbull 1911-1990. The Journal of Gemmology, 22(6), p.330. Available at:

https://gem-a.com/wp-content/uploads/2023/11/JoG1991_22_6.pdf

Liddicoat, R., 1972. Developments and highlights at GIA's lab in Los Angeles. Gems & gemology, 14(1), pp.18-28. Available at: https://www.gia.edu/doc/spring_1972.pdf

Radford, T., 2004. Museum revealed as a James Bond 'toy shop'. The Guardian, 12 April 2004. Available at: https://www.theguardian.com/uk/2004/apr/12/arts.education

Read, P., 1983. Gemmological instruments. London: Butterworths.

Schmetzer, K. and Kiefert, L., 1998. The colour of Igmerald: I.G. Farbenindustrie flux-grown synthetic emerald. The Journal of Gemmology, 26(3), pp.145-155. Available at:

https://gem-a.com/wp-content/uploads/2023/11/JoG1998_26_3.pdf

Spencer, L., 1936. A key to precious stones. Glasgow: Blackie & Son Limited.

University of Bristol, 2024. 1966-1967: Frank Coles Phillips. Available at:

https://earthalumni.blogs.bristol.ac.uk/history/1966-1967-frank-cole-phillips/

Webster, R., 1964. Composite stones: A survey of their types and their properties. The Journal of Gemmology, 9(5), pp.160-176. Available at:

https://gem-a.com/wp-content/uploads/2023/11/JoG1964_9_5.pdf

ABOUT THE AUTHOR

James Evans is a UK-based gemmologist specializing in man-made gemstones. He has a Gemmology Diploma from Gem-A, is recognized as a European Gemmologist by the Federation for European Education in Gemmology (FEEG) and has a master's degree in Development Economics and Emerging Markets.

INNOVATORS

Meet the Artisans

Nina asked five accomplished cutters (Julia Maria Kunnap, Sergey Novoselov, Dmitriy Petrochenkov, John Dyer and Victor Tuzlukov), seven questions. She was curious to see how they would respond. Each in their own right are changing the art of gem cutting, pushing the boundaries and creating gemstones of extraordinary quality. See what they have to say.....

What is your favorite stone?

Julia Maria Kunnap: I love this question. It is like 'what is your favourite colour?'. The younger the person, the easier it is to answer. A child would know right away. An experienced painter could spend a day figuring that out. I think my first favourite stone was tiger eye in the first year at the art academy. Then I say eagle eye. That seemed much more interesting. There was a period I got carried away by the different shades of fluorite and the beauty of the black tourmaline crystals. When I got into faceting myself, I started working with quartz, that just met my needs for easy-to-find large crystals. My recent favourite is grey spinel for its subtle hue.

Julia Maria Kunnap

Sergey Novoselov: Demantoid and Quartz

Dmitriy Petrochenkov: I don't have a favorite stone. I like any stones with interesting inclusions, zoning, pleochroism and other optical effects that can be emphasized by the correct cut. From a research point of view, I spend most of my time studying cassiterite and jewelry ammonites - I defended my PhD thesis on them, visited many deposits, and published many scientific papers.

John Dyer: I like many different gems for many different reasons. Currently, one of my favorite stones to cut and sell is sapphire, because of its hardness, durability, variety of colors, and usability in rings, especially engagement rings but there are many other lovely gems. For example, citrine will give you a large, very attractive yellow gem of high clarity, which looks great in many different kinds of cuts and is quite affordable. And aquamarine has a cool and often greenish-blue color if unheated that is very appealing. Tourmaline comes in such a variety of colors (including bicolor) that can be really exciting and garnet. I feel this is the golden age of garnet because I've never seen so many varieties and colors (including color changes) and phenomena as is currently available in the market in garnet. Dragon garnet, for example, which I've been selling lately, is a Malaya-type garnet that glows a bright red under UV light. People find it fascinating. In truth, the list is endless with different gem types having unique and fascinating properties that all make them beautiful in their own way.

Victor Tuzlukov: It is difficult to say about my favourite stone - how can a mother distinguish which of her children she loves the most? But perhaps the most reverent of all is the fianite cut in the

Mandala design - the prototype of the stone I presented to His Holiness the Dalai Lama when I met him.

Sergey Novoselov

Why did you decide to become a gem cutter?

Julia Maria Kunnap: My artistic ambitions have never been determined by my current skills. I became familiar with most of the traditional jewellery technology, including basic stone cutting, during my school years. When I had the need to cut stones to execute my ideas, I learned the basics of faceting from various gem cutters forums and started practicing.

Sergey Novoselov: It runs in the family. My father Vladimir Ilyich Novoselov, learned from my grandfather and even drew up the design for his own cutting machine.

Dmitriy Petrochenkov: For me, a production necessity grew into a hobby and that turned into a profession. I am grateful for the advice I received from experienced cutters, such as Akhmetshin E.A., Davydov S.S., Cherepanov S.Yu., Ignatiev N. and others. In 2012, I met Tuzlukov V.A. which showed that cutting is not only standard orders, but also an art and a sport. Then I took part in the Russian cutting competitions for the first time. The following year, we bought a Facetron machine. In the period from 2014 to 2018, I took prizes in cutting competitions in the USA, Australia, Gokhran (Russia), and Thailand. From there, in 2020, I went to learn how to process diamonds at TsATiG KP-11. My time there, under the supervision of masters such as Shibaev Yu.A., Samorukov D.V., Grafsky N.N. and others, I not only increased the quality of my cutting but also how to save valuable raw materials. When I had mastered the cutting of most stones with good speed and quality, I began to take part in the evaluation of WorldSkills and FSRRO cutting competitions. In my work, I try to optimize the cutting process, so I constantly update and modernize equipment, master auxiliary technologies: turning, milling, welding, etc. Now, even with my extensive experience in stone processing, I understand that there is still much I don't know, and I continue to constantly learn from different masters and try different approaches to cutting.

