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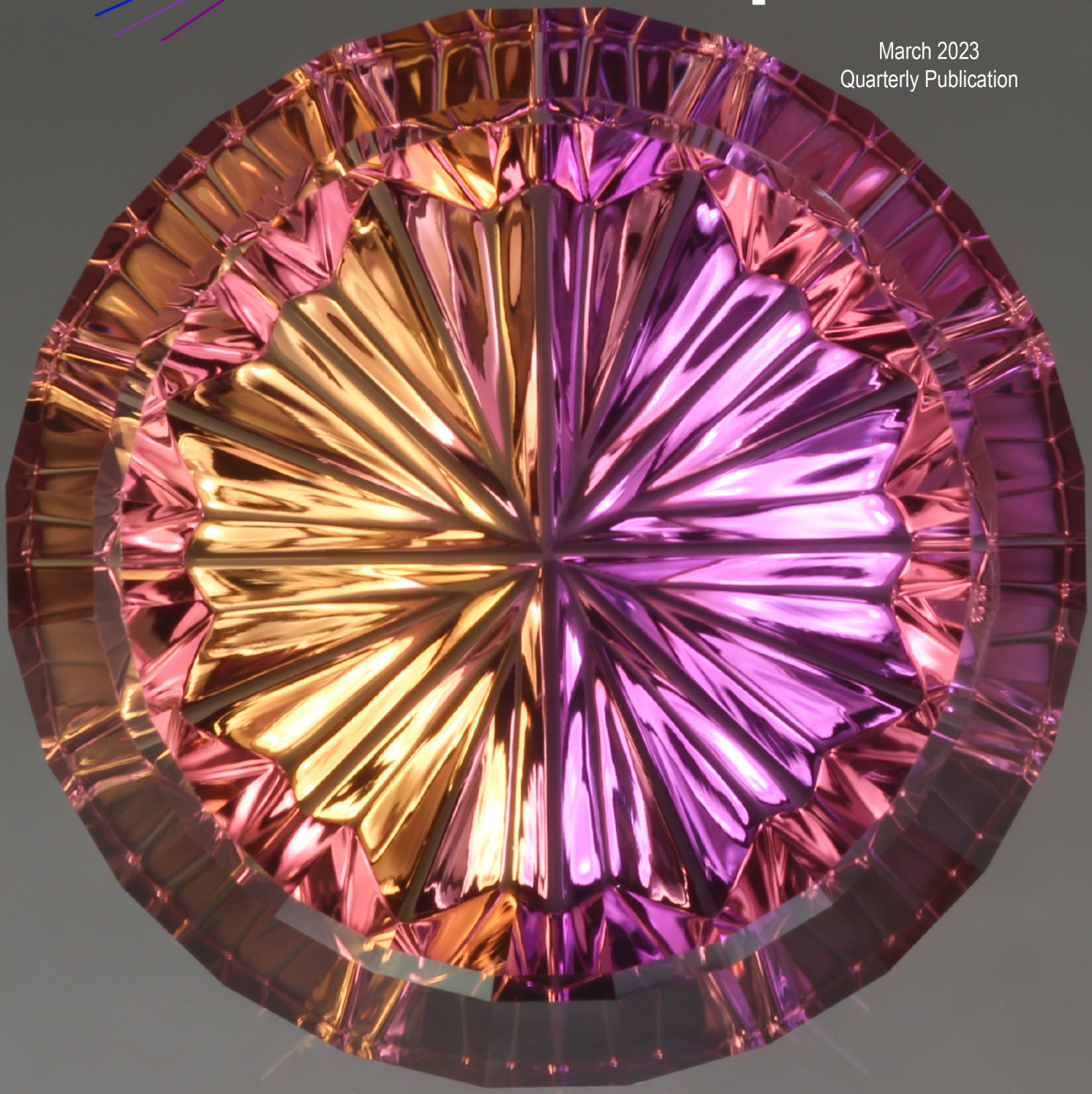
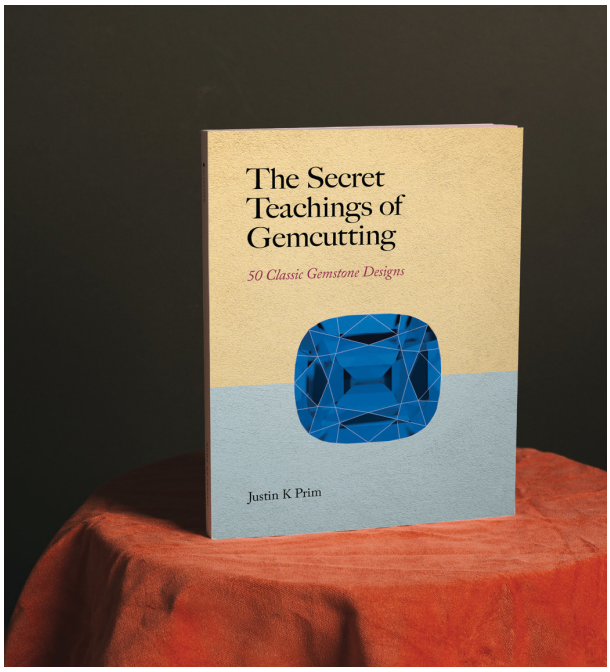


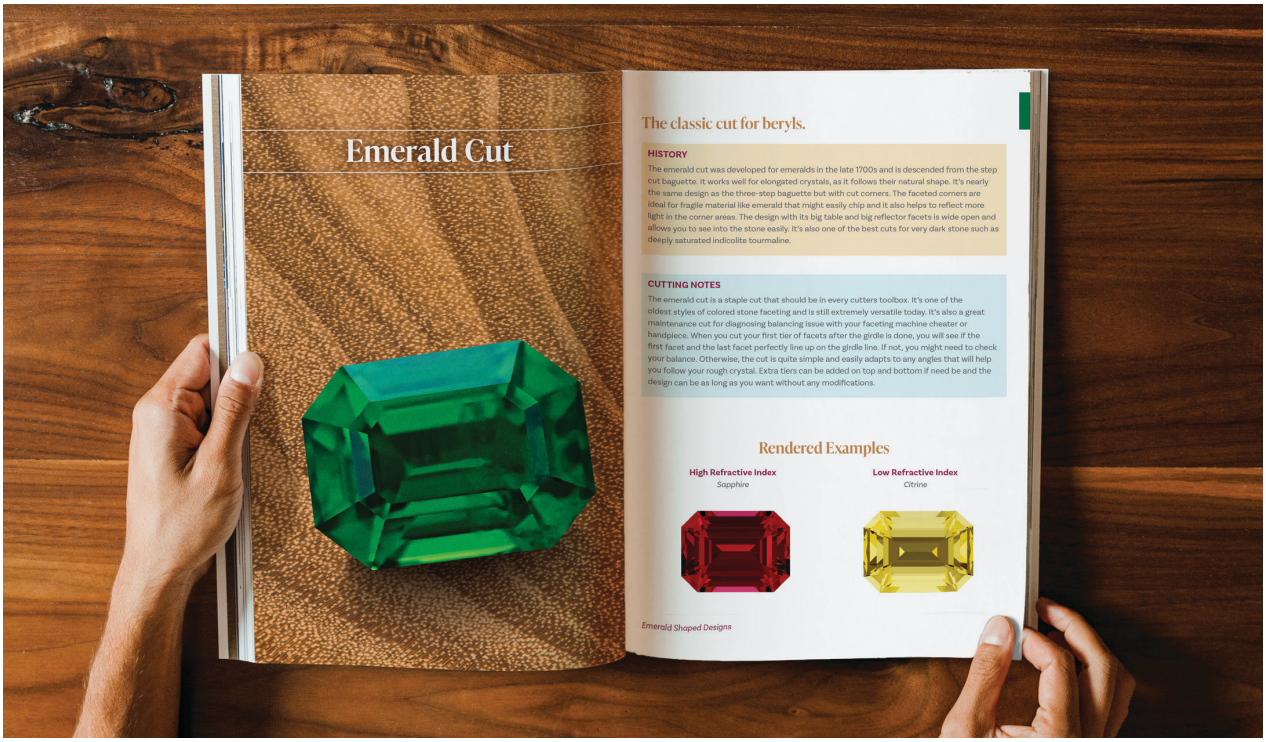
To Dyer...for

The Secret Teachings of Gemcutting

Second edition available now **www.magusgems.com**

The Secret Teachings of Gemcutting is a collection of the world's most popular and jealously guarded gemstone designs. Traditionally, the gemstone cutting trade has been very secretive and this collection marks the first time these designs have been compiled for public consumption. Each gemstone design is accompanied with full color photos, historical notes, cutting advice, as well as design information that will enable you to unleash your stone's greatest potential for beauty and profit. This volume will prove useful to gemcutters who want to cut these market-essential designs, to jewelers who need a visual reference for presenting different gemstone styles to their customers, as well as to gemstone enthusiasts who wish to understand the process of how and why a pebble can become one of the most value-rich objects in the world.





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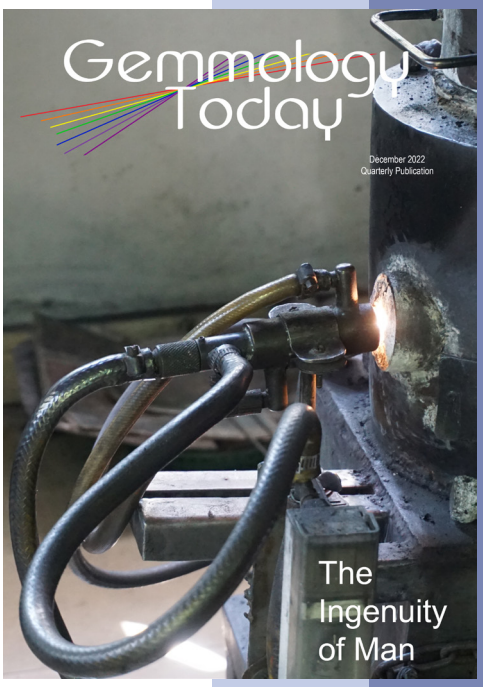


Click here to read the December 2022 Issue

Geoff Dominy - Founder / Editor

Greetings from Spain!

I am back from Ethiopia to recharge my batteries. I am very happy with the end result but it has been extremely challenging. I had been forewarned by friends and colleagues who had done business in Africa. They all said Rome would not be built in a day, a week, or a month. They were right, it has taken four months.

On February 24th, 2023, we signed a joint venture agreement between the FDRE (Federal Democratic Republic of Ethiopia) Ministry of Mines and the World Gem Foundation to establish the first 'Centre of Excellence' in the Ministry compound. This is the first agreement of its kind between the private and public sectors regarding gemmological education in Africa. We hope to have the centre operational by early May 2023. The centre will offer our 25-week Career Gemmologist Diploma program and will offer two 25-week cycles every 54 weeks for a period of five and a half years. During this time, we will train 100 gemmologists. Full scholarships will be offered based on funding that will be sourced by a joint task force. This will enable us to reach students regardless of their financial circumstances. Applicants will be interviewed by a 'Selections Committee' with the mandate to find students who will work to improve the gem and jewellery sectors here in Ethiopia. It will be an intense program but we are confident that the sacrifices they will be asked to make will pay dividends.

Editor at Work

While I will be the first to admit that Ethiopia is not an easy country to live in, I continue to be impressed by the people, their resilience and the respect they have shown me. I have never encountered this anywhere else in the world.

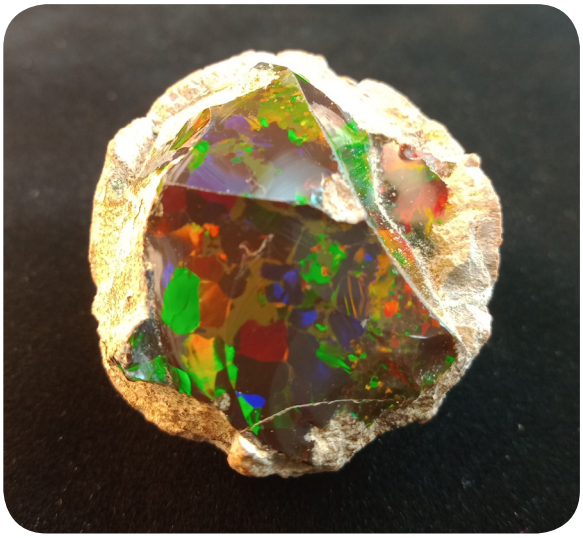
With rampant inflation, I see daily the struggle they face yet they are the first to lend a hand. Religions plays a key role here in Ethiopia and perhaps that is one of the contributing factors.

On February 22nd, I had the pleasure of meeting Daniel Belayneh (second from the right), the CEO of ARTS TV (African Renaissance Terlevision Service). They have been incredibly supportive of Project Africa and truly understand its importance and significance. We hope to work with them in the production of a series of shows that will highlight the plight of artisanal miners, and the ongoing concerns regarding forced and child labour.

We have to work hard to get this information into the public domain. Here in Ethiopia, there are no safety standards employed by artisanal miners and with indiscriminant and unregulated mining going on in the key producing areas, I am sure there will be many lives lost in the pursuit of gemstones.

We also want to help the government in curtailing the illegal export and undervaluing of gemstones by establishing a lab in collaboration with the Geoscience Laboratory. I was chatting to an NGO and he told me he had seen eighteen boxes at a local DHL office with 'Diplomatic' tags on them bound for China.

On a more positive note, I have seen some beautiful opals since I arrived in Ethiopia. This photograph does not do the opal justice but trust me, it is stunning!



So what is new in this issue?

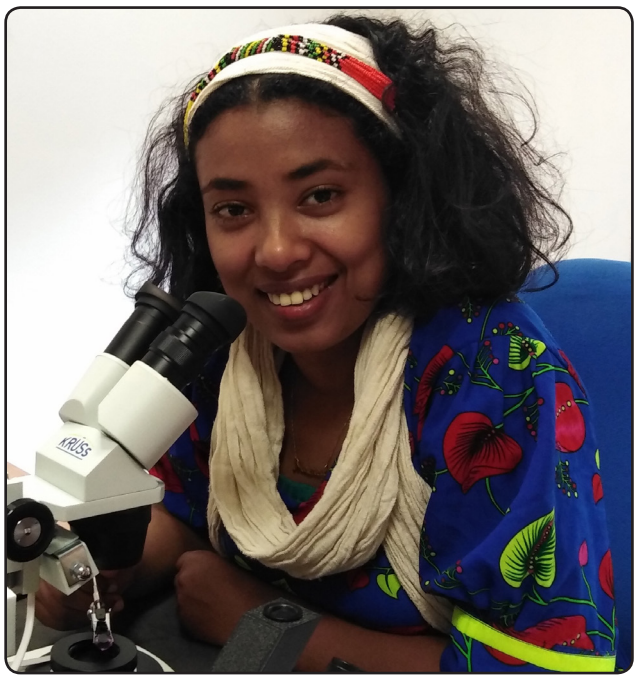
We continue our journey along the supply chain with the focus now on gem cutting.

We have a feature interview with Justin K. Prim, gem cutter, author, and historian. Justin talks about his fascination with gem cutting and has provided us with a wonderful pictorial layout that follows the cutting of a piece of 2000 year old Roman glass, documenting the various steps needed. We look at the thought process a gem cutter goes through before and during the cutting of a gemstone, while TDi Sustainability looks at the gem cutting process and the pros and cons of automation. I look at the upside and the downside of banning the exportation of gem rough to promote localized cutting, and the economics of gem cutting where we look at six case studies. We also bring you up to date on the latest developments with Project Africa, Haimi talks about cutting opals, and last but certainly not least, Leone Langeslag explores a gemstone that is tricky to cut and hugely underrated: fluorite

If you are interested in gem cutting, this issue is definitely for you. At the same token, if you have never thought too much about the cutting of gemstones, perhaps this issue will motivate you to learn more.

In the June issue we will complete the supply chain looking at the artistic aspects of gems and jewellery and some of the exceptional artisans, who were, are or will be game changers in our industry.

As I write this editorial, I am already planning my return to Ethiopia. I have only lived there for four months but already it feels like home. I am also excited to start the first 25-week program.



Haimanot Sisay - Associate Editor

The next three months will present many challenges but I am confident that we are on the right path.

Happy reading and we will see you all again at the end of June!

Associate Editor at Work

FEATURE interview

Meet Justin K. Prim

Who is Justin K. Prim?

I am a gemcutter! I started cutting almost ten years ago and as soon as I finished my first stone, I was hooked. A few years in, I decided to make gemstone cutting the main focus of my life and since making that decision, things have grown a lot. My skills have grown and I have become a very good cutter. My network has grown to the point where I now know most of the master cutters of Europe and America and I try to visit them yearly to continue my journey towards mastery. My responsibility has grown along the way as well. At some point, I took it upon myself to discover and document the entire history of faceting, going back nearly 1000 years. My first book came out a few years ago and I have several more in the works right now. My wife Victoria and I run a gemstone cutting company in Bangkok, Thailand, one of the biggest gemstone trading hubs in the world. I also teach gemcutting. We had a gemcutting school in Bangkok until the pandemic hit and now Victoria and I are making plans to relocate to America and open a new school there. Nearly a decade after getting curious about gemstones, I still see myself as a gemcutter, just one who wears many different hats.

In my earliest days of learning to be a lapidary, even Halloween was a day for coming in to the shop and learning the art of cutting.

What was the catalyst that got you interested in gem cutting?

Before I started faceting stones, I was a musician for about 15 years. I played in many bands, recorded on many albums, and played hundreds of live shows. By the time I was 30, I decided to stop pursuing music in order to give myself a chance to explore other modes of creative expression. However, my years as a musician had made me focused, hardworking, and driven. When I stumbled into the gem trade in San Francisco, I saw faceted stones for the first time and my creative side lit up and I knew I wanted to know how to cut stones! I could see in the gem trade everything that I was looking for; a structured trade system that I could become a part of, a creative skill that I could focus my creativity on, and a way to make money while doing it. All the dreams that I had when I first got intrigued about gemstones are now coming true for me. Gemcutting in its various forms has been funding my lifestyle completely for the last six years.

What are your thoughts on the evolution of gem cutting over the last 30 years?

It's a very exciting time to be a gemcutter. If we look at some of the developments that were happening in the late 1990's, both creative and technical, we are in a different world today, at least from the point of view of American gemcutting. At that time, the first concave and fantasy cutters were beginning to experiment, partially taking influence from the work of the Bernd Munsteiner in Germany. New types of faceting machines were invented in order to perform this new concave cutting style. At the same time, Gearloose was developing the first formula for the BATT lap, which has become the number one polishing lap in the hobby cutting world today. Simultaneously, the Internet was slowing becoming a reality and cutters started sharing designs online with the help of new software made for creating gemstone designs. Of course, a cutter reading this in London or Paris would know nothing of these changes. In the cutting centers of Europe, gemcutting is a timeless art that hasn't changed much in the last 150 years.

When I first learned how to cut, the Internet was extremely important for learning cutting and polishing techniques. I could get answers to specific problems in real time. Before the Internet, the best resources were books from the 1970s and 1980's or a lapidary club if you were lucky enough to live close to one. Today, Internet forums have largely replaced (or at least heavily supplemented) the education that hobby cutters used to receive in the lapidary club system.

A new generation of fantasy cutters has emerged in the 2010's and 2020's who have learned the tricks of the pioneer concave cutters of the 1990s and expanded upon those techniques tenfold. Meanwhile, the mixed cut that is so cherished by the master cutters of Europe, is still the most popular cut in the worldwide jewelry trade. We are living in several gemcutting timelines at the same time, I think.

