

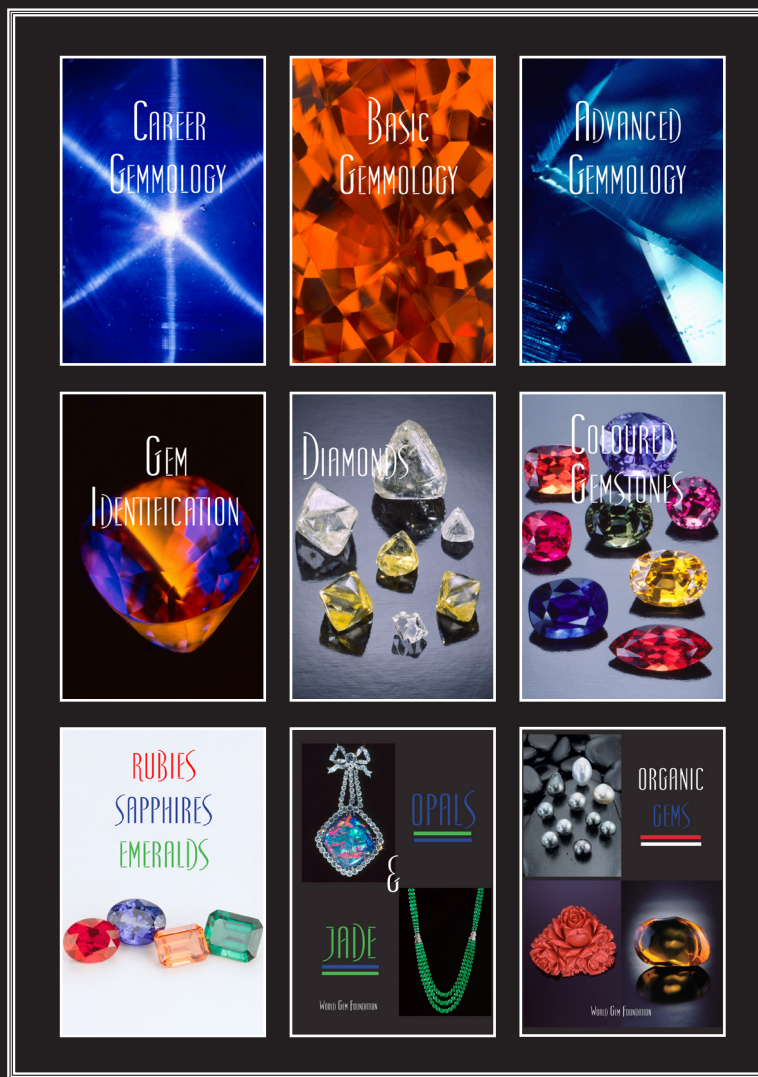


Gemmology Today

September 2019
Quarterly Publication



From the ashes rises the phoenix



A comprehensive gemmological program
for tomorrow's gemmologists

Three 'Diploma' programs

- Career Gemmologist
- Diamond Professional
- Coloured Gemstone Professional

Fifteen exciting and dynamic theoretical and practical
courses covering all aspects of gemmology

'Sometimes it's the journey that teaches you a lot about your destination'

WORLD GEM FOUNDATION

In this issue

| | |
|--|----|
| MEN IN GEMMOLOGY – ‘Renaissance Man’ with Conny Forsberg explores the inner beauty of gemstones and features some of his stunning inclusion photography. | 5 |
| MONEY CENT\$ - ‘Is Bigger BETTER?’ by Geoff Dominy How do you price an 18.02 carat tsavorite garnet when there are no known comparables? Six minds can sometimes be better than one. | 16 |
| THROUGH THE LENS – ‘Meet Antonio Miglioli’. Minerals are Antonio’s passion and he possesses a unique ability to capture their beauty on film. . | 22 |
| FINGERPRINT FILE - ‘Fluorescent Garnets’ by Kirk Feral . Kirk breaks yet another gemmological myth.....some garnets do fluoresce! | 40 |
| WORLD GEM FOUNDATION WORKSHOPS & COURSES | 46 |
| GEMMOLOGY TODAY QUIZ #12 . Let’s see how observant you are! | 62 |
| OUT IN THE FIELD – ‘Seller Beware – Meet the Gem Detective!’ by Kim Rix . Designed to give practical advice to travellers, Kim’s series of books cover some of the most famous gem localities. | 64 |
| MEET THE TEAM - The faces behind the World Gem Foundation | 68 |
| LITERARY SPEAKING - Richard W. Wise reviews MAGNIFICENT GREEN - On The Trail Of The Legendary Colombian Emerald by Adolf Peretti and Thierry Falise | 72 |
| SPICE OF LIFE - ‘Aquamarine - Summer Breezes and Cool Winter Icebergs’ by Leone Langeslag . Leone continues her series on gemstones from around the world with a stone that has become gemmologically synonymous with March. | 75 |
| ACADEMY DIRECTORY & CONTACT INFORMATION | 79 |



Cover Photograph ‘The Baby’ Fire Gate by Tino Hammid

Published by The World Gem Foundation & Amazonas Gem Publications

Editor Geoffrey M. Dominy

Advisory Council Leone Langeslag, Conny Forsberg, Jan Asplund, Leroy Bakelmun, Cristina Rzepka de Lombas, Gérard Quintin, Kyalo Kiilu, Barickeh Charles Kholifa Koroma & Jack Ghazalian

Copyright 2019 - World Gem Foundation

No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means electronic, mechanical, photocopying, recording or otherwise without the prior written permission of the publisher. Any opinions expressed in this publication are understood to be the views of the individual contributors and are not necessarily those of the publishers.



June 2019 Issue



Editor

— at Work

Geoffrey M. Dominy is the author and creator of the 'The Handbook of Gemmology', founder of the World Gem Foundation and editor of Gemmology Today.

I have always felt that gemmology is viewed by many in the field of earth sciences as a 'poor second cousin'.

I can remember in the late 1980's receiving a call from the head of the Mineralogy department at the University of Winnipeg in Canada. He asked me if I would like to give a talk to his mineralogy students. 'Yes' I replied. 'I would love to'.

Up until that point, my public speaking engagements had been geared more to students and consumers so the opportunity to get more scientific and technical really excited me.

I worked on my presentation for two weeks, fine tuning it so that I would 'Wow' the audience. The day before my talk he called to confirm everything and then said something that struck fear into my very soul. He said 'I should warn you my students hate gemmology!' laughed and then hung up. I don't know how long I sat there dumbfounded trying to process what he had just said. What kind of sadistic mineralogist was he? What was I letting myself in for? Should I even go?

In true 'Geoff' fashion I decided to face the lions. Could it really be that bad?

I arrived at the university on a bitterly cold Winnipeg night and was met by an equally frosty student. We exchanged pleasantries and she guided me through a labyrinth of corridors to a huge auditorium. My first reaction was 'Wow this is a huge auditorium'. My second reaction was 'Where are all the students?'. She pointed to the back row of seats where about twenty people were sitting. I say 'about' because they were so far away, it was hard to tell.

I decided very quickly to implement 'Plan B'..... Alan Hodgkinson's Visual Optics. I proceeded to take out a small bedside lamp from my bag, a pair of tweezers, a polishing cloth, ten identical blue boxes with ten identically sized colourless gemstones, a pen and a piece of paper.

I asked (actually I pleaded) for two volunteers, gave one the paper and the pen, the other the blue boxes and told them what I wanted them to do. I then turned on the bedside lamp, asked somebody to turn off the lights in the auditorium and then slowly proceeded to identify the gemstones using only my eye and the lamp.

A magical thing happened. By stone four, the students had started to come down and by the time I had finished, they were all sitting, crossed legged on the ground around me seemingly mesmerized by the 'Harry Potter' spectacle.

We spent the next two hours talking about anything and everything to do with minerals and gemstones. They quickly realized that to be a gemmologist you have to have an appreciation for minerals and while some will always consider us to be 'mineral mercenaries', the vast majority have a deep appreciation for what Mother Earth produces.

It has always been my goal to elevate the science of gemmology, not just through my book The Handbook of Gemmology but also through the World Gem Foundation. I want it to be recognized as a true science. To make it legitimate in the eyes of earth scientists. While I cannot divulge yet what we are working on, I can say that the World Gem Foundation will be the architects of up to four new 'BSc' and 'Masters' programs at universities around the world, with hopefully more to follow. This is the realization of a long held dream and proof that if you sow the right seeds, you will reap a harvest. These are truly exciting times at the World Gem Foundation!



Passionate about gems and passionate about photography, Conny Forsberg is torn between his love for photographing inclusions and faceting gemstones. 'It is like asking which of your children do you love most... I really cannot choose'

Renaissance Man



Conny Forsberg - At the Wheel

GT: Who is Conny Forsberg? Tell us about yourself.

CF: Gemmologist, gem cutter, photomicrographer, owner of Swedish Gem Lab, father, husband, mayor, not necessarily in that order. Born in 1961 (yep getting old). Wife, we met in 2010 and she really has made my life complete. Six kids, four grown up and two still at home, 7 and 2 years old. I bought my first gemstones (tumbled) with my own saved cash at the age of nine. Read books on the subject of gem cutting and dreamt of being able to facet a gem. Started cutting cabochons in '83 and did my first faceted stone, a citrine (still have it) completely by hand on a cab machine. It turned out butt ugly but it was my first faceted stone. After that I built my own faceting head and mast, which I coupled with a pottery wheel. It just barely made better stones than by hand, so money was saved to be able to buy the real deal. Curious and in need to know what I was working with I started attending the Gem-A Gemmology class lectures in Stockholm, 250 kms from where I live, every second Monday. This was fall 1985. I earned my FGA in 1987. In 1993 I did my diamond grading exam at the HRD in Antwerp. For ten years, 1988 to 1998 I had my

own company (with partners and without) where I did gem cutting, selling equipment and rough, diamond polishing as well as gemmological consulting. In 1998 I entered the field of IT as business in the Swedish gem industry was very slow and kids needed to be fed. From the turn of the century until last year I have stayed in the IT-industry as my main income but never let go of the gem business completely. Today and at least until December 31st 2022 I do service as the mayor of our municipality. Since 2013 I have run the best-equipped gem laboratory in Sweden. The main focus is on colored stones but work is done also on diamonds and organic gems. All modern spectrometers in the laboratory, Raman/Photoluminescence, FTIR and UV-VIS-NIR are state of the art equipment from MAGI.

I run the Scandinavian Gem Academy with my dear friend and colleague Jan Asplund with whom I also twice organized the Scandinavian Gem Symposium. Plans are slowly evolving for another symposium.

Privately I even do have a few other interests though it is hard to get time enough for them. IPSC revolver and rifle shooting has been very dear to me but after an injury, competition has been out of the question and presently done sporadically, just for relaxation. Japanese blades (nihonto) is an interest that has evolved since my days in martial arts. Today I am more interested in the arts and crafts part of nihonto than in the martial connection. As a bonus the nice patterns of nihonto can actually be photomicrographed... I do confess, I am a complete - nerd with free choice of prefix and 'likely suffering from the whole alphabet' (quote, my wife).

GT: What area of gemmology interests you the most; gem cutting or photographing inclusions?

CF: Do I really have to decide? It is like asking which of your children do you love most... I really cannot choose. Two completely different disciplines regarding the world of gemstones which both have their place in my life. If my life depended on making a choice, I guess I would go for photomicrography but it might change depending on what day my life would be in jeopardy and the present mood.

GT: What's the most challenging gemstone you have cut and why?

CF: Also this is a tough one to answer because it depends on what is meant by challenging. What first comes to mind was a close to 12 carat blue, untreated rough Montana sapphire that should be transformed into something beautiful without sacrificing too much weight and preferably satisfy the customer as it was the first cutting mission from one of my return customers. It ended up at 6+ carats and a yield exceeding 50%. The challenge consisted of the combination top looks and weight retention. The customer was happy.

GT: Do you feel the average jeweller and/or consumer has a greater appreciation for stones cut to enhance their overall brilliance or is the focus still on 'yield'?

CF: I feel the focus here in Sweden, in the field of colored stones, has during the last ten years slowly changed towards well-cut and good looking stones instead of just carats and species. The customers are also more aware and demanding, which is good.

GT: Today inclusion photography has taken on a whole new direction with talented photographers such as Danny Sanchez bridging the gap between science and art. What direction interests you the most?

CF: In the beginning I was just opting for the science part but as we do find fantastic beauty not only externally but also internally in our gemstones, the art side of it got to me very early on. In my opinion the science and art meet in perfect symbiosis in the field of inclusion photography. One does not exclude the other.

GT: Photographing inclusions is extremely challenging. What are some of the obstacles you have faced and what advice would you give to up and coming photographers.

CF: My main obstacles have been finding enough time and also a lack of enough stones. Photographing inclusions is very time consuming and you can never have access to too many gemstones. My main advice would be to never give up, make sure you always have enough light sources and play with different types of light and shadowing. Do not forget the use of crossed linear polars.

GT: Are you a purist or do you use software, such as Photoshop, to bring out the best in your photographs?

CF: I do not necessarily see a contradiction there. I am a purist in that sense that I use stacking and color tweaking only when absolutely necessary. On the other hand, I always post process in Photoshop as I shoot in RAW format and need to digitally 'develop' the shots.

GT: What is your 'preferred' equipment when it comes to cutting gemstones and photographing inclusions?

CF: For gem cutting I use two UltraTec machines. One V2 upgraded with the OEM digital protractor and one V5 digital. Sintered cutting disks from Adamas faceting and a large amount of different pre-polishing and polishing laps from Gearloose and a few from other manufacturers. When cutting cabochons (rather if, as that is not often nowadays) I use two old machines; one from Homberg & Brusius in Germany and an old Gem Lab Polisher from Raytech. The latter equipped with three expanding drums and one wheel.

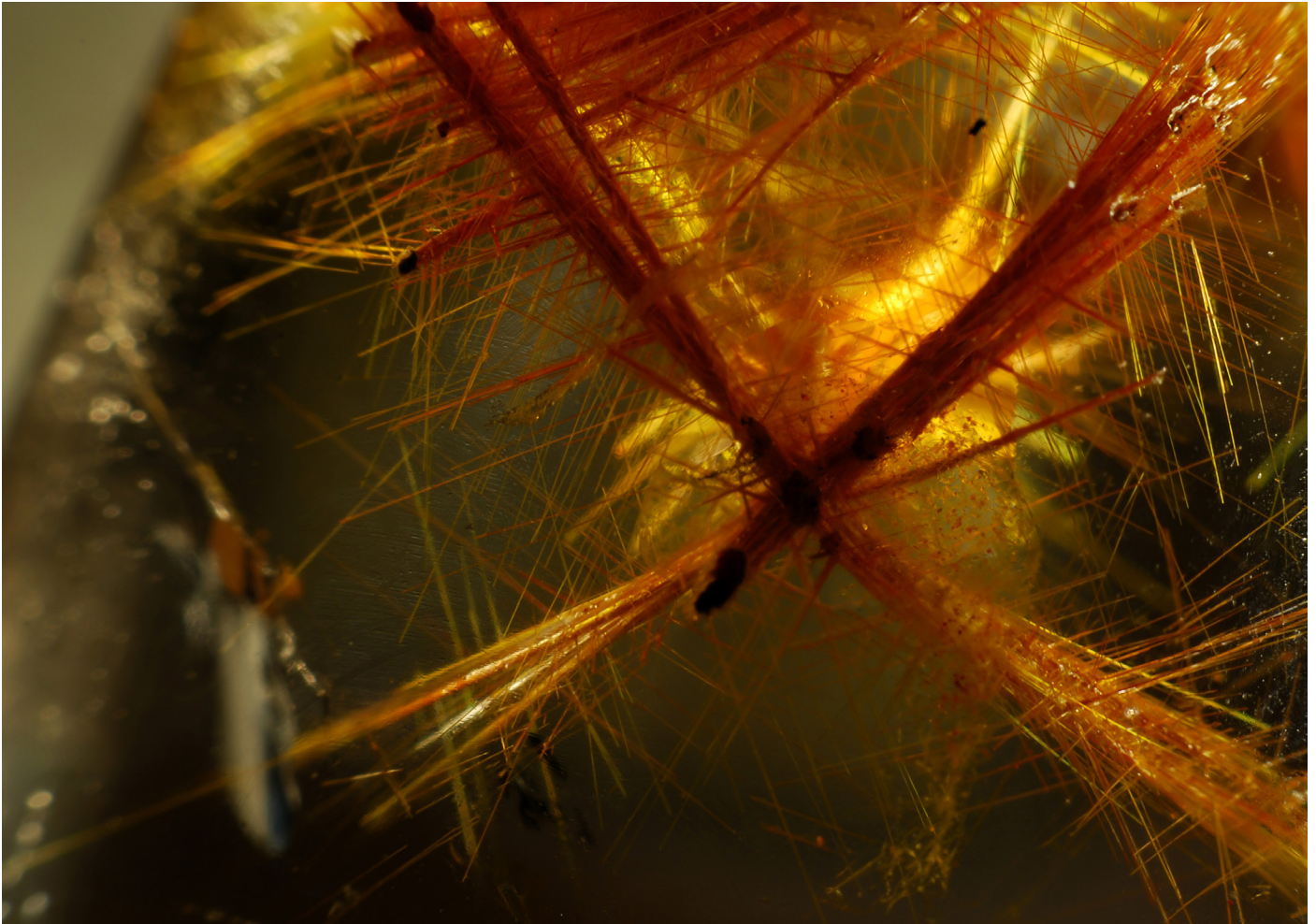
For photography of inclusions I mainly use my Wild M400 coupled with a Olympus OM-D, E-M1 camera. Of course, several different light sources, fiber optics, filters and plain plastic sheets for shadowing. Once in a while I do also shoot images through a Wild M3-Z and a Wild M-11 coupled with Nikon cameras but the M-400 is the first choice for inclusion photography, always.

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

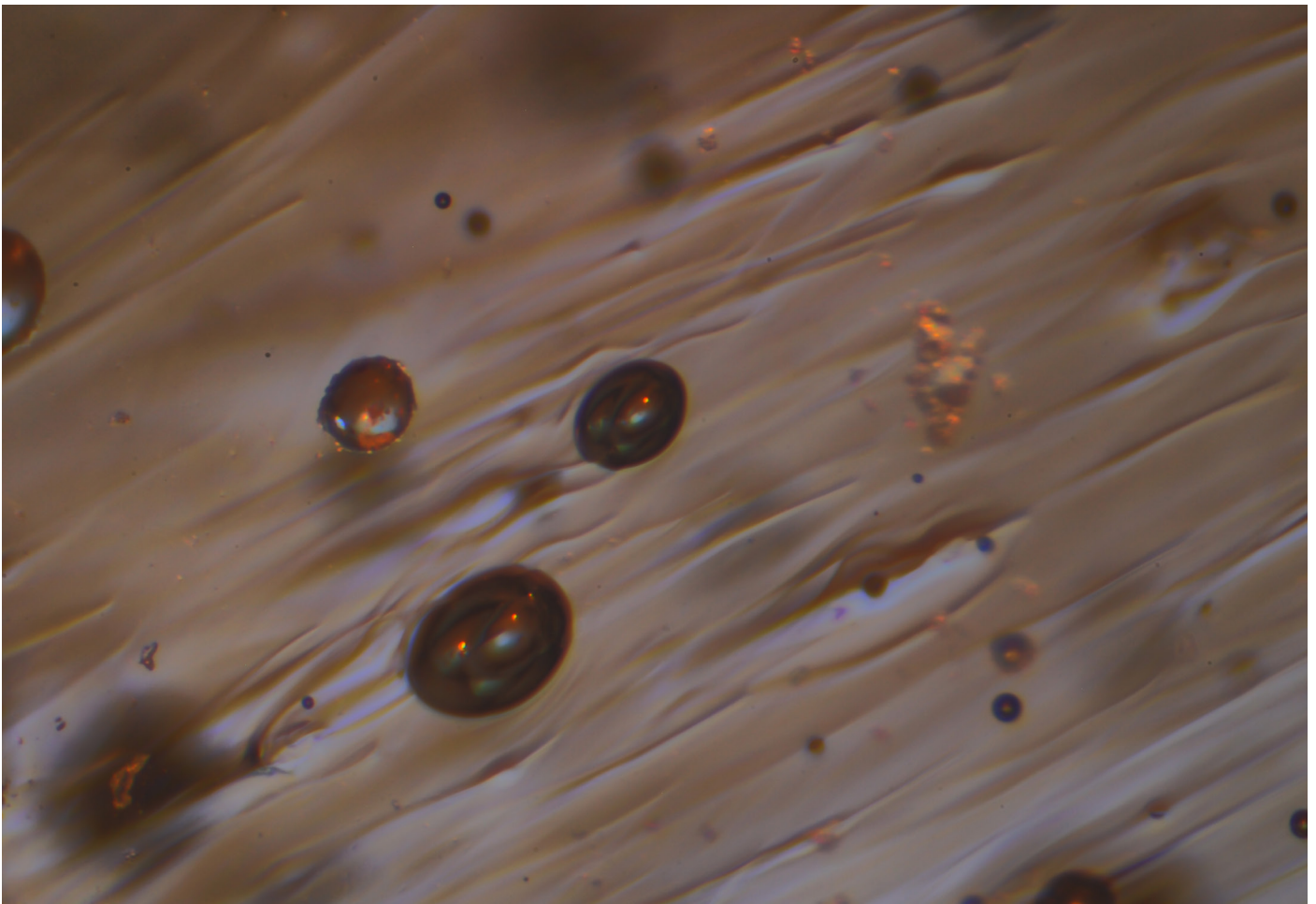
CF: In short: More challenges than ever as well as a need for even better prepared gemmologists. In not so short: I see more gems coming out of 'new' areas both in Africa, Asia and the Americas and unless Donald Trump succeeds in buying Greenland and raises yet another Trump tower, increased production of even better quality pink sapphires will come out from there. Treatments will continue to develop and we will see new challenges as well as new solutions to them. Much help will be gained from modern equipment in terms of different types of spectrometers. In the same way as the last ten years has seen prices shifting downwards, even types of spectrometers that are today out of reach for most gemmologists will be possible, as well as necessary, to acquire. Gemmological science will be taught as higher education in universities and colleges. Possibly even consumer protection regulations with mandatory testing of certain types of stones might be discussed amongst the EU legislators.

GT: If we were sitting here a year from now celebrating what a great year it's been for Conny Forsberg professionally, what would you say was the reason?

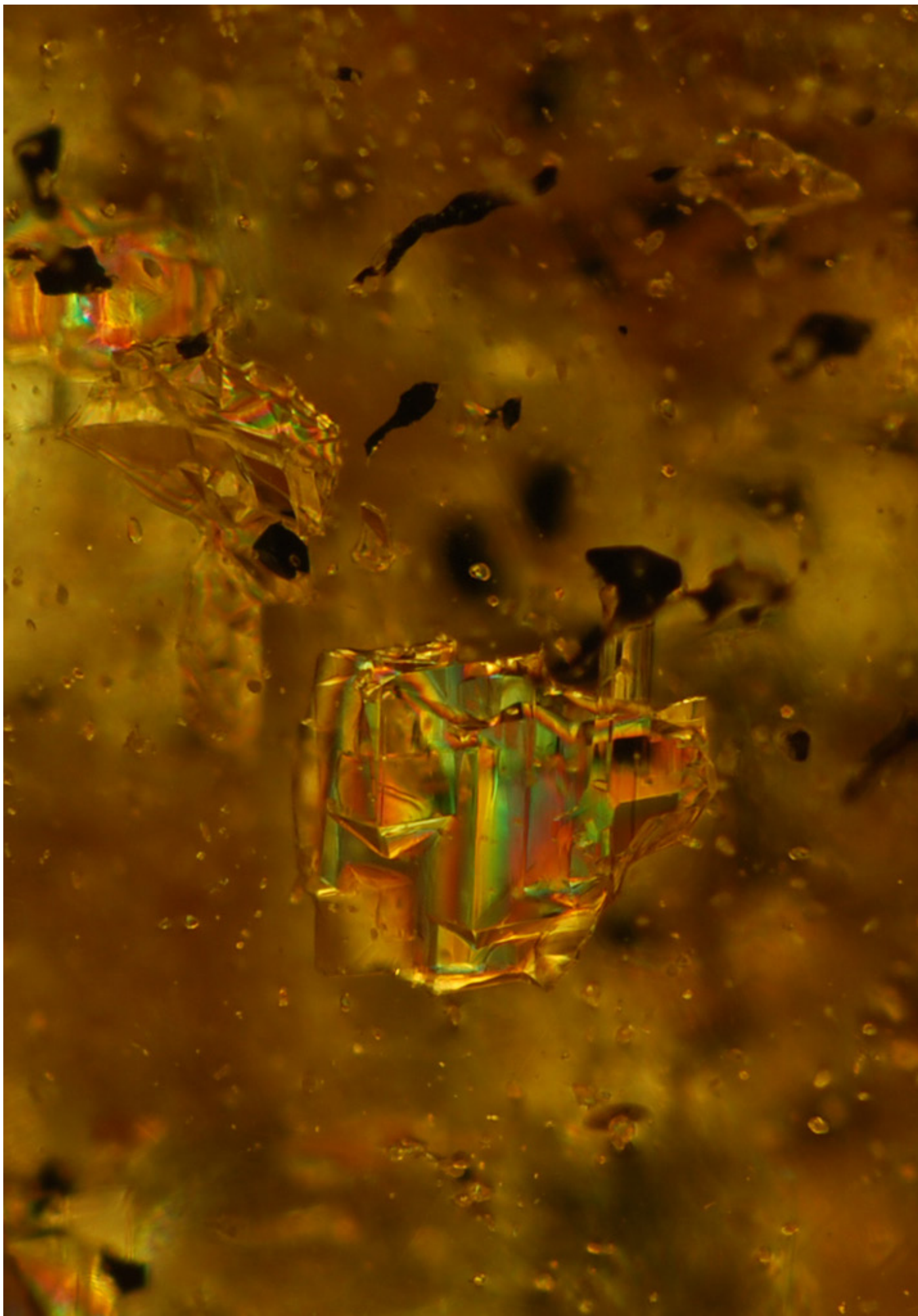
CF: Oh, man... that is the million dollar question. As I am presently serving as the Mayor of our municipality it might be some political smartness that made a huge contribution to the community and the citizens. But as we are talking gems and gemmology here, I have to say that the reason for me to celebrate the great year 2019 professionally would be my supportive family and my colleagues and friends in the field of gems and gemmology scattered around the world. You all know who you are!