Dmitriy Petrochenkov

For the last three years I have been holding the position of head of the Department of Mineralogy and Gemology at MGRI, and due to the large amount of educational and organizational work there is practically no time left for cutting stones.

John Dyer: That is a long story, but the short version is that I wanted to get into the gem business and first purchased rough in Africa which another cutter cut for me. He did a bad job that was also expensive. God used that to help us decide to start cutting our own gems and that is how I discovered that I not only liked it but also had a God given talent for it.

Victor Tuzlukov: I have loved stones since childhood, even dreamed of becoming a geologist - to combine my love for stones with the romance of travelling. But Life had a different way of doing things, although later on it gave me a sign - my friends introduced me to an amateur cutter. I looked at it, tried it, liked it. And further - already by myself...

What is the most difficult gemstone you have ever had to cut?

Julia Maria Kunnap: The bigger the stone, the more challenges there can be. I find large facets on quartz hard to polish, but it turns out, I am not alone with this difficulty. Sometimes the biggest challenge is to stop and let go of a piece of stone just for artistic reasons.

Sergey Novoselov: The most difficult to facet is probably demantoid since you need to ensure a high yield due to the cost. For this reason, you sometimes turn a stone for a week, looking for the best shape.

John Dyer

Dmitriy Petrochenkov: The most complex stone was 'Solar System', since it needed to combine all stone processing technologies: cutting, carving, making cabochons and balls, and gluing doublets. Among minerals, quartz requires a special approach, on which it is quite difficult to quickly obtain high-quality polishing due to the small scratches that appear. Very soft stones (calcite, fluorite, pearls, sphene, sphalerite, etc.) also cause difficulties. You have to first try several discs and operating modes so as not to damage the stone. Separately, it should be noted that diamond cutting is a whole different world with its own technologies, equipment, processing modes, and most importantly, very high requirements for cutting quality and saving raw materials.

John Dyer: Different gems present different challenges. Techniques that create heat when cutting tanzanite is challenging, as is cutting emeralds and other gems with inclusions. Due to its softness and multiple directions of perfect cleavage, fluorite is also challenging. I enjoy the strategy involved in trying to create the most beautiful and well-cut gem possible out of each piece of rough and that is one reason why I do such a wide range of different cutting styles and techniques.

Victor Tuzlukov: Speaking of gemstones, we are referring to the "big three", if I understand correctly - emerald, ruby, sapphire? Then let me mention a 126-carat sapphire crystal that had to be cut so that the weight of the finished stone exceeded 100 carats. In that case, I repeated the shape of the crystal by levelling and polishing the facets - the result was a hexagonal spindle with two pyramids at the ends. The difficulty was in polishing the huge facets, the area of each of which was several square centimetres. And this is sapphire - the hardest material after diamond! The result was a beautiful 109-carat stone in which one natural facet was left. It looked like a window covered with frost - it was so beautiful that a hand didn't rise to cut it....

What gemstone do you enjoy cutting the most?

Julia Maria Kunnap: I love different stones for different reasons. For example, I enjoy nephrite for its translucency and extreme durability that allows me to cut very thin pieces, quartz for its simplicity and variety, and lapis lazuli for its blue colour that one can drown into.

Sergey Novoselov: I like to make large, faceted gemstones.

Dmitriy Petrochenkov: There are no favorite stones. In general, I like the 'challenge' to mastery: to make a complex cut or process a very fragile stone or recut with minimal losses, revealing the internal features of a mineral or optical effects.

John Dyer: My favorite gem variety to cut is beryl, it comes in large sizes, often is very clean, is not heat sensitive, a joy to polish, and the color is usually of medium or lighter saturation which shows off the cutting design really well.

Victor Tuzlukov: The thing I like most about faceting 'impossible' stones. To explain. I have already mentioned the Mandala in a stone that was cut for the Dalai Lama. It contained 722 facets, which corresponds to the 722 Deities, or elements of the Kalachakra Mandala. The original stone was 36mm in diameter. One of my clients asked me to cut for her a stone of the same design, but in a smaller size - for a ring. 722 facets in a smaller size! I told her it was impossible. But she asked me to try... So

the first of the stones was cut, which I myself thought was impossible. It was an uncut topaz, greenish-blue in colour, 18 mm in diameter! And it was cut without a single mistake, without a single defect! That's when I realised that most of the limits of what is possible are only in our minds. Since then, there have been several such stones pushing the boundaries of the possible. I like them most of all, because they are not just my children - they are my Mentors.

What gemstone have you not cut but would like to cut in the nearest future?

Julia Maria Kunnap: There are some garnets waiting on my desk. I am eager to find out how to make them flow and how I can take advantage of the high R.I. and therefore shallower pavilions. I also make all my jewellery myself, and it makes me think in advance, how the stone should be set and worn. Deep pavilions are always difficult for jewellery, they make the rings too high and heavy or earrings hard to balance.