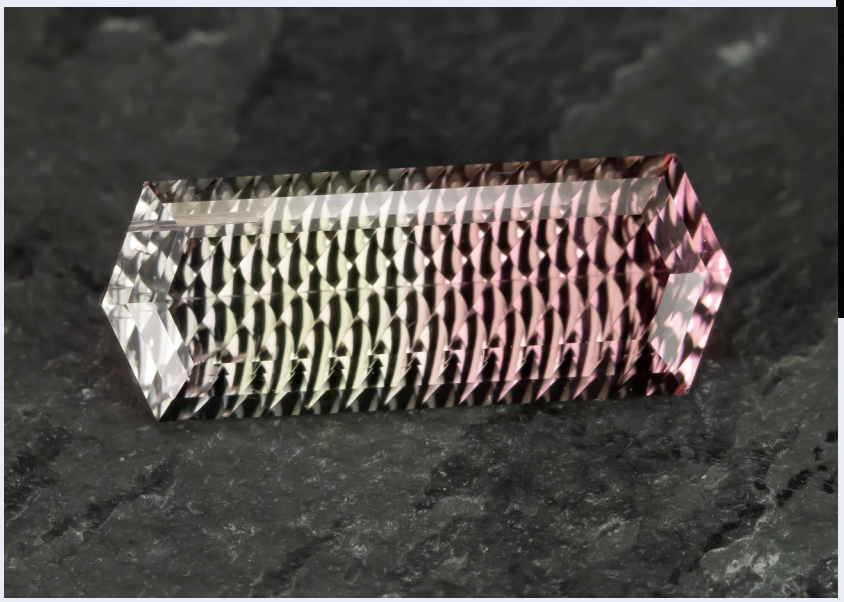
Many cutters like Victor Tuzlukov, Glenn Lehrer, Michael Dyber, and Dalan Hargrave, to mention a few, have taken gem cutting to a whole new level. What are your thoughts on the emergence of gem cutting as an artform?

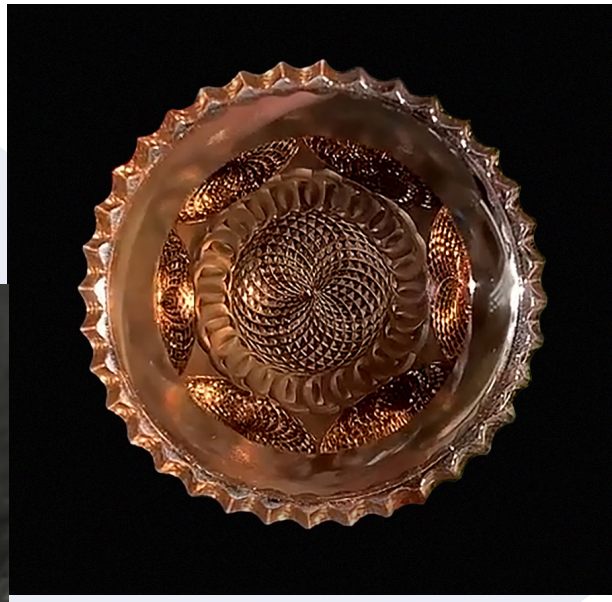
I love seeing the work of these ground-breaking cutters. Victor has shown us what extreme levels of patience and creativity can achieve. Glenn and Michael have both shown us new ways of looking at what a gemstone can do as far as performance. Dalan has probably done more for new cutters and carvers today than any other gemstone artist. He has taken gemstone cutting back to the ornate level of the Renaissance, but at the same time infused his cutting style with futuristic alien technology (that's my theory at least :). All four of these amazing artists are creating incredible new pieces of art and their often-imitated influences can be seen all over Instagram in the works of younger cutters.

For myself as a cutter and an antiquarian, I enjoy watching this very modern style develop while also keeping in touch with the classic techniques of faceting that have developed over the last 500 years in Europe and beyond. The classic and the modern styles are existing side by side and it's going to be very interesting to see how the relationship between these two styles develops. Will one dominate the other? Will we see a new market emerge? The modern style of cutting, whether with concave/carving techniques or simply with modern types of hyper-brilliant designs are still very much on the fringe of the mainstream jewelry industry, so I'm excited to see how it plays out.

What were some of the key things you learned during your tour of the US?

My latest project has been to write a book about the history of American cutting and how it got started. In order to do this, I spent a year at home in Bangkok doing research and then I spent 13 months on the road, travelling all over the United States and Canada looking for clues, old machines, books, and conversations with old cutters. The whole project has been extremely rewarding and I'm only now getting ready to sit down and start writing. I learned so much along the way. I discovered an entirely forgotten story about who developed the first modern-style faceting machines in America. I learned a lot about the kind of cuts that were popular 100 years ago which informs me about why certain styles are so popular in America today. I was able to visit all the major gemstone





Today's generation of cutters is using new types of concave cutting machines and even experimental rose engines to create a new types of gemstone styles. On the left is a Tourmaline from the Himalaya Mine in California that has been fantasy cut by Derek Katzenbach. Above is a Smokey Quartz from Hallelujah Junction, Nevada that has been faceted and then turned on a rose engine by Nolan Sponsler.

mining areas in America and learn about their history and how that relates to the development and growth of gemcutting in America.

One of the best things about this project was all of the cutters that I was able to interview. After more than a year of travel, I have about 45 hours of interviews full of personal stories going all the way back to the 1950s. It's given me a new respect for the cutters who came before me, going all way back to the 1880s, as well as giving me a context to understand the lineage of American cutters that I am a part of. I won't give away too many specifics now because it's an incredible story and best told long-form in my upcoming book.

One interesting discovery was how the cutting aesthetic in America began to favor the brilliant cut for colored stones versus the mixed cut used in Europe. Before the American amateur cutting movement began, the full brilliant cut was only used for diamonds and never colored stones. This started to change in the 1890s and was a full-blown cultural phenomenon by the 1930s.

What specific challenges do you face running your cutting factories in Bangkok?

When I moved to Thailand six years ago, setting up relations with Thai cutting factories was one of my first priorities. It took me a few years to find the factories as they all work fairly quietly here. Once I found a few of them, I needed to try them out to see which ones would work for my cutting goals and for the quality standards of my customers. There have been several interesting challenges along the way. Most Thai cutters don't speak English, so this was the first hurdle, but eventually I figured out who I could communicate with effectively.

After that, communicating design ideas became my biggest challenge. In America, cutters have really precise and mechanical faceting machines as well as software that allows you to create diagrams for faceting patterns that you can cut on those machines. The cutters in Thailand use another type of faceting machine that comes with a totally different cutting philosophy than the one I was trained with. I had to learn a lot from them to be able to get my ideas across. I couldn't just print out a design and give it to them, the way that I would with American or even a Sri Lankan cutters, whose machines have specified cutting angles and rotational indices. The Thai style is more about eye and hand feeling, but once I understood how they approach the work, our communication problems got sorted out. In fact, working with Thai cutters has made me a much more knowledgeable cutter. This Thai education led to a much deeper understanding of European cutting styles and traditions, as the Thai technique is much more directly connected to the traditional Europe approach than with the techniques of American cutting. Several concepts that I learned from Thai cutters made it into my 2021 book, *The Secret Teachings of Gemcutting*.

Currently, I have partnerships with several cutting factories in Bangkok and I cherish those relationships. The final hurdle that I encountered was cutting quality standards. There are several contrasting philosophies in the commercial cutting world. Some factories cut for weight/cost savings and some cut for beauty. My customers also subscribe to several different philosophies, so it's important that I work with different factories that can do both kinds of work. My preference is always a well-cut stone that is carefully balanced between weight, color, and beauty, but some customers and cutters have different ideas and it's important that I stay flexible in my work.

From your experience, what gemstone is the most challenging for gemcutters?

That's a difficult question to answer because every cutter has unique strengths and weaknesses. For the Thai cutters, kunzite is a very difficult stone to cut because the cleavage planes make the stone easy to break. However, my Afghan friends make cutting kunzite look easy. For me, I dislike the rare and hard-to-polish gems, though I have friends who have made a whole business out of faceting collectible rare minerals that can sometimes take days or even weeks to cut with a perfect polish. Many times, as a teacher, I have been asked about emerald cutting and there seems to be a lot of fear and mystery around emeralds due to their inclusions as well as high value. I love cutting emeralds and they're one of my favorite stones to work with. I'm not sure if we can say that one specific type of stone is

the MOST challenging, but surely there are a lot of stones that are hard to polish.

For many years, 'Cut' was considered the least important factor in the valuing of coloured gemstones. Are we finally winning the battle over yield versus brilliance?

This is a complicated question. Of course, color is the most important factor for a colored stone. As the cutter, if you have a chance to improve the color and therefore increase the value, you should. However, there is a big difference between cutting a citrine or blue topaz versus cutting a fine ruby, sapphire, or emerald. With less valuable material, you can get away with losing color saturation in an effort to create a more scintillating stone. This is true for fantasy cuts and carvings as well, which is why you see a lot of these innovative new cuts on various colors of quartz and topaz. With extremely valuable stones, color and yield is all-important. In the world of high-end rubies, I would say that 'Cut' gets almost no consideration at all. If we look at some of the most expensive rubies sold at auction in the last 10 or 20 years, there are quite a lot of potatoes in the group. When I teach cutting in our school, we inform the students that most of the rules that we teach about good cutting don't apply to high-end rubies. They are in a world of their own. That being said, with most stones, a compromise is met between yield and performance. A good cutter knows this. I have seen many heavy stones which have been cut for yield and have a very unpleasant face-up appearance with all the worst traits; windowing, extinction, poor outline shape, and are likely too deep to be set in jewelry.

The process of cutting a stone on a Thai style faceting machine. The cutter uses a Thai-made jambpeg head to facet the stone with different angles. The Thai machines use a copper lap to polish every type of stones and they spin 10 times faster than polishing wheels on other types of faceting machines.

A 3.16ct unoiled Panjshir emerald cut in a classic emerald cut style by Justin K Prim

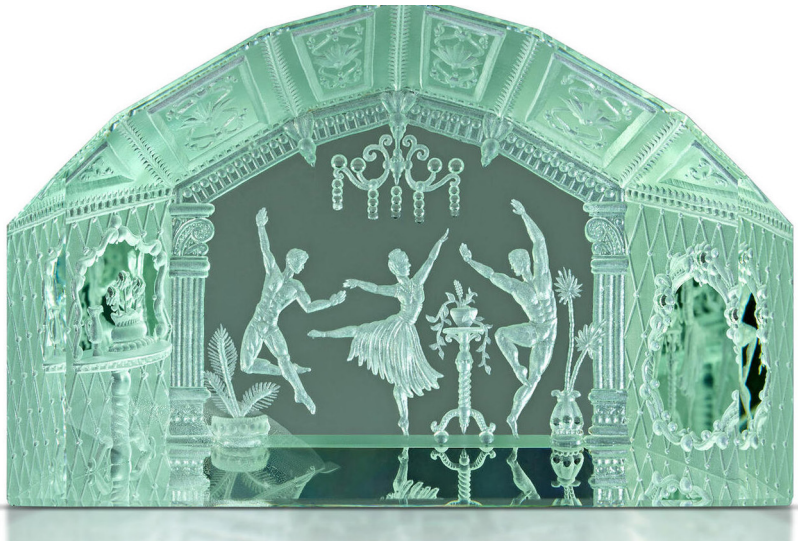
We must also consider that every country has certain cutting aesthetics that appeal to their market. Many American cutters are currently experimenting with fantasy cutting or hyper-brilliant designs, but when I talk to professional cutters (or jewelers) in Europe about these modern styles, they balk at them. For the trained European eye, there is a reason why the classic designs reign supreme; they possess a tasteful blend of color saturation, weight retention, sweet outline shape, and a scintillating movement of light that brings the stones to life.

The modern styles of cutting that we've been talking about are almost all uniquely American and there is a historical reason why we see these designs being developed there, as I will outline in my upcoming book. Of course, the Munsteiner's were pioneering unique cutting styles as far back as the 1970's, but they are quite singular in the cutting community of Idar-Oberstein, Germany, which in my opinion is one of the most style-conservative cutting centers in the world.

Instead of looking at 'Cut' as a battle between brilliance and yield, I think it would be more productive for the jewelry industry to reframe the narrative into talking about good cutting versus bad cutting and then

inside the bubble of well-cut stones, we can talk about aesthetic movements in the same way that we would talk about modern art. In the same way that it would be unfair to compare a Claude Monet painting to an Edward Hopper painting, it would be unfair to compare the work of Dalan Hargrave to the work of Paris' top cutter Manuel Soirat. They exist in two different schools of gemstone art.

I think more education is needed on the part of our customers. I've had colored stone buyers from major jewelry houses tell me that they can't see the different between a stone with a window and a stone without a window. Sadly, the industry is so used to seeing poorly cut stones that they might not even know what a well-cut stone is supposed to look like. This is evident when you look at certain ads from major jewelry houses around the world who are using windowed stones in the photos of their marketing campaigns. There is also a bit of a battle happening behind the scenes in the jewelry trade; jewelry designers with a specific artistic vision versus the cutting factory who has to deal with hard physics when cutting. The jeweler frequently wants low profile stones while not realizing that this is exactly what will make the stone appear windowed. Again, this is a very complicated question whose answer probably deserves a whole article.



It's not possible to compare a modern fantasy cut to a classic cut. They exist in separate schools of gemstone art. (Top) a green beryl that was cut and carved by Dalan Hargrave. (Bottom) a fine emerald that was cut by Manuel Soirat.

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

I hope that we see more talented and well-trained cutters emerging to support as well as stimulate the trends of the jewelry market. However, my fear is that we are on the verge of a robotic takeover. With new developments in robotics, lasers, and AI, it seems that the commercial cutters of the world might be challenged soon. I know several people personally in America, Canada, Germany, and China who are using robotic cutting machines to handle the bulk of their medium-quality cutting work. The cutting of garnets in the Czech Republic is almost all done by robots now and the melee industry in China uses the same types of automated robotic cutting technology. Soon, maybe very soon, someone is going to hook an AI up to one of these cutting machines and start getting very precise, computer created stones coming out.

We only need to glimpse into the world of diamond cutting to see where colored stones might go. I have one friend who just opened a diamond cutting factory in Canada who uses water jet-controlled lasers to cut all the facets on their diamonds. The hardware and software that diamond-cutting factories use to analyze and plan diamond cutting is so sophisticated that it already seemed like AI to me 5 years ago. I think we will see artificial intelligence being used in the planning and cutting of diamonds in only a few years.

That being said, there will always be a place in the market for the fine cutting of fine material. The best cutters in the world don't need to fear new technology. The jewelry markets of the world have a constant need for local cutters who can quickly and creatively repair and repolish stone as well as taking fine materials with mediocre cuts and transforming them into world-class gems. The high-end cutters of London, Paris, New York, and Los Angeles do this type of improvement cutting all the time and I think they

In this photo, we can see the phenomenon of windowing and how it affects the stones color and performance. In the synthetic ruby on the left we see a window in the middle of the stone which allows light to pass through the stone instead of being reflected. This makes the color look pale and dull with no sparkle. In the stone on the right, the stone has been cut with appropriate angles which allow reflections to happen throughout the stone and gives the stone a more vivid color and provides the entire face-up view with movement and life.

will probably be doing it until the end of time, thankfully. For the new cutters coming into the cutting world, they should aim to be the best, and it's my personal goal through my books and classes to help them get there.

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

Wow, you picked a crazy year to ask that question. My wife Victoria Raynaud (a world-class cutter in her own right) and I have decided to relocate our life and business from Thailand to America. In one year, I hope to be toasting myself to successfully launching a new cutting studio, a new lapidary school, and a new faceting machine museum in Portland, Oregon. Aside from those big, expensive, and time-consuming endeavors, I hope that my new book, 'Pioneering the American Faceting Movement' will be arriving from the printer and that my next book after that will already be started. 2023 will be my most challenging year yet, but I am extremely excited that this move will put us closer to our customers, our students, and to other gem and jewelry artists and miners that we can collaborate with.

Artificial Intelligence can already show me what a gemcutting studio might have looked like if Edward Hopper had painted it. How long until the AI starts cutting my stones for me? Image generated by Justin K Prim with Midjourney AI.

My personal goal with the cutting knowledge as well as the cutting history project has always been to become a master and expert. As I continuously learn from some of the greatest cutters around the world, I hope to be able to join their ranks one day and replace them when they retire. I also want to make my knowledge available by working on research projects about past and future cutting with museums, labs, gemology institutions, and more. These are big dreams that need a lot of energy to see them attained, but it's this energy and momentum that keeps me going day after day.

VALUE added

Capacity Building

During our ongoing discussions with officials from the FDRE (Federal Democratic Republic of Ethiopia) Ministry of Mines, the subject of banning the exportation of rough gemstones has been raised numerous times.

On face value, it would seem absurd for any country to export a finite resource at its lowest possible value, but is it?

It is all well and good to say that the banning of rough will help to develop a local cutting industry and that will in turn add value but setting up such an initiative is fraught with danger.

In early 2010 the Parliament of Tanzania took a decision to ban the export of rough tanzanite. Their goal? To drive the development of a domestic cutting and polishing industry and to boost local involvement and entrepreneurship in the coloured gemstone sector. In 2017, the ban was extended to other varieties of gemstones and then scaled back two years later to cover only the higher-value gemstone types, such as ruby, sapphire, emerald, any type of green garnet, and spinel weighing 2 grams (10 carats) or more.

One of the challenges any gem producing country faces by implementing such a policy is balancing supply and demand with production capabilities. Critics of the Tanzanian legislation argued that there was a lack of domestic lapidary capacity, and this led to an increase in the illegal export of gem rough and a significant drop in tax receipts from tanzanite exports. Roger Dery, a foreign lapidary, noted at the time that Tanzania would need to train 600 to 800 gem cutters over the next ten years in order for this strategy to work. Happiness is being able to buy and process the rough in the same location, but this only works if there are the production capabilities.

Others argue that such a move would force foreign companies to set up business in the gem producing countries, thereby increasing foreign investment, and circumventing the production capability issues. True but this only works if the producing country has significant quantities of gem rough that is vital to the international community. Banning ruby rough in Mozambique would certainly attract a wealth of interest from cutting factories to move there but what about Ethiopian blue sapphires, emeralds or even opals? Can the world live without them? If the answer is yes, banning the exportation of these rough gemstones would simply create a stockpile of rough that would never see the light of day and that would hurt the producers.

We also have to look at the definition of 'Gem Processing'. Does polishing a facet on a piece of rough constitute gem processing? Clearly not but unless this is defined in legislation, countries open up the possibility of creating grey areas that exporters will exploit. At the same token, the quality of the cutting is important. If you are offering a poorly cut stone to a potential buyer, that buyer will use this against the seller, claiming that the stone will need to be recut, resulting in a lower yield, a higher price per carat and a significant risk factor. If the stone is cut to international standards, this benefits the seller but how do you create such high standards overnight?

There is also the matter of wages. In Madagascar, for example, the Malagasy are simply not prepared to work for the salaries paid in cutting factories in India, China, Sri Lanka, and Thailand. It is a similar issue to post-BREXIT in England, where jobs filled by migrants who were forced to leave the country were hard to fill. Who picks the fruits and vegetables or chooses to work in the hospitality industry for a pittance when British workers shun this type of work because they feel it is beneath them?

In an attempt to solve the problem, the British Government now offers temporary work visas for seasonal workers, but this is a complicated process that requires a valid certificate from a UK licensed sponsor, a financial maintenance requirement, together with other route-specific requirements.

In the first year after free movement ended, if we exclude 'Frontier Workers' (people who do not actually live in the UK but used to come to the UK for work before the end of free movement), EU citizens only

Aquamarine
(Photo by Jeff Scovil)

made up 8% of the work visa applications. The situation was also complicated by the drop in the British pound, which reduced the value of UK earnings sent abroad, making the country less attractive to foreign workers.