Rutile (Photo by Conny Forsberg)



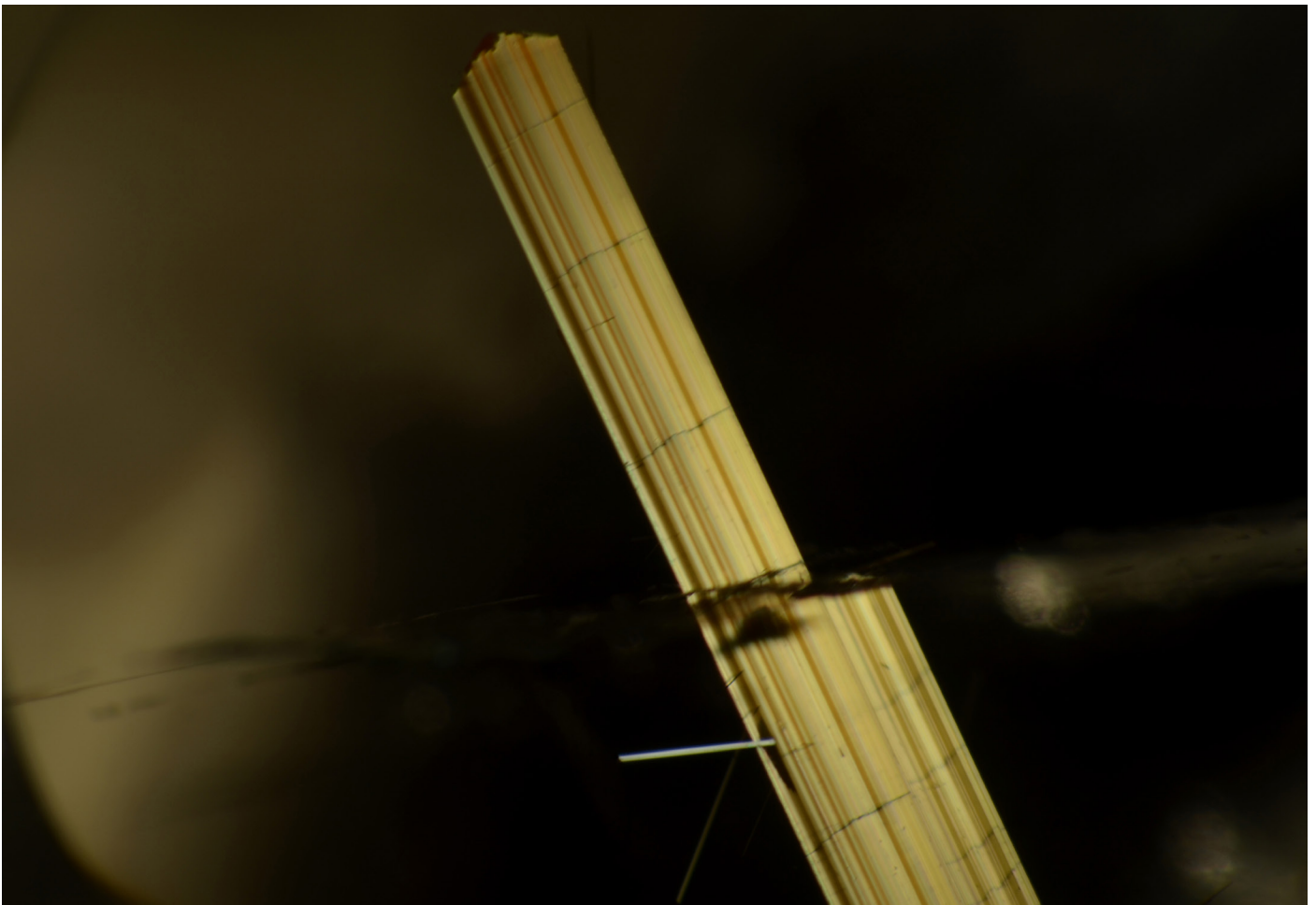
Moldavite (Photo by Conny Forsberg)



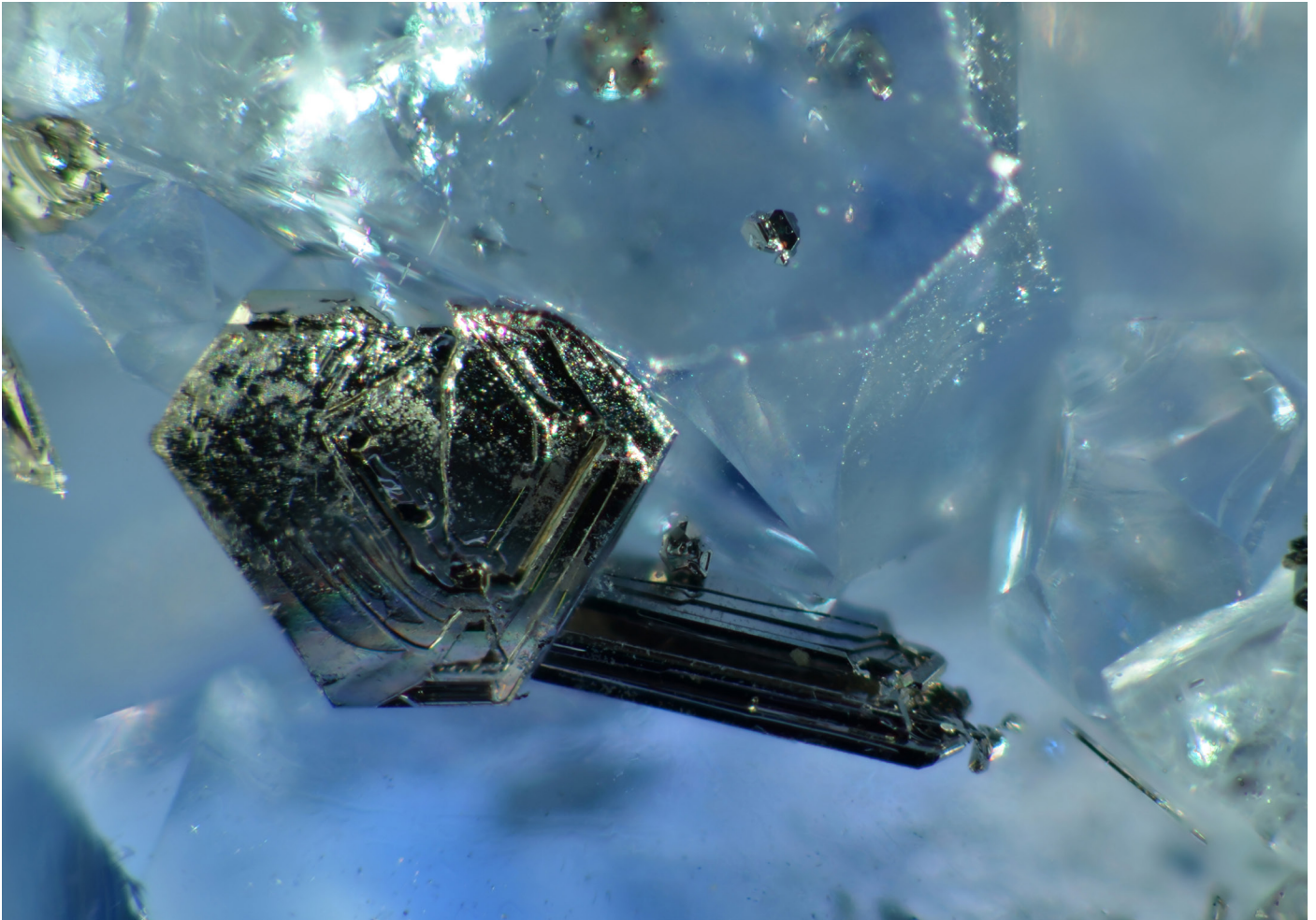
Crystal in Spessartite Garnet (Loliondo, Tanzania) (Photo by Conny Forsberg)



Mica in Emerald (Ethiopia) (Photo by Conny Forsberg)



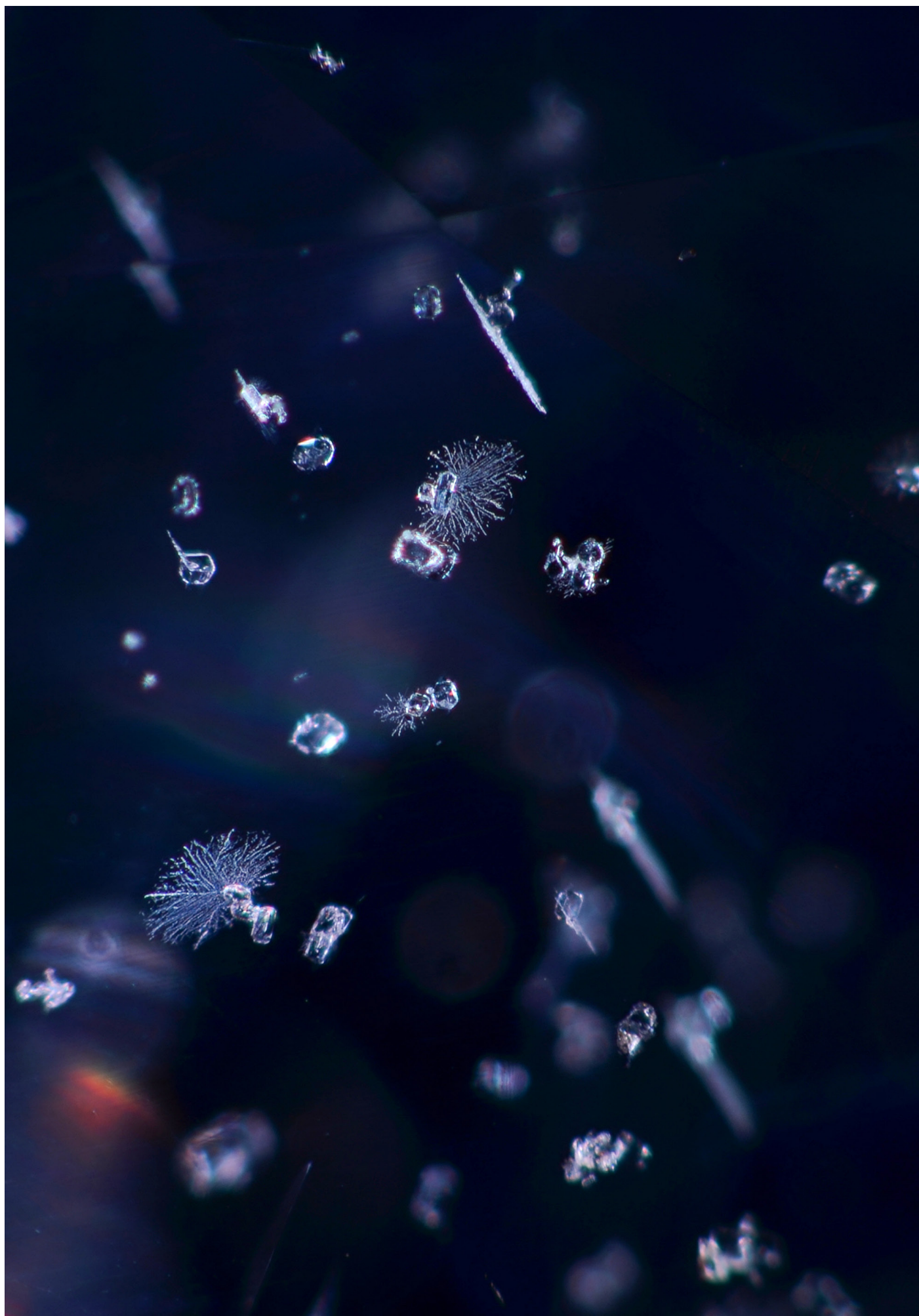
Rutile in Quartz (Photo by Conny Forsberg)



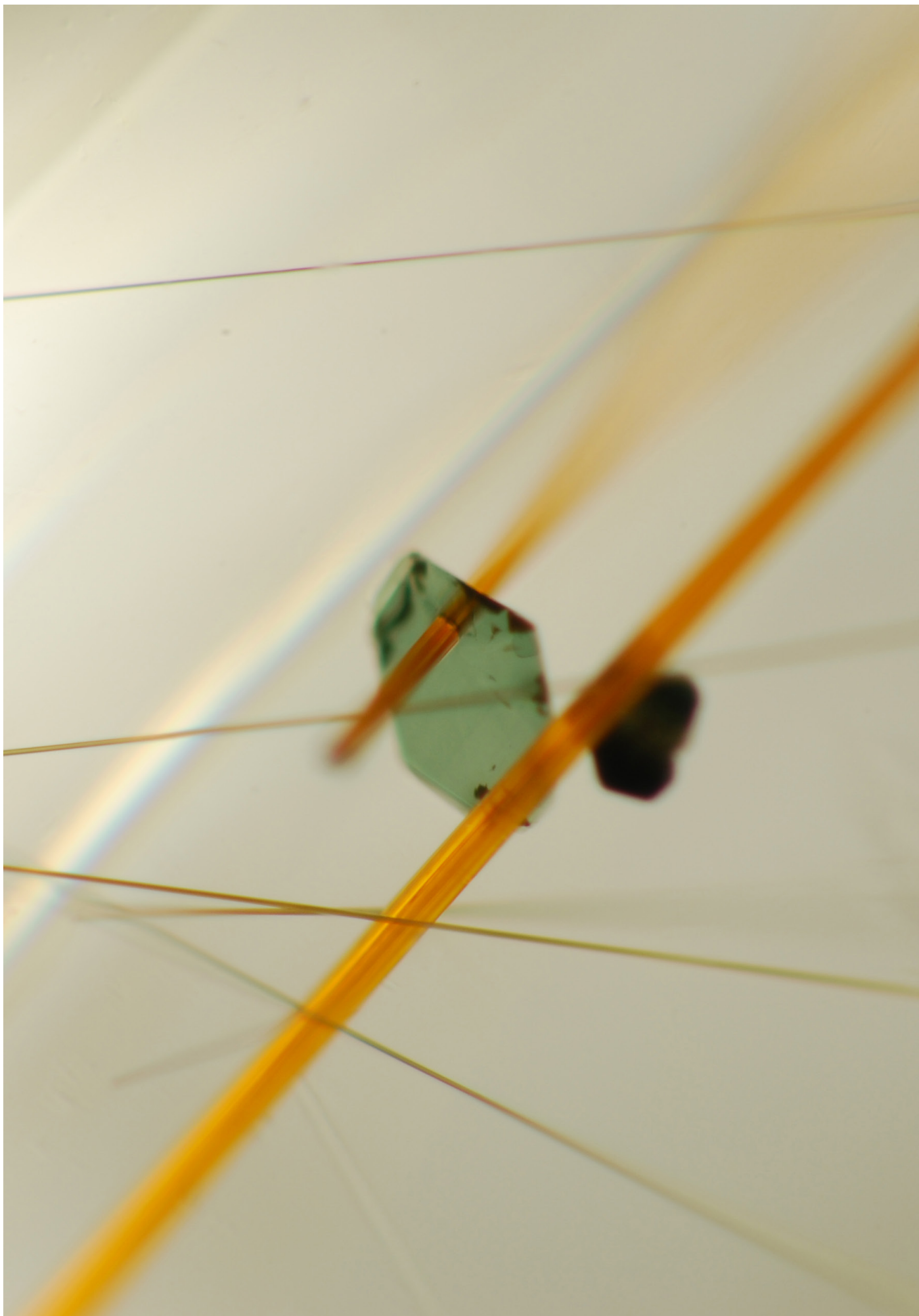
Platinum Flux Residue in Chatham Lab-created Sapphire (Photo by Conny Forsberg)



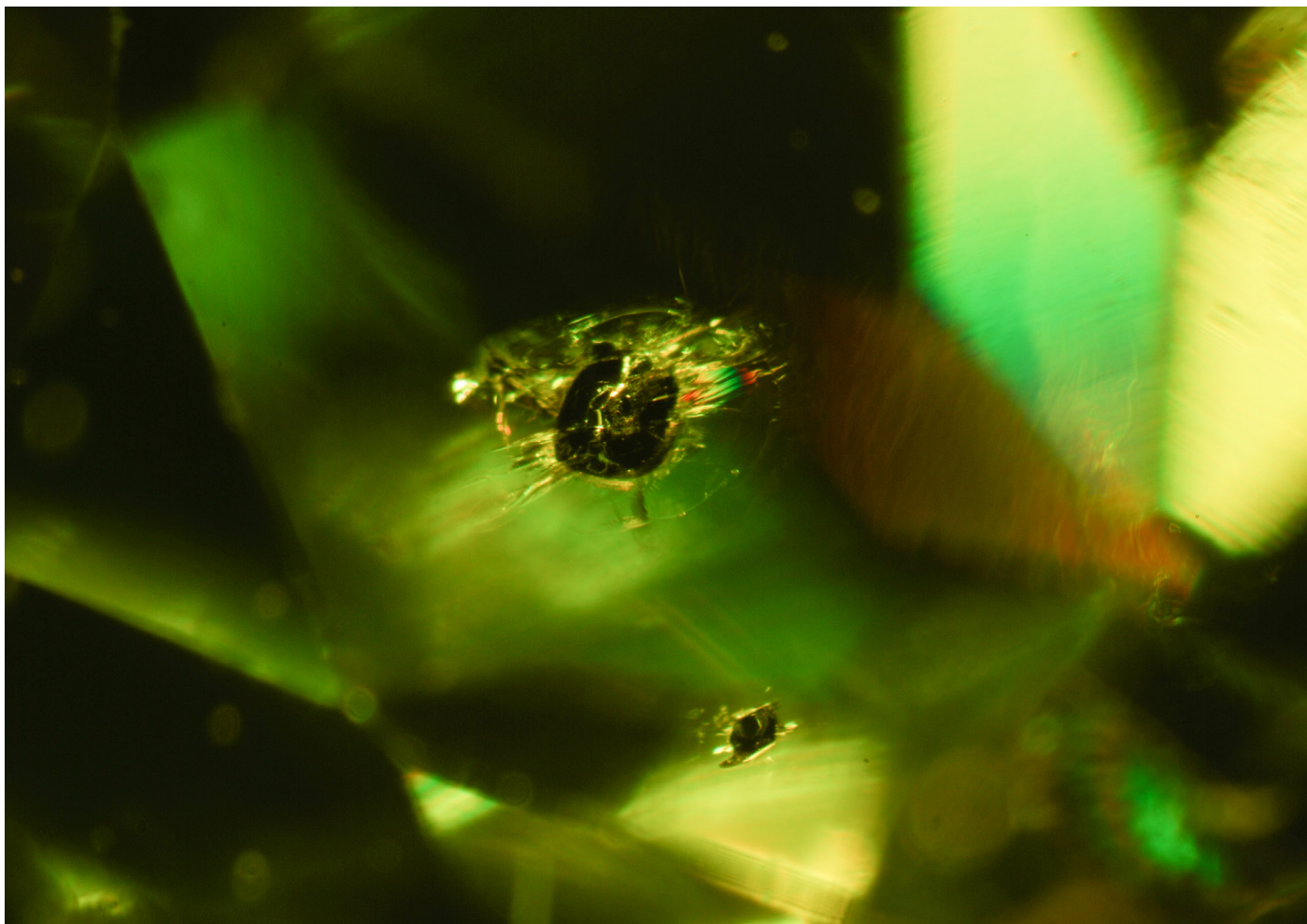
Spaghetti in Quartz (Photo by Conny Forsberg)



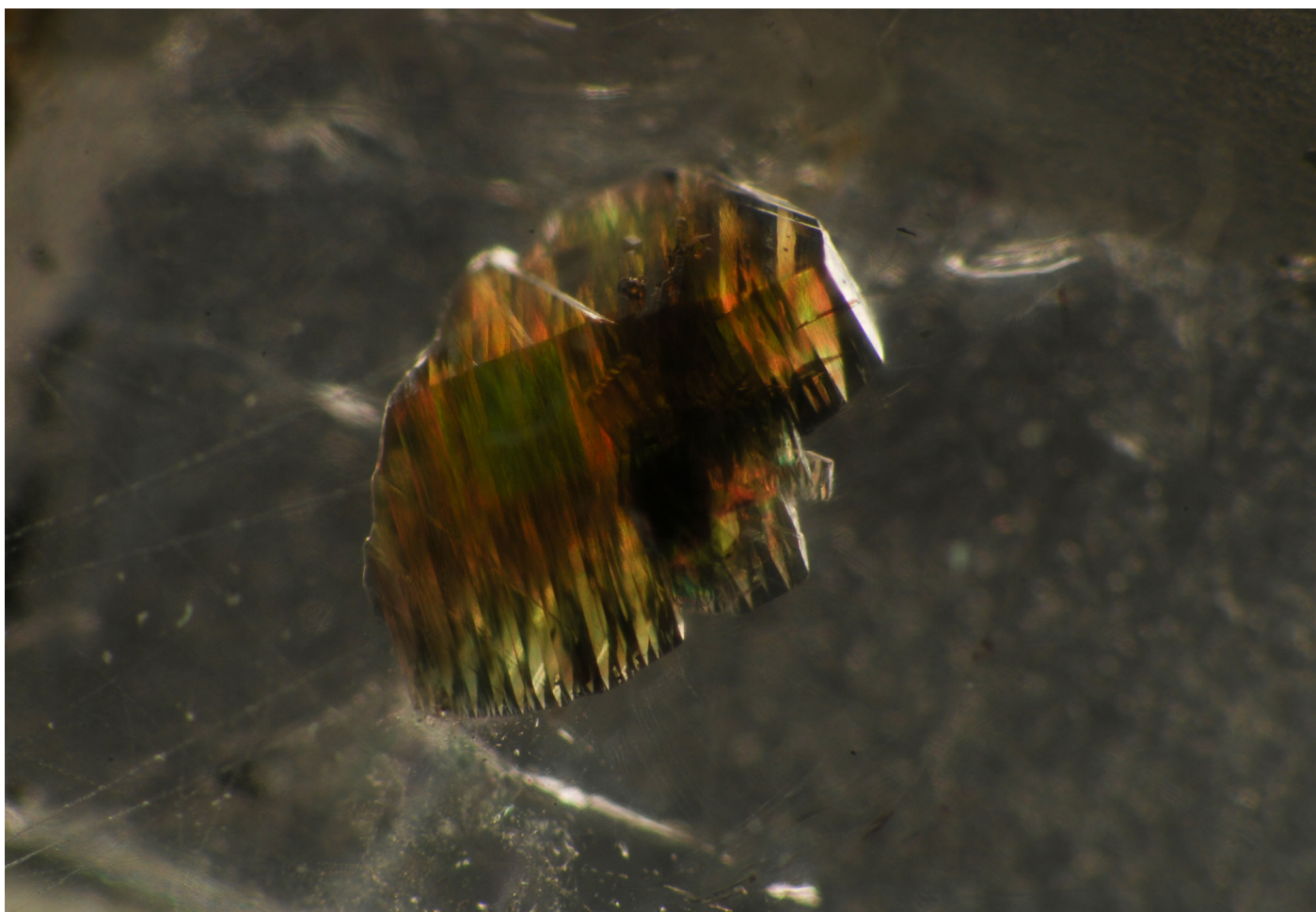
Blue Purple Shift Spinel (Vietnam) (Photo by Conny Forsberg)



Rutile and Chlorite in Quartz (Photo by Conny Forsberg)