Sergey Novoselov: In the future, I probably want to cut a diamond.

Dmitriy Petrochenkov: There are more than 4,000 minerals in the world, of which about a hundred are used in the jewelry industry. I would like to try all of them in cutting, including possible synthetic analogues.

John Dyer: Sometimes I think it would be fun to cut a few diamonds just to see how that works, but it doesn't currently fit well with our current equipment or business model.

Victor Tuzlukov: I have not yet worked with sulphur and rock salt - halite. This material is extremely difficult in all parameters: softness, brittleness, cleavage, etc. And it dissolves in water as well.

Victor Tuzlukov meets the Pope

What advice can you give to somebody who wants to start cutting gemstones? What should they begin with?

Julia Maria Kunnap: Don't be afraid! Experience is the only thing in the world you cannot learn, so start cutting! You should start with a sparkle in their eyes. It is vital to have an inner trigger to do something, an idea, or a concept. Remember, a gem of a certain size can only be cut once from the rough. You must think before acting because ultimately, you are going to turn more than half the material to dust! The basic cutting instructions can be found anywhere.

Sergey Novoselov: Advice for beginners learn the basics first, the correct angles and proportions and do not chase 'weight'.

Dmitriy Petrochenkov: Commercial cutting is a fairly monotonous process that requires a lot of patience and perseverance. To keep your work always interesting, you cannot stop at a narrow range of precious stones and a small assortment of shapes and types of cuts. You need to try something new every time: different minerals, different types of cuts, different machines and devices, different discs and pastes, different processing modes - this way the work will not only be varied, but also the speed and quality of processing will be constantly improved. In parallel with mastering cutting technology, it is imperative to study gemology and gemstone evaluation systems; this will allow you to take a more meaningful approach to the technological process and cut stones of the required quality. It is better to start with your own material, so you get the 'feel' before you take on small orders. Cutting some-one else's materials forces you to take responsibility for your work and forces you to treat the stone with more care and attention.

John Dyer: The first thing is to decide WHY you want to start cutting. For the fun of it? To try to make money at it? If for money, then how much money? Would it be just a little supplemental income, or do you need to survive on that income alone? I can tell you right away that making money cutting gems is not easy. The entry costs are high. For an Ultra Tec (which I sell and use for flat faceting), a basic starting setup would run at least $6,000 to $7,000 USD and used machines are almost always overpriced or trash because everyone is trying to get a machine on the cheap. Once the machine and initial batch of laps and supplies are purchased you still don't have any gems to cut and that is what gets REALLY expensive quite fast unless you buy man-made or cheap rough (which is hard to market at a

profit). Cutting for others is a possibility, but you have a responsibility for other people's rough gems, and you should be at least an adequate cutter before you do that. To get to an adequate level, you need practice and possibly training (it also can cost a fair bit for training). The cutting labor market is made much more challenging by the fact that most gems are cut overseas in India, China, Thailand, or Sri Lanka where labor costs are very low. So, differentiating yourself in the market is a major challenge in order to be able to justify a (much higher) living wage in parts of the world where the cost of living is much higher (such as the US or Europe). In the end, making a living from cutting gems has a LOT more to do with marketing and running a business than it has to do with the cutting itself. You can be the best cutter in the world, but if you can't market your services or the gems you won't be able to make a living at it.

If on the other hand you are cutting for fun then that is a lot easier, although still a somewhat expensive hobby. It takes the pressure off you. Gems make great gifts for friends and relatives. You will always find a ready 'market' when you can give people gems for free. Many doctors, engineers and other people who enjoy patience and precision love faceting as a hobby. In many places, there are faceting clubs that you can join which have very affordable classes and will let you use club owned equipment at a very affordable price. This is often one of the first possibilities to check out if you are interested in the field.

Victor Tuzlukov: I would advise those who want to start faceting stones to first think about what they really want, what is their main goal? Or, in other words, what do they want to cut stones for. If they want to become a professional cutter and cut stones in large volumes, in standard shapes with acceptable quality - I would advise them to find something else....

Let me explain why. With the advent of automatic cutting machines, with the development of cutting in the traditional centres of stone processing - South-East Asia, Africa, Sri Lanka, where labour is very cheap - it is useless to compete with the specialists there. You will have to increase the speed of work to the detriment of quality, and this is a dead end. Another thing is if cutting is a hobby for you and/or a means of creative self-realisation. Then go ahead, and the main thing I would advise you on this path is to strive for perfection, to listen to the stone and not to be afraid of impossible tasks. Today they seem impossible, tomorrow - possible, and the day after tomorrow they will become commonplace. Also don't try to follow the beaten path. Look for your own paths. And when you learn to cut, don't learn to cut. Set higher goals. Say, learn perfection. If you take faceting only as a path, as an opportunity - if not to achieve Perfection, then at least to touch it. Then you will not notice how perfectly you master the process of cutting. But, again, let it not be a goal for you, but only a means of achieving some higher goal.

Let me remind you of a parable: three men carrying heavy stones were asked - what are they doing? One said: 'Don't you see? I am carrying stones.' The second said: I earn bread for my family.' And the third exclaimed: 'I am building the great Taj Mahal!'

Where do you see the future of gem cutting ten years from now?