According to TDi Sustainability, in order for these laudable value-addition initiatives to succeed, they must be supported holistically, paying attention to all the factors that can help a viable gemstone manufacturing cluster to grow, and to compete with its international peers. One-off training programmes in lapidary skills are valuable, but will not be sufficient. Should it be found, after careful study, that any planned coloured gemstone manufacturing hub is not commercially viable, development resources may be better spent on other initiatives for poverty alleviation and economic empowerment, in order to best serve the people living in coloured gemstone-producing countries.

What is needed is a balanced approach where the smaller, commercial grade rough is exported to countries such as India and China, while the larger, better-quality pieces are cut locally. Since the latter constitutes a much smaller percentage of production but a much higher value, this would seem to be a good compromise, preventing a stockpile of rough while still incentivizing a local cutting industry that could function without the need to train hundreds of skilled workers. However, in order to make this work and ensure that the governments receive their fair share of the taxes, there must be state run laboratories that not only grade and value the rough for export but also provide traceability. Exporters must purchase an export license and pay a royalty fee on all exported goods. In Tanzania, it costs $100 to purchase an export license and exporters must pay a 6 percent royalty on the value of rough stones leaving Tanzania and 2 percent on cut stones.

Here in Ethiopia, kilos of material are leaving the country, sealed in diplomatic pouches, or valued at a fraction of their real value. The government is losing a substantial revenue but with no skilled professionals capable of assigning grades and values, exporters can claim whatever value they like without fear of being challenged.

It is clear that Ethiopia's attempt to create a sustainable cutting sector has failed. To be successful, it needed a well-executed game plan. Unfortunately, money was thrown into the training of cutters without any sense of cohesion or purpose. Foreign governments have to stop funding programs unless they make sense and can be monitored. Equipment funded by these programs often sits unpacked in storage rooms, destined to one day disappear and be sold by some enterprising employee who wants to supplement his meagre salary.

Malaya Garnet (Photo by Jeff Scovil)

Creating a pool of professionals who have the skill set to responsibly manage the gemstone sectors throughout Africa would help change the current dynamic. To every problem, there is always a solution, but it seems often, here in Africa, for every solution, a new problem is created. A vicious cycle that needs to change.

Elbaite - Brazil (Photo by Jeff Scovil)

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

Project

AFRICA

POWERED BY THE WORLD GEM FOUNDATION

SCHOLARSHIPS

Tino Hammid Memorial Gemmological Scholarship

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

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

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

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

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

W.E. Hunn Memorial Gemmological Scholarship

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

To download the application form, please click on the image

APPLY NOW!
SCHOLARSHIP
APPLICATION

2023 Recipients

RAJAA AWN - SAUDI ARABIA

Rajaa is originally from Yemen, married to a Saudi and has four children (two sons and two daughters) ranging in age from 8 to 16. She completed her master's degree in geological and geochemistry of volcanic rocks at Sana'a University in 2005, becoming the first woman to graduate as a geologist in Saudi Arabia.

She is fluent in Arabic and English, has completed six levels at the Yemen American Language Institute, and four levels of French at the French Cultural Center.

She has a YouTube channel where she provides lessons on precious stones and currently offers gem identification services to her YouTube followers.

She loves the outdoors and sees life in a fun way, believing we are here to enjoy ourselves, while adding our own creative touches. She loves difficult challenges and takes immense satisfaction when she succeeds. She is constantly striving to increase her scientific knowledge and wants to complete her higher studies and doctoral thesis.

DIBORA MELAKU - ETHIOPIA

Dibora earned her bachelor's degree in chemical engineering and business administration in 2020, and is currently enrolled in the second year of an MBA degree.

She works for Exodus plc as an operations manager. Her position allows her to learn something new every day about inventory management, customer service, and personnel management, which is the best part of my career.

Her experiences over the last two years have helped her grow in many different areas of her life, including figuring out what her true passion is. Finally, her dreams are coming true. Along with her family, she is starting a small business engaged in gemology, which she hopes will turn out to be a large lapidary and jewelry-making operation. receiving the WGF scholarship is a significant step in the right direction, towards her goal of becoming a gemmologist.

She adores searching for and learning about gemstones and picking up new knowledge regarding all types of resource management. She aspires to enter the gemological community very soon!

INDIKA BANDARA - SRI LANKA

Since 2009, Indika has worked as Assistant Director in the National Gem and Jewellery Authority in Sri Lanka in the field of Jewellery Testing Valuation and Hallmarking Division (Assay Office Sri Lanka). He has a Bachelor of Science from the University of Peradeniya in Sri Lanka. He has completed a two-year Gemmology Certification course at the University of Moratuwa and a Jewellery Making Techniques course (3 month full-time scholarship) in China at the Hunan International Vocational University. He has also successfully completed a foundation in gem and jewellery appraisal with the American Society of Appraisers (ASA). He is a government approved gold appraiser and is currently working on his Applied Jewellery Professional Diploma with the GIA.

He now finally has the opportunity to study gemmology through the World Gem Foundation scholarship program. This will give him the opportunity to add to his thirteen years of experience in the jewellery testing and valuation industry and to further train and guide as a professional experienced service provider in the wide and productive jewellery industry.

World Gem Foundation Scholarship Recipients

Haimanot Sisay
(Ethiopia)

Joel Dyer
(Finland)

Sandra Eriksson
(Sweden)

Lemma Beyene
(Ethiopia)

Muhammad Zeeshane
(Pakistan)

Brandon Williams
(U.S.A)

Veronicah Mosweu
(Botswana)

Muhammad Asif
(Pakistan)

Asif Rasheed
(Pakistan)

Shakeel Ahmad
(Pakistan)

Khawaja Muhammad Abbas
(Pakistan)

Teklebrhan Teklehaymanot
(Ethiopia)

Tendai Masvore
(Zimbabwe)

Nelson Tellez Cortez
(Bolivia)

Mohamed Mubassir
(Sri Lanka)

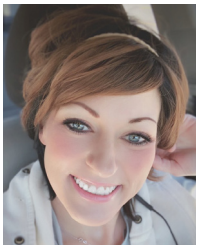
Indra Perkasa
(Indonesia)

Clever Sithole
(Zimbabwe)

Alexey Tuev
(Russia)

Juan Pablo Vasquez Heredia
(Bolivia)

Vladimir Gery Alanes Garcia
(Bolivia)



Lisa Clark
(U.S.A)

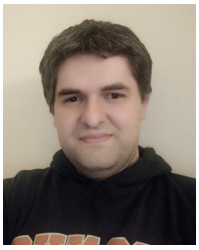
Guarino Edilberto Condorilaime
(Bolivia)

Abdel Issa
(Central African Republic)

Edmont Pasipamire
(South Africa)

Moffat Gudo
(Zimbabwe)

Mogogi Tirelo
(Botswana)



Rasul Rajabov
(Czech Republic)

Gisselle Jiménez
Colombia

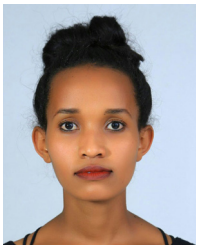
Abuu Peter
(Tanzania)

Anna Kurguzova
(Russia)

Hassan Ibrahim
(Uganda)

Stuart Pool
(United Kingdom)

Rajaa Awn
(Saudi Arabia)



Dibora Melaku
(Ethiopia)

Indika Bandara
(Sri Lanka)

35 Recipients from 19 Countries

TDi Sustainability

MAKING the cut

Gemstone Manufacturing: Process, Practice & Automation

The transformation of a piece of gem rough into a finished gemstone consists of several stages: pre-forming, which includes evaluating the rough, sawing or grinding away structural weaknesses or flaws, and creating the 'form' onto which facets will be placed; faceting, placing the many small windows by which light enters and leaves the finished gemstone onto the form according to a specific pattern; and polishing those facets to both reflect and refract light hitting the surface, entering into, passing around inside and exiting the gemstone. Oil-based, chemical, heat and even radiation treatments may be applied at various stages of transformation, to improve the appearance of the finished gemstone.

The principal stages of coloured gemstone manufacture are illustrated in the image below, made by the industrial ruby-producing company Greenland Ruby.

The Journey of a Greenland Ruby
from rough to cut

42.78 ct rough | 19.72 ct preform | 14.98 ct cut

Courtesy of Lotus Gemology

Preforming

In this process a lapidary slices away waste rock with a diamond-tipped electric saw and grinds the rough gemstone into an approximation of its final shape, removing cracks and inclusions. Grinding by hand employs one of the key tools of the lapidary: a spinning horizontal disc of abrasive material, known as a lap wheel, or flat lap. Lap wheels can be made of copper, tin, steel, or even ceramic material. To this wheel might be added a suspension of diamond powder and liquid. Historically, lapidaries had to repeatedly prime their wheels with abrasive powders at every stage of cutting. But twentieth- and twenty-first- century technology has produced lap wheels that are plated with abrasive material or even sintered — that is, impregnated — with diamond powder, which improves productivity.

Cabbing

Cabbing is a relatively straightforward process to form and smooth a convex surface. Cabochons are often cut on vertically orientated wheels that make it easier to achieve a smooth curve. Practice and experience are still required to achieve a consistent, symmetrical shape, efficiently time-after-time.

Faceting

Faceting, on the other hand, requires extreme precision in the angles, pressures, and orientations at which the gem is held against the grinding surface. The means used to attain this precision range from adjustable, calibrated, and lockable masts or arms to the centuries-old jamb peg — a post or pad carved with notches into which a 'dop' stick with a gem attached is inserted, the position alternated for different sections of the gemstone. While it can take months to become proficient in basic faceting with a mast and cut diagrams, it takes many years to develop the jamb peg without referring to cutting manuals. But once a lapidary has it mastered, they can facet gems more quickly and with more virtuosity than those more reliant on making multiple, time-consuming adjustments to a mast or arm. The time it takes to facet a single gem ranges from less than an hour to several days.

Polishing

Even after facets have been cut, the gem is not ready. Next, it must be polished. The flat lap used for faceting leaves rough, translucent surfaces which hide the true brilliance of the gem, so a lapidary polishes each surface using a wheel with very fine diamond powder.

Cabochons must be polished too and are most often polished using wheels made of felt, coated with gentle abrasives.

Different strokes

What is clear when examining the process of gemstone manufacturing is the depth and breadth of the skills involved, and the level of judgement required.

The profusion of techniques, styles and materials means that you could take at random a hundred lapidaries with a decade of experience each and not find a single pair with identical expertise. One might have spent a career cutting Australian black opal into cabochons; another might re-facet damaged antique rubies for use in modern jewellery; and a third might exclusively cut round brilliant sapphires. In the 21st century this immense diversity and plurality in what is, in many ways, simply a light-manufacturing industry, seems almost quaint. However, the romantic image of a master who works by hand and has spent decades accruing unique expertise is not the whole truth; it disregards the drive for standardisation, efficiency, and profitability.

The progression from crude repurposed millwheels to powder-coated copper laps to high-tech sintered steel-and-diamond wheels illustrates the march of technology clearly. Just as striking is the historical shift from freehand cutting to jamb pegs and then to angle-manipulation equipment that allows the precise calibration of almost every variable. Once that level of formulaic input is possible, one might be tempted to imagine the next step will be to write software to enable machines to cut and polish gemstones, removing the human touch completely.

Automation

For a long time, gem processing defied the typical patterns of standardization and automation that affected other previously artisanal industries. While automation revolutionized manufacturing in countless sectors, the diversity of techniques and the lack of standardized gem material meant that the lapidary industry stayed largely the same.

There are signs that this has begun to change because of rising labour costs and a lack of new entrants leading to a skills shortage; coupled with improvements and innovation in available technology. Understanding the role of technology and automation is key to understanding the challenges and opportunities facing the lapidary industry in the coming years.

Mechanized, motorized cutting has been around since the 1930s. Electric grinders, lapidary wheels, faceting machines, tumble polishers and bead machines make the processes considerably less strenuous and more efficient than hand-cranked or foot-pedaled machines.

In the 21st century, advances in scanning technology, adapted from the diamond industry, and the development of artificial intelligence to accurately grade rough gemstones mean that computers can now analyse and map flaws in individual stones and devise cuts that give optimal yields. This technology has so far has not been scaled to commercial levels and tends to be restricted to use with high-value stones.

Advancements have been made by the Fraunhofer Institute for Industrial Mathematics and industrial partners Paul Wild in Germany and Hexagon

Topaz - Pavilion View (18.26cts) Cut by Stephen Kotlowski (Photo by Tino Hammid)

Manufacturing Intelligence in the United Kingdom, with rough scanning and gem-cutting software for CNC (computer numerical control) machines that were proven faster, more accurate and more efficient than humans cutting melee emerald, ruby and Paraiba tourmaline in under 0.20 carat sizes. All are high value varieties in demand for use in the global watch and jewellery-making industry.

While automation offers a glimpse into the future, people, by contrast, are more intuitive and adaptive than machines, and can learn and transfer subtle skills that allow them to adapt to new types of gems and cuts, take non-standardized input material and create non-standardized outputs. Once the fundamental principles of cutting and faceting are mastered, they can be applied to almost any gem type or shape.

Where cheap, skilled labour is available, there is less incentive for investment in the latest technology. The set-up cost in automation is high, especially relative to the profit that can be gleaned from lower-value gems. In regions with less-developed infrastructure, the frequency of power outages forces greater reliance on human labour too.

Many industries are experiencing a resistance to automation, as people fear the loss of livelihood that could result. For unskilled workers in low-income countries with few alternatives, this loss can be devastating. For some in the lapidary sector, such concerns can loom large.

Upsides of automation for the lapidary sector may also exist. For example, where there is a desire to develop a lapidary industry but insufficient skilled lapidaries, or where the number of lapidaries in an established gem processing hub is dwindling, and the resultant skills gap must be closed.

The Economics of Gemstone Clusters

The lapidary industry is not spread evenly across the world. Numerous factors mean that, at any point in history, the majority of gemstone manufacturing has taken place in a handful of key locations, or 'clusters'.

Cluster economics, usually referring to manufacturing and high technology industry, was first discussed by name in the 1990s by Michael Porter. Beginning in the book The Competitive Advantage of Nations, Porter observed that the world economy is dominated by 'clusters' — dense geographic concentrations of businesses and institutions in the same field, like technology firms in Silicon Valley or the motor industry in Detroit — and argued, to briefly paraphrase, that this happened because the advantages that businesses derive from being in close proximity to their competitors — such as innovation, shared infrastructure, and

economies of scale — outweigh the benefits of setting up shop in relative isolation. In line with Porter's thinking, there is a pattern in the lapidary industry of densely packed clusters of gemstone manufacturing, and related businesses and organisations that foster intense competition, innovation, and expertise.

These are frequently interlinked, through infrastructure, vertical integration, and public and private institutions. Such clusters tend to be found in international gemstone trading hubs. Over the last few centuries, hubs could be found in Britain, the Netherlands, France, and Germany. Now, the key hubs are in China, India, Sri Lanka, and Thailand. The vast majority of the world's gemstone manufacturing currently takes place in these four countries.

In China, India, Sri Lanka, and Thailand hundreds, if not thousands, of lapidary businesses compete with one another, without merging and consolidating in ways that would stifle the diversity and vibrancy of the industry. Rather, this competition fosters innovating and learning. The nature of gem cutting is such that no one person could ever hope to master every type of cut for every type of gem. This gives the industry a rich complexity, with different firms in different trading-manufacturing hubs specialising in different gemstone varieties, qualities, sizes, cuts and serving different segments of the market.

One of the advantages of clustering is that all the experts are in one place, which means that anyone can bring rough gems to such a cluster and be confident that, regardless of the material, someone there will know how to cut the gems in the way the person wants. Moreover, other services and supplies will be available to support further value-addition, like jewellery manufacture and gemstone setting on a gemstone's journey towards retail.

ABOUT TDi Sustainability

This article is an exerpt from WHEELS OF FORTUNE: THE INDUSTRIOUS WORLD OF COLOURED GEMSTONE MANUFACTURING, researched and written by TDi Sustainability with the support of the Coloured Gemstones Working Group. Copyright by Assheton Stewart Carter and Graham Lee, TDi Sustainability

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WGF signs historic agreement

On February 24th, 2023, the World Gem Foundation and the FDRE Ministry of Mines (MIDI / Geoscience Laboratory) signed an historic agreement. The joint venture agreement paves the way for the first 'Centre of Excellence' in Ethiopia and a Gem Testing Laboratory that will work with the ministry to ensure that all gemstones are properly graded, valued, and tagged for traceability.

The World Gem Foundation will be offering their complete Career Gemmologist Diploma program over twenty-five weeks, starting in early May, 2023. Successful graduates will earn three diplomas (Career Gemmologist, Coloured Gemstone Professional and Diamond Professional). Over the five and a half year agreement, ten 25-week programs will be offered, allowing one hundred lucky students to become internationally recognized gemmologists.

Geoff with Dr. Guta Legesse at the official signing of the agreement

Both parties have created a 'Selections Committee' that will interview potential candidates with the mandate that they show a willingness to help develop the gem and jewellery sectors in Ethiopia.

In order to accommodate students who work or are currently attending programs at the University of Addis Ababa and the University of Science and Technology, the program will consist of online studying with two days of practical instruction every week.

'We needed to create a flexible study schedule because for many, taking six months off work or deferring their other studies, was not an option. Since the goal of this initiative is to develop the gem and jewellery sector, we want to attract students who are already active in the sector but need the gemmological education to compete on the world stage. It will be an intense program that will require many sacrifices but we are confident that the opportunity to finally study gemmology in Ethiopia will far outweigh these sacrifices'.

'We have been working on this agreement for almost a year. It has certainly been challenging but we stuck to our game plan and we are delighted that we have finally reached an agreement. This is truly a win / win for everyone and I am proud that Ethiopia has chosen to be the leader in this initiative. It was important that we find a strong partner who could open doors to potential funding and so for us, it made sense to partner with the Ministry of Mines'. said WGF Founder / CEO Geoff Dominy.

The World Gem Foundation is especially grateful to H.E Habtamu Tegegne (Eng), Minister of Mines, Dr. Guta Legesse, Director of the Mining Industry Development Institute (MIDI) and Dr. Dejene of the Geoscience

Laboratory for having the vision and the determination to make this agreement a reality.

The Centre of Excellence and laboratory will be located in the Ministry of Mines complex.

'We are happy to expand the program if additional funding is available. Our ambition is to offer this program throughout Africa'. said Director of Operations for Project Africa Haimanot Sisay, one of the architects of the initiative. 'This is a dream come true for me. I am proud of the World Gem Foundation for coming to Ethiopia and that my country has taken a leadership role in this initiative'.

The fruits of their endeavours

How historic is this agreement?

'To my knowledge, there has never been an agreement of this kind, between the public and private sector, to offer gemmological education in Africa' said Geoff Dominy

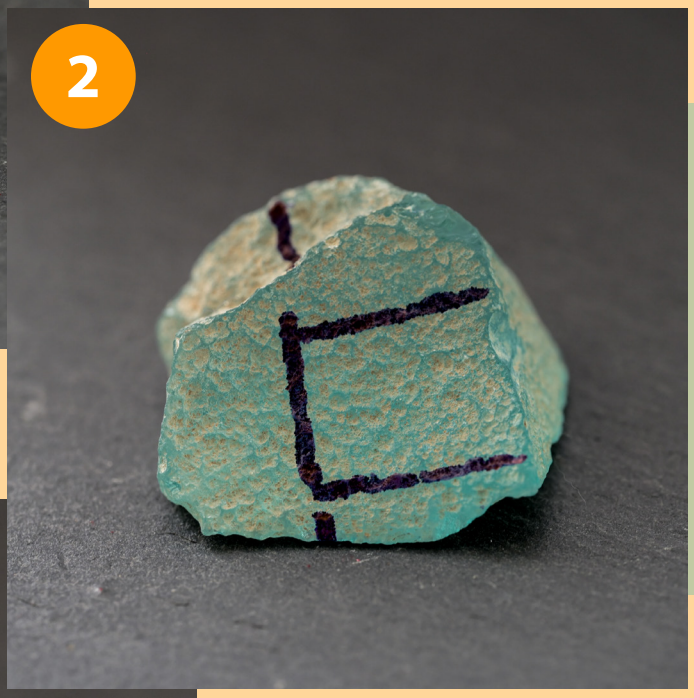
Geoff Dominy & Dr. Guta Legesse exchanging signed copies

'As an industry, we all benefit from the gems coming out of these gem producing areas and yet we show little interest in the welfare of the people who live in these regions. That must change. We must ensure that they also benefit from these gem resources. I am tired of hearing empty words. I won't name names, but there are certain trade organizations who say so much but do so little. Education is one of the main combatants of poverty yet sadly, most people cannot afford it. We must make education accessible to everyone, regardless of the financial circumstances they were born into. Education changes lives and empowers people. It is why we are so passionate about implementing this important initiative.