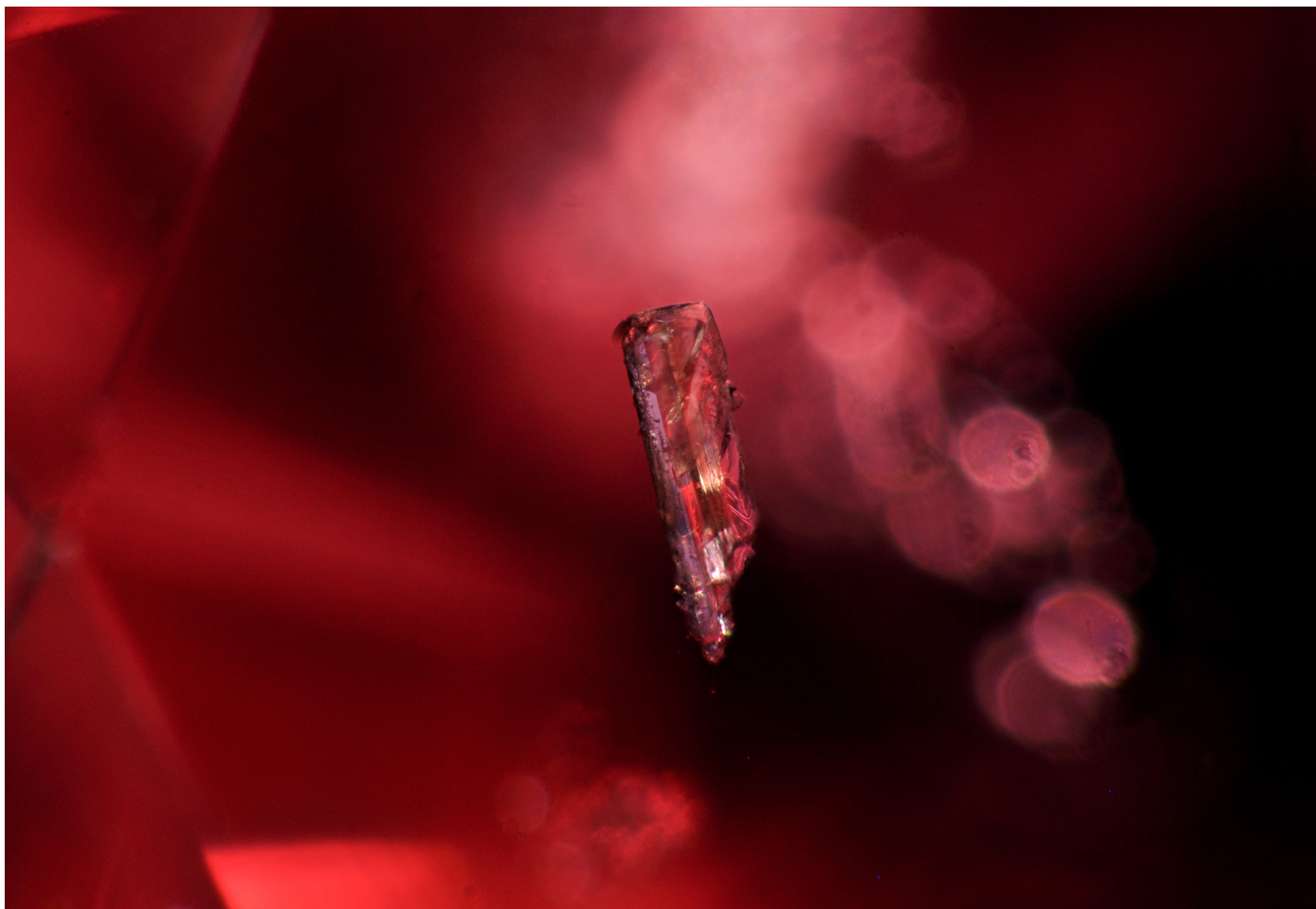
Chromite in Peridot (Pakistan) (Photo by Conny Forsberg)



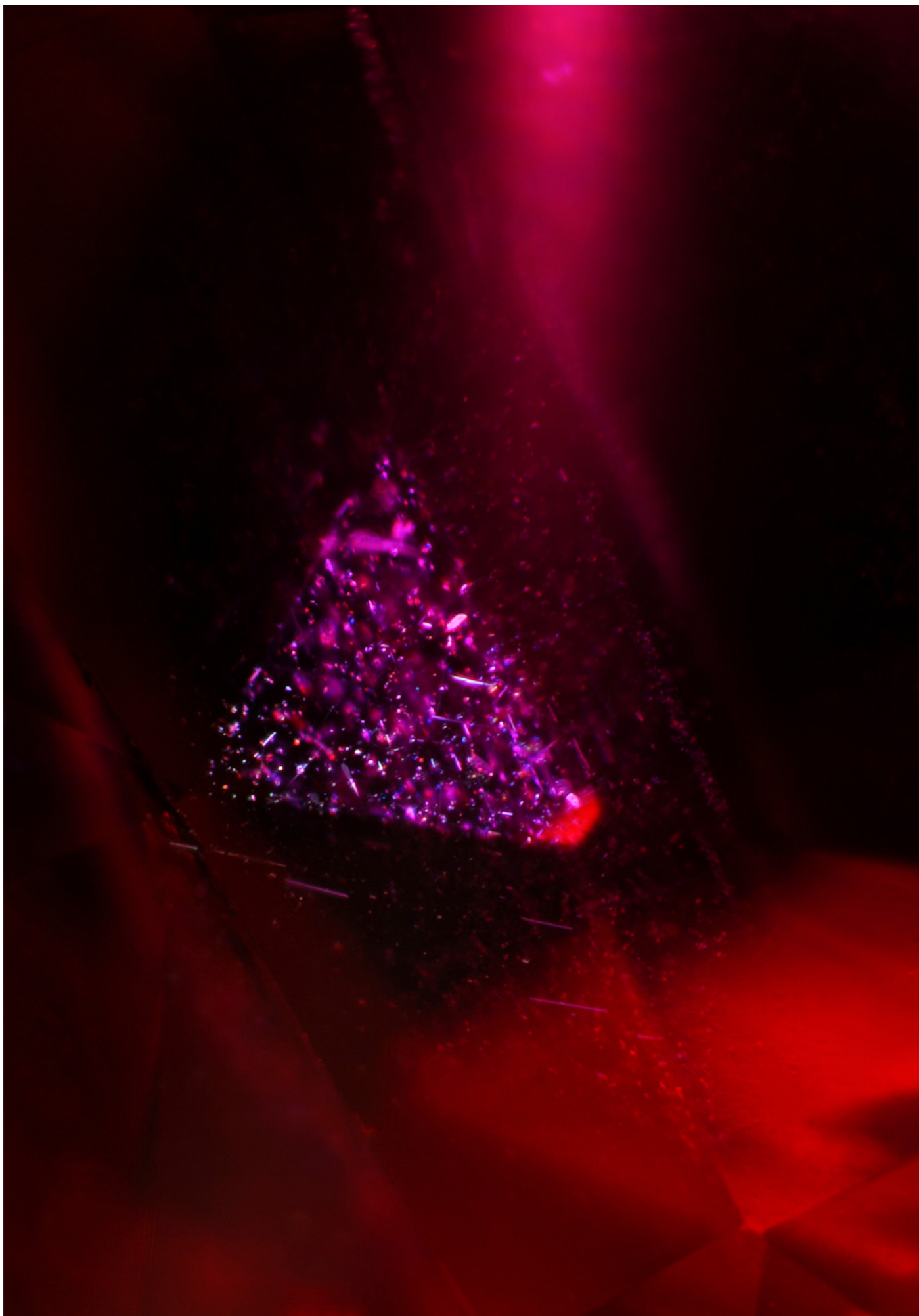
Crystal Inclusion in Topaz (Brazil) (Photo by Conny Forsberg)



Iridescence in Fracture in Emerald (Panjshir Valley, Afghanistan) (Photo by Conny Forsberg)



Euhedral Crystal Spinel (Vietnam) (Photo by Conny Forsberg)



Triangular Rutile Cloud in Ruby (Tanzania) (Photo by Conny Forsberg)



Is Bigger BETTER?



Figure 1 - 8.6 gram rough Tsavorite Garnet

This article looks at the complexities of pricing an item, in this case an 18.02 carat tsavorite garnet, when there are no readily available comparables. While it is true that everything has a price, how do we determine it and more importantly support and justify it to others?

Having been involved in the valuation of gemstones and jewellery both as a private consultant, at auction houses and on the Canadian Antiques Roadshow for twenty-six years, this particular study brought back memories.

For me, the limitations placed on an appraiser and the unreal expectations of the clients far outweighed the pleasure of appraising. You could go from 'hero' to 'villain' in a heartbeat and were often at 'odds' with older appraisals that were prepared by people who were ill equipped or qualified to prepare them.

Trying to assign a value is never easy. Sometimes it is near impossible especially in the case of unique and one-of-a-kind items. I once worked for a large jeweller in Canada that also had a jewellery-manufacturing division and I remember visiting them and being told that the 'pricing information' was confidential. I asked the manager how I was supposed to appraise 'their jewellery' if they were not prepared to divulge their manufacturing costs. He simply shrugged his shoulders.

I always strived to arrive at a value that I could at least justify in my own mind or in a court of law. A client may not agree with my logic but if I could explain the rationale behind the value, I felt happy.

Recently I was asked to help a friend and colleague who is currently mining tsavorite garnets in Kenya. He wanted my assistance not only in finding an experienced cutter for the finer pieces but also how he could price and market them in Europe. Having spent many years cutting and wholesaling gemstones, I readily agreed to help.

When he delivered the initial three pieces of rough, I was struck by how intense the colours were, how well formed the crystals were and how clean the material was. My attention was immediately drawn to the largest piece weighing 8.6 grams (Figure 1).

I contacted David Papaux, a friend and accomplished faceter to see if he would like to cut the stones. He was delighted to help and seemed to relish the challenge. Cutting gemstones is never easy and can be especially stressful when you are working with somebody else's stones. Mistakes can be costly and like appraising, the possibility of going from 'hero' to 'villain' is even more likely. It is certainly not for the faint of heart.

Over the course of two weeks, the finished stones appeared, weighing in at 3.36 carats, 4.92 carats and 18.02 carats.

What was interesting about the three tsavorite garnets was the three different grades (AA, A and B) they received from IGE in Madrid. Having all come from the same locality, this meant that if a cut 18.02 carat B quality stone was possible, under the right geological conditions, an 18.02 carat AA quality tsavorite might also be found at some point. This would push the value into the stratosphere and make the mining consortium very, very happy.

Yes the 18.02 carat tsavorite was dark but how would you price such a stone?

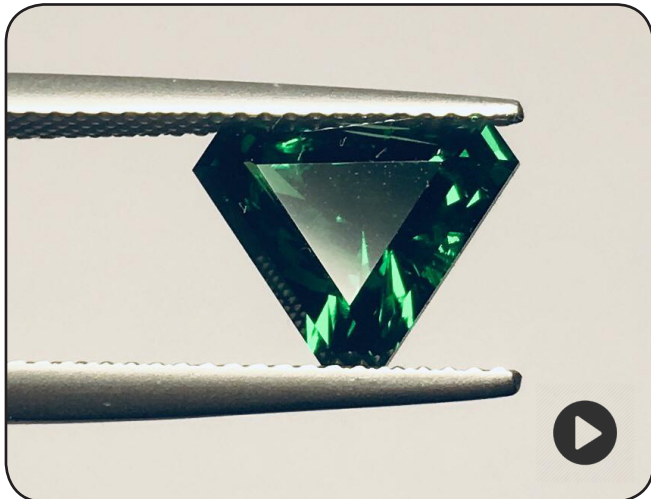


Figure 2 - 3.36 carat AA Tavorite Garnet (Video)



Figure 3 - 18.02 carat B Tavorite Garnet (Video)

I decided to enlist the help of six people, both here in Europe and in the U.S to see how they would approach the valuation of such a stone.

While their opinions varied substantially it is important to emphasize that no one was right and no one was wrong. Prior to contacting them, I had done an exhaustive search of the Internet and did not find one tavorite garnet that was even close to the one in my possession so the question became 'How do you assign a value?'

Michael D. Cowing was adamant that 'like real estate where location is of prime importance, colour and not rarity should be the only determining factor'. Because the resulting stone was a very dark green, he placed a value of less than \$ 10,000 USD.

Marian Jaén, an appraiser based in Madrid commented 'In my opinion, this tavorite needs more intense colour, it is too dark'.

While she did not commit to a price, she did explain her rationale. 'Regarding the prices of stones that exceed the

established price tables, as an appraiser, I must find the most adjusted price to the market, that is, when I do not have a price due to the large size of the stone, I always turn to my wholesale friends and I also draw on auction prices of similar stones in the auctions. With all these prices that I have at my disposal, then I use common sense to arrive at a price.' Since the 18.02 carat tavorite exceeded the weight categories stated in GemGuide, Marian added 'Regarding the price jumps in the different tables where prices are published, in my opinion, I believe that these prices are marked to unify sizes and prices. If a stone falls between the intermediate sections by size, I again use common sense taking into account other characteristics of the stone to increase or decrease the value'.

Craig Lynch commented 'although I only have photos and a video to go on, here are my thoughts. Any tavorite garnet above 5 carats is scarce and above 10 carats rare. Fine quality tavorite garnets are only found in East Africa, and this particular tavorite is very clean! That being said, large dark rough although rare, is not nearly as rare as the large lighter and brighter hues. Typically this dark material is cut into stones that range in size from one to two carats instead of a larger overly dark stone. I would value it at the market typical for smaller sizes (1.00 to 2.00 carat). I would expect those to be lighter and brighter because of the shorter light path and to be graded in the good to lower fine range of the price guide. I would probably value this stone (hypothetically) at \$500 USD to \$ 1,000 USD a carat wholesale.

Bill Korst wrote 'without a client stated 'Intended Use' driving an agreed upon scope of work including a defined market we can simply look at 'Market Value' for either the most typical market or multi-valuation for various markets.

The very dark tone presents issues as you've noted. My initial thought is that the 'Collector's Market' may very well be the most typical market for this tavorite. Regardless of the market though, for this material most likely selling in the 5-figure range, actual completed transactions of comparables will most decidedly involve astute, knowledgeable buyers, which is a component of 'Market Value' anyway.

Your statement 'of course, any item is only worth what someone is prepared to pay for it' is very true and goes to the heart of valuation, as value/worth is what buyers typically pay in a defined market for comparables. It is not what a valuer-appraiser thinks a market should do BUT what that market does. Price guides and price-lists may at times contribute to our professional opinions but in the end there is no substitute for market knowledge, research to that market knowledge, and wrapped up in proper basis. Taking a figure from a price-guide and trying to factor in for size and rarity is not the proper basis from a professional valuation standpoint.

As you've noted, there are no readily apparent 'comparables' that jump out but that is no obstacle as research would lead us to talk to players in a market, in this case sellers of goods with substantive elements of similarity. I've done a little research but would need to do more to move the needle from preliminary to a well-informed opinion'.

Jack Ghazalian wrote 'in terms of the stone, it has a dark tone and sometimes beauty outweighs rarity and size. When it comes down to this stone, it does not have the beauty and the typical vivid color, which is expected from a tsavorite.

Without seeing an item, it is impossible to value it based on the photograph and video, I would estimate a value of around \$5,500 USD per carat.

Richard Drucker of GemGuide responded 'In the GemGuide, price charts are shown for tsavorite garnets in qualities from very low commercial to upper extra fine and from .50 carat to 9.99 carats. The prices per carat for only the largest sizes are shown in the chart below (5.00 to 9.99 carats). The stone in question weighs 18.02 carats. This is unusually large for a tsavorite. A frequent question we get is regarding what happens to the gem prices per carat when gems of unusual size are encountered. For some gems, larger is not always better. The quartz family is a good example of this where very large gems in the hundreds of carats can easily be obtained in most varieties. Here, unless it is some very unusual gem specimen, the prices per carat will almost always be significantly lower as the size increases. After all, what can you do with a 200-carat smoky quartz?

With rare gems, and tsavorite is one of these, the price per carat will often increase as the size gets larger as long as it still has reasonable jewelry use. The exception to the 'jewelry use' rule would be a specimen that is so fine and large that its uniqueness earmarks it for some type of museum-like display or collector status without intent to create jewelry. It is then often more about ownership of rarity as the main pricing consideration. A handful of very large tsavorites above 100 carats are known and would certainly be considered as rare collector's gems, priced uniquely as such.

The price per carat does not always increase for all rare gems. Quality is still a determining factor. With tsavorite, in the fine and extra fine categories, there will be a significant premium from 'under 15 carats' and again another jump from '15 to under 20 carats'. However, for the commercial and

good categories, the prices per carat will remain close to the prices shown for the up to 9.99 carat category.

The tsavorite in question weighs 18.02 carats. While I have not examined the stone directly, photos were provided along with further information from Geoff Dominy upon his physical examination. Although it is attractive and unusual in size and appears to be well cut, this tsavorite is definitely dark in tone and has the appearance of green tourmaline. When a tsavorite is very dark and tourmaline-like in appearance, or conversely, very light and mint grossular in appearance, the final ranking per our GemGuide scale is likely to remain in the commercial to good range. My estimate for this gem without seeing it would be around \$1,500 USD per carat wholesale. Of course, the caveat here is that I have not viewed the stone for a final grade determination. I do not believe it would warrant above the 5 grade for \$2,000 USD per carat.

Another question that comes up often is the use of the quality terms in the GemGuide when a gem ends up in the 1-4 grade. For these grades, on the GemGuide scale, the quality ratings are very low commercial (1), lower commercial (2), middle commercial (3), and upper commercial (4). A concern is how to describe a gem such as this if the final grade was indeed between 4 and 5 (upper commercial to lower good). Is it fair to label such a rare gem of this size in this way? The issue is that we need a grading scale. A gem graded 9 or 10 is more expensive than a 4 or 5. Therefore, some users of the GemGuide may opt not to apply the verbiage associated with the grading scale but ultimately the grading scale is necessary for better pricing.

Conclusions

I have to say that when I was examining the rough and the finished stone, I really started to understand the mentality of those people engaged in the treatment of gemstones. Based on value, it is only natural that any person would seek to try and increase it by whatever means were available to them. Imagine if you could treat the 18.02 carat tsavorite and achieve the colour of the 3.36 carat stone? If it were possible, would you not at least try? If the resulting stone were stable and the treatment was irreversible, why not?

The problem of course is that you cannot treat tsavorite garnet and while it is an isotropic stone, meaning the cutter does not have to worry about how he orientates the stone to maximize the best colour, the fact is, whatever hand Mother Nature deals you, is the hand you must play. It is what it is.

| Garnet - Grossular - Tsavorite | | | | | | | | | | |
|--------------------------------|---------------|------------|-------------|------------|------------|------------|------------|------------|------------|-------------|
| | Commercial | | | | Good | | Fine | | Extra Fine | |
| | Very Low 1 | Lower 2 | Middle 3 | Upper 4 | Lower 5 | Upper 6 | Lower 7 | Upper 8 | Lower 9 | Upper 10 |
| 5.00 - 9.99 CT | 400 | 475 | 550 | 750 | 2000 | 2500 | 3000 | 3400 | 5500 | 8500 |

This of course brings up another observation. Should we not value stones that cannot be treated more than stones that can? If you find an AAA quality (Extra Fine) tsavorite garnet, should this not be considered on a completely different level to another stone of the same quality that can be treated? After all, the probability of Mother Nature producing an 'Extra Fine' quality ruby, blue sapphire, emerald or in this case a tsavorite garnet is extremely low. So why do we not make this more apparent in how we price them. To some, a heat-treated sapphire is no different than an untreated one but I disagree.

If I compare the current price list for tsavorite garnet in the 5.00 to 9.99 carat weight categories to those of January/February 2017 (GemGuide), we can see that while the price per carat for stones in the Commercial (1 to 4) and Lower Good (5) have remained the same, for the better qualities they have decreased (Upper Good 6 - 21.88%), (Lower Fine 7 - 25%), (Upper Fine 8 - 32%), (Lower Extra Fine 9 - 31.25%) and (Upper Extra Fine 10 - 15%). For a gemstone that comes from limited sources, cannot be treated and is considered rare in larger sizes, this is remarkable and perhaps indicates the lack of knowledge that exists in the market place all the way down the food chain to the eventual consumer.

So where do we stand with the 18.02 carat tsavorite? While there is a common consensus on the quality and the fact that in this size range, it is quite rare, there is a lack of consensus on the price with prices ranging from \$ 10,000 USD to \$ 99,000 USD for the stone. Again, I want to stress that no-one is right and no-one is wrong because in this case, we have nothing to compare it to.

I have to say that if I had encountered this stone while I was an appraiser, I would have had many sleepless nights because whatever value I assigned, there would always be somebody who would question it. Appraising is not an exact science, how can it be? There will always be 'grey' areas, where it is impossible to apply logic or rationale. For those of us with experience, we understand this. The problem is we seem to be in the minority.

Acknowledgements

I would like to thank Michael D. Cowing, Marian Jaén, Craig Lynch, Bill Korst, Jack Ghazalian and Richard Drucker for participating in this article and providing their unique perspectives especially without having the benefit of seeing the tsavorite garnet in person. I would also like David Papaux for cutting the stones and providing the photographs and videos and the owner for giving me permission to publish the findings.

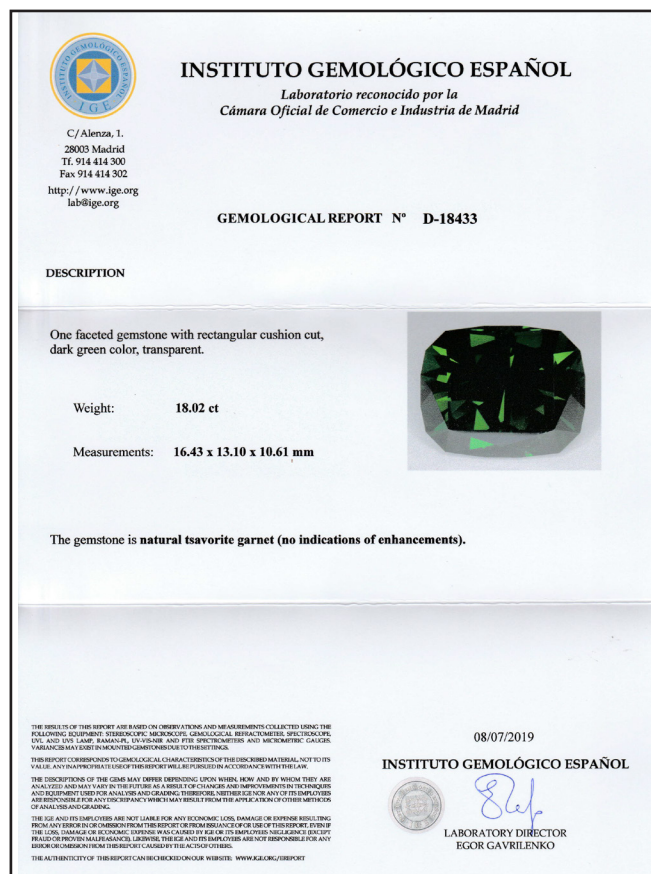


Figure 4 - IGE Madrid Certificate 18.02 carat

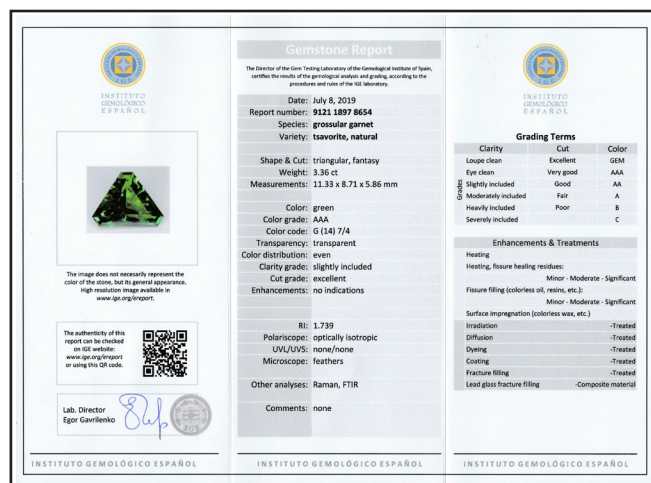
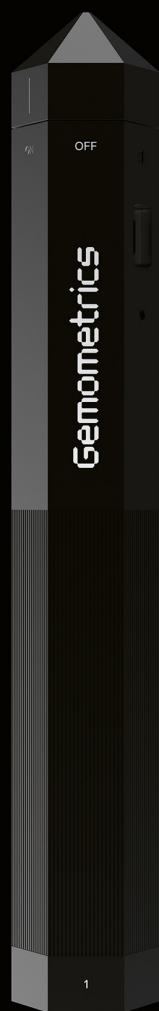


Figure 5 - IGE Madrid Certificate 3.36 carat

GemPen®

Gemometrics



A new portable tool for screening diamonds.
Detects synthetics (HPHT, CVD) and treatments.

Visit gemometrics.com to learn more about the features that make GemPen® stand out.

Scan the QR-code to visit the GemPen® Store.

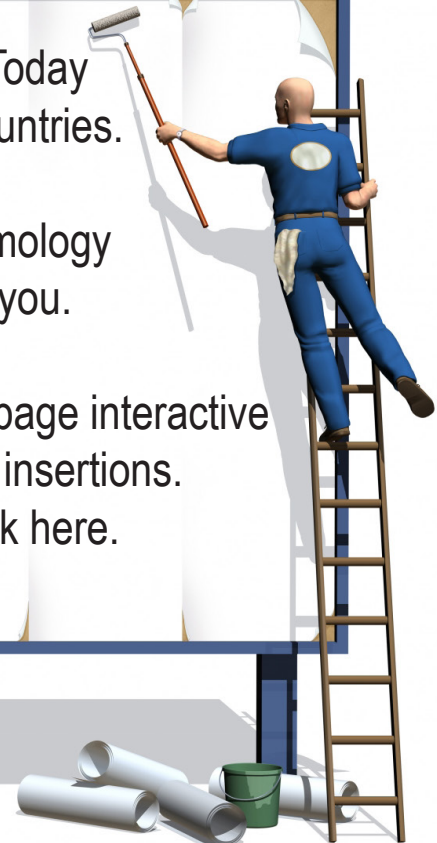


The eleventh issue of Gemmology Today reached over 20,000 readers in 50 countries.