Julia Maria Kunnap: The world of gem cutting tends to adapt slowly due to the high costs of experimentation. There are, of course, some nerds out there, me included, who don't care much about the wasted time and energy but focus on creating something that hasn't been around yet. Concave cut somewhat put gem sparkle on steroids, but it has not become a dominant style of cutting. If I can borrow a term from music, traditional flat facet gems sparkle in, staccato, but I would like to see their sparkle vary from staccato to legato and why not from crescendo to diminuendo? In order to create these kinds of reflections, you must combine flat facets with soft round surfaces, and these combinations are still very much uncharted waters. I also believe that there will be advances in digital technology, because the younger generation does not seem to be that much into crafts and will find new ways to compensate for it. I find these new approaches good for the field.

Sergey Novoselov: I would like to believe that everything will improve in our industry, the cutter will not face the problems of finding raw materials and selling his finished stones. Trends in the jewelry market are changing very quickly, so I don't even know what that will bring.

Dmitriy Petrochenkov: In the world of commercial cutting, reducing costs and increasing the yield of raw materials play an important role, so most colored stones are still cut by hand with maximum mass retention, as a result of which the stones do not always show their color and play. We have a strict system for assessing the cut of a diamond, where a deviation from ideal proportions can lead to a big difference in the price, yet in color stones, cut is not as well defined. At the same time in the colored gemstone market, the demand for well-cut gems stones is increasing.

John Dyer: I don't see major differences in gem cutting happening in the future but trends which I figure will continue are a trend to increased precision and quality of cutting as the market gets more educated. The Internet and social media have really played into that with people being able to see higher quality cuts, such as ours, and therefore demanding higher quality cutting in the gems they buy. Although automation has already been around for quite a while for very small gems, I don't see it being used for high-end gems. I suppose if AI advances a lot and becomes viable for niche markets such as ours, that is a possibility someday.

JULIA MARIA KUNNAP

Liquid Smoky Quartz

Liquid Citrine Quartz

Liquid London Blue Topaz

SERGEY NOVOSELOV

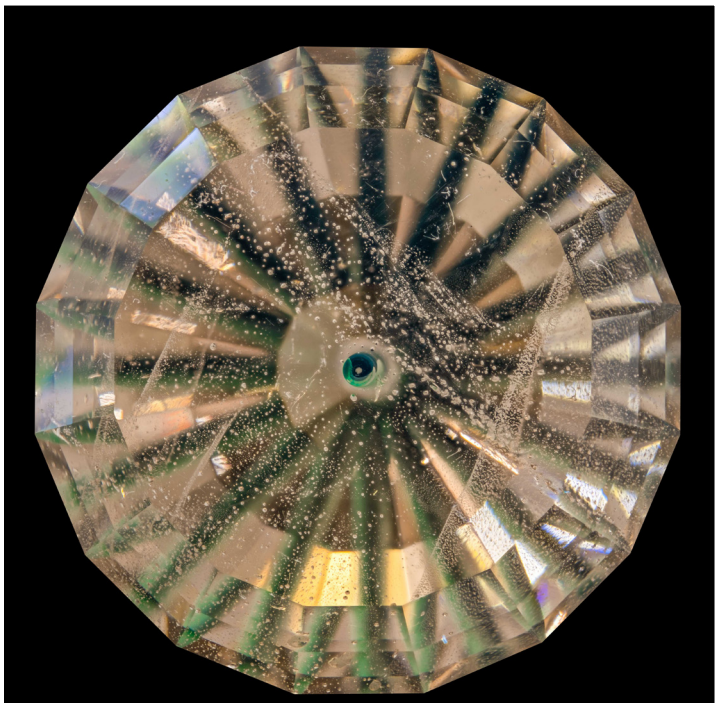
Quartz

Quartz Trillion (1145 carats)

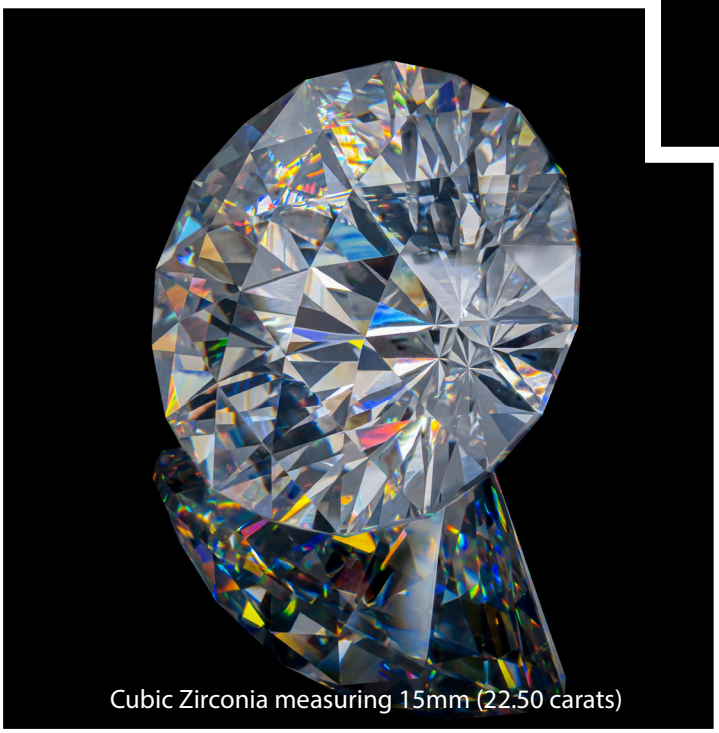
Quartz

DMITRIY PETROCHENKOV

Lab-created Corundum measuring 10mm (5.70 carats)