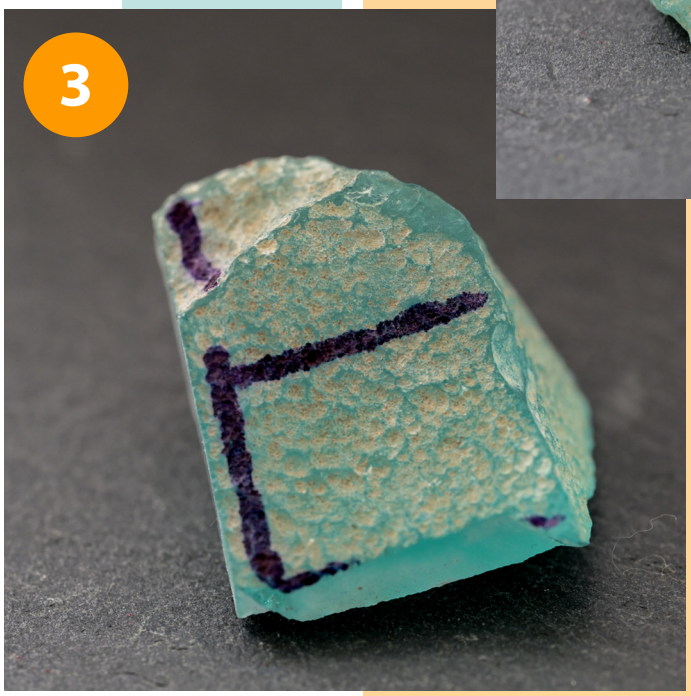
STEP by step

The Evolution of a Gemstone

2000 year old Roman Glass weighing 69.80 carats



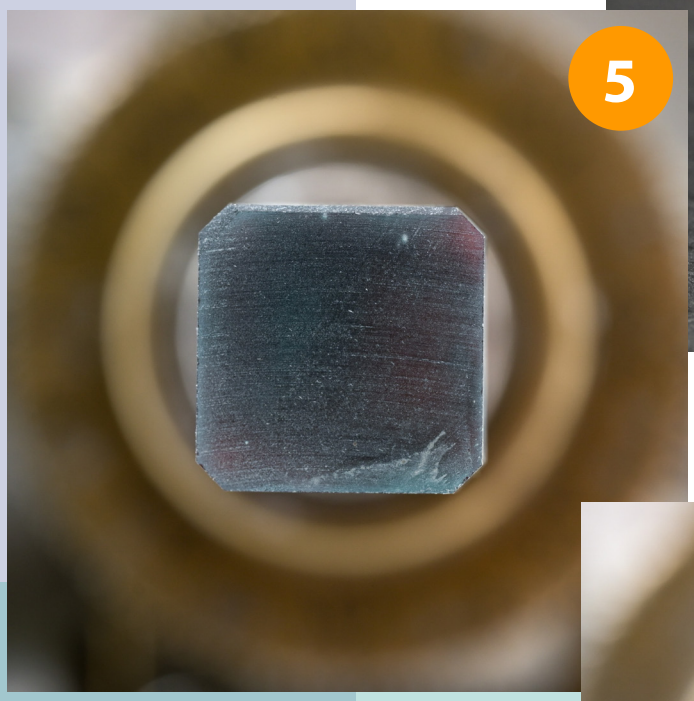
Marking with India Ink



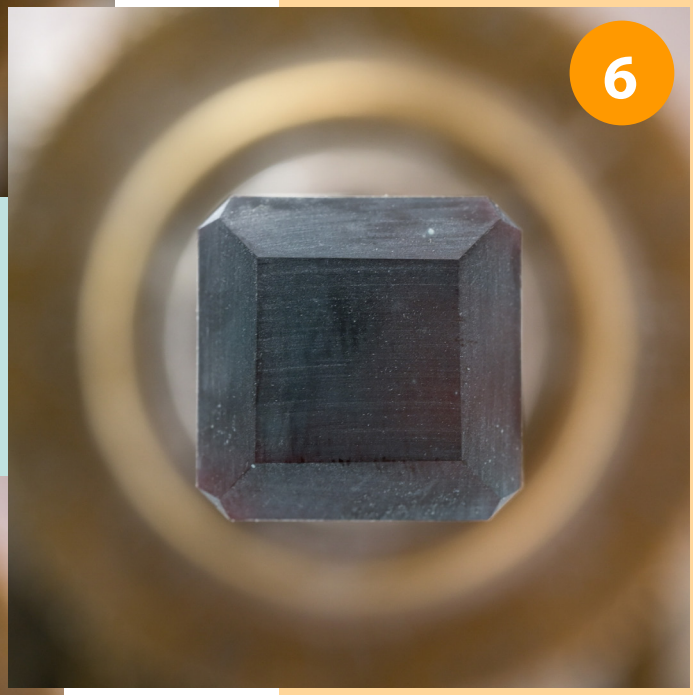
After sawing the weight is now 54.20 carats

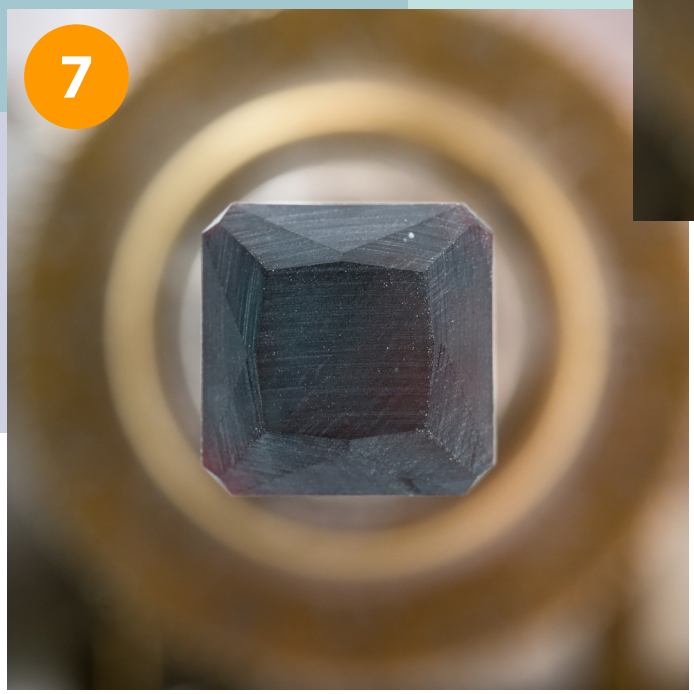
Pre-form weighing
24.70 carats

Calibrated sides



First crown facets





Crown facets completed

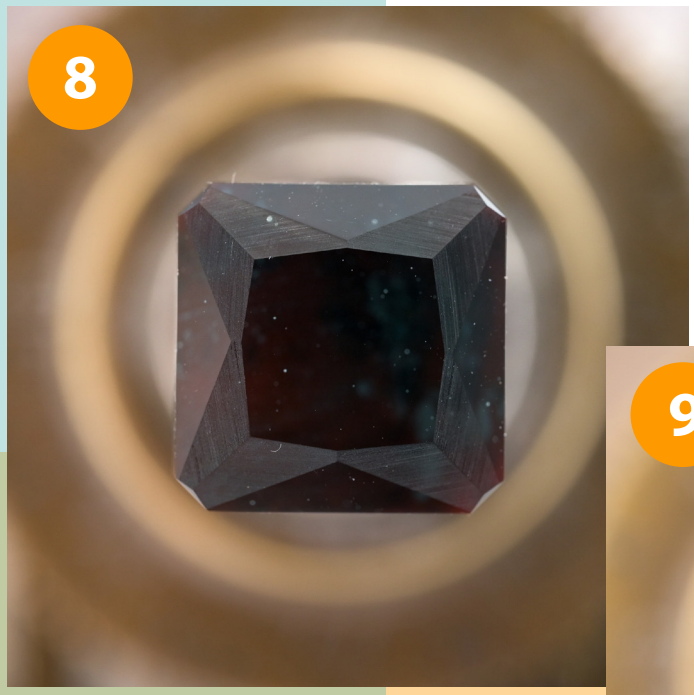
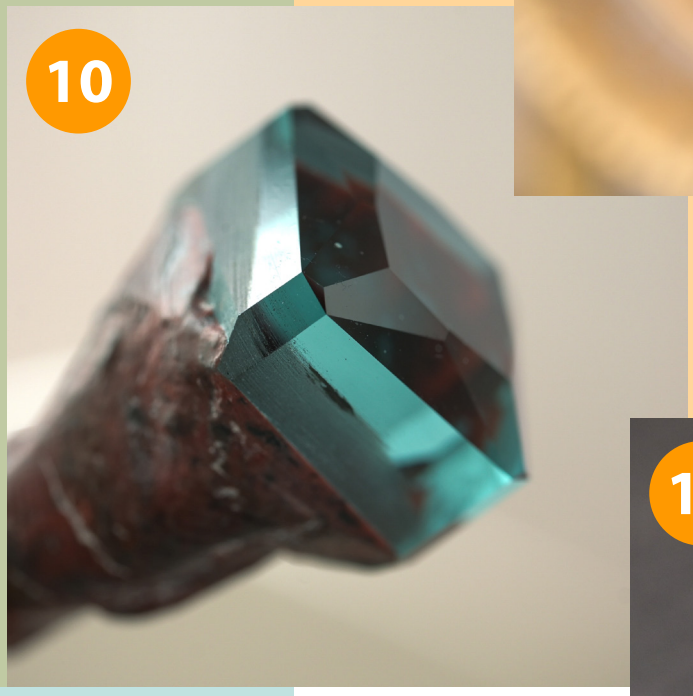