If you would like to advertise in Gemmology Today, we would love to hear from you.

Prices start for as little as 100 € for a 1/6 page interactive ad with discounted rates for multiple insertions.

For more information, please click [here](#).



Praise for the 1st Edition:

"A masterpiece, a tour de force. My recommendation, buy this book."

— Canadian Jeweler & Orchid

"The second edition builds substantially on the first edition...breaks new ground in the discussion of blue-white diamonds and includes perhaps the most comprehensive and sensitive overview of the aesthetics of jade to be found in the English language."

— Benjamin Zucker



Secrets of the Gem Trade:

The Connoisseur's Guide to Precious Gemstones

Second Edition

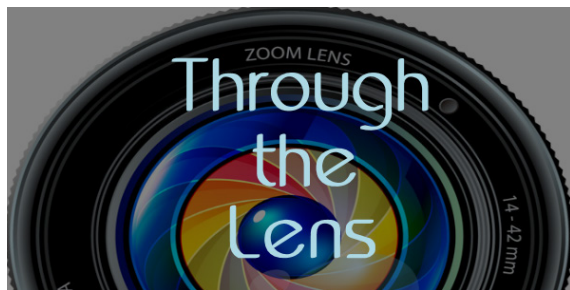
Completely Revised.

11 New Chapters.

5 New Introductory Essays.

277 Photographs.

www.secretsofthegemtrade.com



The real 'explosion' of interest in minerals actually took place from the age of 10 when, with the family, we began to frequent the island of Elba.

Meet Antonio Miglioli



Antonio Miglioli doing what he loves best!

GT: Who is Antonio Miglioli? Tell us about your background?

AM: My name is Mario Antonio Miglioli (Antonio for friends and acquaintances). I was born in Sassuolo, in the province of Modena, Italy. I obtained a degree in electronics at the end of the 70's, then I started working in the paternal company where molds were produced for ceramic industries. I started from work in the workshop and then I reached the role of manager of the technical and planning office and finally as head of the development and research office. I am a person literally fascinated by all aspects of nature in the broadest sense of the term. What characterizes me is a marked cultural and intellectual curiosity that led me to investigate very different subjects such as cosmology, astronomy, quantum physics. My 'myth' is Albert Einstein. With the due caution of the case I think to share with him the amazement towards nature and the world around us (unfortunately only this), a characteristic that fortunately I still maintain despite the age and that makes life much more stimulating and full

of enthusiasm and planning. The most engaging passion, which I have cultivated for a lifetime, certainly remains that which concerns the mineral world. I remember that at the age of 8, I was intrigued and fascinated by everything that 'shone'. I collected with passion the gypsum, calcite and pyrite crystals, which were quite common in the abundant clays in our hills, starting to catalog them and observe them with my first microscope. The real 'explosion' of interest in minerals actually took place from the age of 10 when, with the family, we began to frequent the island of Elba. At that time all the mines of the island were active and the number of samples of the highest mineralogical level of pyrite and hematite were omnipresent at very reasonable and reasonable costs. I remember samples I bought, with the help of my parents, at the barber shop in Rio nell'Elba or from a petrol station in Cavo. I also remember that at the Portoferraio market there was a counter selling minerals where I bought a beautiful specimen of tourmaline, now practically impossible to find.

In the summer school period I have always worked and of course all the salaries were used by me in the purchase of minerals, some of which were excellent and I still have in the collection today. As the mineralogical passion progressed, I refined my taste in the choice of pieces. I prefer medium-small sized samples, including the samples called 'thumbnail', particularly appreciated in the North American market. My idea of the ideal piece leads me to acquire samples with a certain difficulty, considering my propensity to choose perfect specimens such as matrix-crystal proportions and quality of the crystals themselves. I own a high-level collection with around 350 selected pieces from all over the world.

GT: When did you first develop a passion for mineral photography? Was there a defining moment that got you started?

AM: Even at an early age I liked to design crystals, it had become an activity daily and still I preserve these early designs that I made directly on the pages of the mineralogy books I bought in those years. I was particularly well-suited to artistic subjects (propensity

inherited from parents) and my transition to mineralogical photography was an inevitable and natural stage. I started photographing minerals about 35 years ago. Then I used a Nikon FM mechanical camera combined with a 55mm macro Nikkor lens, which still today is an almost unsurpassed set in terms of quality and image and color definition. Naturally I used chemical films and slides, obtaining good results in terms of sharpness and general harmony in the reproduction of minerals.

GT: You told us that you are not a professional photographer. How do you account then for the wonderful photos? Is it a natural talent or was it acquired through study?

AM: I am not a professional photographer but the number of shots I have made in my life I believe can be quantitatively compared to those of a professional photographer. Many of my photos are considered 'artistic' though they are completely original and not elaborated with photo editing filters like Photoshop. As I said before, perhaps my artistic aptitudes (I made a hundred paintings with colored crayons on excellent black paper) naturally lead me to make shots that, combined with particular lighting techniques, allow to obtain quite personal and peculiar final results. I prefer very sharp photos with crystals and samples perfectly in focus in all their parts, which can often remember 3D images. To obtain this result almost all the photos are obtained with the 'stacking' technique, which consists of joining several shots of the same sample with different areas in focus to have the final image in perfect focus. For backgrounds, almost always black, I use both the real background and the digitally created background after optimally cutting out the silhouette of the sample. For lighting use high-level LED lights with color temperatures similar to sunlight. I prefer the use of many light points of fairly limited intensity (at least 6) in order to obtain, depending on the sample, controlled reflections on the faces of the crystal that I consider fundamental to give three-dimensionality to the photo.

GT: Is there one mineral shot on your 'bucket list' that you would love to capture on film?

AM: For an advanced collector and photographer like me, the possibility of photographing high-level specimens from well-known collectors is certainly a much appreciated opportunity. Until now the best specimens I have photographed are surely the tourmalines of the island of Elba by Federico Pezzotta, which should be published within the year in Mineralogical Record. The list of minerals that I would like to photograph could be really long. Some of these are certainly the splendid Colorado rhodochrosites (Sweet Home Mines, Park county, Colorado), the beautiful green Garnets in the demantoid variety of Madagascar, the pink fluorites of alpine origin and the best specimens of crystallized gold from the Roraima Shield District, Bolivar, Venezuela.

GT: What is the one most memorable mineral you have photographed and why?

AM: Until now I have had the pleasure of creating at least 15 mineralogical articles on some of the most famous mineralogical magazines in the world (Mineralogical Record, Italian Mineralogical Magazine, Lapis, Le Regne Mineral, Mineral Up), as well as having photographed a hundred samples for articles by other authors. The most important samples I have photographed are surely the tourmalines of the Isle of Elba of Federico Pezzotta that will be published in an article on Mineralogical Record within the year. These are fairly small samples but of great historical, mineralogical and commercial value. These tourmalines are truly a world-class classic, present in the most famous museums in the world starting from the end of the 1800's when these deposits were intensively exploited on a professional level.

GT: While you specialise in minerals, is there any desire to branch into gemstone photography? Are they equally challenging or do you feel one is more difficult to photograph than the other?

AM: My passion for the world of minerals led me naturally to mineralogical photography. Although I greatly appreciate the world of gemology and obviously recognizing the close relationship between natural crystals and precious stones, I must say that I have missed the opportunity to make gemological photos. My insatiable curiosity would surely have pushed me, if there had been the opportunity or the request, to take photos in this charming camp. As for my opinion on which type of photo is more challenging, even with the premise that I have never taken gemological photos, I believe that mineralogical photography is more complex and delicate. This is my opinion supported by the many variables concerning mineralogical photos. These can be: extremely variable sample size, number of crystals present on a sample, matching and chromatic differentiation between crystals of the same sample, brightness and different reflectivity on crystals present on the same sample, frequent coexistence of crystals with metallic reflection and transparent crystals with a glassy consistency, different types of gloss on the crystals of the same sample.

Another important and fundamental variable is the positioning of the sample with respect to the camera. In this choice it is fundamental an innate taste of the framing and a good mineralogical culture to identify the crystallographic characteristics or of mineralogical interest.

The gemological photo, although not simple, has fewer variables to manage and probably allows to obtain good results in a shorter time compared to mineralogical photography.

GT: There are pros and cons to everything but in the age of digital photography, do you feel that a majority of photographers rely too heavily on software such as Photoshop? Is there a downside to this technology?

AM: This is a very delicate and debated issue. I believe that almost all professionals in the field of mineralogical photography use photo-editing programs. Naturally I find it absolutely correct as long as the interventions are really minimal and non-invasive. A well-crafted photo represents a result that can already be proposed when printing or viewing on the Web, but a well-made and content retouching is acceptable and can only improve a job that is already good at shooting. Personally, the only touch-up I prefer is an increase in sharpness of the photo and a possible balancing of the areas with different brightness. An exaggerated photoshopped photo is immediately categorized and recognizable as such, often with saturations of colors that are too accentuated and unnatural. On the contrary, a well-managed photo during photo editing is natural and completely credible. Particular care must be devoted to the white balance in order to avoid unpleasant and unnatural color dominants.

GT: Is there still a place for analog film in the world of gem and mineral photography?

AM: I believe that digital camera technology has reached such a level that it does not feel the need to resort to the use of chemical negatives or slides. Even the problem of color nuances that were not perfectly described with digital machines (in particular green and blue colors) is now practically obsolete for the use of high-level digital sensors. I myself took photos of samples photographed with a chemical negative a long time ago with the current digital camera but the quality of the two photos is identical. For particularly important photos, even the use of high-level software allows the photographer to perfectly reproduce the nuance of the crystal. Naturally this intervention must have the purpose of reproducing exactly the nuance without altering its saturation.

GT: Guitarists are always asked about the equipment they use and the ones they most prefer. What is your camera of choice and why?

AM: Naturally, advanced mineralogical photography cannot ignore the use of reflex cameras and high-level lenses. I speak of course of digital cameras that today have reached levels of performance really unimaginable until a few years ago. My technical equipment includes a Canon Aps Eos 70D camera and its EF-S 60mm 1: 2.8 USM macro lens and a Nikon full frame D810 camera with AF-S micro nikkor 105mm 1: 2.8G ED lens. As far as the Nikon camera is a professional full frame I almost always use the Canon 70D. A larger sensor does not always give a better picture than smaller sensors such as the Canon cameras I use. In fact,

in terms of sharpness the best pictures are taken with the Canon I use almost exclusively. Recently I bought a Canon MP-E 65mm macro lens of excellent quality that allows you to get photos of crystals with a minimum size of 3mm, a dimension below which you need micro equipment that I currently don't have.

GT: If we were sitting here a year from now celebrating what a great year it's been for Antonio Miglioli professionally, what would you say was the reason?

AM: Naturally I hope that the question can turn into a real situation lived in the coming year. In fact, in the next few months, three important articles should come out which are certainly the most important among those realized so far. If this really happened, I think that the reason can be first of all my remarkable photographic experience in the mineralogical field, surely accentuated and enhanced by the extreme passion that binds me to the world of crystals. This creates in me a very strong desire to continuously improve and search for new shooting and lighting solutions. Probably a professional photographer does not live this situation having a more professional and less enthusiastic relationship with his work. I believe that my great interest can be seen in my photos and my artistic inclination probably leads me in a natural way to create peculiar and fortunately much appreciated shots. However, I remain a fairly reserved person who does not aim to fame as certain positive feedback makes me very happy. I simply hope that my photos are appreciated and can stimulate the greatest number of people to take an interest in and deepen that splendid subject that is mineralogy at the collecting and scientific level.

More Information on Antonio

Antonio has been running a Facebook page for the last five years where he deals with and proposes topics related to mineralogy. He also shares videos and photos.

You can connect with him through FB at:

<https://www.facebook.com/profile.php?id=100008729269220&sk=photos>

He also has videos on YouTube:

<https://www.youtube.com/channel/UCJw6TApBNpIQqO0FFDy60ag>

There are currently 120 videos to watch!

Additional Image Information

- | | |
|---|---|
| 1. Antonio Miglioli Collection Dimensions 28cm. | 12. Antonio Miglioli Collection Dimensions 18mm |
| 2. Giuseppe Agozzino Collection Dimensions 60mm | 13. Marco Pellecchia Collection Dimensions 14mm |
| 3. Antonio Miglioli Collection Dimensions 12mm | 14. Giuseppe Agozzino Collection Dimensions 25mm |
| 4. Giuseppe Agozzino Collection Dimensions 28mm | 15. Marco Clerici Collection Crystal Dimension 30mm |
| 5. Giuseppe Agozzino Collection Dimensions 20mm | 16. Marco Clerici Collection Total Dimensions 100mm |
| 6. Antonio Miglioli Collection Dimensions 20mm | 17. Antonio Miglioli Collection Dimensions 35mm |
| 7. Antonio Miglioli Collection Dimensions 22mm | 18. Alberto Ancillotti Collection Dimensions 170mm |
| 8. Antonio Miglioli Collection Crystals of 7mm | 19. Marco Clerici Collection Crystal 20mm |
| 9. Antonio Miglioli Collection Dimensions 70mm | 20. Antonio Miglioli Collection Dimensions 35mm |
| 10. Marco Clerici Collection Dimensions 80mm | 21. Antonio Miglioli Collection Dimensions 12mm |
| 11. Marco Pellecchia Collection Dimensions 7mm | 22. Antonio Miglioli Collection Dimensions 28mm |



1. Stalactitic brown Calcedony on fossil coral (Florida USA) (Photo by Antonio Miglioli)



2. Brown Vesuvianite with Grossular Garnet & Diopside (Aosta Valley, Italy) (Photo by Antonio Miglioli)



3. Fluorite Crystal on Barite (Berbes, Asturias, Spain) (Photo by Antonio Miglioli)



4. Grossular Garnet (Hessonite Variety) (Bellecombe, Aosta Valley, Italy) (Photo by Antonio Miglioli)



5. Pseudopristine Grossular Garnet Crystal (Bellecombe, Aosta Valley, Italy) (Photo by Antonio Miglioli)



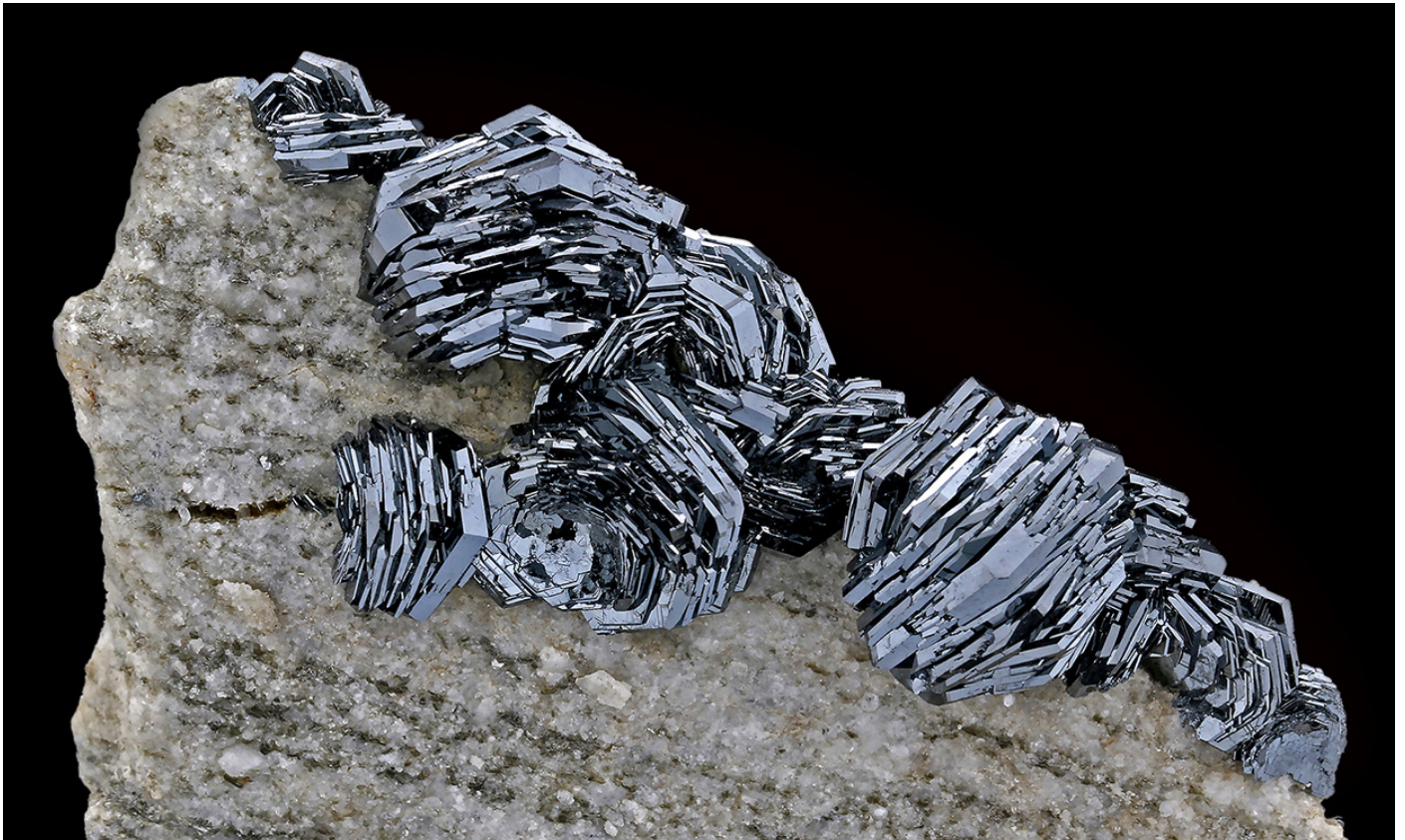
6. Grossular Garnet with Clinoclone (Jeffrey Mine, Asbestos, Quebec, Canada) (Photo by Antonio Miglioli)



7. Vesuvianite with Grossular Garnet and Clinoclone (Bellecombe, Aosta Valley, Italy) (Photo by Antonio Miglioli)



8. Diopside Crystals on Calcite (Tsumeb, S.W. Africa) (Photo by Antonio Miglioli)



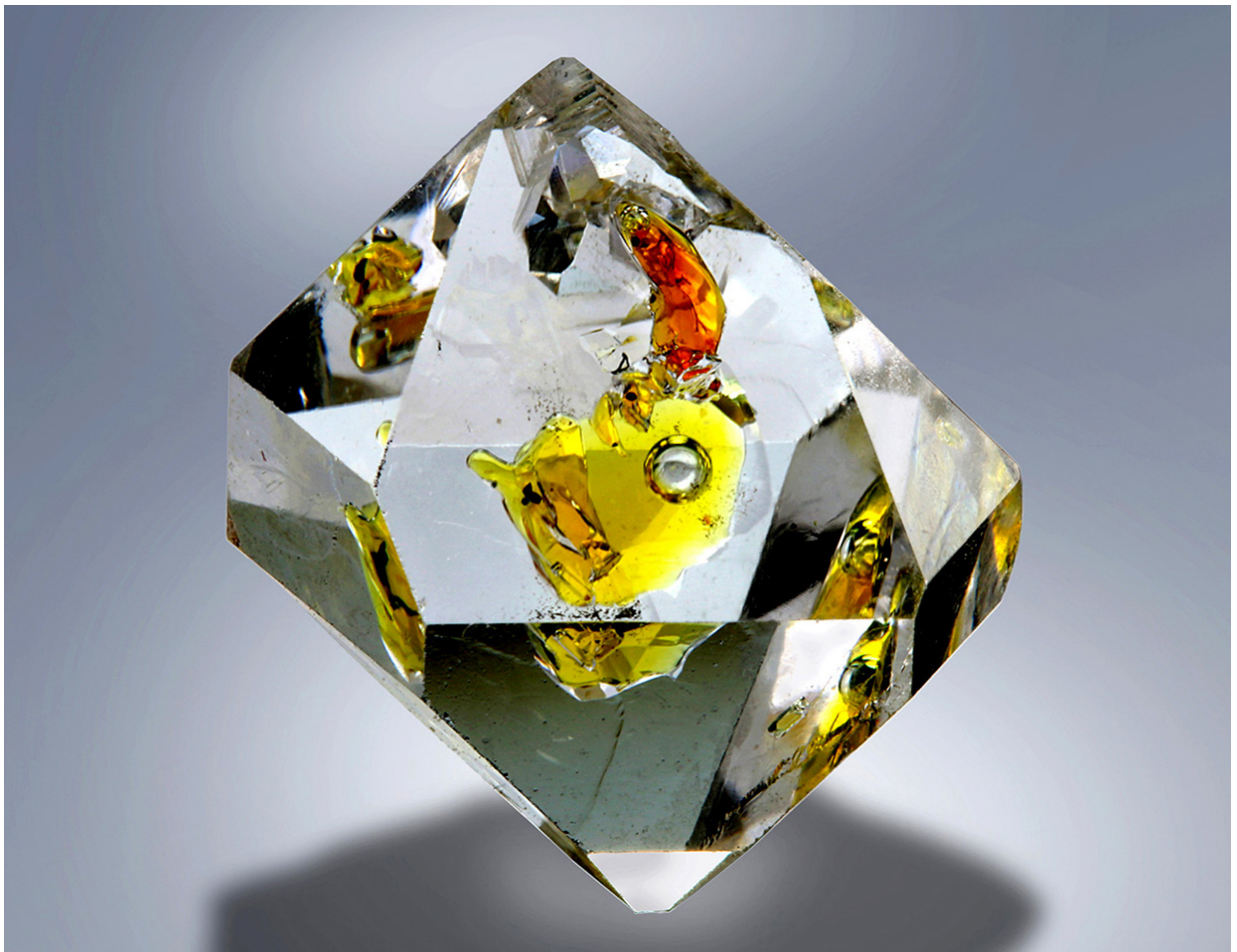
9. Hematite Crystals on Gneiss (Cervandone Mountain, Devero Valley, Piedmont, Italy) (Photo by Antonio Miglioli)



10. Vesuvianite on Grossular Garnet (Laietto, Susa Valley, Piedmont, Italy) (Photo by Antonio Miglioli)



11. Sphalerite with Colusite in Epitactic Growth (Torano, Carrara, Tuscany, Italy) (Photo by Antonio Miglioli)



12. Quartz Crystal with Petroleum Included and Methane Bubble (Waziristan, Pakistan) (Photo by Antonio Miglioli)



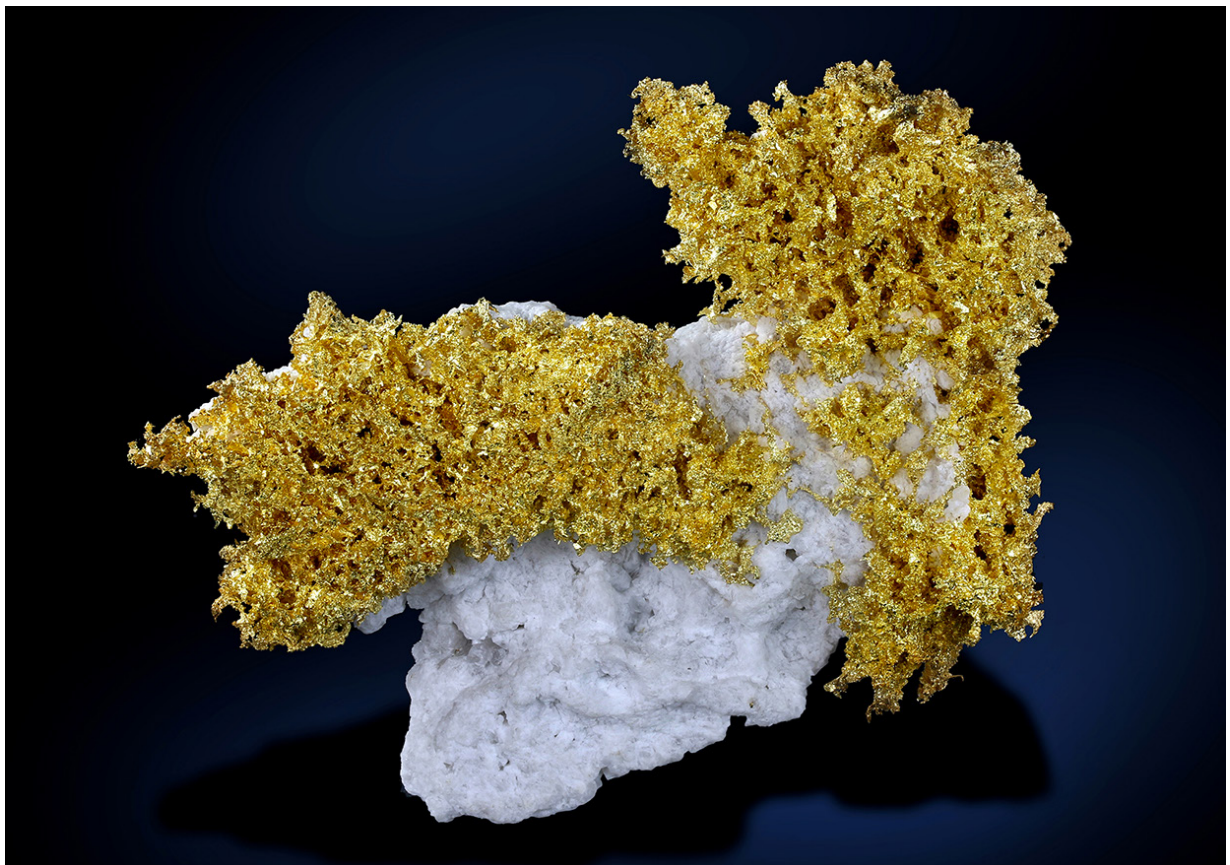
13. Wurtzite Crystals on Calcite (Carrara, Tuscany, Italy) (Photo by Antonio Miglioli)