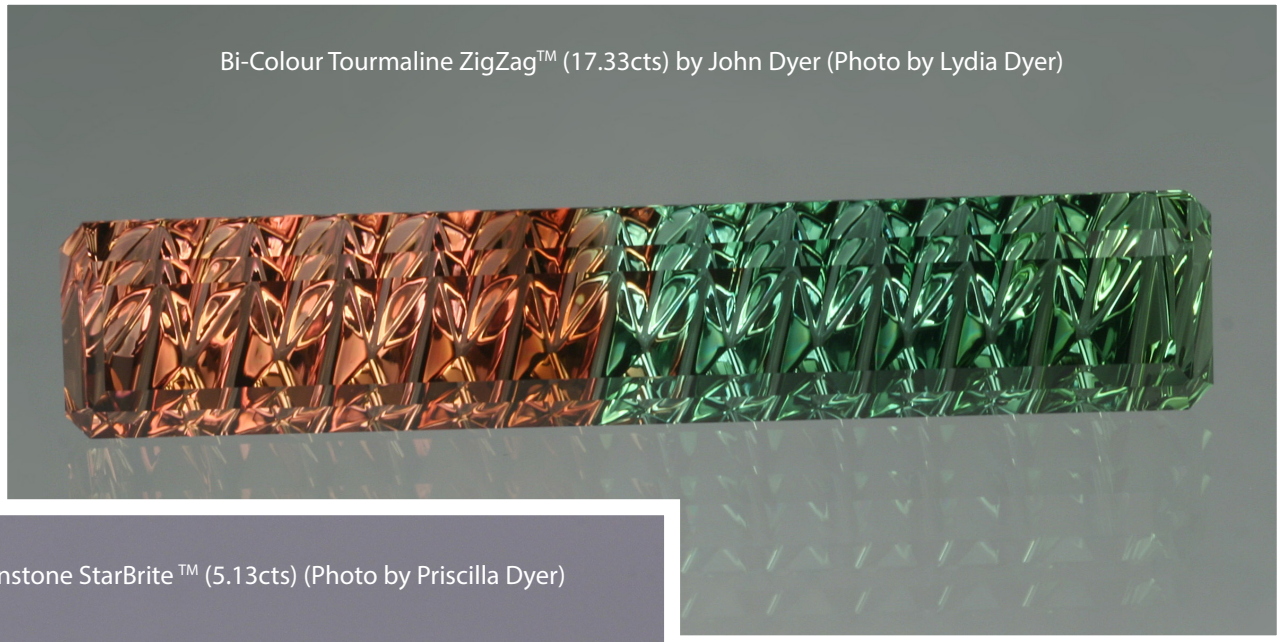


Quartz measuring 21mm (35.70 carats)



Cubic Zirconia measuring 15mm (22.50 carats)

JOHN DYER

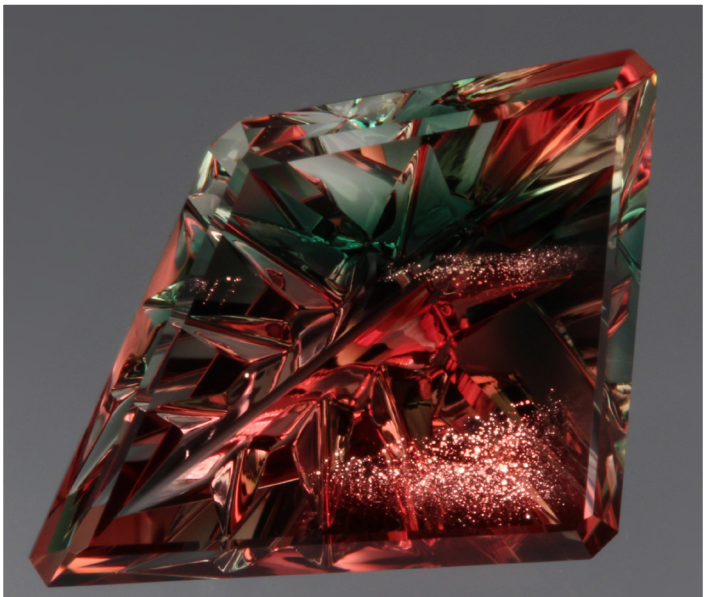


Bi-Colour Tourmaline ZigZag™ (17.33cts) by John Dyer (Photo by Lydia Dyer)

Sunstone StarBrite ™ (5.13cts) (Photo by Priscilla Dyer)

Oregon Sunstone Dreamscape ™ (9.48cts) (Photo by Lydia Dyer)

Citrine Dreamscape ™ (30.82cts) (Photo by Lydia Dyer)



Sunstone Dreamscape ™ (5.17cts) (Photo by Priscilla Dyer)

Oregon Sunstone Sculptural Gem ™ (27.22cts) (Photo by Lydia Dyer)

VICTOR TUZLUKOV

Crosswalk of Cultures Lemon Citrine 673 facets (185 carats)

Photo by Dmitry Stolyarevich

Legend of Stars-Wanderers

Gothic Rhapsody

Another advance that is already happening is much wider spread usage of, for lack of a better term, fantasy cut styles. More and more people are doing different fantasy styles of cutting, which offers interesting possibilities in the finished appearance of the gem. This is a trend that I have seen happening for quite some time now, and I think this will just increase.