Table and mains polished

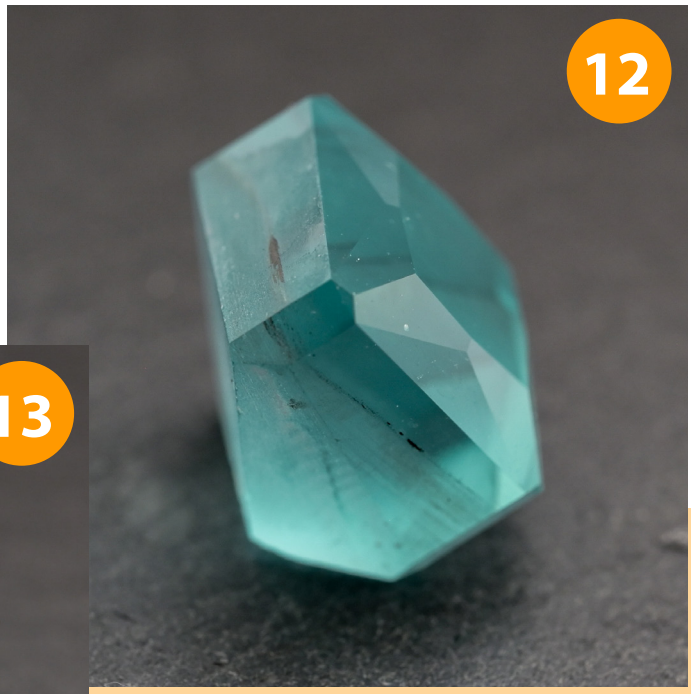
All crown facets polished

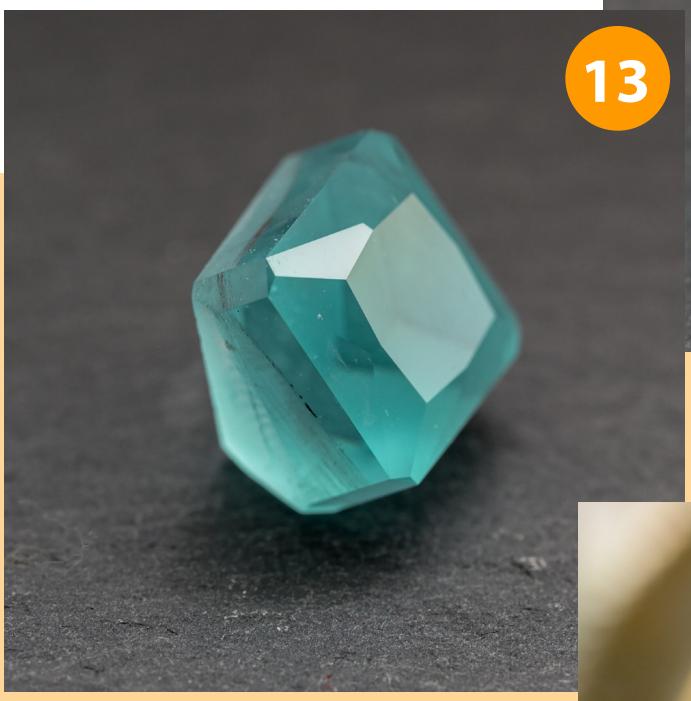


Side view of polished crown

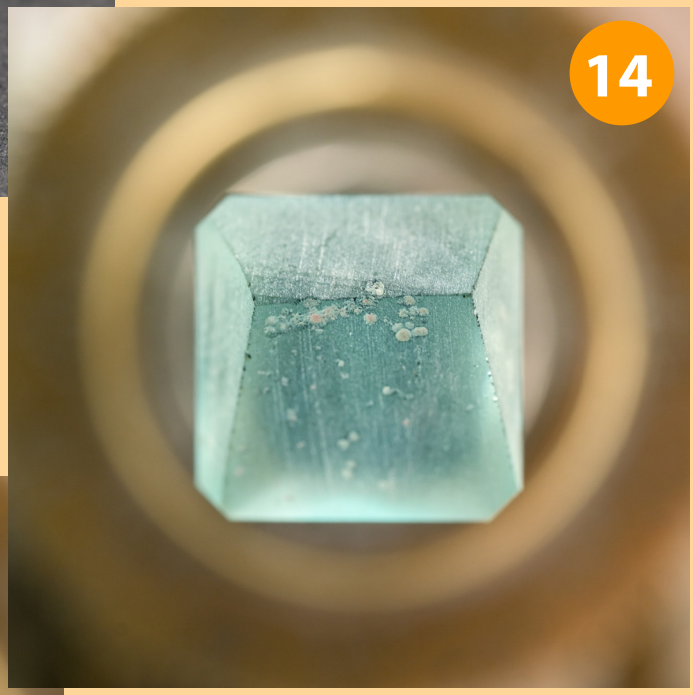
Polished crown
weighing 18.10 carats

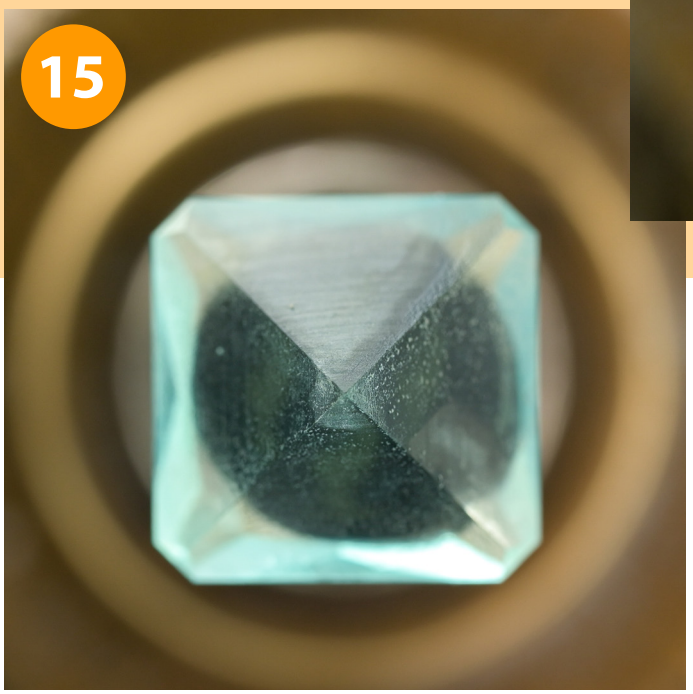
Side views



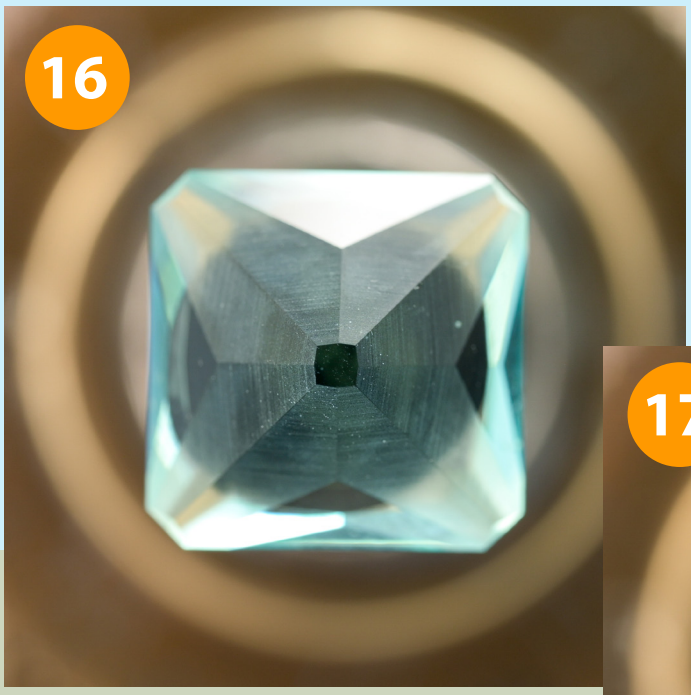


Starting on the pavilion



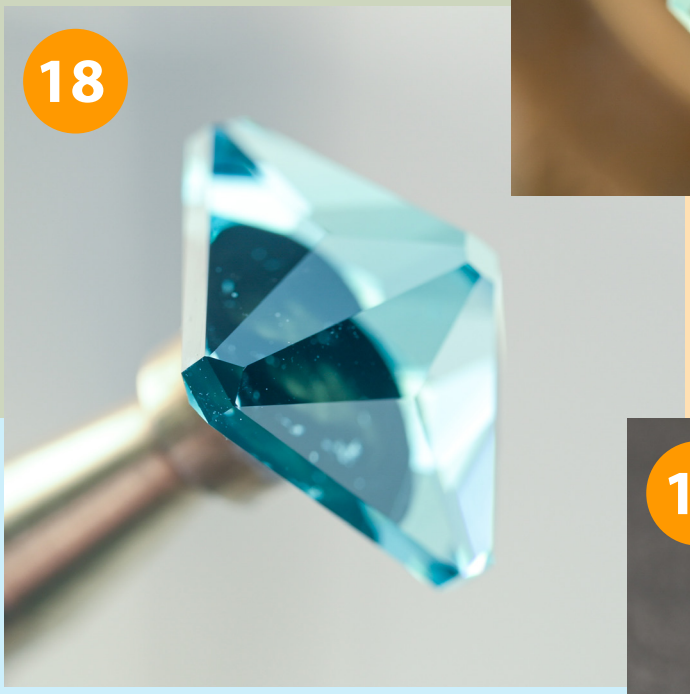


First pavilion facets polished



Pavilion facets cut

Pavilion facets polished



Side view of pavilion

Finished stone
weighing 9.25 carats

Side view

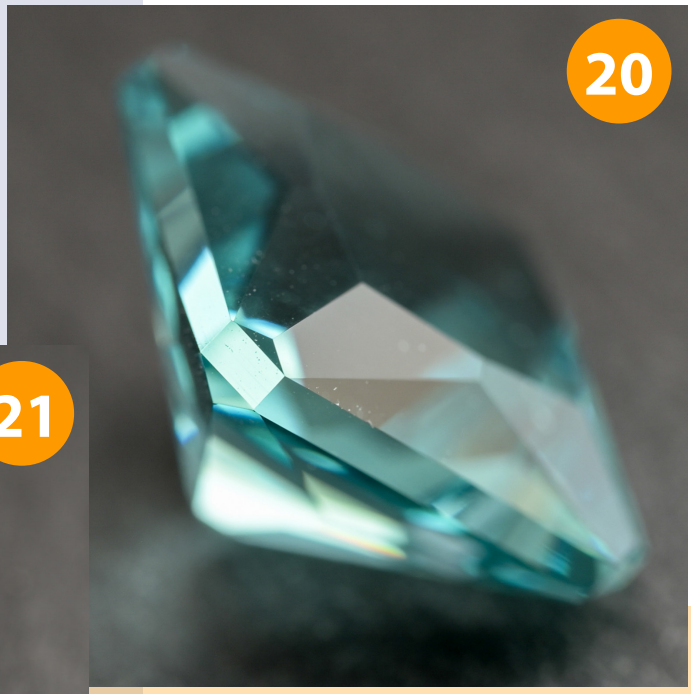
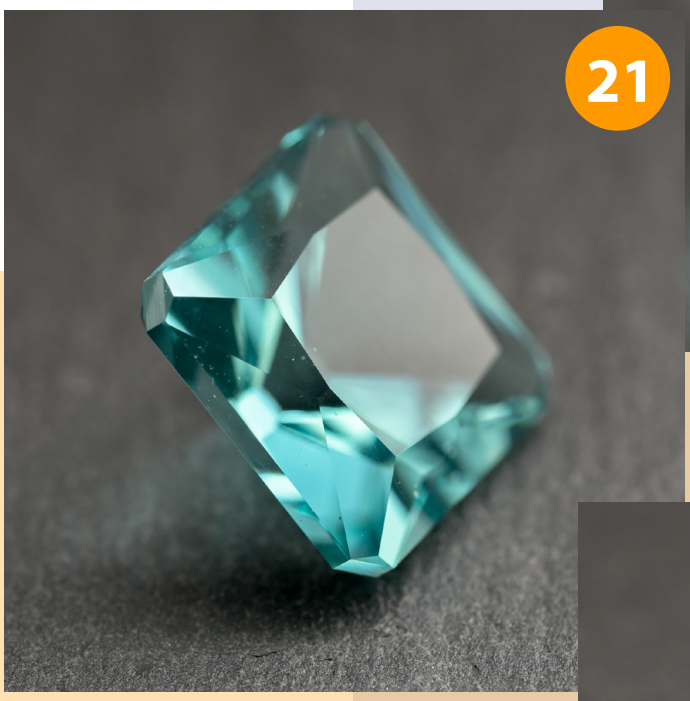


Table view



Pavilion view

All photos courtesy of Justin K. Prim

Origin: 2000 year old Roman glass from Israel

Original Weight: 69.80 carats

Weight after Sawing: 54.20 carats

Preform Weight: 24.70 carats

Weight after Crown Cut: 18.10 carats

Finished Weight: 9.25ct

Yield: 17%

Cut by Justin K. Prim

DECISIVE action

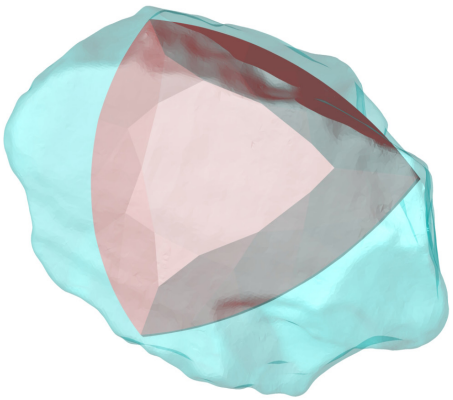
Measure twice, cut once

A lapidary has three options when it comes to cutting a coloured gemstone; to orientate the stone so that in a face-up position, the most desirable colour and/or optical phenomena is displayed, maximize weight regardless of colour or optical phenomena, or make a compromise between the two.

Of course, it is not always that simple but without question important decisions will need to be made before he starts to cut. The impact of these decisions, both positive and negative, will depend on the value of the rough. The more valuable the rough, the greater the impact.

Regardless of what is decided, it is important to remember that 'cut' is the one factor that can be controlled. The lapidary has it within his control to cut a stone for optimum brilliance, optimum colour or optimum weight and this must always be remembered when making the final analysis of the finished stone.

Initial Examination



During the initial examination, the lapidary will focus on one or more of the following factors: weight retention or yield, shape, cut, colour, clarity, and optical phenomena.

He will start out with a detailed examination of the rough crystal. How lengthy and thorough this examination will be will depend solely on the value of the rough crystal. As with carpentry work, the old adage 'measure twice, cut once' applies equally to gemstone cutting.

Weight Retention & Yield

Once the crystal has been studied and mapped out, the cutter must decide how best to cut the stone to achieve as much yield as possible. Yield is a complex combination of the shape he chooses and the perfection of the cut he aims to achieve. Ultimately, these two variables impact on the finished weight, and this is where profits can be made, and fortunes lost. Let's look firstly at how the various weight categories impact on the price.

Yield	Original Cost of the Rough (Per Carat)				
%	$ 2	$ 4	$ 8	$ 20	$ 100
50%	$ 4.00	$ 8.00	$ 16.00	$ 40.00	$ 200.00
40%	$ 5.00	$ 10.00	$ 20.00	$ 50.00	$ 250.00
30%	$ 6.66	$ 13.33	$ 26.66	$ 66.65	$ 333.33
20%	$ 10.00	$ 20.00	$ 40.00	$ 100.00	$ 500.00
15%	$ 15.00	$ 30.00	$ 60.00	$ 150.00	$ 750.00
12.5%	$ 17.50	$ 35.00	$ 70.00	$ 175.00	$ 875.00
10%	$ 20.00	$ 40.00	$ 80.00	$ 200.00	$ 1000.00

The chart above shows the relationship between the eventual price per carat of a finished stone and the initial cost of the rough based on the overall yield. This illustration does not include the cost of cutting, shipping/transportation or taxes and duties.

As you can see, the eventual price per carat jumps substantially in the under 20% yield categories, doubling when the yield drops from 20% to 10%.

In the case of coloured gemstones, cutters have far more latitude when it comes to how they choose to

These stunning tri-colour tourmalines from California have been cut to ensure maximum yield and also to highlight the different colours (Photo by Tino Hammid)

cut a stone with less impact, generally on the price, as we move from one weight category to the next. This is illustrated by comparing the price differences between a natural 'Colombian' emerald graded as extra fine - 10 using the GemGuide pricelist (March / April 2023). With the exception of the .99ct to 1.00ct, 3.99ct to 4.00ct and 4.99ct to 5.00ct weight categories, the effects on the price per carat are minimal compared to those for diamonds.

Weight Change	% Difference
.99ct to 1.00ct	100%
1.99ct to 2.00ct	11%
2.99ct to 3.00ct	6.5%
3.99ct to 4.00ct	17.4%
4.99ct to 5.00ct	21.6%
5.99ct to 6.00ct	0%

Shape

The relationship between shape and weight retention is quite obvious, however, whereas both Rapaport and GemGuide use different pricelists based on the shape of a diamond, the same is not true for coloured gemstones. In fact, apart from emeralds, rubies and blue sapphires cut en-cabochon, GemGuide makes no distinction based on shape.

Although the lapidary does not have to contend with different pricelists based on the shape of the stone, he must be mindful of the fact that the shape he chooses will affect not only the colour but also the presence, location and prominence of inclusions and any optical phenomena. He will also want to avoid shapes that may make it difficult for jewellers to find pre-manufactured settings. This is particularly true when dealing with gemstones of a lower value. Jewellers simply will not invest money creating custom designs if the value of the material does not warrant it.

Cut

In most cases, unless we are dealing with exceptional quality-coloured gemstones, cut will have less of an impact on the overall price. This often leads to cutters taking advantage of this fact by cutting stones that are unduly deep or shallow, thereby maximizing weight at the expense of brilliance. While this may not be as noticeable in darker coloured gemstones, it is certainly more apparent in lighter coloured gemstones.

The Gemological Institute of America (GIA), Gemewizard, GemDialogue, World of Color, and ColourWise all include cut grading systems.

Colour

For the lapidary, his biggest challenge is to ensure that the stone has the best colour in a face-up position since even slight variations in colour can have a huge impact on the value. With colour accounting for as much as 70% of the overall value, how he chooses to orientate the stone will be crucial in determining whether or not he will profit from his work.

Students, jewellers, and even gemmologists often make the mistake of grading a coloured gemstone at right angles to the table or even worse in a table-down position. This not only skews their perception of the colour but also does a great disservice to the lapidary who has carefully orientated the stone so that the best colour is visible through the table facet.

Depending on the shape of the rough and the directions of either the dichroic or trichroic colours, the lapidary will also need to see if it would be more profitable to cut a smaller stone of better colour or a larger stone of inferior colour. This is particularly true with stones that belong to either the trigonal or hexagonal crystal systems since they invariably involve long slender crystals.

If we look at the World of Color grading chart below for a 5PB sapphire with a colour ranging from very pale blue to deep blue to vivid blue, we can see that a stone with a tone (value) of 4 (left hand column) and a saturation (chroma) of 14 (bottom row) would score a 10. At the same token we can see that a sapphire that is slightly darker (tone of 6) and is less saturated (8) would only score a 6.

The 40% difference in the score is significant and while again it may not be apparent to an untrained eye, to a gemmologist, the combination of a darker tone and lower saturation will have a profound effect on the appearance of the sapphire and its value.

5PB

9	1	2							
8	2	3	4						
7	1	3	4	5.5					
6		2	4.5	**6**	7				
5		2	4.5	6	8	8.5			
4		2	5	6.5	9	9.5	**10**		
3		3	5	7	9				
2		2	4	6					
	2	4	6	8	10	12	14	16	18

This blue topaz has a noticeable inclusion that will have a serious impact on the value since it is a Type 1 stone (Photo by Tino Hammid)

If we look at the chart below, we can see how much this change in tone (value) and saturation (chroma) will impact on the wholesale price. For this comparison we have used blue sapphires (non-origin specific and heat treated) and origin-specific (Burma) untreated in three weight categories. The percentages represent the difference in value between a 5PB sapphire graded a '10' and one graded a '6'.

Weight	Non-Origin Specific Heat Treated	Burma/Myanmar Unheated
1.00 to 1.99ct	+361%	+317%
2.00 to 2.99ct	+285%	+377%
3.00 to 3.99ct	+233%	+355%

How does this translate into dollars?

Well, if the blue sapphire were from Thailand and weighed 3.25 carats, the difference would be $ 9,669 USD at wholesale while if the same sapphire were untreated and from Burma (Myanmar), the difference would be $ 38,025 USD (GemGuide March / April 2023).

It is important to remember that in this example the hue, clarity and cut are identical. The only factors we have changed are the tone and saturation levels.

Clarity

There are key differences in the clarity grading of diamonds and coloured gemstones. In the former, we are dealing with one gemstone formed in a similar growth environment; therefore, it is fair to assume that all diamonds have an equal opportunity to crystallize with a minimal number of inclusions. Of course, we are going to reward those that form with a higher degree of purity but at least all diamonds start out on a level playing field.

In the case of coloured gemstones, the playing field is not level because each gemstone species and/or variety is formed in a different geological environment.

In the case of gemstones formed through rapid cooling, they are more likely to be found with inclusions while those formed through slow cooling are not. In order to create a level playing field, we must acknowledge these varied growth conditions and make certain allowances. This entails grouping coloured gemstones into three categories, those that typically form with little or no inclusions (i.e. topaz), those that form with a certain degree of inclusions (i.e. ruby) and those that are rarely found without some degree of inclusions (i.e. emerald).

All the major grading systems (G.I.A, Gemewizard, GemDialogue, World of Color, and Colourwise) include a clarity grading system. Some of these systems (G.I.A, World of Color, and Colourwise) are compatible with Gemworld's GemGuide. In the case of World of Color and Colourwise, they use three components, namely degree of inclusions, texture or transparency, and zoning.

Inclusions refer to the degree of inclusions in a gemstone, texture to the transparency of a gemstone due to the presence of these inclusions, while zoning refers to the presence or absence of any colour zoning. Bi-colour gemstones, such as ametrine quartz or tourmaline would not receive any deductions because the zoning is an integral part of the gemstone.

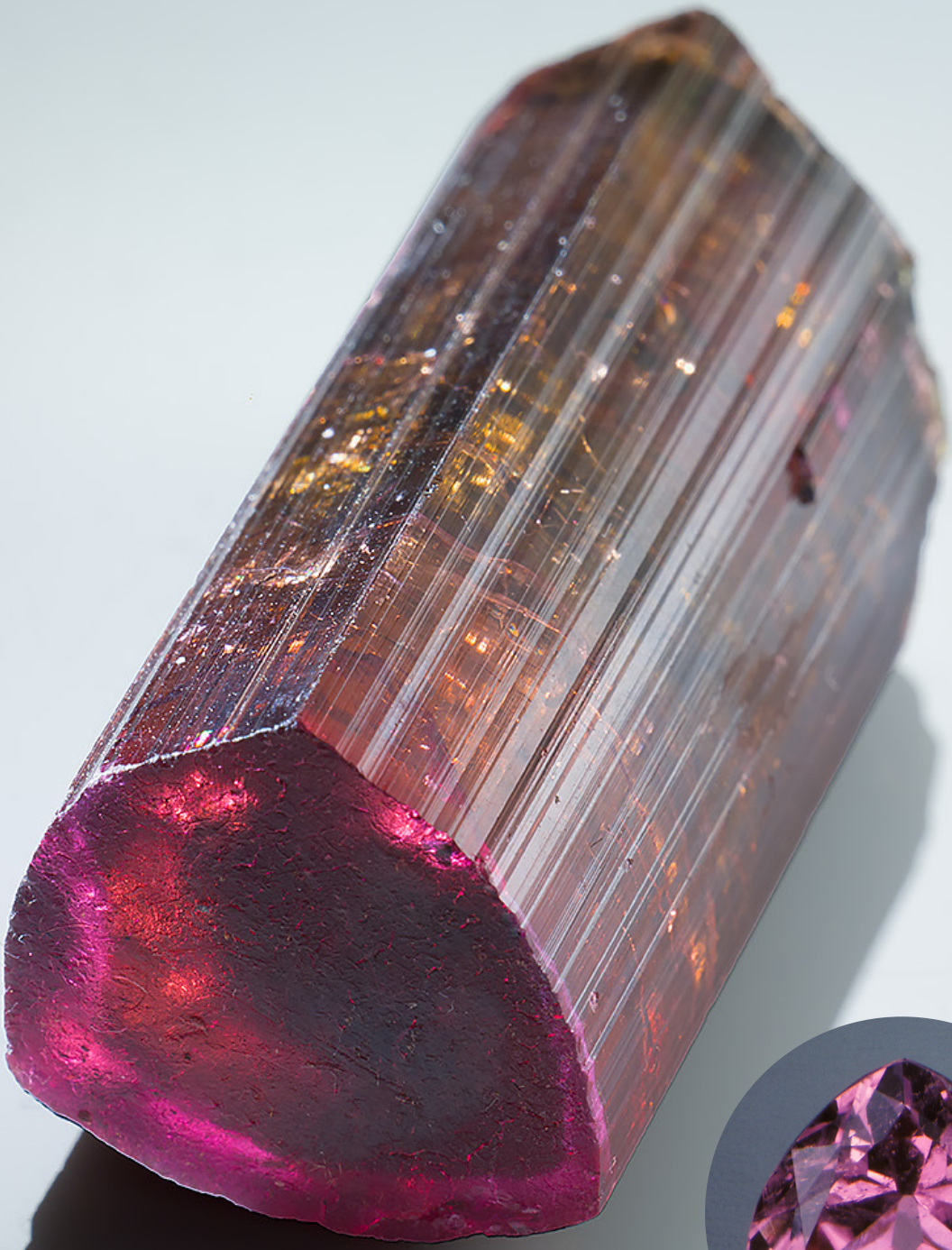
While it is difficult to generalize what impact clarity has on the overall price of a coloured gemstone, let's look

Yellow Topaz

Emerald

Ruby

Photos by Tino Hammid



This beautiful tourmaline crystal presents a dilemma to the cutter. Should it be cut with the table parallel to the c-axis for maximum yield or cut as a series of trilliants with the table at right angles to the c-axis (Photos by Tino Hammid)

at two examples; a three-carat non-origin, heat-treated blue sapphire and a three-carat aquamarine. Let us assume that in both cases the stones have been graded as 'Extra Fine' in terms of colour, are transparent and exhibit no zoning. These will be used to establish our 'base' prices.

Blue Sapphire

Using World of Color, if the sapphire were graded as 'moderately included', the price would drop by 10%, while a clarity grade of 'heavily included', would drop the price by 30%.

If we now adjust the texture and the zoning and grade each sapphire as being 'strongly textured' with 'prominent zoning', the prices would drop by 41% for the moderately included sapphire and 55% for the one that is heavily included.

Aquamarine

Using ColourWise, if the aquamarine were assessed to be 'moderately included', the price would drop by 25%, while a clarity grade of 'heavily included' would drop the price by 31%.

If we again adjust the transparency (due to the presence of inclusions) and the zoning and grade it as 'translucent' with 'prominent zoning', the price would drop by 50% if it were moderately included or 59% if it were heavily included.

Clearly 'clarity' plays an important part in the overall value of a coloured gemstone.

Optical Phenomena

Stones with the potential for optical phenomena, such as asterism, chatoyancy, play of colour or labradorescence, must be oriented correctly; otherwise, the finished stone will not display the optical effect to its best advantage, and this can result in a reduction in the value.

When cutting star rubies and sapphires, the cutter will attempt to ensure that the 6-rayed star is centred, well-defined and balanced in a face-up position. Off-centred stars and those that lack definition will reduce the overall value. Often it is impossible to achieve perfect optical phenomena and fine colour, particularly in the case of blue star sapphires since they are usually heat-treated to improve their colour, through the dissolution of titanium into the stone, at the expense of the asterism. The same is true of stones that exhibit chatoyancy with importance placed on how well-defined and centred the eye is in a face-up position.

In the case of opals, the cutter will not only seek to maximize the play of colour but will also try to ensure that the ratio of colour layer to the thickness of the opal is high, the pattern is evenly distributed and that there is no extinction of colour as the stone is rotated 360 degrees. He will also try to avoid cutting a stone that is unduly flat or thin, contains sand-like inclusions or webbing and is asymmetrical. Again, he will be acutely aware of how each factor affects the value of the stone and choose an option that will allow him to maximize his profits.

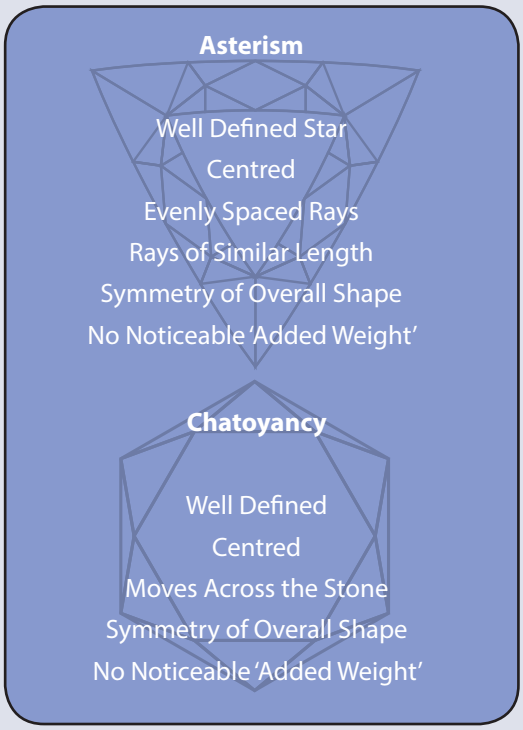
CONCLUSIONS

Cutting gemstones is certainly not for the faint of heart. Based on the quantity and the value of the rough you process, it is possible to make a sizable profit or lose a small fortune. Add in the unpredictability of certain gem rough (opal is a prime example) and you have a recipe for disaster.