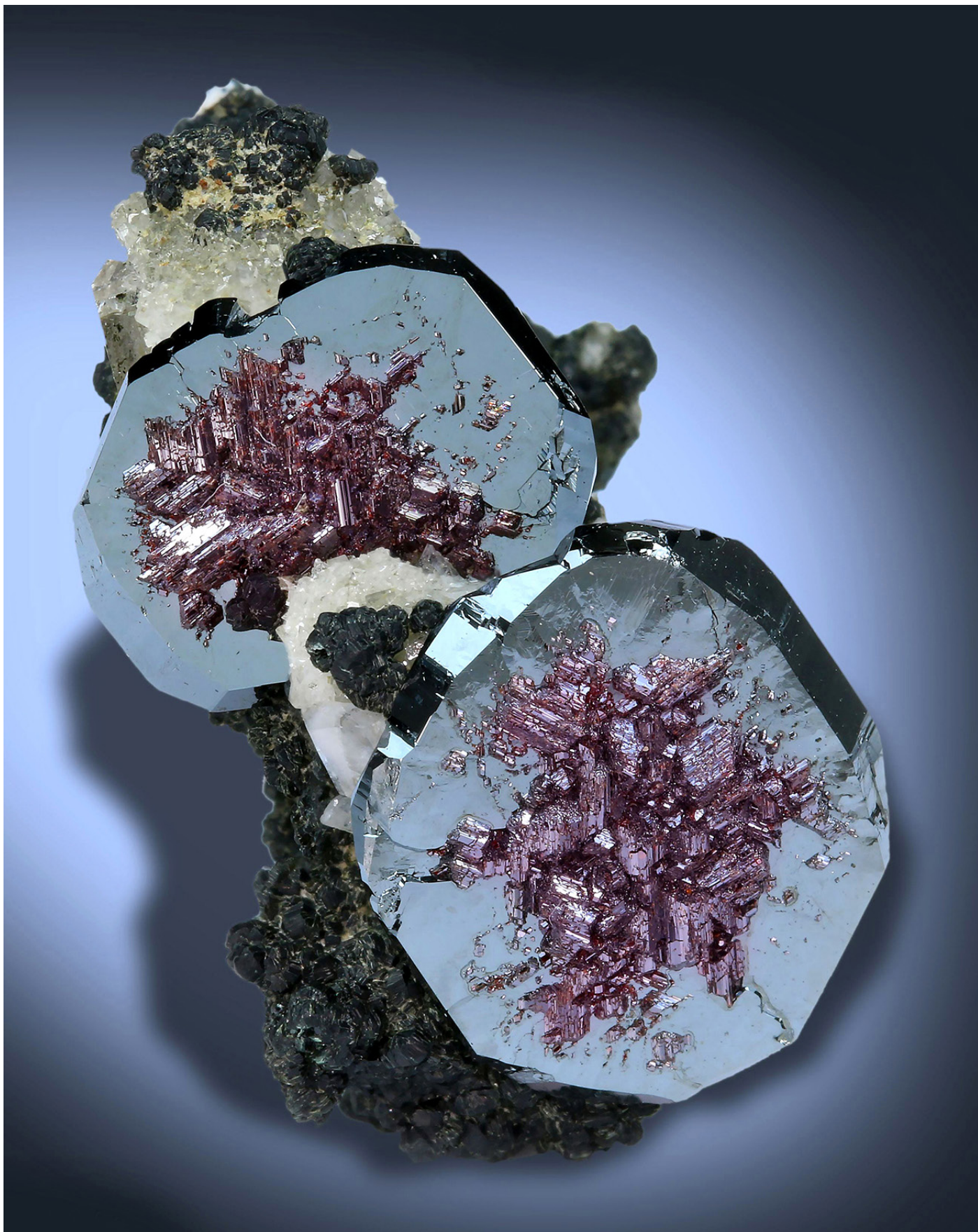
14. Policro Vesubianite (Bellecombe, Aosta Valley, Italy) (Photo by Antonio Miglioli)



15. Demantoid Garnet on Asbestos Fibers (Campo Frasca, Malenco Valley, Lombardia, Italy) (Photo by Antonio Miglioli)



16. Gold on Quartz (Brusson, Aosta Valley, Italy) (Photo by Antonio Miglioli)



17. Hematite Crystals with Epitactic Rutile (Devero Valley, Piedmont, Italy) (Photo by Antonio Miglioli)



18. Quartz Crystals with Scepters (Fenice Capanne, Grosseto, Tuscany, Italy) (Photo by Antonio Miglioli)



19. Grossular Garnet with Diopside (Alpe Alle Frasse, Susa Valley, Piedmont, Italy) (Photo by Antonio Miglioli)



20. Hoppered Quartz Crystal incorporated in a Root (Emilia Romagna, Italy) (Photo by Antonio Miglioli)



21. Perfect Fluorite Crystal with Baryte Inclusion (Berbes, Asturias, Spain) (Photo by Antonio Miglioli)



22. Corundum Crystal (Sapphire Variety) (Sri Lanka) (Photo by Antonio Miglioli)

There is a general misconception that garnets do not fluoresce. In this issue Kirk Feral dispels that myth and sets the record straight. But why do they fluoresce? That's where the story begins.....

Fluorescent Garnets

Do garnets fluoresce? A common assumption in gemology is that garnet gems can't fluoresce under UV light because they contain too much iron, and that's certainly true of red garnets. Published documentation of garnet fluorescence is quite sparse, and according to most resources and glossaries of gemstones, all garnet species are inert to ultraviolet light except for grossular garnets. But such information is inaccurate and remarkably incomplete. There's much more to the story.

Garnet is a large gem group that's extremely diverse and full of surprises. After examining hundreds of gem garnets among 20 varieties and 6 species (distinguished by differences in measured chemical composition as well as color), I found that fluorescence occurs to some degree in 11 varieties across 3 species!

That's right, half of all gem garnet species and varieties can fluoresce. This phenomenon is mostly restricted to garnets that are light in color and low in iron, and fluorescence is often bright enough to be viewed in a well-lighted room with no need for darkness. The colors of fluorescence are often astonishingly beautiful, and can also serve as aids to gem identification.

To detect fluorescence, I make use of 3 inexpensive light sources: a longwave UV flashlight, a shortwave battery-powered UV tube lamp, and a blue laser pointer. A blue laser is by far the most powerful tool, revealing fluorescence in garnets that might otherwise be considered inert. When viewing fluorescence, loose gems are placed on a non-reflective black background. Along with a longwave UV flashlight, a visible light filter lens (ZWB2) is used in order to render the truest color of fluorescence.



Fluorescent Malaya Garnet (Daylight & Longwave UV Light)

Pyrospite garnets (pyrope, almandine and spessartine) are known for red or orange body color, but every color of the rainbow is also represented in this group. Among the 3 pyrospite species, fluorescence can be observed in 2 of those species: pyrope and spessartine. The only other documentation of fluorescence in these 2 garnet species that I've encountered is by the online database of luminescent minerals (fluomin.org), but this website presents no details about the different varieties of fluorescent pyrope and spessartine.

Pyrospite garnets don't fluoresce under shortwave UV light. Many do fluoresce under longwave UV light, and the color of fluorescence in these garnets is pink or red. Almandine garnets never fluoresce, as that species is very high in iron (Fe^{2+}), which puts the kibosh on fluorescence.

Ugrandite garnets (uvarovite, grossular and andradite) are known for their bright green body color, but every color except blue is also found in this group. Among the 3 species of ugrandite garnets, fluorescence can only be seen in grossular garnet, which is a species that's relatively low in iron (Fe^{3+}). But there are 6 varieties of grossular that can fluoresce.

The color of fluorescence in grossular garnets can be pink, red or pinkish orange under longwave UV light. Yellow fluorescence under shortwave UV light can also occur in some grossular garnets.

The high iron content in the andradite species quenches all fluorescence that might otherwise be evident in some green andradites (demantoid variety). In green uvarovite garnet, an excessive concentration of chromium prevents fluorescence in this species.

Why do Garnets Fluoresce?

Fluorescence in garnets is enabled by trace amounts of metallic elements called activators. There are 2 known activators of fluorescence found among garnets: chromium and manganese. These same metals also act as chromophores, contributing to body color.

Fluorescent Garnets

| Garnet | Body Color | Longwave (365nm) | Blue Laser (405nm) | Shortwave (254nm) |
|--------------------------|--------------|-------------------------------|-----------------------------------|---------------------------------|
| Pastel Pyrope | Light Pink | Weak Pink to Strong Red | Weak Pink to Strong Red | Inert |
| Malaya Pyrope | Light Pink | Inert to Strong Red | Inert to Strong Red | Inert |
| | Light Orange | Inert | Inert to Weak Red | Inert |
| Color Change Pyrope | Any Color | Inert to Weak Red | Inert to Strong Red | Inert |
| Malaya Spessartine | Light Orange | Inert | Inert to Weak Red | Inert |
| Color Change Spessartine | Any Color | Inert to Weak Red | Inert to Strong Red | Inert |
| Mali Grossular | Green | Inert | Inert to Strong Red (Rare) | Inert |
| Green Grossular | Light Green | Strong Pinkish Orange | Strong Pinkish Orange | Inert to Moderate Yellow-Orange |
| | Dark Green | Inert | Weak to Strong Pinkish Orange | Inert |
| Hessonite Grossular | Light Orange | Weak to Strong Pinkish Orange | Moderate to Strong Pinkish Orange | Inert |
| Leuco Grossular | Colorless | Weak to Strong Pinkish Orange | Strong Pinkish Orange | Inert to Weak Yellow |
| Rosolite Grossular | Pink | Weak Orange Pink | Strong Pinkish Orange | Inert |
| Hydrogrossular | Pink | Moderate Pinkish Orange | Strong Pinkish Orange | Inert |
| | Green | Inert | Inert to Weak Pink | Inert |
| | Colorless | Moderate Pinkish Orange | Strong Pinkish Orange | Inert |

Chromium along with iron causes red body color in pyrope garnets, but in ugrandite garnets, chromium (along with vanadium) produces green body color. Divalent manganese (Mn^{2+}) is responsible for orange and yellow body color, but in a trivalent oxidation state, manganese (Mn^{3+}) can create pink body color.

Fluorescence occurs when chromium or manganese atoms within a garnet are excited by the high energy of cool light such as violet or ultraviolet light. Excess energy is then released as visible fluorescent light in warmer colors such as yellow and orange (due to manganese), or pink and red (due to chromium).

Although manganese is much more prevalent in pyrope and spessartine garnets than in grossular garnets, it appears that manganese is an activator of fluorescence only in grossulars. The most common activator in garnets is chromium, and all fluorescent garnets that I've tested owe at least a portion of their fluorescence to chromium.

As a chromophore, chromium is found in all 6 species of gem garnets. With a Chelsea filter and an incandescent light source, the red glow of chromium can be detected in garnets of all colors, including red garnets. The over-dark red body color of chrome pyrope garnet transforms into bright crimson under a Chelsea filter due to high levels of chromium. Chromium can cause pink or red fluorescence in low-iron gems when viewed under longwave UV light (365nm). Chromium fluorescence can also be seen under blue laser light (405nm). Blue laser light is actually violet light that's slightly above the ultraviolet range.

The concentrated beam of a blue laser pointer induces stronger chromium or manganese fluorescence than a standard longwave UV light source. As a cautionary note, never view blue laser fluorescence without safety glasses that are specifically designed to block blue laser light.

Iron quenches chromium fluorescence, and fluorescence in garnets is largely dependent on the ratio of chromium to iron. Vanadium can also quench fluorescence, but the amount of vanadium in gem garnets is likely too small to affect fluorescence except in the case of dark green grossular garnets.

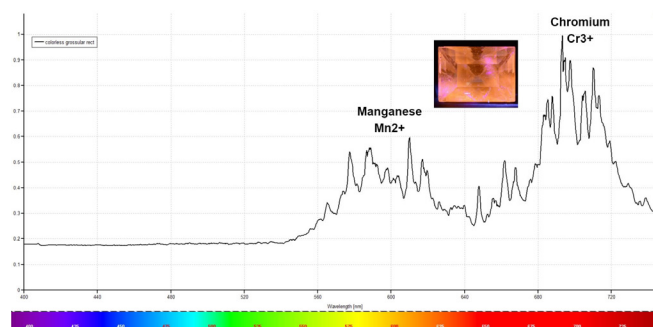
Chromium does not activate fluorescence in red garnets, as practically all red garnets contain sufficient iron (Fe^{2+}) to completely quench fluorescence. Even chrome pyrope garnets cannot fluoresce, in spite of the fact that they contain more chromium and less iron than any other variety of pyrope garnet. The lack of fluorescence in chrome pyrope may not only be the result of quenching by iron. Chrome pyropes might fail to fluoresce even if they contained no iron at all. The excessive concentration of chromium in this variety of pyrope (4%-8% chromium oxide by weight) would likely have a significant quenching effect on fluorescence.

In grossular garnets, photoluminescent spectroscopy suggests that manganese along with chromium can both exist as activators within a single gem. Under longwave UV light (and/or blue laser light), the yellow fluorescence of manganese combines with the pink fluorescence of chromium, resulting in pinkish orange fluorescence in several varieties of grossular garnet.

Under shortwave UV light (254nm), manganese causes yellow to yellowish orange fluorescence in only 2 varieties of grossular garnet. Safety glasses should always be worn when viewing shortwave fluorescence.

Fluorescence in garnets can be analyzed with a UV-Vis-NIR spectrometer if we switch from a standard incandescent light source to a longwave UV light source. This is called fluorescence spectroscopy, and it can help us identify which fluorescence activators are present in a gem. With this method, we examine the light that is transmitted by activators as fluorescence rather than the light that is transmitted by chromophores as body color.

In the transmission spectrum for fluorescence of grossular garnet shown below, we can see two distinct transmission ranges. Manganese fluorescence is represented by the longwave UV transmission peaks in the yellow and orange portion of the light spectrum, while chromium fluorescence is indicated by transmission peaks in the red portion of the spectrum.



Grossular Garnet Longwave UV Fluorescence Spectrum

Pyrope

Most red pyrope garnets derive a portion of their body color from chromium, but these garnets fail to fluoresce because they contain a high percentage of bivalent iron (Fe^{2+}). The varieties of non-fluorescing red pyropes are all in solid solution between pyrope (magnesium garnet) and almandine (iron garnet). These include chrome pyrope, red pastel pyrope, standard pyrope, purplish-red rhodolite garnet and red malaya garnet.

But not all pyrope garnets are primarily red. Among non-red pyropes, I've found 3 varieties that can show chromium fluorescence: pastel pyrope, malaya pyrope and color change pyrope. Chromium can usually be detected with a Chelsea filter in pyropes that fluoresce, except in cases when the concentration of chromium is very low.

All fluorescent pyrope garnets are in solid solution between pyrope (magnesium garnet) and spessartine (manganese garnet), and this is key to their ability to fluoresce. The chemical composition and lighter color of

these garnets is controlled by manganese rather than iron, and the concentration of iron can be quite low. Unlike iron, manganese in pyrope-spessartine garnets does not quench fluorescence.

Pastel Pyrope: These pyropes are distinguished from other pyropes by their light color, low refractive index and low magnetic susceptibility. We'll go into more detail about pastel pyrope in another article. This variety appears in several colors, but only those with light pink body color fluoresce pink or red under longwave UV light. The pink body color is caused by chromium. Chromium fluorescence in pastel pyropes is possible due to exceptionally low iron content.



Pastel Pyrope (Daylight & Longwave UV Light)

Malaya Pyrope: As a variety of pyrope, malaya garnets often have moderate to dark red or dark orange color, but only malayas with light pink body color fluoresce under longwave UV light from chromium. These fluorescent malayas can look very similar to pink pastel pyropes, but they're easily distinguished by a higher refractive index and a stronger magnetic response (pick-up response) due to higher concentrations of manganese. Some malaya pyropes with light orange color also fluoresce red, but concentrated blue laser light is needed to reveal the fluorescence.



Malaya Pyrope (Daylight & Longwave UV Light)

Color change Pyrope: The phenomenon of color change from daylight color to a warmer color in incandescent light is enabled in these garnets by chromium, which is usually detectable with a Chelsea filter. Body colors among fluorescent color change pyropes include blue, green, brown, yellow and orange. Red fluorescence can be considered one of the identifying characteristics of color change garnets.

However, fluorescence in color change garnets is rarely seen under longwave UV light. In most cases we must rely on the concentrated light of a blue laser pointer to make

the fluorescence visible. Long wave fluorescence may be quenched by iron and/or vanadium. Some color change garnets such as blue color change garnets can contain high levels of vanadium, and it's possible that in conjunction with iron, vanadium quenches the chromium fluorescence in some of these garnets.



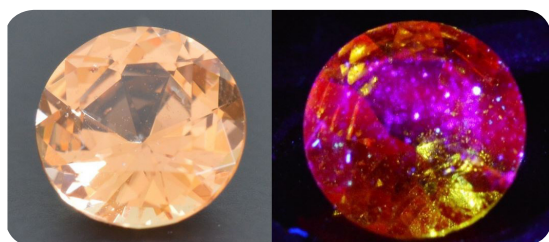
Color Change Pyrope (Daylight & Blue Laser Light)

Spessartine

There is very little information in gemological literature about fluorescent spessartine garnets, but many do show some degree of fluorescence. There are 3 varieties of this species that I recognize: standard spessartine, color change spessartine and malaya spessartine. I've encountered fluorescence in 2 of these varieties: malaya spessartine and color change spessartine. These spessartines are distinguished from malaya pyrope and color change pyrope by higher manganese content. The primary component in these garnets is spessartine rather than pyrope, and a small amount of chromium is responsible for the fluorescence.

Malaya Spessartine: These malaya garnets are much rarer than malaya pyropes, as the vast majority of malayas are composed primarily of pyrope. Most malaya spessartines have orange body color rather than pink or red body color, with manganese responsible for the orange color. Malaya garnets that have moderate to dark orange color contain too much iron to fluoresce.

However, I've found several light yellow-orange malayas that fluoresce red. But like orange malaya pyropes, the fluorescence is only seen under blue laser light. These gems can look like 'fanta' orange spessartine garnets, but they contain much less manganese and have a lower refractive index than standard orange spessartine gems. The concentration of chromium is too low to create pink body color or to be detected with a Chelsea filter. But the trace amount of chromium in these orange malaya spessartines is enough to induce red fluorescence.



Malaya Spessartine (Daylight & Blue Laser Light)

Color change Spessartine: Many color change spessartines in a variety of body colors fluoresce pink or red under blue laser light due to chromium. Most color change garnets that have a refractive index higher than 1.76 can be classified as color change spessartines rather than color change pyropes. These low-iron high-manganese garnets often have warmer body colors than color change pyropes.

Rare and extreme examples of fluorescent color change spessartine garnets are those gems that have reddish brown or reddish orange body color and an extremely high manganese (spessartine) content. The chemical composition of these chromium-bearing spessartines can be as high as 88% spessartine, which is equivalent to the composition of standard orange spessartine garnets. Orange gems may be indistinguishable in appearance from standard spessartine garnets.

What separates these rare spessartines from standard spessartine garnets is their ability to show color change and to fluoresce red under blue laser light, all due to significant chromium content. The chromium in these spessartines can be detected with a Chelsea filter and with a UV-Vis-NIR spectrometer.



Color Change Spessartine, 88% Spessartine (Daylight & Blue Laser Light)

Grossular

Grossular is the most consistently fluorescent species of garnet, and for purposes of gem identification, fluorescence can be considered an identifying characteristic for most grossular varieties. Vanadium along with chromium creates green body color in grossular garnets. Manganese produces orange or pink body color, depending on the oxidation state of the manganese.

Grossular garnet is a calcium-aluminum species that is in solid solution with andradite, a calcium-iron species. The relatively low level of iron in grossular garnets is primarily trivalent iron (Fe^{3+}), which differs from the divalent iron (Fe^{2+}) found in the 3 species of pyralisite garnets.

Trivalent iron in grossular garnet is a less potent quencher of fluorescence than divalent iron, and this is one reason fluorescence is so prevalent among grossulars. The trivalent oxidation state of iron is also a weak chromophore.

While divalent iron causes red color in pyrospite garnets, trivalent iron in grossular garnet often fails to create color, contributing nothing to the body color of the garnet. Sometimes trivalent iron can result in light yellow-green or 'grass' green color in grossular garnets and also in andradite garnets (demantoid variety).

Grossulars often show pinkish orange fluorescence under longwave UV light and/or blue laser light due to the combined effect of 2 activators, chromium and manganese. Some grossular garnets also fluoresce weak to moderate yellow to yellowish orange under shortwave UV light. The yellowish shortwave fluorescence is due to divalent manganese (Mn^{2+}), and like all shortwave fluorescence in garnets, is visible only in darkness.

Mali Garnet: This variety of grossular is sometimes referred to as grossular-andradite. It has the highest levels of iron (from andradite) found in the species. Consequently, Mali garnets rarely fluoresce. Most Malis have a refractive index in the range of 1.755 – 1.775, and I haven't seen fluorescence in any Mali garnets whose refractive index is 1.75 or higher. But this variety has a broad range of refractive index, much broader than what is typically reported for Mali garnet. The lower the refractive index, the lower the concentration of iron.

Low-iron green Mali garnets that have a particularly low refractive index (R.I. 1.747-1.749) can fluoresce when they contain chromium. Light green 'chrome' Malis colored by vanadium and chromium can fluoresce pink or red under blue laser light when the R.I. is low. Such Malis are rare. The refractive index of these green 'chrome' Malis separates them from the more common green grossulars such as tsavorite and Merelani garnets, which contain much less iron (R.I. 1.728 to 1.735).



Mali Garnet (Daylight & Blue Laser Light)

Green grossular Garnet: Tanzania and Kenya are the leading mining locations for gems of this variety. Although some green grossulars can be colored yellow-green by iron, the cause of striking pure green colors in dark green tsavorite garnets and light green Merelani garnets is primarily vanadium along with a much lesser amount of chromium. It's the chromium component that causes pink or red fluorescence.

Strong fluorescence under longwave UV light is typical of light green grossulars (Merelani garnets). The concentration of fluorescence-quenching vanadium in light green grossulars is too low to dampen the fluorescence. The color of the fluorescence is modified to pinkish orange by trace amounts of manganese.



Merelani Garnet (Daylight & Longwave UV Light)

In contrast, the saturated color of dark green grossular gems (tsavorite garnets) is due to higher levels of vanadium, and these dark green grossulars show no longwave UV fluorescence due to quenching by the vanadium. The best way to see the orangey pink chromium fluorescence of most dark green grossulars is with blue laser light.



Tsavorite Garnet (Daylight & Blue Laser Light)

Hessonite Garnet: This variety of grossular has orange body color that ranges from light yellowish orange to dark reddish orange or brownish orange. Color is likely due to charge transfer processes involving manganese (Mn^{2+}) and iron (Fe^{3+}).

Light orange hessonites are known in the trade as 'imperial' hessonites, and these typically show weak pinkish orange fluorescence under a good-quality longwave UV light source. Fluorescence spectroscopy shows that fluorescence is due to a combination of trace amounts of manganese (Mn^{2+}) and chromium, which act together to create the beautiful salmon pink colors of fluorescence.

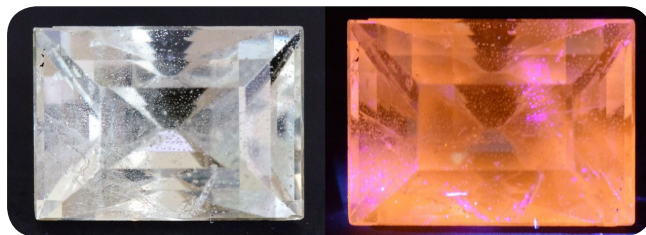


Hessonite Garnet (Daylight & Longwave UV Light)

Dark orange hessonites don't fluoresce, even under blue laser light. These dark gems tend to have more iron than light orange gems, and the absence of fluorescence is probably due to the quenching effect of iron.

Leuco Garnet: Leuco means colorless. The concentration of chromophores in these garnets is so low that little or no color is apparent. Leuco garnets can be completely colorless, faint green or faint orange in color. Leuco garnets with a hint of color represent the extreme low end of color saturation for green grossulars (colored by vanadium/chromium) and for orange hessonites (colored by manganese/iron).

Still, most leuco garnet gems contain enough chromium and manganese to show strong pinkish orange fluorescence under longwave UV light. Under shortwave UV light, the fluorescence is yellow in color due to manganese.



Leuco Garnet (Daylight & Longwave UV Light)

Rosolite Garnet: This variety of pink grossular is only mined in Mexico, and it's sometimes referred to as raspberry garnet. The bright pink body color is due to a small amount of trivalent manganese (Mn^{3+}). Since rosolite is almost always translucent or opaque, it's primarily seen in mineral form and is seldom fashioned into gemstones.