Victor Tuzlukov: Predictions are a thankless task. But I would venture to guess that cutting on automatic machines will take a slightly larger place. The quality will change slightly towards improvement. In general, it is difficult to expect radical changes. Twenty years of market development have passed before me. There is only one fundamental change: curved facet cutting has appeared. It will probably develop. Although I personally do not use this type of faceting. With curvilinear facets, the virtual prisms that split the light inside the stone into spectral components disappear, and such a wonderful property as dispersion disappears. We no longer see multi-coloured flashes in the stone. Yes, it becomes more iridescent, but some life in it disappears ...

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).

Fragilityof Eternal Cubic Zirconia (35mm)

Kunzite weighing 3051carats, 914 facets (Photo by Dmitry Stolyarevich)

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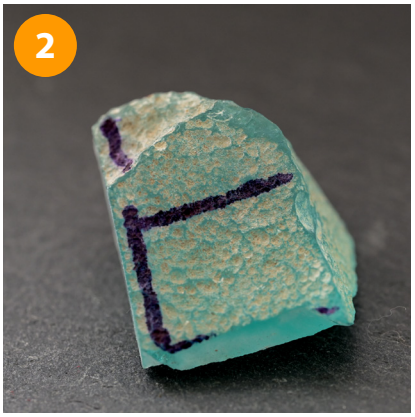
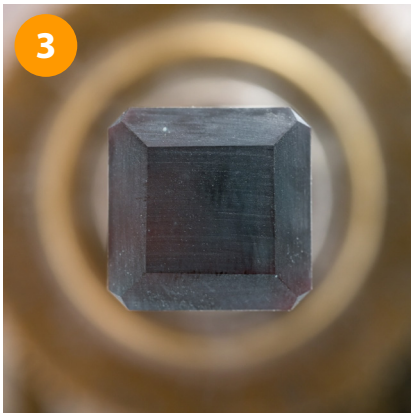
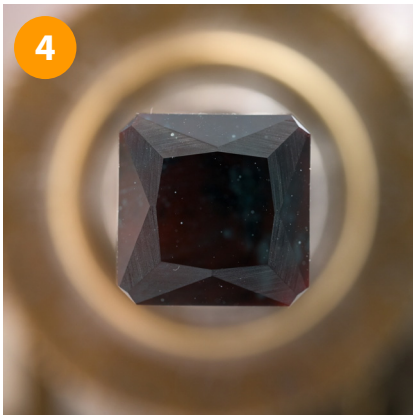
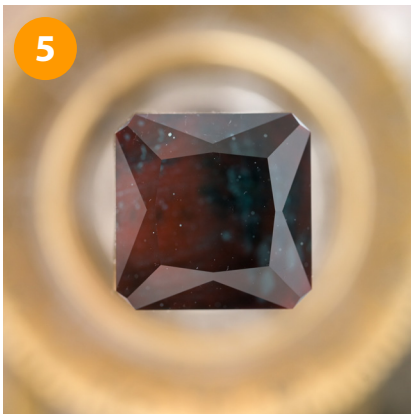
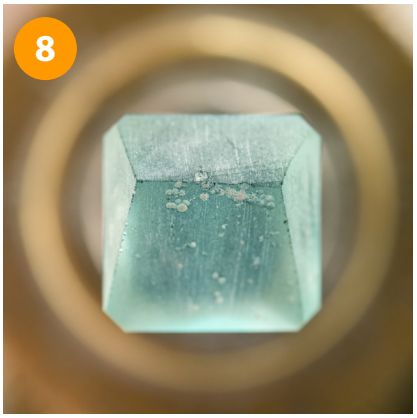
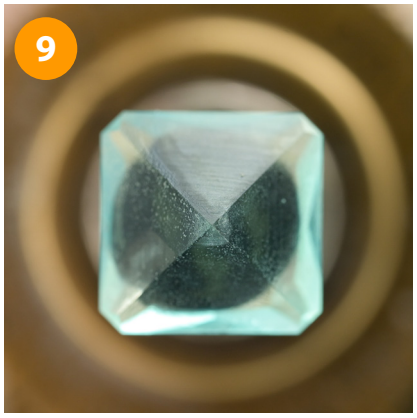