As we will see in 'Gem Economics - Good Choice, Bad Choice', even small miscalculations can have major ramifications.

Fortunately, many are attracted to the 'lottery' of cutting gemstones, content to take the risks in search of the potential reward. Others are quite happy to buy the cut stones. You may not make as much but at least it is not a blind purchase.

Regardless, cutting gemstones is about far more than just grinding out a result!



GRADING FACTORS FOR STAR AND CAT'S EYE STONES

This stunning cat's eye chrysoberyl has a perfect eye that is centred and well-defined (Photo by Tino Hammid)

Photos by
Tino Hammid

Clearly in the case of these stunning emeralds and pink sapphires, the cutters have scarificed weight to achieve the matched pairs. The additional weight loss will be offset by the 'premium prices' one would expect to pay for these sets.

Photo by Tino Hammid

As we can see from the diagram, by choosing a non-traditional cut for this beautiful tourmaline from California, the cutter has added substantial weight.

Normally this would lower the price per carat but in this case, the exceptional cutting adds value and makes this choice the right one!

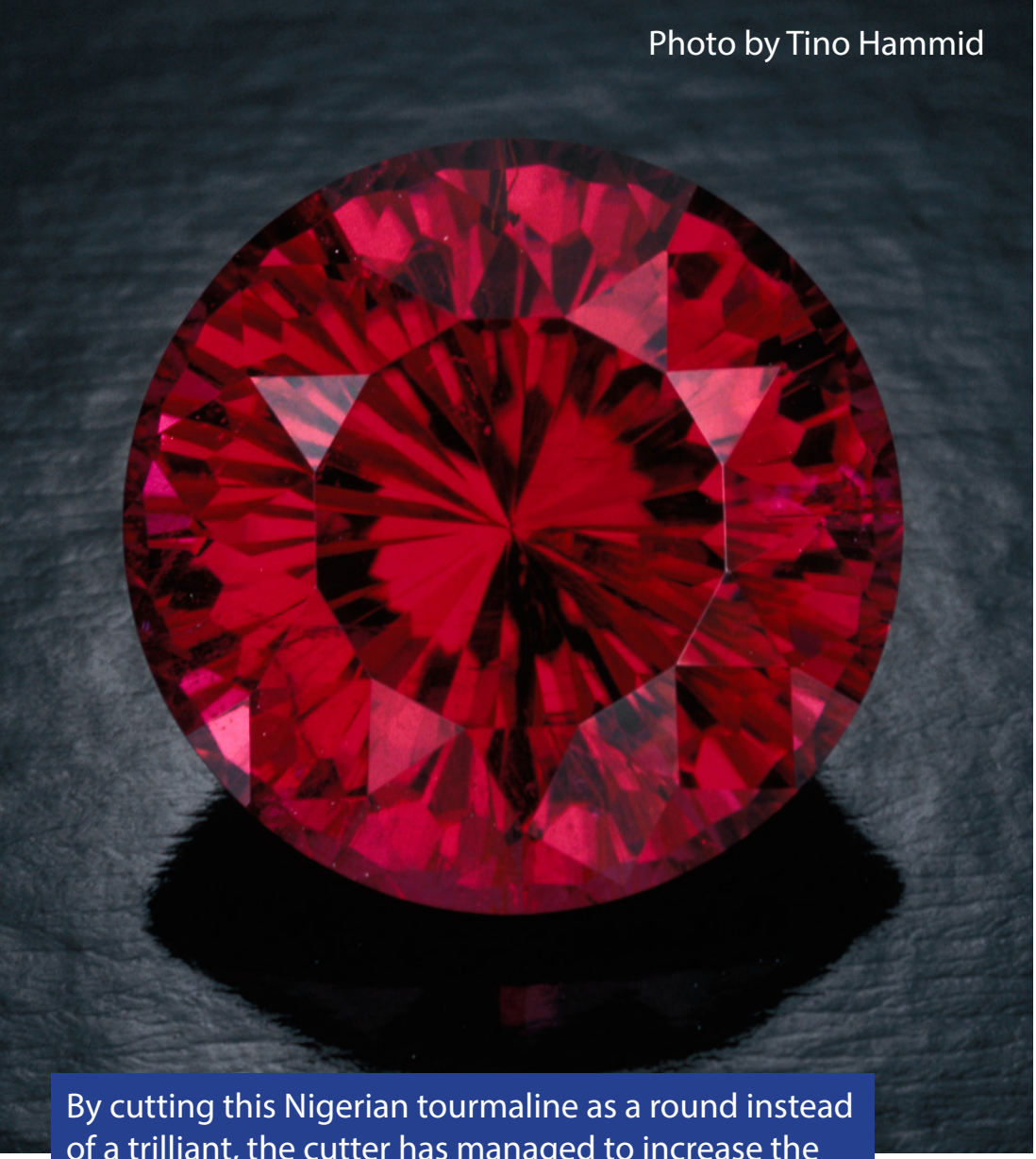
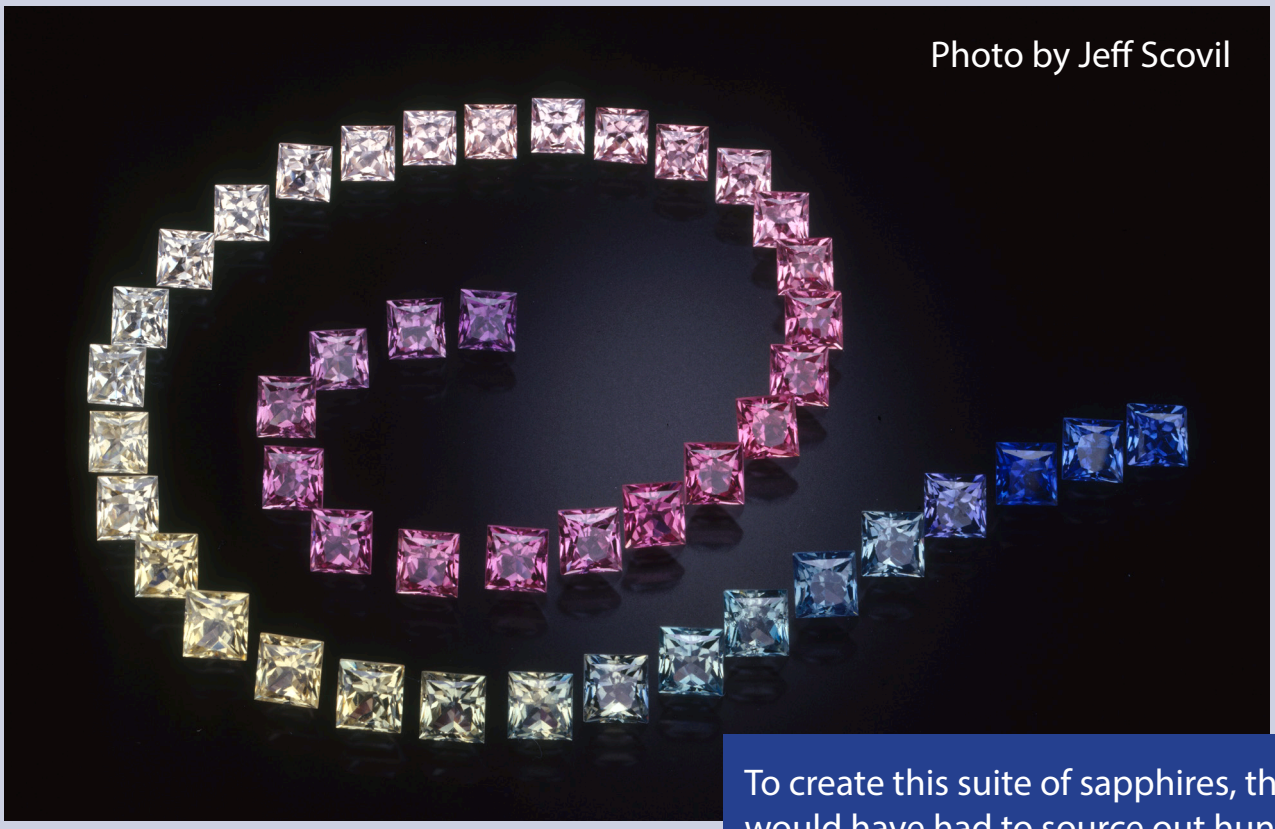


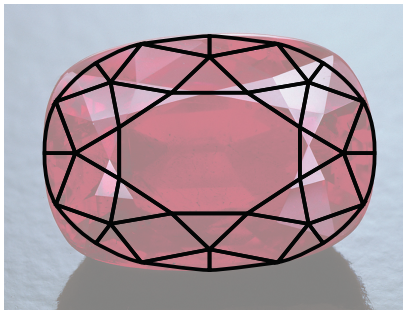
Photo by Tino Hammid

By cutting this Nigerian tourmaline as a round instead of a trilliant, the cutter has managed to increase the yield. The chart below indicates the estimated weight increase based on a 60% total depth

Size	Round	Trilliant	% Difference
10mm	3.66	3.30	12.5%
11mm	4.87	4.38	11%
12mm	6.32	5.69	11%
13mm	8.04	7.24	11%
14mm	10.04	9.03	11%



To create this suite of sapphires, the cutter would have had to source out hundreds of pieces of rough that not only represented the logical colour progression but were also of similar weight. His objective was not to maximize yield but to create a fabulous suite!



By choosing a cushion cut over a standard oval, the cutter has managed to increase the weight of this Mogok ruby by 12.5%. With the stone weighing 15.97 carats, this makes a substantial difference in the price!

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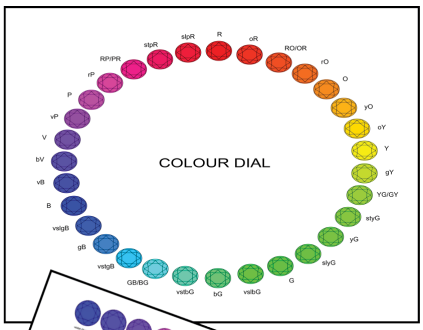

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Studying Gemmology with the World Gem Foundation

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.

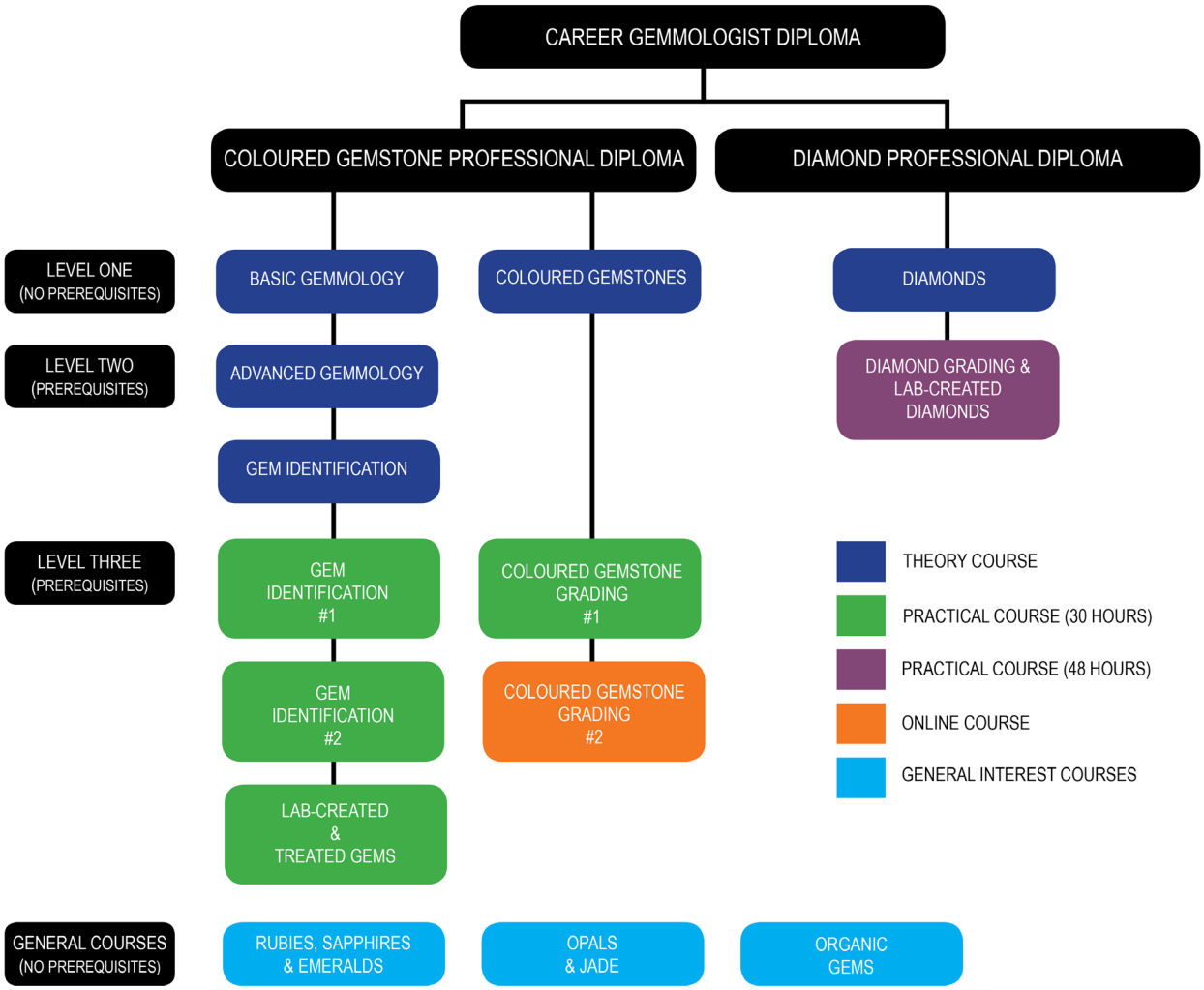
COURSES IN OTHER LANGUAGES

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

You can download the complete curriculum by clicking 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.

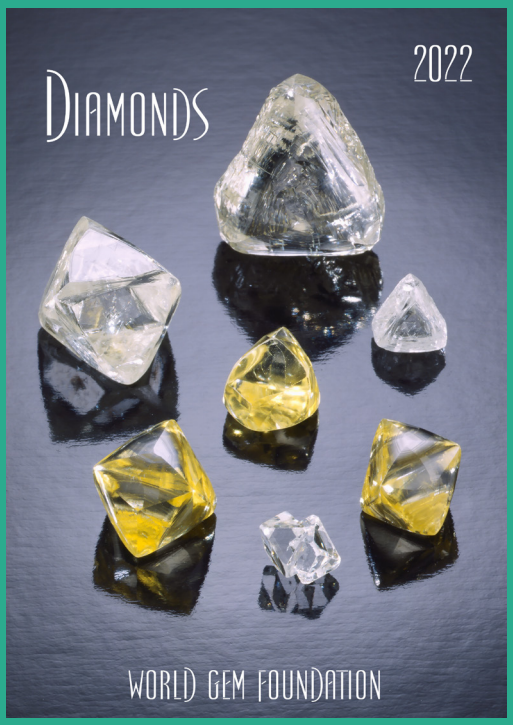
Prerequisites: World Gem Foundation Advanced Gemmology (Theory) or equivalent

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!



QUIZ #26

This time, it's a general interest quiz with a little bit of everything!

All participants who answer the questions correctly (100%) the **FIRST TIME** will be entered into a draw to win our newly updated Diamonds course (Value: $ 225 USD). The course is available in English, French and Spanish.

There is only one correct answer so make sure you pick the one that you think is right!

ENTRY DEADLINE: April 15th, 2023

GOOD LUCK!

START QUIZ

Article Submissions

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

E-mail all submissions to:

information@worldgemfoundation.com

New Deadlines Dates for Submissions

June 2023 Issue: March 31st, 2023
September 2023 Issue: June 30th, 2023
December 2023 Issue: September 30th, 2023

Articles for upcoming issues

For the June 2023 issue, we are looking for articles on jewellery manufacturing and design.

For the September and December 2023 issues, we are looking for general interest articles.

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WGF PRACTICAL CLASSES 2023/ 2024

Gem Identification #1 - September 4th - 8th, 2023

Gem Identification #2 - September 18th - 22nd, 2023

Lab-created & Treated Gems - October 16th - 20th, 2023

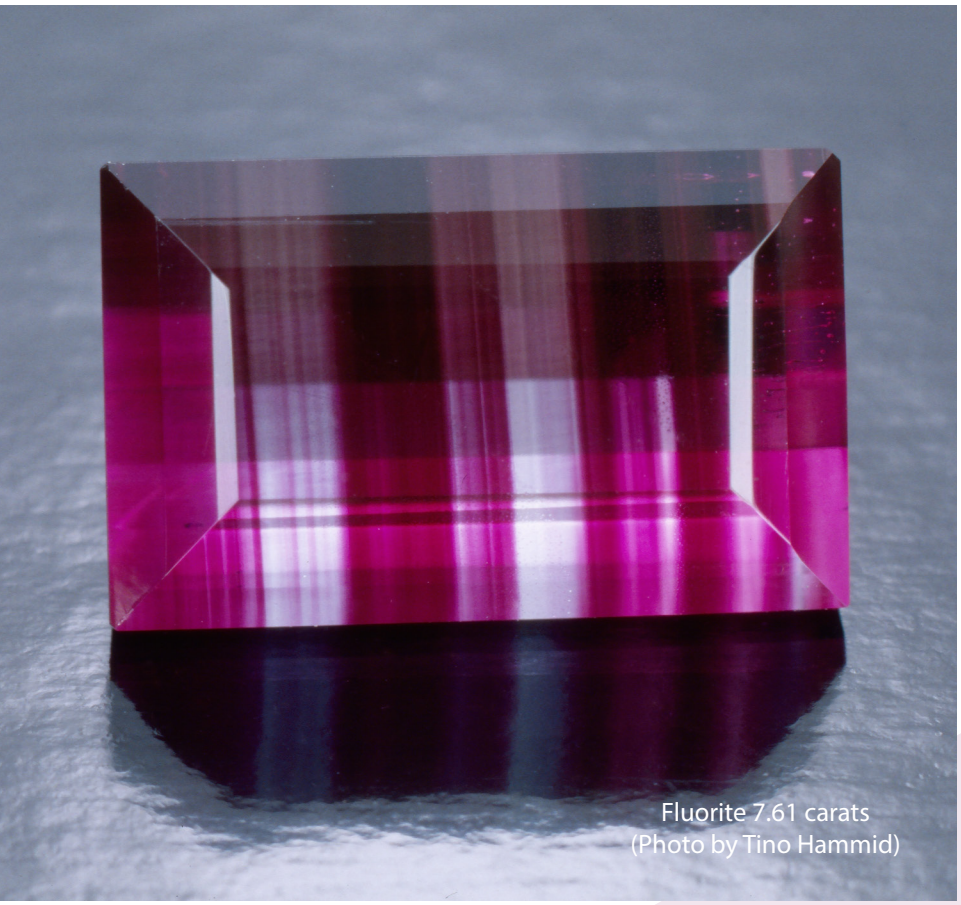
Coloured Gemstone Grading #1 - TBA

Diamond Grading & Lab-created Diamonds - January 22nd - 31st, 2024

REGISTER TODAY CLICK HERE

SPICE of life

Shedding light on Fluorite



Fluorite 7.61 carats
(Photo by Tino Hammid)

Gemmology deals specifically with minerals, rocks and organic materials that possess certain key attributes allowing them to be categorized as gemstones.