Weak orangey pink fluorescence in rosolite can be seen under longwave UV light, but fluorescence is much stronger under blue laser light. Fluorescence is due to a combination of trace amounts of chromium and divalent manganese (Mn^{2+}). Although trivalent manganese (Mn^{3+}) creates pink body color, this oxidation state is not known to be an activator of fluorescence.



Rosolite Garnet (Daylight & Blue Laser Light)

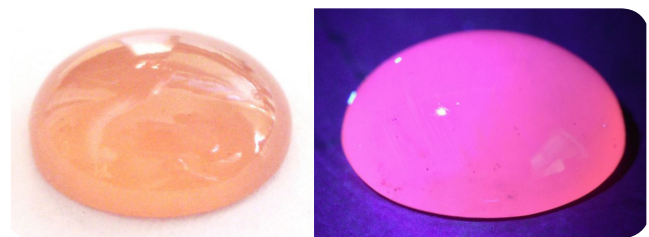
Hydrogrossular Garnet: This translucent to opaque microcrystalline garnet is never fully transparent. Hydrogrossular garnet is aptly named because it contains a structural water component of hydrogen and oxygen (OH). Hydro-grossular is seldom faceted and is mostly fashioned

into cabochons. The most common body color is green, but gem color can also be pink, red, and even white (colorless). Rare bi-color gems that show both red and green phases have been referred to as 'watermelon' garnets.

Green body color in hydrogrossular garnet is due to chromium and/or iron, while pink body color is the result of trivalent manganese (Mn^{3+}), just as it is in the rosolite variety. Most translucent hydrogrossular gems that I've tested, whether pink, green or white, show some degree of pink or pinkish orange fluorescence.

Most green hydrogrossular garnets don't fluoresce under UV light, but they do fluoresce weakly under blue laser light when sufficient chromium is present. Hydrogrossulars colored green entirely by iron don't fluoresce. Fluorescence in pink gems and white gems is weak under longwave UV light and strong under blue laser light.

A trace amount of chromium seems to be the main fluorescence activator in both green and pink hydrogrossular. Divalent manganese (Mn^{2+}) can also contribute to the fluorescence, and in white hydrogrossulars, this results in a lovely orangey pink fluorescence.



Hydrogrossular Garnet (Daylight & Longwave UV Light)

All photographs by Kirk Feral and may not be reproduced without his written permission.

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 (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 100 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, Skull Crucible, Zone Melt, Horizontally Oriented Crystallization, the Sublimation Method, and the Modified Stober 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 section looks specifically at diamonds, their physical properties, geology, localities, principle mines, crystal system, chemical composition and classification. You will also find lessons dedicated to fancy coloured diamonds, the causes of colour, absorption spectra, inclusions, fluorescence, mining, gem identification, methods of synthesis (including HPHT, CVD, Detonation and Ultrasonic Cavitation), common treatments and enhancements 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, gem identification, synthesis, common treatments and enhancements, 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 (GIA, Gemewizard, GemDialogue and the World of Color) including 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 a 100 hour online Coloured Gemstone Grading course where you will work with the Gemewizard Colour Grading system.

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 100 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 CGP 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 100 hour online Coloured Gemstone Grading #2 course.

Courses in Other Languages

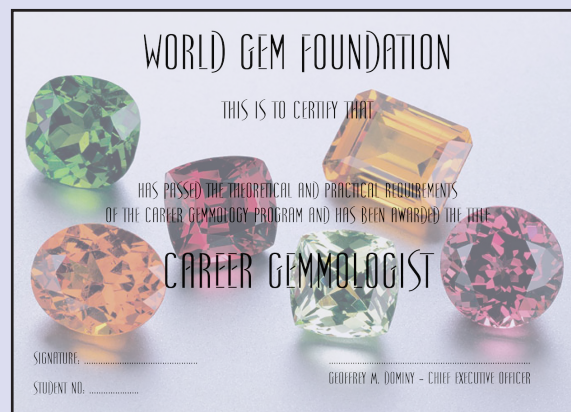
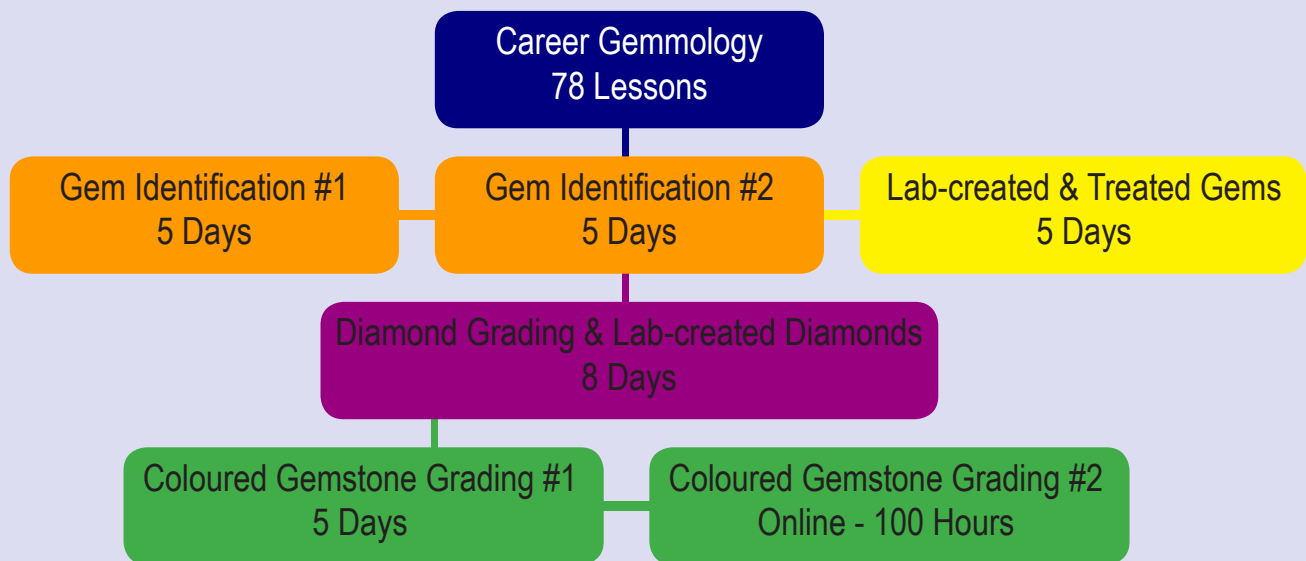
We are currently translating all of our 'Diploma' program courses into Spanish, French and Chinese to meet the needs of our Spanish, French and Chinese speaking students.

Currently our Gemología Básica (Basic Gemmology) and Gemología Avanzada are available in Spanish in digital, print and also online.

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 six theoretical courses (Career Gemmology, 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).

GEMMOLOGY SEVEN PROGRAM



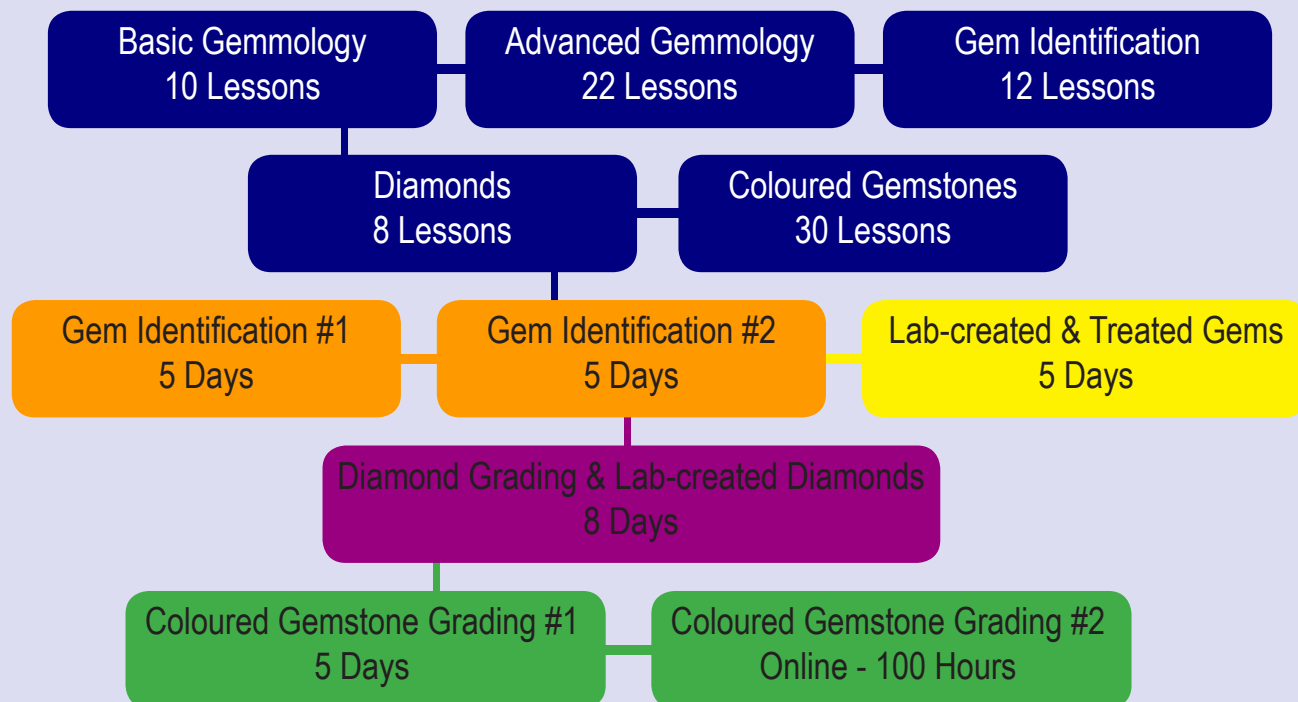
Career Gemmology Seven

Digital Fees

Printed Fees

| Course Name | Euros | Pounds Sterling | USD | Euros | Pounds Sterling | USD |
|--------------------------------------|-------------|-----------------|-------------|-------------|-----------------|-------------|
| Career Gemmology (Theory) | 1400 | 1100 | 1600 | 1570 | 1235 | 1795 |
| Gem Identification #1 | 500 | 400 | 550 | 500 | 400 | 550 |
| Gem Identification #2 | 500 | 400 | 550 | 500 | 400 | 550 |
| Coloured Gemstone Grading #1 | 500 | 400 | 550 | 500 | 400 | 550 |
| Coloured Gemstone Grading #2 | 1000 | 800 | 1150 | 1000 | 800 | 1150 |
| Diamond Grading/Lab-created Diamonds | 1750 | 1400 | 2000 | 1750 | 1400 | 2000 |
| Lab-created & Treated Gems | 500 | 400 | 550 | 500 | 400 | 550 |
| Examinations Fees (Final Exam) | 250 | 200 | 280 | 250 | 200 | 280 |
| Total Cost | 6400 | 5100 | 7230 | 6570 | 5235 | 7425 |

GEMMOLOGY ELEVEN PROGRAM



Career Gemmology Eleven

Digital Fees

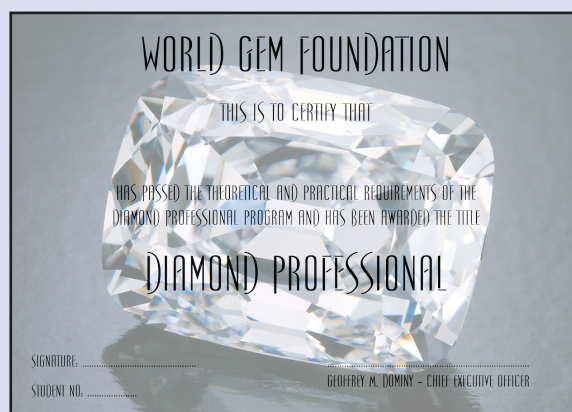
Printed Fees

| Course Name | Euros | Pounds Sterling | USD | Euros | Pounds Sterling | USD |
|--------------------------------------|-------------|-----------------|-------------|-------------|-----------------|-------------|
| Basic Gemmology (Theory) | 200 | 150 | 225 | 235 | 180 | 265 |
| Advanced Gemmology (Theory) | 400 | 300 | 450 | 430 | 325 | 485 |
| Gem Identification (Theory) | 225 | 175 | 250 | 255 | 200 | 285 |
| Diamonds (Theory) | 225 | 175 | 250 | 255 | 200 | 285 |
| Coloured Gemstones (Theory) | 500 | 400 | 550 | 565 | 450 | 625 |
| Gem Identification #1 | 500 | 400 | 550 | 500 | 400 | 550 |
| Gem Identification #2 | 500 | 400 | 550 | 500 | 400 | 550 |
| Coloured Gemstone Grading #1 | 500 | 400 | 550 | 500 | 400 | 550 |
| Coloured Gemstone Grading #2 | 1000 | 800 | 1150 | 1000 | 800 | 1150 |
| Diamond Grading/Lab-created Diamonds | 1750 | 1400 | 2000 | 1750 | 1400 | 2000 |
| Lab-created & Treated Gems | 500 | 400 | 550 | 500 | 400 | 550 |
| Examinations Fees (Final Exam) | 250 | 200 | 280 | 250 | 200 | 280 |
| Total Cost | 6550 | 5200 | 7355 | 6740 | 5355 | 7575 |

DIAMOND PROFESSIONAL

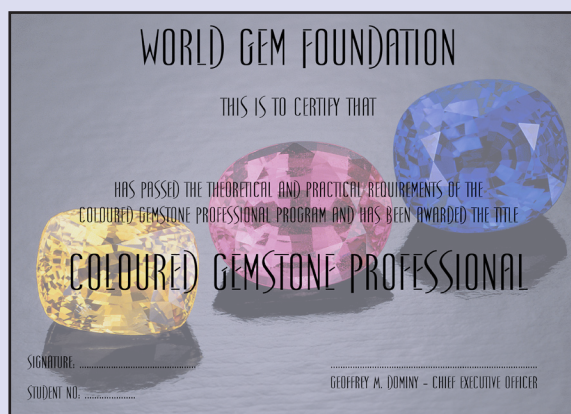
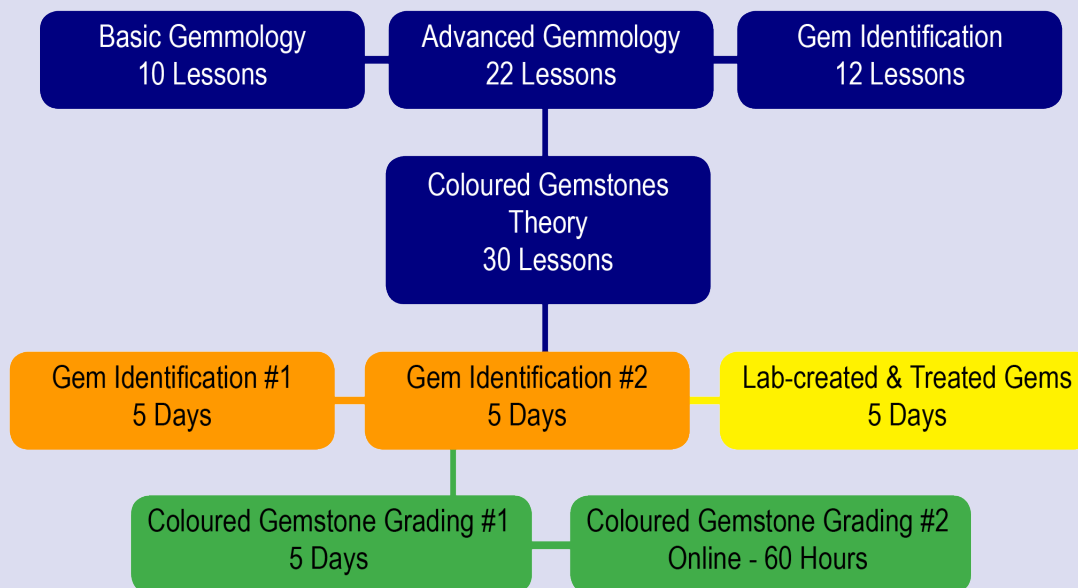
Diamonds
Theory
8 Lessons

Diamond Grading & Lab-created Diamonds
Practical Workshop
8 Days



| Diamond Professional | Digital Fees | | | Printed Fees | | |
|--------------------------------------|--------------|-----------------|------|--------------|-----------------|------|
| Course Name | Euros | Pounds Sterling | USD | Euros | Pounds Sterling | USD |
| Diamonds (Theory) | 225 | 175 | 250 | 255 | 200 | 285 |
| Diamond Grading/Lab-created Diamonds | 1750 | 1400 | 2000 | 1750 | 1400 | 2000 |
| Examinations Fees (Final Exam) | 250 | 200 | 280 | 250 | 200 | 280 |
| Total Cost | 2225 | 1775 | 2530 | 2255 | 1800 | 2565 |

COLOURED GEMSTONE PROFESSIONAL



Coloured Gemstone Professional

Digital Fees

Printed Fees

| Course Name | Euros | Pounds Sterling | USD | Euros | Pounds Sterling | USD |
|---------------------------------|-------------|-----------------|-------------|-------------|-----------------|-------------|
| Basic Gemmology (Theory) | 200 | 150 | 225 | 235 | 180 | 265 |
| Advanced Gemmology (Theory) | 400 | 300 | 450 | 430 | 325 | 485 |
| Gem Identification (Theory) | 225 | 175 | 250 | 255 | 200 | 285 |
| Coloured Gemstones (Theory) | 500 | 400 | 550 | 565 | 450 | 625 |
| Gem Identification #1 | 500 | 400 | 550 | 500 | 400 | 550 |
| Gem Identification #2 | 500 | 400 | 550 | 500 | 400 | 550 |
| Coloured Gemstone Grading #1 | 500 | 400 | 550 | 500 | 400 | 550 |
| Coloured Gemstone Grading #2 | 1000 | 800 | 1150 | 1000 | 800 | 1150 |
| Lab-created & Treated Gems | 500 | 400 | 550 | 500 | 400 | 550 |
| Examinations Fees (Final Exam) | 250 | 200 | 280 | 250 | 200 | 280 |
| Total Cost | 4575 | 3625 | 5105 | 4735 | 3755 | 5290 |

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 science 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 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.

The chart below outlines the number of online tutoring hours that are included in your course price. If you require more online instructional tutoring, please contact your education coordinator to discuss availability and pricing.

| 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 |

We strongly suggest that you contact your instructor beforehand by e-mail with your questions so that you will derive maximum benefit from your online session. Please remember that these sessions are designed to provide you with 'coaching' rather than direct instruction.

Once a Student, Always a Student

With our 'Once a student, always a student' policy, every WGF registered student receives lifetime access to their student page. So every time we update our courses, they get the latest version free of charge.

Why? Because at the WGF, we believe you should never stop learning.

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.

2020 Workshops

Interested in taking one of our practical workshops in Europe in 2020? Click [here](#) to see the current schedule.

Practical Workshops

Gem Identification #1



Course Cost € 500

Reserve Your
Place Now

This five day (30 hour) practical workshop focuses on the study and identification of six colour groupings (colourless/white, red, pink, orange, yellow and green) and basic crystallography. Gemstones covered in this workshop include:

Natural Diamond, Natural Ruby, Natural Sapphire, Emerald, Beryl, Garnets (Spessartite, Almandite Rhodolite, Pyrope, Colour Change, Hessonite, Demantoid, Tsavorite and Grossular), Spinel, Tourmaline, Topaz, Beryl, Quartz, Zircon, Alexandrite, Chrysoberyl, Apatite, Kunzite, Sunstone, Sphalerite, Sphene, Phenakite, Brazilianite, Scapolite, Hiddenite, Danburite, Benitoite, Diaspore, Epidote, Kyanite, Idocrase, Sinhalite, Diopside, Kornerupine, Enstatite, Euclase, Andalusite, Ekanite, Idocrase, Moldavite, Obsidian, Chrome Chalcedony, Amazonite, Jadeite, Nephrite, Chalcedony, Dyed Jasper, Chrysoprase, Maw-Sit Sit, Rhodonite, Rhodochrosite, Amber, Coral, Fire Opal, Lab-created Moissanite, Cubic Zirconia, GGG, YAG, Lab-created Rutile, Strontium Titanate, Lithium Niobate, Lab-created Spinel, Glass, Lab-created Alexandrite, Garnet-topped Doublet, Spinel Triplet, Copal Resin, Bakelite and Imitation Coral.

Prerequisites: Basic Gemmology or Equivalent

Gem Identification #2



Course Cost € 500

Reserve Your
Place Now

This five day (30 hour) practical workshop focuses on the study and identification of four colour groupings (blue, violet/purple, brown and black) plus unusual and phenomenal gemstones. Gemstones covered in this workshop include:

Sapphire, Benitoite, Spinel, Tanzanite, Apatite, Tourmaline, Topaz, Aquamarine, Quartz, Iolite, Zircon, Scapolite, Garnet (Grape, Rhodolite and Hessonite), Chrysoberyl, Taaffeite, Idocrase, Ekanite, Sinhalite, Kornerupine, Andalusite, Kyanite, Euclase, Smithsonite, Sugilite, Charoite, Lapis Lazuli, Sodalite, Turquoise, Odontolite, Serpentine, Chrysocolla, Petrified Wood, Hematite, Marcasite, Pyrite, Jadeite, Jet, Chalcedony, Jasper, Coral, Obsidian, Cubic Zirconia, Bakelite, Dyed Jasper, Lab-created Forsterite, Lab-created Spinel, Lab-created Quartz, Glass, Gilson Lapis Lazuli, Gilson Turquoise, Stained Howlite, Star Sapphire, Star Ruby, Star Almandite Garnet, Star Diopside, Cat's Eye Chrysoberyl, Cat's Eye Tourmaline, Cat's-Eye Quartz, Hawk's Eye Quartz, Tiger's-Eye Quartz, Bi-Colour Tanzanite, Bi-Colour Tourmaline, Ametrine Quartz, Watermelon Tourmaline, Usambara Tourmaline, Trapiche Emerald, Labradorite, Moonstone, Bloodstone, Tortoiseshell, Shell Cameo, Hardstone Cameo, Lava Cameo, Ammolite, Fire Agate, Black Opal, Crystal Opal, Semi-Crystal Opal, Larimar, Malachite, Lab-created Cat's Eye Chrysoberyl and Imitation Cameo.

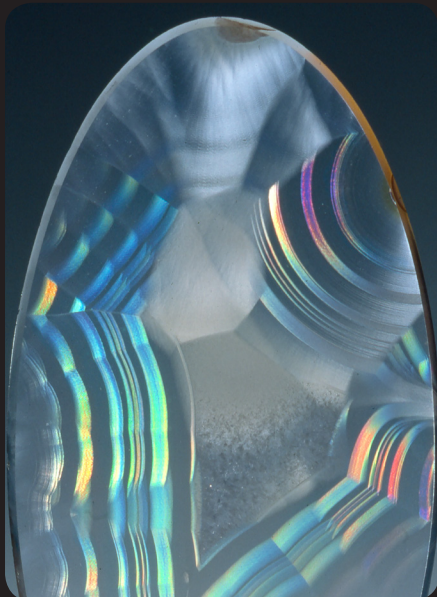
Prerequisites: Gem Identification #1 or Equivalent

Practical Workshops

Coloured Gemstone Grading #1

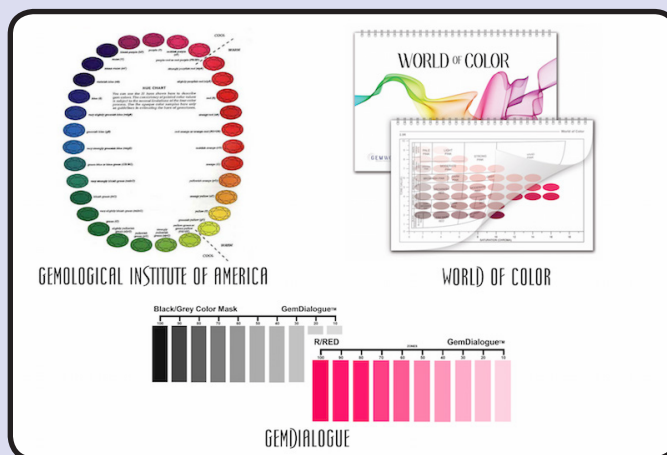
This five-day (30 hours) workshop includes practical instruction on how to access the hue, tone and saturation of coloured gemstones using three popular colour grading systems (Gemological Institute of America, GemDialogue and World of Color) and how to grade pearls, jadeite and opals.

Prerequisites: None



Course Cost € 500

Reserve Your
Place Now



Coloured Gemstone Grading #2

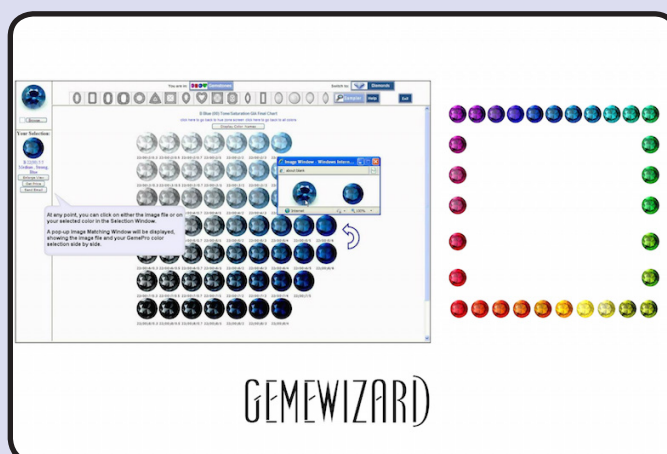
This 100 hour online course consists of a comprehensive overview of the GemWizard Colour Grading System including colour theory (hue, tone and saturation), how they impact on the value of gemstones, practical exercises that are completed online, and a six month subscription to the Gemewizard program.