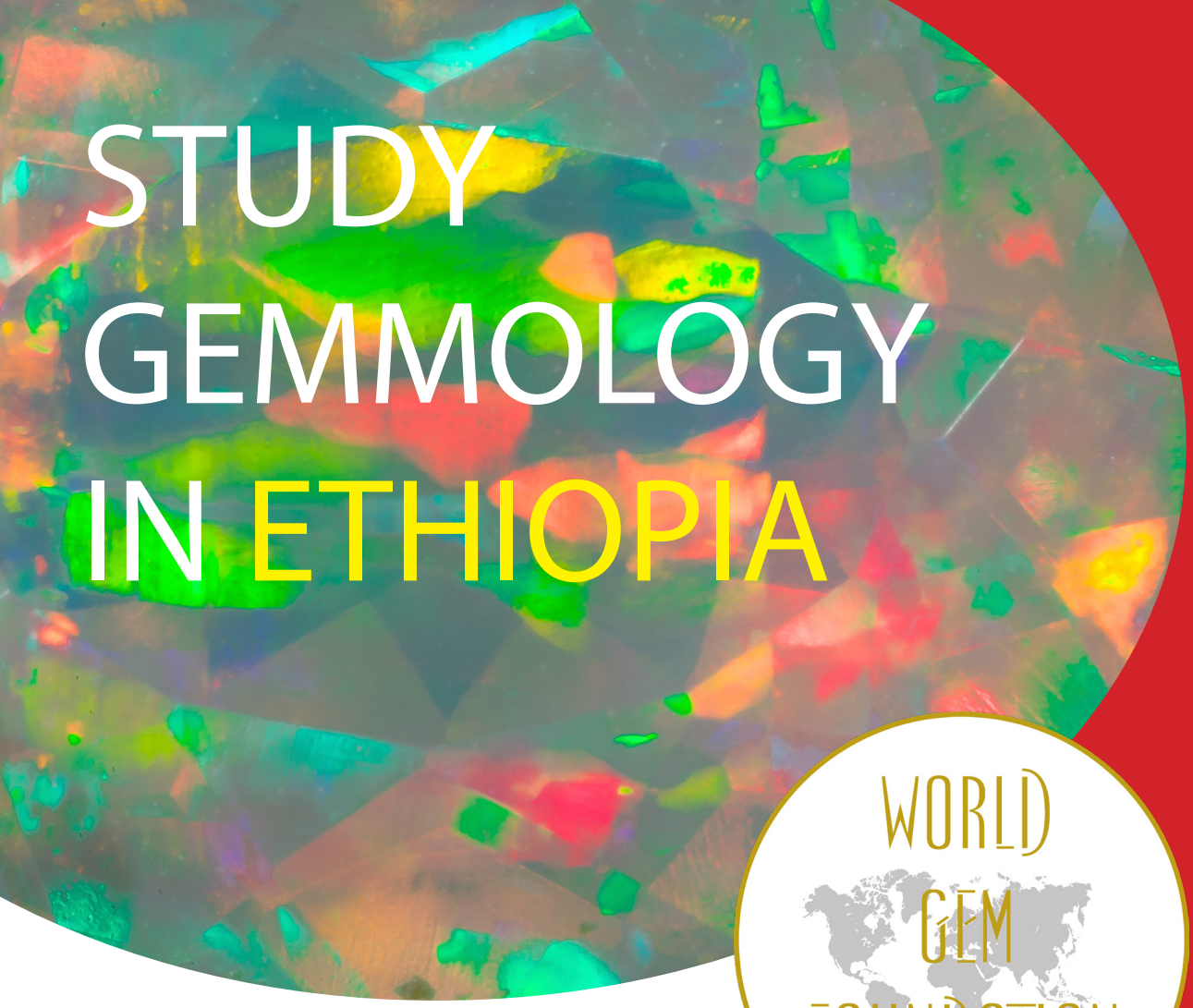








Photos courtesy of Justin K. Prim & World Gem Foundation



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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 2024, 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, 2024. 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.

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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 Addis Ababa, Ethiopia 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.

Beth West (British Gem Academy) is the principal tutor at GCS, a gemmologist, educator and writer with over fifteen years' experience in the jewellery industry in varying senior roles. As a Fellow and Diamond Fellow of the Gemmological Association of Great Britain and a member of the Federation of European Education in Gemmology, she has a wealth of passion for her subject, and is driven by a desire to share her knowledge with others. Outside of her immediate professional responsibilities as the laboratory director, she has worked as a diploma level tutor for Gem-A for over five years, and also as a consultant for De Beers Institute of Diamonds, designing and writing educational content. She is also involved in number of other projects, with a particular focus on the importance of gemmological education along the supply chain, which drives her work as a committed volunteer for the NGO, Diamonds for Peace.

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.

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.

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.

With more than 20 years of experience in the Gems & Jewelry industry, Dr. Massi was the Director of the Asian Institute of Gemological Sciences (AIGS) Gem Laboratory and Gem School based in Bangkok - Thailand. He then 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.

Back to France, Dr. Massi has been the head of the international gem academy AGAT (for 'Academy of Applied & Technical Gemology') located on the French Riviera, in Nice - France, as well as the co-founder of the French-Swiss Gem Academy (from the World Gem Foundation).

In addition to a variety of scientific and educational publications on different precious stones such as diamonds, rubies, sapphires and on rarer gemstones such as clinohumite, color-change bastnäsite and hibonite, one of the rarest gems on Earth, Dr. Massi traveled around the world in many mining areas and gem markets to collect samples and valuable information that will later be used in his lectures, teachings, fine art photomicrographs (as the ones displayed on this page) and NFTs.

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.

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.

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.

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.