This collective term encompasses ornamental stones that not only possess beauty, rarity and durability but also stones where there is demand, traditional or cultural significance, and of course portability.

While certain gemstones, such as emerald, opal, pearl, and tanzanite do not meet this criterion due to their fragile nature, they are still important players in the world of gemstones, not so in the case of fluorite. Despite offering a tantalizing array of colors and being extremely affordable, it is rarely seen in jewellery stores due to its low hardness and is often considered more of a stone for collectors.

While its use in the gem world may be limited, fluorite does have a number of industrial applications including as a flux in steel manufacture, opalescent glass, enamels for cooking utensils, hydrofluoric acid, high-performance telescopes, and camera lenses.

Interestingly, the term fluorescence dates back to 1852, attributed to fluorite and its ability to produce visible light when exposed to UV radiations.

ETYMOLOGY

The word fluorite is derived from the Latin *fluere* which means 'to flow' and was named by Carlo Antonio Galeani Napione for its use as a flux in 1797.

GEOLOGY

Fluorite formed between 150-200 million years ago and was initially mined in Illinois in 1842 as fluorspar. It was used as a flux to help remove impurities while smelting metals such as aluminium and iron. It is found in hydrothermal veins, specifically those containing zinc and lead. It is also found in granite pegmatites, granites, gneisses, and high-temperature veins next to components of marble, and other metamorphic rocks.

LOCALITIES

Deposits of fluorite are found worldwide but famous producers are France, United Kingdom, Myanmar, Peru, and USA.

CHEMICAL COMPOSITION AND VARIANTS:

Fluorite is a compound of two elements fluorine and calcium. Together they form calcium fluoride or CaF_2.

Blue John is the traditional name for the banded variety of fluorite with purple and white or yellow bands. It is also known as Derbystone or Derbyshire Spar, as this

Fluorite (Photo by Tino Hammid)

variety is found in Derbyshire in England and has been used for decorative objects and jewellery for centuries.

Tiffany stone is a variety of opalized fluorite from Utah that is also found in China and Turkey. This variety is formed when carbonate source rocks weather and are replaced by fluorite. Also known as bertrandite or ice cream opal, they are highly prized by collectors.

Although uncommon, color change fluorite shows blue under natural light and purple under incandescent light. This variety of fluorite also comes from Derbyshire (Castleton).

Yellow Fluorite (85.69 carats)
(Photo by Tino Hammid)

COLOR

The colour range of fluorite is large, encompassing all colors from purple and blue to green, yellow, orange, pink, and brown. The color is dependent on impurities, exposure to radiation, and the size of the color centers.

PHYSICAL AND OPTICAL PROPERTIES

Fluorite belongs to the cubic crystal system and often forms beautiful cubes, with interpenetration twinning although octahedral and more complex isometric forms are not uncommon.

It has a hardness of 4 on the Mohs scale, an R.I of 1.43-1.44 (isotropic), a specific gravity of between 3.0 to 3.25, a vitreous luster and can be found in a range of transparencies.

Chelsea Filter

Under the Chelsea filter, green fluorite will appear red.

Pleochroism and Fluorescence

Due to its isotropic nature, fluorite does not exhibit any pleochroism. Under LW UV light, fluorite will fluoresce blue to violet, while under SW UV light it will fluoresce a weak blue to violet. When exposed to X-rays, it will fluoresce blue to violet with some stones exhibiting phosphorescence. Blue John, on the other hand, is inert under all radiations.

Absorption Spectra

Greenish blue fluorite can show an intense spectrum due to the color centers and rare earth elements. Lab-created fluorite may show a spectrum with a wide band in the green area.

INCLUSIONS

Fluorite can contain two or three-phase inclusions, crystal inclusions, negative crystals, and healing cracks.

CUTTING

Fluorite is a particularly challenging stone to cut due to its low hardness and perfect cleavage.

TREATMENTS AND ENHANCEMENTS

Heating fluorite to between 100 and 150 ° C can lighten the color but care must be taken otherwise all color will be removed. There are reports of oiling (Chinese and Irish fluorite) and exposure to gamma rays will turn colorless fluorite purple. This is caused by a radiation induced color center where one of the fluoride ions is dislodged thereby creating a vacancy. Detection is difficult since fluorite can be naturally colored by radiation. However due to the low cost of fluorite and its relative unsuitability as a gemstone, the distinction between natural and artificially colorred fluorite is generally unnecessary. Decorative objects might receive coating, dyeing, and plastic impregnation treatments.

Lab-created Fluorite (4.89 carats)
(Photo by Tino Hammid)

SYNTHESIS

Due to the abundance of fluorite and its low cost, there are no known reports of commercial synthesis.

SIMULANTS

Since fluorite is singly refractive and has a low R.I, glass is probably the most likely imitation available on the market. Purple and green fluorite (sometimes sold as African emerald) is often used to imitate amethyst and emerald but is easily identifiable by its isotropic nature.

CLEANING AND CARE

Due to the low hardness and perfect cleavage, care should be taken when cleaning fluorite. Ultrasonic and steam cleaners should be avoided. Concentrated hydrochloric acid will attack fluorite to some extent, although the reaction is very slow. Long term exposure may affect the polish and the overall brilliance. In terms of jewellery, earrings and necklaces are better suited than rings due to its relative fragility.

CONCLUSION

Fluorite is yet another example of a gemstone that is affordable and blessed with a wide range of colors yet due to its softness, it is rarely sold in jewellery stores. With the high cost of certain gemstones, one wonders why jewellers are not more creative and seek to offer alternatives that will provide more buying options to their clients. To do this effectively, jewellers need to acquire knowledge so that they can pass this on to their clients. Why not dare to be different? It may be niche marketing but what a niche to explore?

REFERENCES

Handbook of Gemmology

Mindat.org

Gemdat.org

Gem Testing Techniques

Gems by O 'Donoghue

Extraordinary Blue Fluorite (3965.35 carat)
(Photo by Tino Hammid)

ABOUT THE AUTHOR

Leone Langeslag is a graduate of the Federation for European Education in Gemmology (FEEG) (2006), an independent gemmological consultant, owner of SoleLeone, and CEO of the Dutch Gem Academy.

GEMSTONE economics

Good Choice, Bad Choice

In this article we will look at six case studies that involve two different scenarios for three different gemstones (blue topaz, amethyst quartz, and green tourmaline).

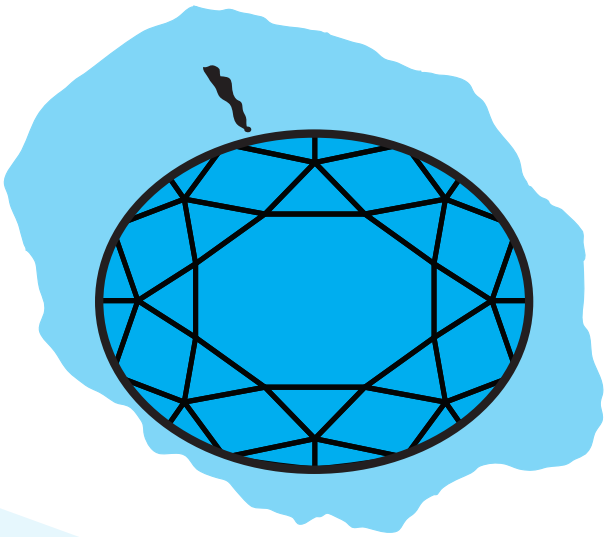
In Cases 1 to 3, we will focus on identical rough with an identical inclusion and see whether a cutter would benefit financailly from cutting a larger, more included stone or a smaller, inclusion free one.

In Cases 4 to 6, we will look at the importance of choosing the right shape and how the wrong choice can impact negatively on the final price.

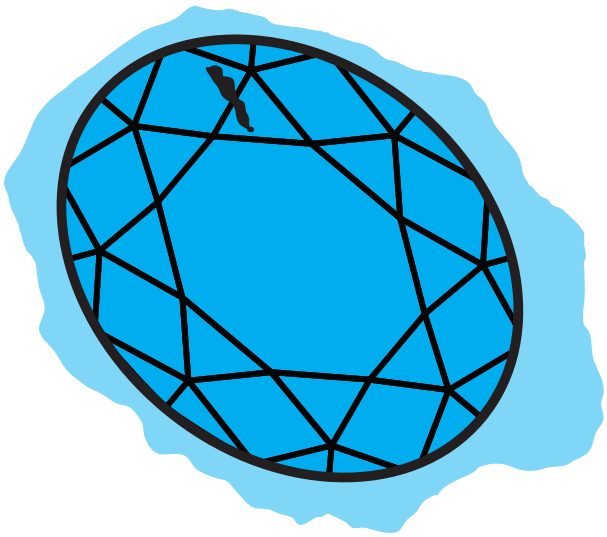
You will see that gem cutting is not just about the physical process of sawing, grinding and polishing gemstones, it is all about gemstone economics, and making important decisions that will hopefully have a positive affect on the bottom line.

Let's see how our cutters faired?

CASE STUDY #1 - BLUE TOPAZ



Gemstone: Blue Topaz
Weight of Rough: 11.50 carats
Finished Weight: 2.86 carats
Yield: 25%
Finished Shape: Oval Cut
Finished Dimensions: 10 x 8mm x 4.8mm
Price per Carat (Extra Fine): $ 18 USD per carat
Value: $ 51.48 USD



Gemstone: Blue Topaz
Weight of Rough: 11.50 carats
Finished Weight: 5.37 carats
Yield: 47%
Finished Shape: Oval Cut
Finished Dimensions: 12 x 10mm x 6mm
Price per Carat (Upper Commercial): $ 5 USD per carat
Value: $ 26.85 USD

In Case Study #1, the gem rough weighs 11.50 carats but has an inclusion in the upper corner.

Blue topaz is a Type 1 gemstone. Type 1 stones normally form with relatively few inclusions. Any inclusions present in the finished stone will have a detrimental affect on the overall value.

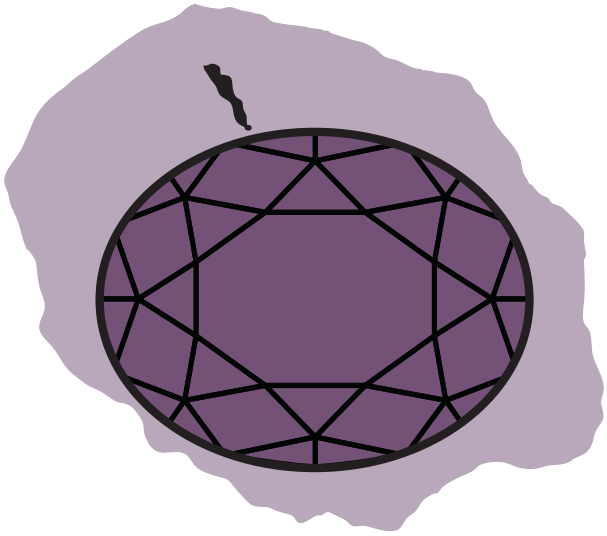
If the cutter cuts a larger stone (12mm x 10mm x 6mm), he will increase the yield (47%) but he will end up with a 5.37 carat oval cut that will be graded as 'Upper Commercial' due to the inclusion.

If, on the other hand, he chooses to cut a smaller stone (10mm x 8mm x 4.8mm), the yield will go down to 25% but he will end up with a 2.86 carat oval cut that will be graded as 'Extra Fine' since it will be inclusion free.

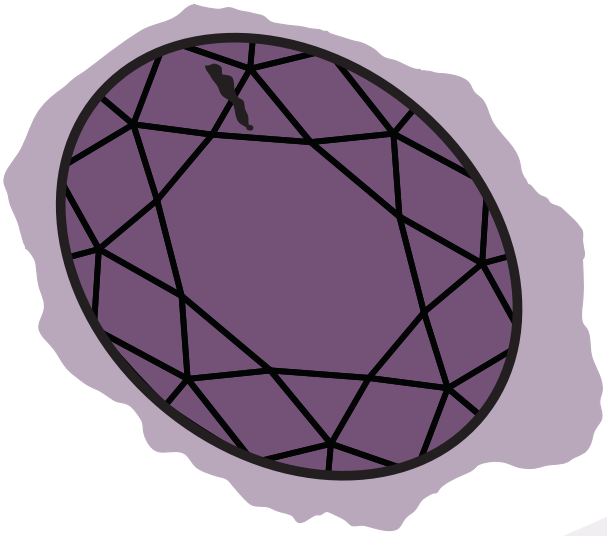
While the finished weight is only half the weight, the price per carat is over three and a half times more ($ 18 USD compared to $ 5 USD), translating into a smaller finished stone that is almost double the value of the larger stone.

In Case Study #1, if all other factors are equal (colour and cut), the cutter will make $ 24.63 USD more.

CASE STUDY #2 - AMETHYST QUARTZ



Gemstone: Amethyst Quartz
Weight of Rough: 8.50 carats
Finished Weight: 2.14 carats
Yield: 25%
Finished Shape: Oval Cut
Finished Dimensions: 10 x 8mm x 4.8mm
Price per Carat (Extra Fine): $ 50 USD per carat
Value: $ 107.00 USD



Gemstone: Amethyst Quartz
Weight of Rough: 8.50 carats
Finished Weight: 4.00 carats
Yield: 47%
Finished Shape: Oval Cut
Finished Dimensions: 12 x 10mm x 6mm
Price per Carat (Good): $ 24 USD per carat
Value: $ 96.00 USD

In Case Study #2, the gem rough weighs 8.50 carats and has an inclusion in the upper corner.

Amethyst quartz is a Type 2 gemstone. Type 2 stones normally form with some inclusions. Any inclusions present in the finished stone will affect the value but will not have such a detrimental affect on the overall value.

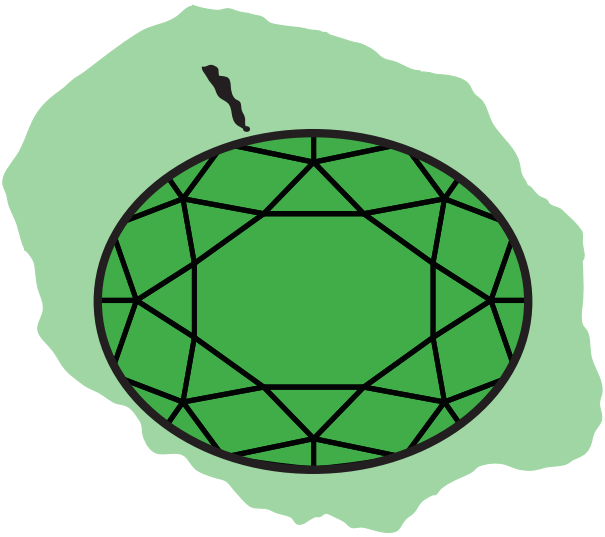
If the cutter cuts a larger stone (12mm x 10mm x 6mm), he will increase the yield (47%) but he will end up with a 4.00 carat oval cut that will be graded as 'Good' due to the inclusion.

If, on the other hand, he chooses to cut a smaller stone (10mm x 8mm x 4.8mm), the yield will go down to 25% but he will end up with a 2.14 carat oval cut that will be graded as 'Extra Fine' since it will be inclusion free.

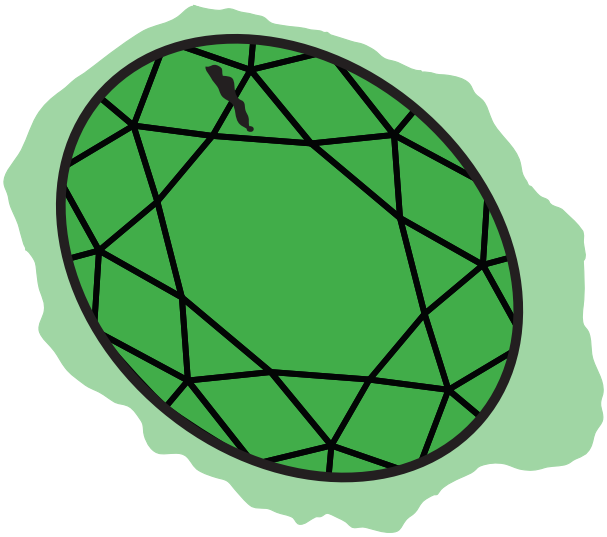
While the finished weight is almost half the weight, the price per carat will be more than double ($ 50 USD compared to $ 24 USD), translating into a smaller finished stone that is slightly more than the larger stone.

In Case Study #2, if all other factors are equal (colour and cut), the cutter will make $ 11 USD more.

CASE STUDY #3 - GREEN TOURMALINE



Gemstone: Green Tourmaline
Weight of Rough: 9.80 carats
Finished Weight: 2.46 carats
Yield: 25%
Finished Shape: Oval Cut
Finished Dimensions: 10 x 8mm x 4.8mm
Price per Carat (Extra Fine): $ 420 USD per carat
Value: $ 1033.20 USD



Gemstone: Gem Tourmaline
Weight of Rough: 9.80 carat rough
Finished Weight: 4.61 carats
Yield: 47%
Finished Shape: Oval Cut
Finished Dimensions: 12 x 10mm x 6mm
Price per Carat (Good): $ 107.50 USD per carat
Value: $ 495.57 USD

In Case Study #3, the gem rough weighs 9.80 carats and has an inclusion in the upper corner.

Green tourmaline is a Type 1 gemstone and like blue topaz normally forms with relatively few inclusions. Any inclusions present in the finished stone will a have a detrimental affect on the overall value.

If the cutter cuts a larger stone (12mm x 10mm x 6mm), he will increase the yield (47%) but he will end up with a 4.61 carat oval cut that will be graded as 'Good' due to the inclusion.

If, on the other hand, he chooses to cut a smaller stone (10mm x 8mm x 4.8mm), the yield will go down to 25% but he will end up with a 2.46 carat oval cut that will be graded as 'Extra Fine' since it will be inclusion free.

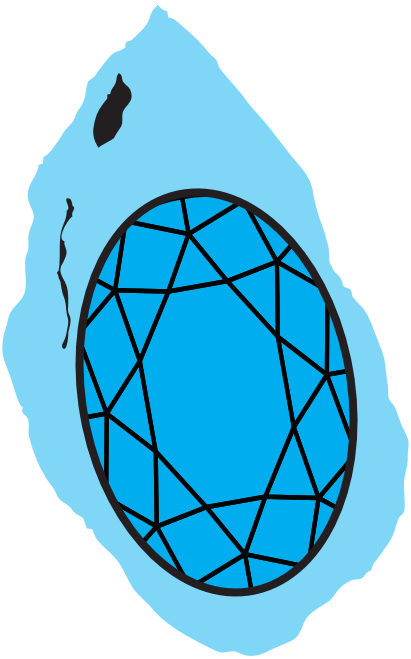
While the finished weight is slightly more than half the weight, the price per carat will be four times more ($ 420 USD compared to $ 107.50 USD), translating into a smaller finished stone that is more than double the value of the larger stone.

In Case Study #3, if all other factors are equal (colour and cut), the cutter will make $ 537.63 USD more.

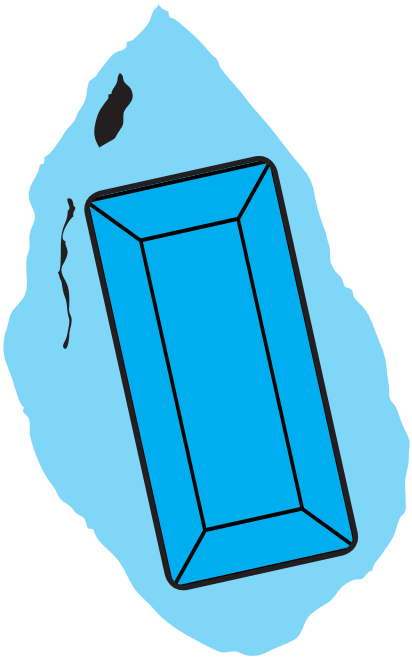
GOOD CHOICE ?