Prerequisites: None



Course Cost € 1000

Reserve Your
Place Now



Practical Workshops



Course Cost € 500

Reserve Your
Place Now

Lab-created & Treated Gems

This five day (30 hour) practical workshop focuses on lab-created gemstones (specifically rubies, sapphires and emeralds) and the many treatments and enhancements that are used to improve the appearance and/or value of gemstones, including:

- Heat treatment
- Surface and Sub-surface Diffusion
- Irradiation
- Fracture Filling
- HPHT Treatment
- Oiling
- Waxes & Dyes
- Sugar/Acid & Smoke Inhalation
- Quench-crackling with Dyes
- Coating & Foil Backs
- Laser Drilling

Prerequisites: Advanced Gemmology or Equivalent



Course Cost € 1750

Reserve Your
Place Now

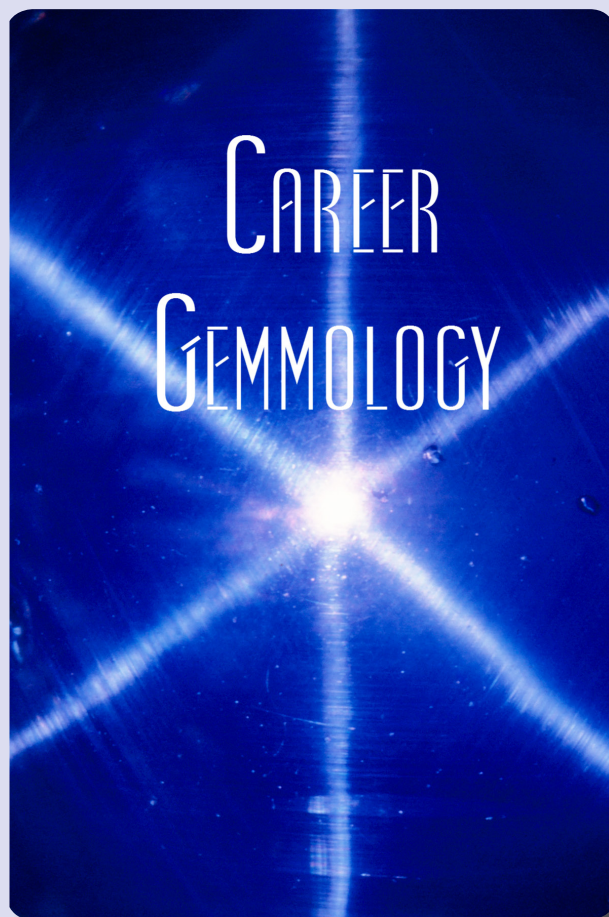
Diamond Grading & Lab-created Diamonds

This eight day (48 hour) practical workshop focuses on the clarity and colour grading of diamonds, how to measure the proportions and how to distinguish natural from HPHT and CVD diamonds.

Topics covered include:

- Clarity Grading
- Colour Grading
- Calculating Table Percentage
- Calculating Crown Angle
- Calculating Pavilion Percentage
- Estimating Girdle Thickness
- Assessing Symmetry & Polish
- Lab-Created Diamonds
- Practical Review

Prerequisites: Diamonds or Equivalent



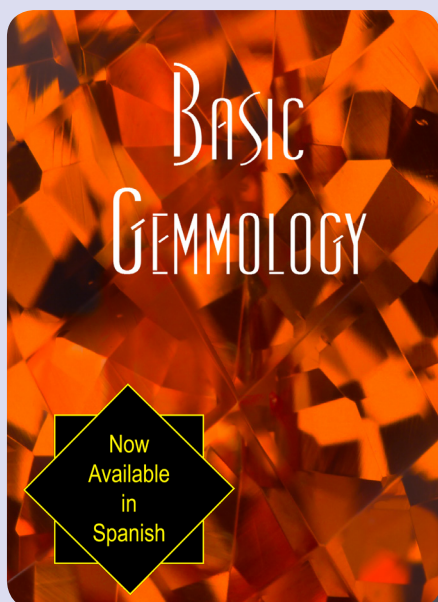
Course Content

The chemical nature of gemstones, their physical and optical properties, basic crystallography, the absorption of light, the spectroscope, refraction, reflection and the refractometer, polarized light, the polariscope, pleochroism, the dichroscope, colour filters, specific gravity, luminescence, magnification, thermal conductivity, imitation, assembled and lab-created gemstones, the methods used to manufacture lab-created gemstones including Verneuil, Czochralski, flux melt, hydrothermal, skull crucible, zone melt, horizontally oriented crystallization, high pressure, high temperature (HPHT), chemical vapour deposition (CVD), detonation, ultrasonic cavitation, sublimation method, and modified Stöber method, their unique identifying features, treatments and enhancements including 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, high pressure, high temperature (HPHT), quench-crackling, surface modifications, coatings and foil backs, laser drilling, and irradiation, gem mining and cutting, diamond and coloured gemstone grading, gem identification by colour and transparency, advanced gem testing techniques and a comprehensive overview of the twenty-seven most common groups, species and varieties including diamonds, corundum (rubies and sapphires), beryl (emeralds, aquamarines and other precious beryls), chrysoberyl (alexandrite and other chrysoberyl), spinel, zircon, topaz, tourmaline, peridot, quartz, garnet, tanzanite, lapis lazuli, turquoise, opal, jadeite, kunzite and hiddenite, feldspars, iolite, andalusite, diopside, apatite, pearls, coral, jet, ivory and amber.

Course Cost: € 1400

Prerequisites: None

Please Note: This course includes all the information contained in the Basic Gemmology, Advanced Gemmology, Gem Identification, Diamonds and Coloured Gemstones courses.



Course Content

The chemical nature of gemstones, 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.

Course Cost: € 200

Prerequisites: None

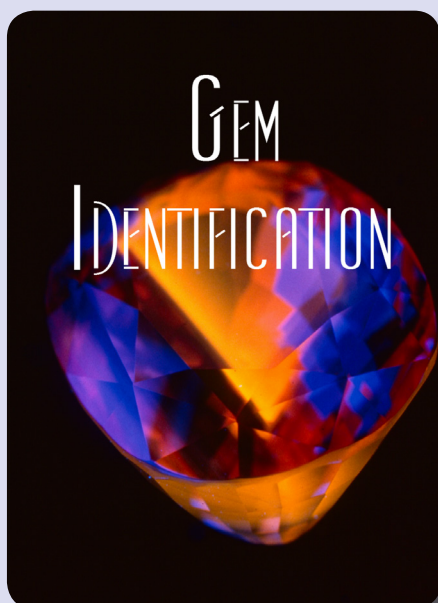


Course Content

Imitation and composite gemstones, methods used to manufacture lab-created gemstones including Verneuil, Czochralski, Flux Melt, Hydrothermal, Skull Crucible, Zone Melt, Horizontally Oriented Crystallization, HPHT, CVD, Detonation, Ultrasonic Cavitation, Sublimation Method, and Modified Stober Method, their unique identifying features, treatments and enhancements including 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, irradiation, and advanced gem testing techniques.

Course Cost: € 400

Prerequisites: Basic Gemmology or Equivalent

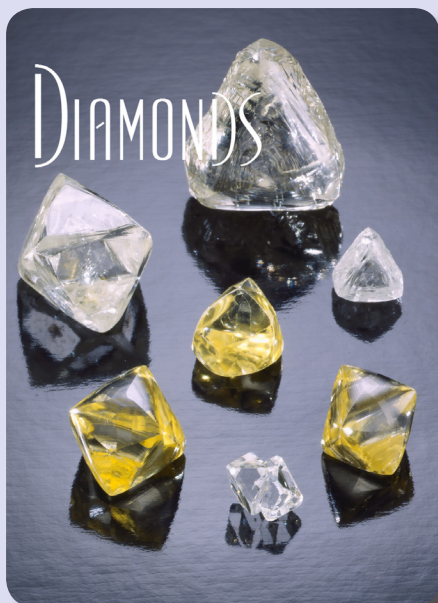


Course Content

Introduction to gem identification and the tests that are commonly used to identify gemstones. An in-depth look at each of the ten colour groupings (colourless or white, red, pink, orange, yellow, blue, green, violet or purple, brown, black or grey) plus phenomenal or unusual gemstones. 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 tourmaline, diamond and lab-created moissanite) or have physical and optical properties that are similar (i.e. amethyst quartz and purple scapolite). All lab-created, imitation, treated and enhanced gemstones that are found in each colour grouping.

Course Cost: € 225

Prerequisites: Basic & Advanced Gemmology or Equivalent

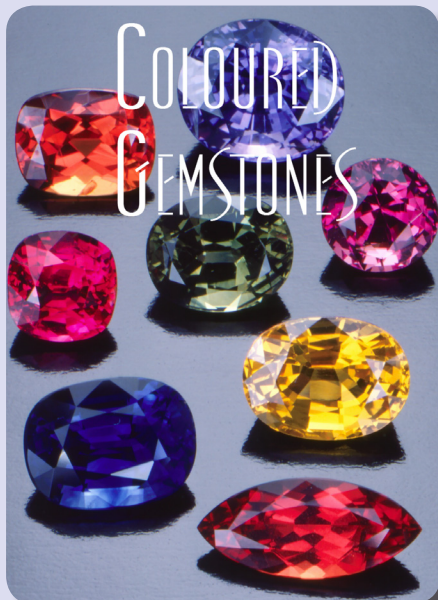


Course Content

Physical properties, geology, localities, principle mines, crystal system, chemical composition and classification, fancy colours, causes of colour, absorption spectra, pleochroism, inclusions, fluorescence, mining, gem identification, methods of synthesis, common treatments and enhancements. You will learn all about the 4 C's (colour, clarity, cut and carat weight) and how they are measured and assessed. We will also compare the various 'Cut' criteria for the Gemological Institute of America (GIA), the American Gem Society (AGS), Hoge Raad Diamant (HRD), International Gemological Institute (IGI), the European Gemological Laboratory (EGL), and Accredited Gem Appraisers (AGA) and explain how the estimated weight of a 'mounted' gemstone is calculated.

Course Cost: € 225

Prerequisites: None

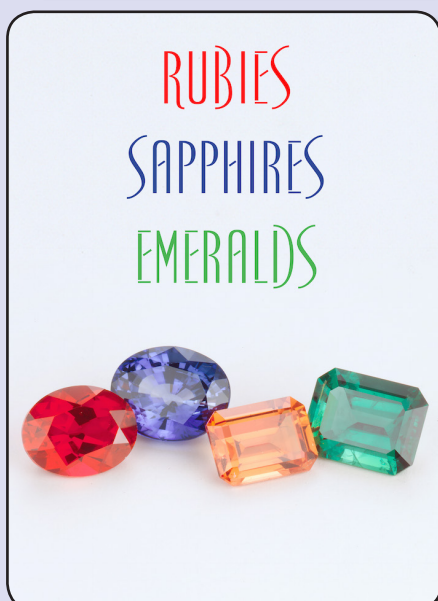


Course Content

Physical properties, geology, localities, crystal system, chemical composition and causes of colour, varieties, absorption spectra, pleochroism, inclusions, fluorescence, gem identification, synthesis, treatments and enhancements, and care guidelines. Gemstones covered in this course include rubies and sapphires, emeralds, aquamarines and other precious beryls, alexandrite and other chrysoberyls, spinel, zircon, topaz, tourmaline, peridot, quartz, garnet, tanzanite, lapis lazuli, turquoise, kunzite, hiddenite, feldspars, iolite, andalusite, diopside, apatite, pearls, coral, jet, ivory, and amber. You will learn how to accurately describe colour, the various colour grading systems currently used by professionals, the clarity classification of gemstones based on their geological environments, how cut is assessed, and how to grade opals, jadeite and pearls.

Course Cost: € 500

Prerequisites: None



Course Content

Topics covered 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.

Course Cost: € 95

Prerequisites: None



Course Content

Topics covered in the course include their physical and optical properties, geological formation, crystal systems, chemical composition, varieties and classification, cause of colour, absorption spectra, common inclusions, fluorescence, mining, grading criteria, methods of synthesis, gem identification, common treatments and enhancements, cleaning and care instructions, and pricing.

Course Cost: € 75

Prerequisites: None



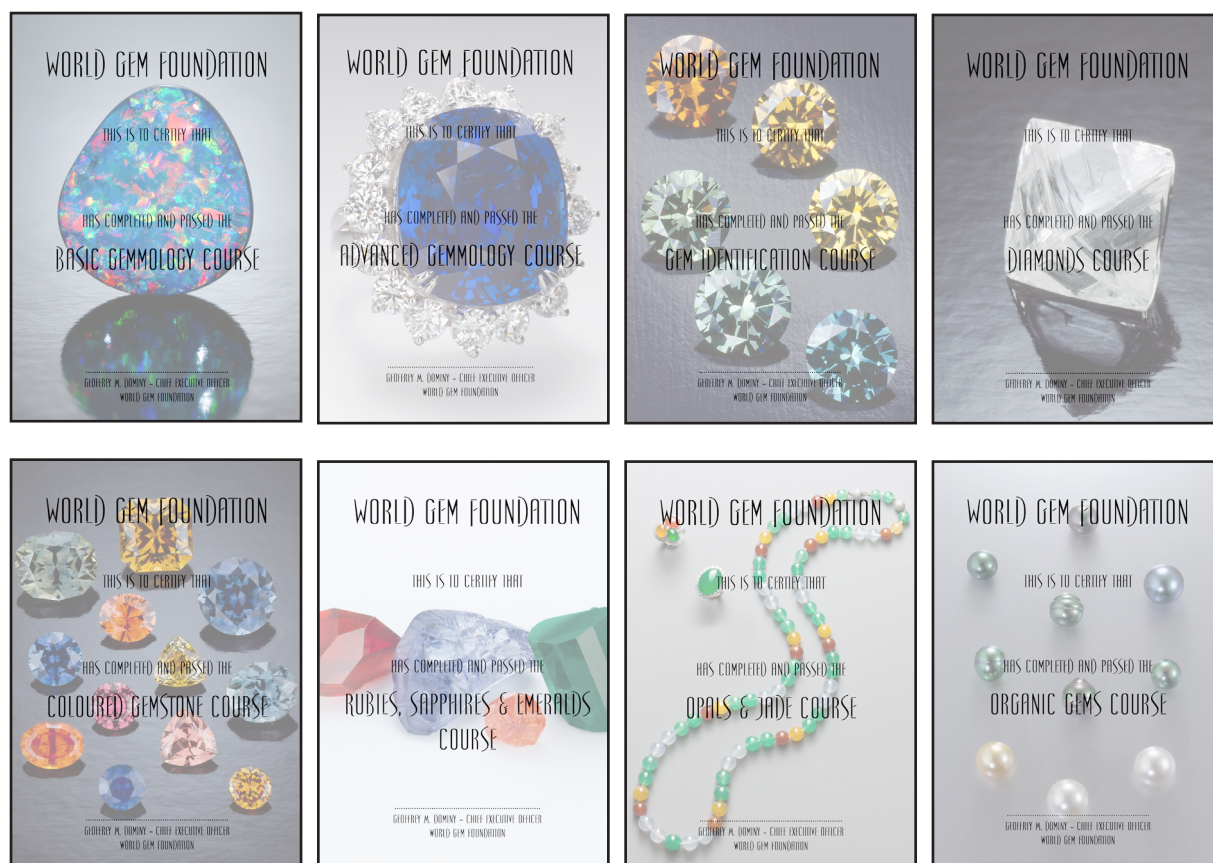
Course Content

Topics covered include their physical and optical properties, geological formation, crystal systems, chemical composition, varieties and classification, cause 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.

Course Cost: € 50

Prerequisites: None

Theory Courses - Letters of Completion



Practical Workshop - Letters of Completion



A TALE OF TWO CITIES



MADRID

AMSTERDAM

Two great cities, two great experiences and five exciting courses to choose from.....

Culturally diverse and steeped in history, Madrid and Amsterdam are two of the finest cities in Europe. Can you think of two better places to study gemmology?

Madrid - 2020 Schedule

| Course Name | Dates | | | |
|--|---------------|-------------|-----------------|-------------|
| Gem Identification #1 | March 2 - 6 | May 4 - 8 | Aug 31 - Sept 4 | Oct 19 - 23 |
| Gem Identification #2 | March 9 - 13 | May 11 - 15 | Sept 7 - 11 | Oct 26 - 30 |
| Coloured Gemstone Grading #1 | March 16 - 20 | May 18 - 22 | Sept 14 - 18 | Nov 3 - 7 |
| Lab-created & Treated Gems | March 23 - 27 | May 25 - 29 | Sept 21 - 25 | Nov 9 - 13 |
| Diamond Grading & Lab-created Diamonds | April 1 - 8 | June 3 - 10 | Sept 30 - Oct 7 | Nov 18 - 25 |

Amsterdam - 2020 Schedule

| Course Name | Dates | | | |
|--|------------------|-------------|-----------------|-------------|
| Gem Identification #1 | March 16 - 20 | May 25 - 29 | Sept 14 - 18 | Nov 3 - 7 |
| Gem Identification #2 | March 23 - 27 | June 1 - 5 | Sept 21 - 25 | Nov 9 - 13 |
| Coloured Gemstone Grading #1 | April 1 - 5 | June 8 - 12 | Sept 28 - Oct 2 | Nov 18 - 25 |
| Lab-created & Treated Gems | June 15 - 19 | Oct 5 - 9 | | |
| Diamond Grading & Lab-created Diamonds | June 24 - July 1 | Oct 14 - 21 | | |

Please note that classes are limited to six participants. To reserve your place, please download the applicable course application forms.

MADRID

AMSTERDAM



Interested in establishing your own gem academy or offering our programs or courses through an existing school, college, university or gemmological organization?

We would love to hear from you.

WORLD GEM FOUNDATION

Contact us at information@worldgemfoundation.com



Gemmology Today Quiz #12

Let's see how attentive
you have been?

CLICK ON THE
IMAGE TO START

IDEX IT'S GUARANTEED



THE EASY,
SMART AND
AFFORDABLE
WAY TO BUY
AND SELL
DIAMONDS



FOR ADDITIONAL INFORMATION ABOUT IDEX ONLINE

Visit: www.idexonline.com

Email: support@idexonline.com

or contact your nearest

IDEX Online representative

Antwerp +32-3-234-1157

Mumbai +91-22-6127-3333

New-York +1-212-382-3528

Ramat-Gan +972-3-612-8995

IDEX ONLINE DIAMOND TRADING NETWORK



For most people, buying gemstones and jewellery is a 'blind' purchase, often made on impulse and from sellers who do not always have the best interests of their clients at heart. Kim Rix would like to change that!



Seller Beware - Meet the Gemstone Detective!

It's been a busy couple of years for gemmologist, photographer and global explorer, Kim Rix, having just published the sixth book in the Gemstone Detective series; a collection of travel guides to help people feel more confident when purchasing gemstones and jewellery on holiday. Having returned from her latest adventure in Myanmar only days ago, Kim has hit the ground running to start writing the 7th book in the series.

Though the Gemstone Detective series has hit our bookshelves at a rate of knots, Kim's fascination with gemstones and jewellery has been a lifelong passion.

'As a seven-year-old, I was chosen by the Independent Adoption Society to present flowers to HRH Princess Alexandra,' Kim laughs, 'I was most excited about all the dazzling jewels I was sure she'd be wearing. Disappointed to find this was not the case, I cheekily asked the princess, 'Where's your crown?'

Upon reaching adulthood, Kim began to explore the world, always seeking out the local jewellery trade in every country she visited. Marvelling at how gemstones revealed their spectacular beauty in the creative hands of skilled artists and craftspeople, she began to frequent the Gemological Institute of America's (GIA) website.

Going back into the classroom environment after years of running her own business didn't appeal, so instead she satisfied her hunger to learn by watching jewellery television. 'It became an addiction,' Kim admits. 'Day after day, I would tune in to either Gems TV, The Jewellery Channel or Rocks & Co. I loved hearing the special guests talk about new gemstone discoveries, the mining process and how the trade is benefitting the local communities'.

It was a bad buying decision on holiday that planted the Gemstone Detective seed in Kim's mind. Kim was in Egypt when she bought a so-called 'natural' Burmese ruby that turned out to be glass. Embarrassed by her mistake after all those hours of self-directed learning about gemstones and now in a position to take things further, Kim finally decided to bite the bullet and enrol on the GIA course.

Juggling full-time study at GIA London with her increasingly successful photography business was difficult, but she qualified as a graduate gemmologist in 7 months.

'Later on, I had the immense good fortune to be able to learn from the renowned field gemmologist Vincent Pardieu. I first met Vincent at the GIA when he gave a presentation on Mozambique rubies. Listening to him, I knew that I wanted to be out in the field, not in a laboratory grading diamonds. A year later, I joined one of his field-training trips to the sapphire mines in Chanthaburi, Thailand.'

Driven by a growing sense of admiration for the honest small businesses and family-run enterprises of the worldwide gem trade, and a desire to help people avoid making the same mistake she did, Kim decided that she would use her experience to write the Gemstone Detective series. 'I have a genuine love for the countries I visit and the people I meet – after all, gemstones link people and places. The thing is that every country has its share of bad apples and tourist destinations are particularly prone to attracting scammers. You can't get away from that.'

She explains the importance of good buying decisions. 'What people buy on holiday has immense sentimental value: my own diamond engagement ring, for example, was bought in the Bahamas. It's important that these memories are not marred by disappointment and financial loss.'

While Kim is refreshingly honest and open about her experience of being cheated, many are less keen to openly admit (or be quoted) they've been fooled. Kim says that she was surprised by how many jewellery industry professionals have confessed off the record that they've made similar mistakes. Though Kim's Gemstone Detective series is aimed at people with little knowledge, she has found that people in the gem trade have found them helpful, especially small jewellery designers and those just starting out in the industry. 'I was thrilled when one gemmologist with 30 years' experience said he'd learned something new from my books,' says Kim.

Tourists and hobbyists are still Kim's target audience, though. At the airport, on the way back from the USA, Kim struck up a conversation with a woman decked in jewellery mostly bought from Gems TV. The woman showed her a pretty floral-style ring, which she had bought on holiday in Thailand for around £500. Under the impression that she was wearing sapphire, she had taken it to be valued for insurance purposes and was mortified when the jeweller revealed that it was coloured glass. It is, unfortunately, an all-too-familiar story.

Kim meticulously researches each book, travelling to each country in question – sometimes more than once – meeting key people in the industry and immersing herself in the culture as far as possible. On each trip, she has to remember to view everything through two pairs of eyes: those of the gemmologist and those of the rookie tourist.

As the former, Kim has had some informative, if hair-raising, experiences. She always tries, wherever possible, to visit the mines themselves. 'On my first Sri Lanka trip, I was given the opportunity to go down a sapphire mine. I left with a renewed appreciation of the conditions the miners work in, and how hard they have to work to feed their families.' More recently in Mogok, an excursion into a mine ended abruptly when the entrance began to collapse. 'We had to get out very quickly,' says Kim, 'I should stress here that I was accompanied by mining professionals – the mines are absolutely not playgrounds for tourists!' Driving 4443km solo through the Australian Outback with no human contact or even a phone signal was tough, and left Kim with an intense sense of isolation. Likewise, navigating herself across eight-lane motorways in the USA sent Kim's heart racing.

Luckily, Kim's natural verve and positive energy has helped her make solid local connections, all of which feed into the valuable advice the Gemstone Detective series gives. These experiences have taught Kim that the jewellery trade in each country is diverse, with different rules and different etiquette. To help her navigate these tricky situations, Kim always uses a local guide recommended by her global network of friends and acquaintances. 'In Sri Lanka, for example, my driver's second job was cutting gemstones. I learned lots of useful local and cultural tips from him – what to avoid at the gem markets, where to stand, how to negotiate and do business...'

Putting herself in the shoes of someone on vacation, Kim has tried out many gemstone experiences targeted at tourists. From fossicking for opals and digging for sapphires in Australia, prospecting for gold and diamonds in the USA and visiting the plethora of museums around the world that house breath taking specimens, Kim aims to include some fun family activities in her books as well as no-nonsense, clear advice about buying gemstones and jewellery in unfamiliar environments.

'The story behind a gemstone is important to its buyer,' Kim points out. 'I like to encourage the readers of my books to get out there and learn about their purchases. The mineralogy section of a good museum, shopping in a bustling local gem market, digging for your own gemstone or commissioning a local artisan makes the consumer experience much more meaningful and can even be the gateway into study of gemmology itself.'



Kim re-emerging from an Opal Mine in Lightning Ridge, Australia

Kim's next book, *Buying Gemstones and Jewellery in Myanmar*, will be aimed at a slightly different audience. Kim says that the Myanmar book is for serious gem enthusiasts looking for insider information.