Deborah Mazza (Italy) 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

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Geoffrey M. Dominy
World Gem Foundation
Spanish Gem Academy

Leone Langeslag
Dutch
Gem Academy

Beth West
British
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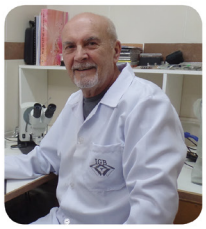
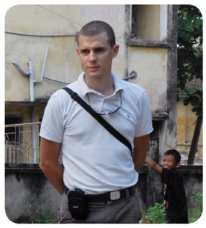


Gérard Raphaël Quintin
South American
Gem Academy

Marie-Hélène Corbin
Gem Academy of Canada
Gem Academy of Belgium

Jack Ghazalian
American
Gem Academy

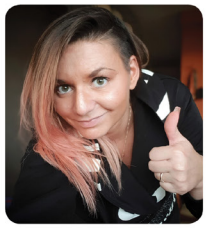


Dr. Laurent Massi
French Swiss
Gem Academy

Kyalo Kiilu
East African
Gem Academy

Salomon Lutumba
South Central African
Gem Academy

Barickeh Charles Kholifa Koroma
West African
Gem Academy



Nina Zolotukhina
Eastern Europe
& Russia

Haimanot Sisay
World Gem Foundation

Lucille Daver
Gem Academy of Canada
Gem Academy of Belgium

Dorian Fitchko
Gem Academy of Canada
Gem Academy of Belgium

Alisson Lemaire
Gem Academy of Canada
Gem Academy of Belgium

Wilma van der Giessen
Gem Academy of Belgium

Gamini Zoysa
Sri Lanka

Deborah Mazza
Italy

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, passed the NAJ/IRV's CAT jewellery valuation diploma, and received her Master's in the History of Art from 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.

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: 1,236
LinkedIn Followers: 1,227
Total Value of Scholarships Awarded: € 231,003

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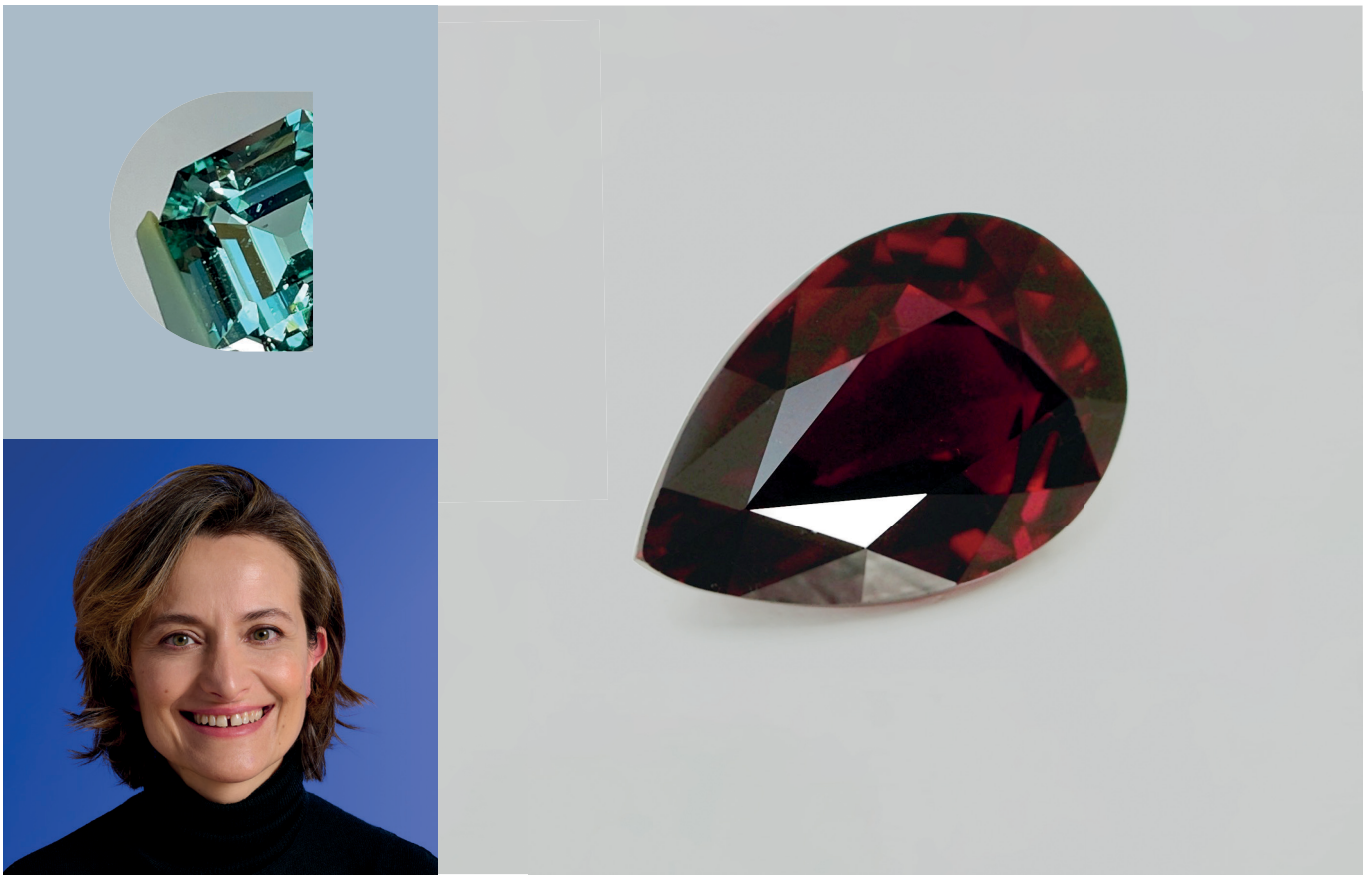

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