BAD CHOICE ?

CASE STUDY #4 - BLUE TOPAZ



Gemstone: Blue Topaz
Weight of Rough: 11.50 carat rough
Finished Weight: 3.43 carats
Yield: 30%
Finished Shape: Elongated Oval Cut
Finished Dimensions: 12 x 8mm x 4.8mm
Price per Carat (Extra Fine): $ 21 USD per carat
Value: $ 72.03 USD



Gemstone: Blue Topaz
Weight of Rough: 11.50 carat rough
Finished Weight: 2.48 carats
Yield: 22%
Finished Shape: Baguette Cut
Finished Dimensions: 12 x 6mm x 3.6mm
Price per Carat (Extra Fine): $ 19 USD per carat
Value: $ 47.12 USD

In Case Study #4, the gem rough weighs 11.50 carats and has two inclusions located in the upper left portion of the gem rough.

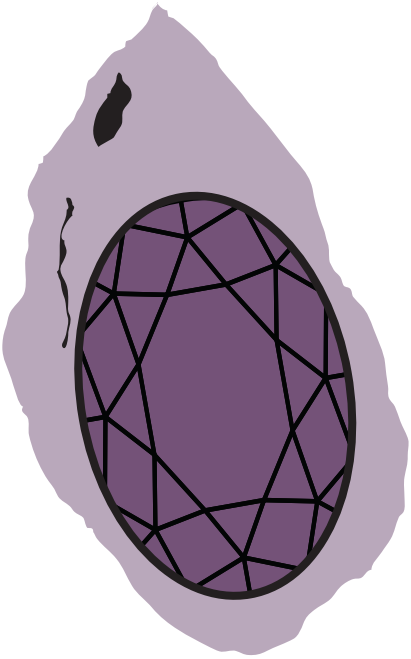
Since blue topaz is a Type 1 stone, our cutter knows that he must cut a stone that is inclusion free in order to maximize value.

In the first example, he choose an elongated oval cut and achieved a yield of 30%, and a finished stone weighing 3.43 carats.

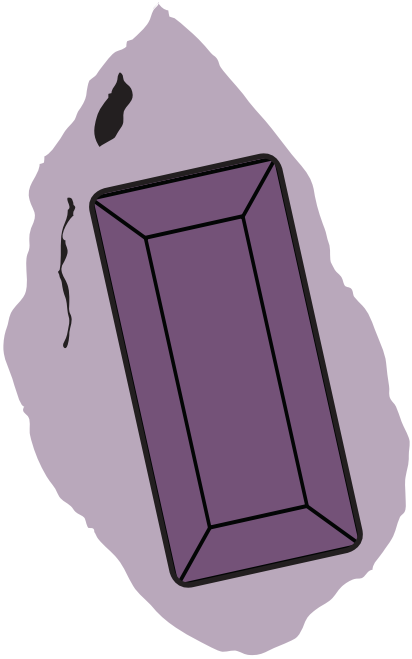
In the second example, he choose a baguette cut with a yield of 22%, and a finished weight of 2.48 carats.

While the price per carat changed slightly due to the weight category, his decision to cut the baguette cut, actually cost him $ 24.91 USD.

CASE STUDY #5 - AMETHYST QUARTZ



Gemstone: Amethyst Quartz
Weight of Rough: 8.50 carat rough
Finished Weight: 2.56 carats
Yield: 30%
Finished Shape: Elongated Oval Cut
Finished Dimensions: 12 x 8mm x 4.8mm
Price per Carat (Extra Fine): $ 45 USD per carat
Value: $ 115.20 USD



Gemstone: Amethyst Quartz
Weight of Rough: 8.50 carat rough
Finished Weight: 1.85 carats
Yield: 22%
Finished Shape: Baguette Cut
Finished Dimensions: 12 x 6mm x 3.6mm
Price per Carat (Extra Fine): $ 45 USD per carat
Value: $ 83.25 USD

In Case Study #5, the gem rough weighs 8.50 carats and has two inclusions located in the upper left portion of the gem rough.

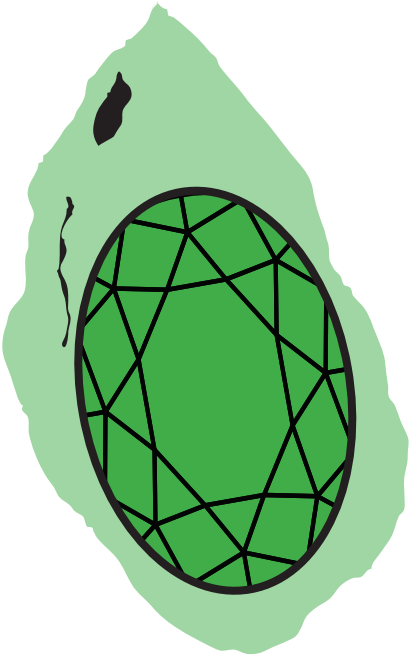
Since amethyst quartz is a Type 2 stone, our cutter knows that minor inclusions are acceptable but chooses to cut an inclusion free stone in order to maximize value.

In the first example, he choose an elongated oval cut and achieved a yield of 30%, and a finished stone weighing 2.56 carats.

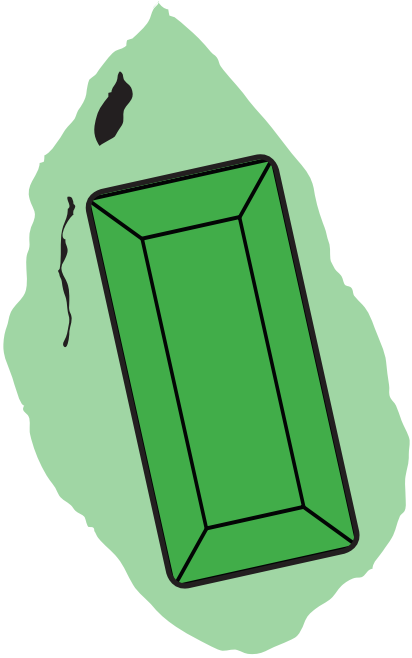
In the second example, he choose a baguette cut with a yield of 22%, and a finished weight of 1.85 carats.

While the price per carat is the same, his decision to cut the baguette cut, actually cost him $ 31.95 USD.

CASE STUDY #6 - GREEN TOURMALINE



Gemstone: Green Torumaline
Weight of Rough: 9.80 carat rough
Finished Weight: 2.95 carats
Yield: 30%
Finished Shape: Elongated Oval Cut
Finished Dimensions: 12 x 8mm x 4.8mm
Price per Carat (Extra Fine): $ 445 USD per carat
Value: $ 1312.75 USD



Gemstone: Green Tourmaline
Weight of Rough: 9.80 carat rough
Finished Weight: 2.13 carats
Yield: 22%
Finished Shape: Baguette Cut
Finished Dimensions: 12 x 6mm x 3.6mm
Price per Carat (Extra Fine): $ 445 USD per carat
Value: $ 947.85 USD

In Case Study #6, the gem rough weighs 9.80 carats and has two inclusions located in the upper left portion of the gem rough.

Since green tourmaline is a Type 1 stone, our cutter knows that in order to maximize the value, he must cut an inclusion free stone.

In the first example, he choose an elongated oval cut and achieved a yield of 30%, and a finished stone weighing 2.95 carats.

In the second example, he choose a baguette cut with a yield of 22%, and a finished weight of 2.13 carats.

While the price per carat is the same, his decision to cut the baguette cut, actually cost him $ 364.90 USD.

CONCLUSIONS

So what have we learned from these six case studies?

Firstly, bigger is not always better. Understanding how gemstones are graded, allows a cutter to make informed decisions. For example, are inclusions acceptable or are they frowned upon?

Secondly, the shape you choose and the yield it produces will have a major impact on the overall value and this impact will increase dramatically based on the gemstone you are cutting. In Case Study #2, the difference may only be $ 11 USD but what happens if you are cutting thousands of stones?

Good decisions, based on knowledge and experience will increase your chances of making money. Bad decisions will seriously affect your profitability.

Most cutters will acknowledge that cutting for profit always involves making compromises but as we can see from these examples, sacrificing weight sometimes is the right choice, while at other times it is not.

REFERENCE:

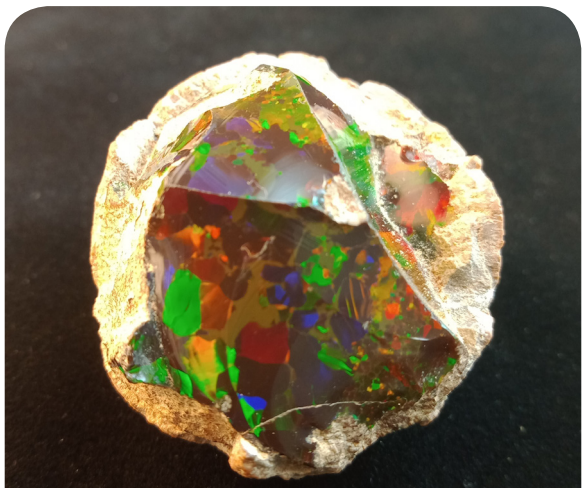
GemGuide (March / April 2023)

TRUE grit

Flirting with Danger

Ethiopian opal was initially found in the early 1990s in Mezezo, in the Shewa region. In 2008, they were also found in the Northern Wollo region. I visited this area in 2022 and recounted my trip in the June issue of Gemmology Today (Out in the Field – My El Dorado). According to the artisanal miners, there are ten mining sites located at Tsehay Mewucha, Min yichil, Zendo awash, Maywuha, Beska, Tachamba, Kokwuha, Abay Minch, Kechinarih, and Medaye.

Ethiopian opals come in a range of beautiful colors and breathtaking patterns. The majority of opals from Ethiopia are 'hydrophane', a term that refers to a porous opal that has the ability to absorb water. A change in color or transparency often accompanies the water absorption. Typically, these opals have a lower specific gravity compared to other types of opal because of their porosity. There have been reported cases where some opals absorbed enough water to produce a weight gain of up to 15%!



Ethiopian Opal (Courtesy of Henock Zewudie)

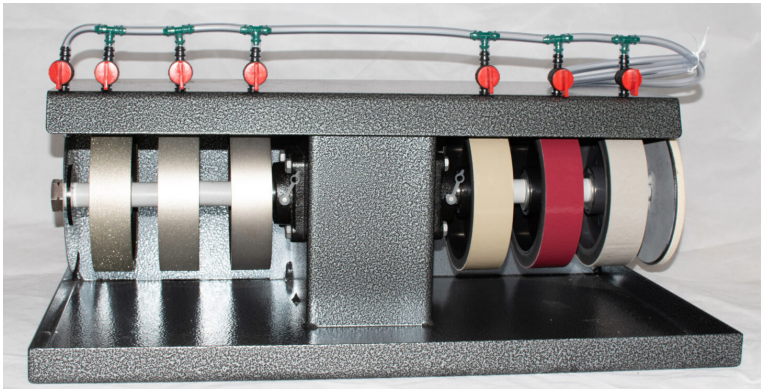
How do you know if you have a hydrophane opal? Simply place a small drop of water on the surface and observe under the microscope (under transmitted light) to see if the water droplet is absorbed into the stone. Alternatively, Of course, you can also test it on your tongue to see if it sticks or wet your finger to see if you can pick it up.

Choosing the right kind of rough is very important and this depends largely on the knowledge and experience of the cutter. Most Ethiopian cutters choose to cut recently mined opals due to their easy access to the artisanal miners and the desire to minimize the risk of cracking due to the careless handling by opal brokers with limited knowledge who simply want to make quick money.

As much as we love transforming rough opals into beautiful jewelry pieces, opal cutting does present hidden dangers that can be detrimental to the cutter's health. Opal consists of silica and the dust generated when they are processed can cause serious lung problems (Silicosis). To prevent this, it is recommended that cutters wear a proper mask and protective eyeglasses, work in a well-ventilated room, and use running water on the cutting lap to minimize the dust.

Gem cutting is a unique vocation because every cutter develops their own techniques. There are no right or wrong ways to cut gemstones as long as you end up with a beautiful, finished stone. My personal training and cutting skills were acquired from my uncle, Wodaje Degalas, who is a self-taught cutter, and Tewodros Sintayehu, an Ethiopian gem dealer.

The first step involves the manual removal of any host material using an array of tools, such as clippers, a Dremel or a trim saw. This will also help us to remove any 'potch' or matrix embedded in the material that will have an adverse effect on the overall value.



Polishing & Cabbing Machine (Courtesy of Silversmithing Tools)

What appears to be 'EYE CANDY' is actually an assortment of lower grade Ethiopian opal that will more than likely be tumbled rather than cabbed

The next step involves studying the rough from all angles to determine what type of stone will yield the best profit. Where to position the dome and where to position the bottom. The positioning of the dome is crucial since this will hopefully display the best play of color. Remember, the quality of the stone will be judged by others in the 'face-up' position, in this case through the dome.

I prefer to work with an undoped stone and a vertical wheel using grit sizes ranging from 180 to 260 for shaping and removing the foreign matter left from the manual cleaning. Be careful when using a new wheel on an opal, since the grit will be too rough. I typically use an agate to make the wheel less gritty. Make sure that you have a constant flow of water on the wheel, and good lighting. When cutting opal, flexibility is very important. You need to let the stone guide you because you might find a chip or matrix requiring you to change from the original intended shape. This, for me, is the beautiful part about opal cutting, the journey and the eventual destination.

I will then move to different wheels with finer grits (600 to 3000), ensuring each time that I maintain the symmetry (if that is the goal compared to cutting a freeform) and removing any grinding marks. It is also important to cut a good girdle. This will make it easier to set the opal. For pre-polishing and polishing, I will use grit sizes ranging from 8000 to 50000. For final polishing, I use cerium oxide with a little water on a felt polishing wheel to give the opal a 'glassy' finish.

Do not forget to clean the machinery when you are finished so that it is ready to use the next time and it is not clogged up with residue.

Once the opals have been cut and polished, it is essential that you dry them properly. This can take anywhere from a few hours to several weeks. In Ethiopia, cutters tend to be quite secretive about the drying of opals. Some wrap them in plastic, while others use paper towels. I know of some traditional cutters in Delanta that will put the opals in plastic bags in their pockets using their body warmth to dry the stones. To ensure that the opals are completely dry, some cutters will also even use a normal table lamp.

Unfortunately, most gem dealers prefer to buy rough instead of polished opals because of the lower price and the lack of well-cut stone production in Ethiopia due to a shortage of quality-trained opal cutters. This is one of the goals of the World Gem Foundation, to work with the Ethiopian government to improve the value addition of our gemstones so that Ethiopians will benefit both socially and economically from these precious and finite resources.

Ultimately the goal of every professional opal cutter is to bring out the dazzling beauty of the opal while maximizing the yield. This may sound easy but experience tells me it is not!

ABOUT THE AUTHOR

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

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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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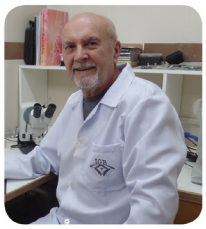
Geoffrey M. Dominy
World Gem Foundation
Spanish Gem Academy

Leone Langeslag
Dutch
Gem Academy

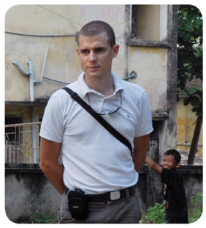
Beth West
British
Gem Academy



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

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Salomon Lutumba
South Central African
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Barickeh Charles Kholifa Koroma
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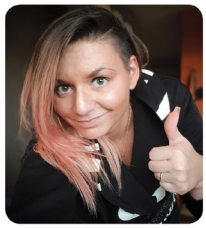

Nina Zolotukhina
Eastern Europe
& Russia

Haimanot Sisay
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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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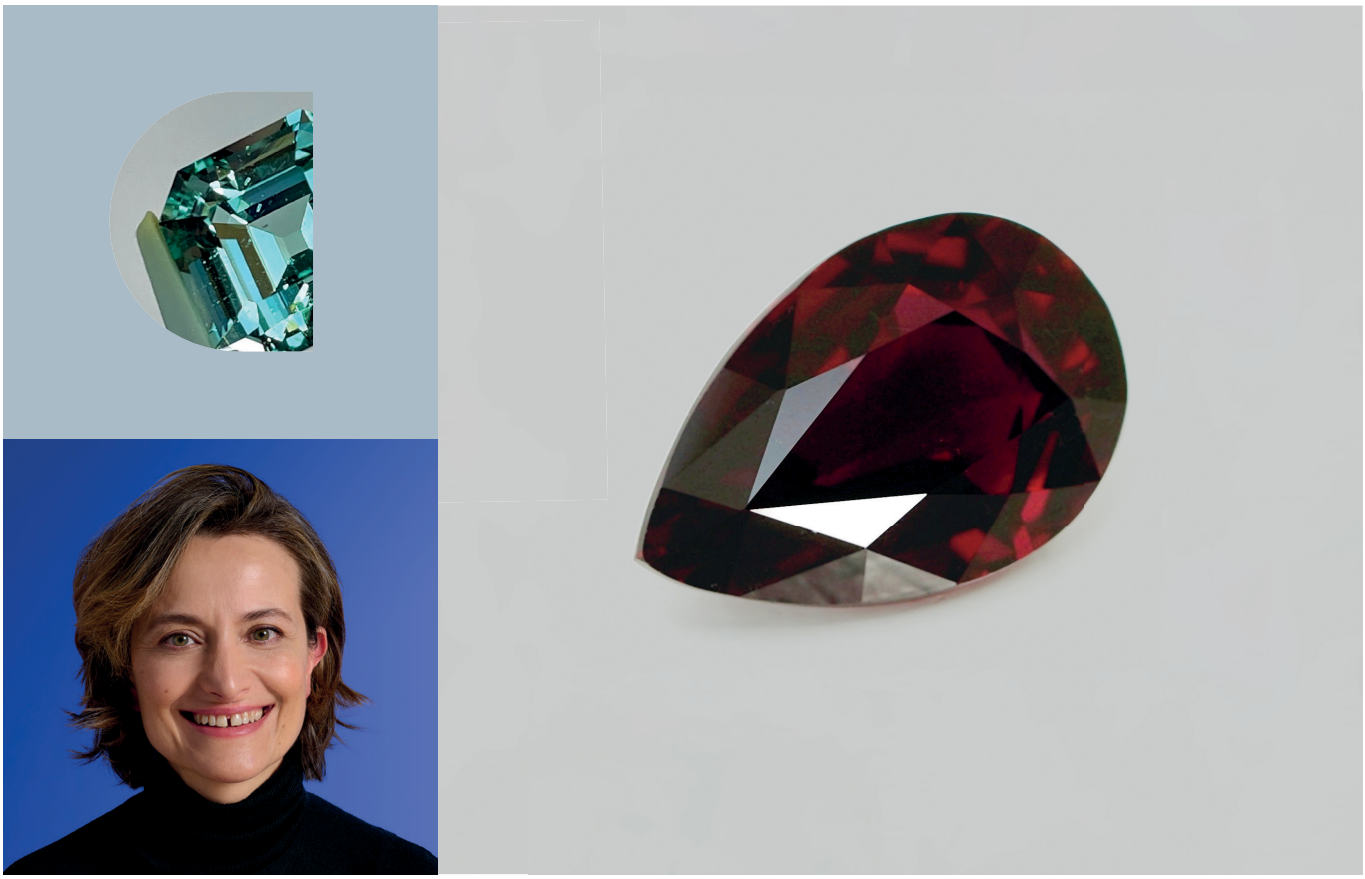

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