Between 1962 and 2011, Myanmar suffered from military dictatorship and civil unrest. As a result, the country has never developed as a tourist destination, unlike the countries covered in her previous books. During this time, the city of Mogok (nicknamed 'The Valley of Rubies') was opened in 1995 to 1996 for Visit Myanmar year, then again in 2000 to 2003, before once again closing. However when Mogok celebrated its 800th anniversary in 2018, the gates were reopened to the public. The three-day celebration brought jobs to the local community, which had suffered from a lack of income in the gem trade and in other sectors. The government, heartened by the event's success, opened Mogok for tourists six months later. For how long it will be open is uncertain.

Myanmar – thanks to Mogok in particular – has become one of Kim's favourite countries. 'For the gemmologist or hobbyist, it's a fascinating place to visit. It's also a stunningly beautiful country (which satisfied the photographer in me!) and because I had a skilled local driver and English-speaking guide, I was able to experience aspects of the locality that a traveller without these would not.'

Kim is passionate when it comes to the ethical aspects of the gem trade. 'I believe we owe it to ourselves and future generations to do our best to help the planet survive and to do right by other people, through fair treatment and fair trade.' She acknowledges that sometimes complex ethical decisions are part and parcel of buying gemstones. 'Sometimes buyers are torn between buying from localities where they know laws are strictly enforced, and buying from people they can see are struggling to feed their families. As a global community, we in the gem trade need to uphold the ethical sourcing of gemstones as a priority. Transparency is key – consumers need to demand evidence of their purchases' provenance and traders need to be able to provide that.'

As the nights in London start to draw in, Kim shows no sign of slowing down – she is already busy making plans to research emeralds in Colombia in 2020 and to travel to Brazil in 2021. Smiling, she says, 'There are so many countries I'd like to cover, I feel like I've barely started...'

Kim Rix is the creator and author of *Gemstone Detective*, a series of travel guide books to help tourists who have an appreciation of beauty, buy gemstones and jewellery around the world.

You can contact Kim through her website:

www.gemstonedetective.com



Gem Mining in Sri Lanka (Photo by Kim Rix)

Sole Leone

Since 2004

Where Science Meets Art



Passionate about Gemstones & Education

Leone Langeslag (EG)

www.soleleone.nl

Meet the Team



Meet our team of dedicated professionals who all share a common philosophy, a common goal and a passion and commitment to gemmology and education.



Geoffrey M. Dominy
WGF Founder

Geoffrey Dominy 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.

Geoff has just released a 5th Anniversary Printed Edition (Two Volumes) and hopes to publish Gemología Para Todos (the first 14 chapters of the Handbook of Gemmology) in Spanish in 2019.

He currently lives in Palma, Mallorca, Spain and in addition to lecturing and promoting his book, is the founder of the World Gem Foundation and Mi Isla También.



Leone Langeslag
Dutch Gem Academy

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

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



Deborah Mazza
British Gem Academy

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

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



Conny Forsberg
Scandinavian Gem Academy

Conny Forsberg has over thirty years experience as a gemmologist and precision gem cutter. He received his FGA in 1986 through Gem-A, his diamond grading diploma through Hoge Raad voor Diamant (HRD) in 1994 and is an Accredited Senior Gemologist with the Accredited Gemologist Association (AGA).

He is currently the owner of the Swedish Gem AB, a modern and accomplished gem lab as well as a precision cutting facility. He has twice received 'Honourable' mention in the Gem-A photo competition for his photomicrography (2011 & 2013) and is a valued contributor to the Handbook of Gemmology, with a large collection of his photomicrographies planned for the upcoming 4th Edition. Conny is also an Accredited PRINCE2 Practitioner (Project Management), experienced in public procurement and contracting (EU law) and the initiator and organizer of the Scandinavian Gem Symposium. He is currently the auditor for the Swedish Gemmological Association.

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

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

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



Jan Asplund
Scandinavian Gem Academy



Leroy Bakelmun
Gem Academy of Canada

Leroy Bakelmun started his gemmological career after receiving his certificate in gem cutting and polishing at the Lapidary Training Centre Sri Lanka in 1995. In the same year he also received his certificate in Gem Identification, through the A.K. Institute of Gemmology in Sri Lanka.

In 2006 he received his 'Gemmologist' certificate through the Canadian Institute of Gemmology (C.I.G.)

Leroy has extensive experience buying and selling gemstones. From 1997 to 2014, he owned and operated GeoGem Jewellers in Langley, British Columbia, Canada and from 2012 to 2014, he also owned the 925 House of Silver in Fort Langley, British Columbia, Canada.

Gérard Raphaël Quintin 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.



Gérard Raphaël Quintin
South American Gem Academy



Cristina Rzepka de Lombas
Central American and
Caribbean Gem Academies

Cristina Rzepka de Lombas is a geologist, gemmologist, appraiser of gemstones and jewellery and an expert in diamond and coloured gemstone grading.

Currently Cristine serves on the Board of Directors of the Instituto Gemológico Español (IGE) in Madrid, Spain where she also teaches their 'Gems of Organic Origin' course.

She is also the Director of Education for the Central American and Caribbean Gem Academies.

Kyalo Kiilu 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.



Kyalo Kiilu
East African Gem Academy

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
Gem Academy of DR Congo

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

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

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

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



Jack Ghazalian
American Gem Academy
Director of Corporate & Career
Development

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

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

Barickeh Charles Kholifa

Koroma 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.



Barickeh Charles Kholifa Koroma
West African Gem Academy

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.

A new 'Team Member'

We are delighted to announce that the **French-Swiss Gem Academy** will be operational in mid-October 2019 as a full-service facility. Who will be heading up the academy? All will be revealed soon!

Article Submissions

The deadline for
the next issue is

November 15th, 2019

Guidelines:

- We do not accept highly scientific articles. These are better suited for either the Journal of Gemmology or Gems & Gemology
- All articles should be a minimum of one page.
- All accompanying photographs must be high resolution.
- All photographs must be accompanied by written permission from the copyright holder unless the author owns the rights.
- Wherever possible please try to supply images from the same photographic source or one that are at least compatible with each other. This will ensure that the article is aesthetically pleasing as well as informative.
- We reserve the right to refuse articles

E-mail all submissions to:

information@worldgemfoundation.com



Leafing through this book, I was immediately struck by the quality of the images. Both photographic technique and reproduction technology have seen a great leap forward in the past ten years and this book is an excellent showcase of these improvements.

The major photographer, Thierry Falise, has done a particularly good job of capturing the everyday scenes of miners working and dealers dealing. I was particularly struck by the mining images. Having visited and photographed inside Colombian mines, I can attest to the difficulties of producing a good image.

Just a few highlights.....

The foreword includes a series of interesting charts graphing numbers of emeralds by weight examined by the GRS lab (2000 - 2017). Three additional charts break down the numbers into fine color as well as the rare trapiche and cats eyes. Though hardly a comprehensive look at overall emerald production, it does give real insight, useful to both the professional and the aficionado, into the relative scarcity of first quality gems and two rare emerald types.

The book's organization is unhelpful. There are twenty-eight chapters and intermezzos. The latter term, as the name suggests, describes chapters between chapters. It is difficult to discern any difference between the two as each cover several, often distantly related, topics. A comprehensive index would have been useful here, but that, unfortunately, is lacking.

First Intermezzo, Masterpieces, showcases images and descriptions of important antique 'crowns', a full-page image of the world's largest fine unenhanced emerald plus a contemporary suite.

Chapter One; Fever of the Conquistadors, presents a nicely illustrated and refreshingly accurate history of the Colombian discoveries. It not only documents the events, it also does not dance around the fact that atrocities were committed by Spanish conquistadors in their single-minded quest for pearls, emeralds and gold.

Second Intermezzo; Stories of Magnificent Jewels, tells some interesting tales indeed. Illustrated with full page images, this section focuses on crowns, objects d'arte and liturgical objects.

Chapter two; The Pinnacle of Emeralds: The reader is treated to a general discussion of world emerald sources, gem quality and fakes which morphs into another section of 'Masterpieces'. There are some exceptionally beautiful images in this section, but it seems to be an extension and more properly belongs in either the first or second intermezzos, which themselves, might have been consolidated. But, then again, there are images of masterpieces scattered everywhere throughout this volume. An embarrassment of treasures!

Chapter Three; From Green Wars to Grey Peace: We learn about the period of unrest at the Boyacá mines in the 1980's known as the Green or Emerald Wars. Conflict and violence are not new to the gem trade, but the situation in Colombia became particularly violent when the cocaine kingpins of the Medellin Cartel attempted to take over the mines. A formal peace agreement, signed in 1990 has largely held, but, the authors warn, an attempt to reaffirm the agreement in 2015 failed.

Chapter four: A Dream In The Deep, showcases the co-author's fine images of mining operations mentioned earlier, along with an interesting two page graphic geological profile of Cosquez, the third of the original historical triumvirate.

Chapter Five; The Twilight of the Guaqueros gives insight into the incredibly hard life of the guaqueros, the independent miners who eke out a precarious living working the tailings - the streams flowing out of the large-scale partly mechanized mines.

This is a tale that varies little whether we are talking about the Kenese women of Burma or the gariempieros of Brazil. Like the information served up in the previous chapter, it is not the usual fare served up in folio sized gem books. It is, however, essential reading for jewelers and armchair aficionados who wish to peer beneath the gloss and get a real factual overview of the workings of the trade.

Chapter 8; Flying Into The Heart Of The Mining Land: Beside some useful diagrams of the geology of the Colombian mines, provides access to a number of short but well produced videos. The reader need only scan the QR codes at the bottom of many of the images in this chapter to be whisked away, by cell phone, on a trip to the storied emerald mines of Boyacá. My particular favorite; Geology of Emerald Mines, page. 250.

Overall the book offers up beautiful photographs, catalogues of magnificent jewels and lots of information of interest to everyone from the dedicated professional to the casual aficionado, at the turn of each page. Author Adolf Peretti has enhanced this experience with his video series. This is an outstanding innovation.

Magnificent Green is a book of stories, beautifully illustrated stories. Stories of miners, stories of lapidaries, stories of the Emerald Dons, stories of brokers and stories of magnificent gems and their wealthy and sometimes quixotic owners.

There is a dearth of really good contemporary works on emerald in English. The present volume is both a beautiful, well written valuable addition to the literature and is highly recommended. Well-constructed and sturdy the book is printed on high quality paper with an eye pleasing layout. Every gemologist, jeweler and emerald aficionado should make a point of adding Magnificent Green to their library.

Magnificent Green, On The Trail Of The Legendary Colombian Emerald

Authors: Adolf Peretti and Thierry Falise

Dimensions: 26cm x 26cm x 3cm Weight: 1.6 kg

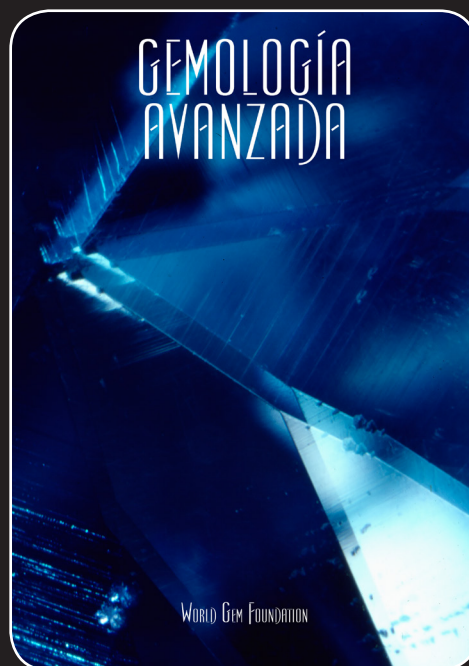
ISBN: 978-3-906905-10-5

Publisher: GRS, GEMRESEARCH, SWISSLAB 2018

Copies can be ordered at: www.gemresearch.ch

Price: \$100.00

Hablas Español?



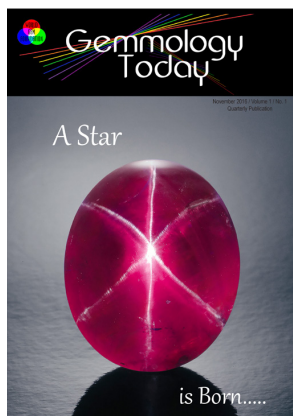
Dos cursos ahora disponibles
en español a través
World Gem Foundation

Gemmology Today in Print?

Each issue of Gemmology Today is individually bound and available in sets of four. Please click on the 'ORDER TODAY' icon below. All orders are shipped from Spain. Prices include shipping and handling.

Prices:

Set of Four € 75 (EU) and € 85 (Outside EU)
Set of Eight € 150 (EU) and € 170 (Outside EU)
Set of Twelve € 225 (EU) and € 255 (Outside EU)



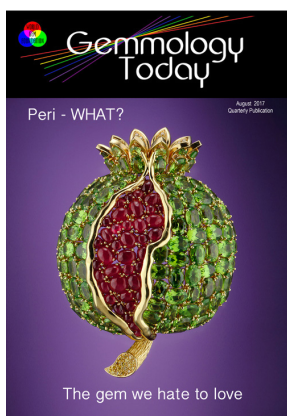
November 2016



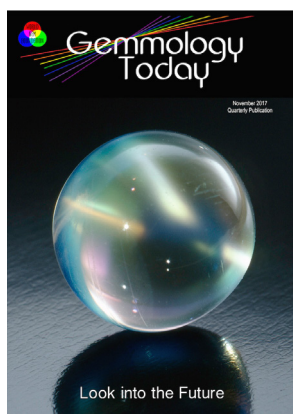
February 2017



May 2017



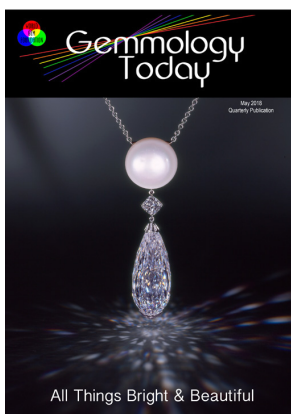
August 2017



November 2017



February 2018



May 2018



September 2018



December 2018



March 2019



June 2019



September 2019

Order Today!

The Spice of Life

Coloured Gemstones



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



Aquamarine - Summer Breezes and Cool Winter Icebergs



Aquamarine cut by Michael Dyber (Photo by Tino Hammid)

Aquamarine is the sea blue to light green variety of beryl that is also the birthstone for March. Next to emerald, aquamarine is one of the most popular members of the beryl family, which also includes morganite (pink), heliodor (yellow), goshenite (colorless) and bixbite (red).

A staple in most jewellery stores, most people are familiar with aquamarine but rarely get the opportunity to see fine quality stones with the majority being light in color and low in saturation.

Etymology

The name aquamarine is derived from the Latin: aqua marina, (aqua = water and marina = sea), which translates to 'water of the sea' as it resembles the color of seawater. Since legend states that aquamarine was treasured by mermaids and sailors would carry them to protect themselves against drowning it seems quite appropriate.

Geology

Aquamarine is commonly found in cavities, granite pegmatites, alluvial deposits and sometimes stream gravels. This blue variety of beryl belongs to the hexagonal crystal system and some enormous transparent crystal masses have been found, producing exquisite gems weighing thousands of carats.

Gem Deposits

The largest producer of aquamarine is Brazil; other important producers include Pakistan, Myanmar (Burma), Russia, China, Namibia, Mozambique, Zambia, Kenya, and the United States (Colorado and California).

Recently a very nice dark blue variety of aquamarine was found in Madagascar.

In 1910, the largest ever aquamarine was found in Brazil, Minas Gerais, weighing 243 pounds (110 kg).

Characteristics

Since Aquamarine belongs to the beryl group it is a beryllium aluminium cyclosilicate with the chemical formula: $\text{Al}_2\text{Be}_3(\text{SiO}_3)_6$.

Aquamarine is a hard (Moh's Scale 7,5 to 8) and durable gem, but it may develop internal cracks if mishandled. In general, aquamarine is transparent to translucent and is often 'eye clean'. Cleavage is poor and the luster is vitreous.

Color

The blue color of aquamarine can vary from light blue towards blue, blue green and a deeply saturated blue. The best blue color is often called 'Santa Maria Blue' and the new variety from Madagascar is called 'Double Blue' due to its intense blue color.

Aquamarine obtains its blue color from iron impurities within colorless beryl. This depends on the relative concentrations



Stunning Brazilian Aquamarine (Photo by Tino Hammid)

and location of iron within the beryl crystal structure. The deeper the blue color, the more valuable the gem. It is routinely heat-treated to bring out the blue hues, but while the treatment is unfortunately undetectable, it is very stable.

Physical Properties

| Physical & Optical Properties | Aquamarine |
|-------------------------------|--|
| Crystal System | Hexagonal |
| Chemical Composition | $\text{Al}_2\text{Be}_3(\text{SiO}_3)_6$ |
| Colour Range | Blue to Green |
| Refractive Index | 1.564 – 1.596 |
| Birefringence | .004 – .005 |
| Dispersion | .014 |
| Optic Character | Uniaxial |
| Optic Sign | Negative |
| Pleochroism | Colourless; Light Blue |
| Specific Gravity | 2.68 – 2.74 |
| Hardness | 7 ½ – 8 |
| Cleavage | Poor (Basal) |
| Fracture | Conchoidal to Uneven |
| Lustre | Vitreous |
| Transparency | Transparent to Opaque |
| Colour Streak | White |

As we can see from the chart above, the identification of aquamarine is quite straightforward using standard gemmological equipment.

Inclusions

As mentioned earlier aquamarines are typically clean and are classified as Type 1, which means that they are formed with relatively few inclusions and invariably have no eye-visible inclusions. Nevertheless inclusions that can occur include fingerprints and liquid inclusions, two-phase or three-phase inclusions, hollow or liquid filled parallel tubes, cavities, tubes that look like rain and mica flakes. Some crystal inclusions may occur such as apatite, almandine and spessartite garnet, quartz and tourmaline.

Cut

Since very large crystals are found it explains why aquamarine is a favorite among gemstone lapidaries, allowing us to enjoy often marvelous and imaginative cuts and shapes.

The aquamarine 'Dom Pedro' is the largest cut aquamarine gem in the world and was mined around 1980 in Pedra Azul, Brazil's Minas Gerais State. The crystal had an original weight of about 100 pounds (45 kg) and a span of over 3

feet (0.91 m). Dom Pedro was named after the Brazilian emperors Pedro I and Pedro II.

Optical Effects

Translucent aquamarine displaying the cats eye effect and asterism are uncommon, but they do exist and can show a weak 6 or 4-rayed star and sometimes both. Aquamarines displaying asterism and cat's eyes are cut en-cabochon to showcase these optical phenomena.

Treatments and Enhancements

Heat Treatment: Unheated natural aquamarine is normally found with a greenish coloration, often referred to as 'Sea foam'. This is due to presence of Fe_3 that imparts a yellowish color that combines with the blue color to give a greenish appearance.

By subjecting the stones to 400 degrees Celsius in a reducing (oxygen free) the green hue can be removed, making it more marketable and easier to sell. The use of higher temperatures may lead to discoloration.

The light blue to blue-green color of aquamarine may fade upon prolonged exposure to light, so it is especially important to purchase this gem from a reliable dealer.

Light green beryl can be transformed into aquamarine when heated to 400 degrees Celsius.

Irradiation: Colors can also be improved by neutron and gamma irradiation, but these changes do not last and will fade when exposed to strong sunlight.

A deeper blue variety of beryl called 'Maxixe', named after the Maxixe mine in Brazil where it was found, should be referred to as blue beryl, since it owes its color to natural radiation that creates a color centre.

Synthesis

The synthesis of aquamarine is possible using both the flux melt and hydrothermal processes. However since the costs of producing lab-created aquamarine are very high, lab-created aquamarine is generally not produced for the gemstone market.

Simulants

Light blue topaz is easily mistaken for aquamarine since the colors of both can be identical along with physical properties that are quite similar. Since topaz is generally less expensive, fraudulent dealers often sell their topaz as aquamarine.

Other imitators include lab-created spinel and glass, however their resemblance with aquamarine is only superficial since there are marked differences in their refractive indices, optical character and sign, and specific gravity. The only gemstone that may cause concern is aquamarine produced by the hydrothermal manufacturing technique. However under magnification it is not difficult to detect the near-colorless beryl seed plate and the surrounding blue overgrowth. This is often characterized by very weak color zoning running parallel to the seed plate.

Misnomers

There are a variety of trade names used, with many designed to mislead the buyer. Brazilian aquamarine, which as the name suggests should refer to aquamarine that originates from Brazil and Nerchinsk Aquamarine are in actual fact blue topaz.

Other names include 'Mass Aqua', which is actually faceted glass that is dyed blue to resemble aquamarine and 'Siam Aquamarine', a false name used for heat treated blue zircon.

Cleaning and Care

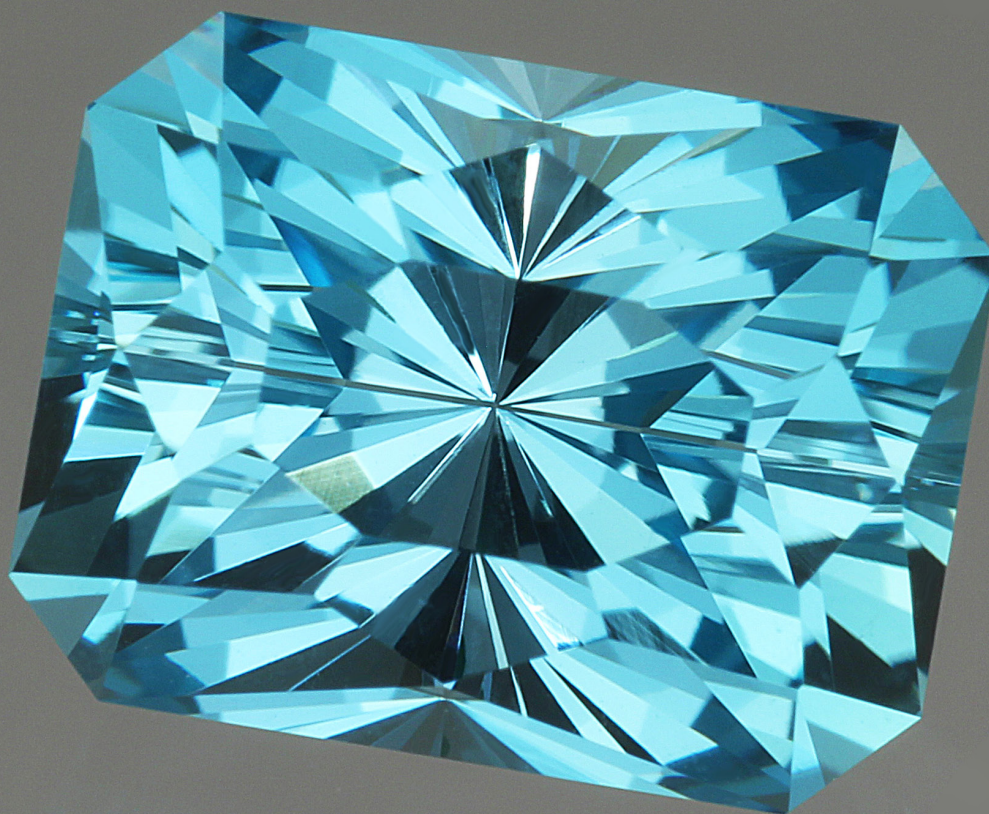
Aquamarine can be cleaned with ultrasonic and steam cleaners however stones with inclusions should be cleaned in warm water using a mild detergent. While it is generally stable to light, usage of hydrofluoric acid should be avoided.

Conclusion

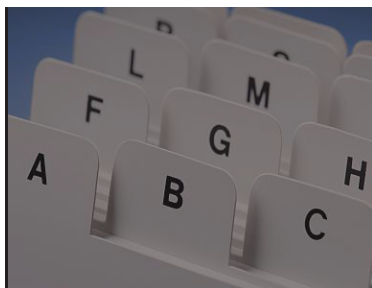
While aquamarine has suffered over the years from an over saturation of blue topaz in the market, it is an ideal gemstone for everyday wear and while price wise, it may seem expensive when compared to blue topaz, it is still relatively affordable. Mermaids are seldom wrong!

References:

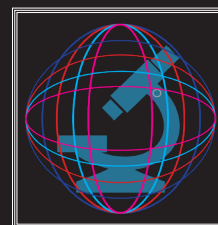
Handbook of Gemmology
Mindat.org
Gemdat.org
Geologypage.com



Aquamarine (Mozambique) Regal Radiant™ cut by John Dyer (Photo by David Dyer)



Academy Directory & Contact Information



| Academy Name | Website Address | E-mail Addresses |
|----------------------|--|--|
| World Gem Foundation | www.worldgemfoundation.com | information@worldgemfoundation.com |
| American | www.americangemacademy.com | info@americangemacademy.com |
| British | www.britishgemacademy.com | information@britishgemacademy.com |
| Canadian | www.gemacademyofcanada.com | info@gemacademyofcanada.com |
| Caribbean | www.caribbeangemacademy.com | info@caribbeangemacademy.com |
| Central American | www.centralamericangemacademy.com | info@centralamericangemacademy.com |
| DR Congo | www.gemacademyofdrcongo.com | information@gemacademyofdrcongo.com |
| Dutch | www.dutchgemacademy.com | information@dutchgemacademy.com |
| French-Swiss | www.frenchswissgemacademy.com | info@frenchswissgemacademy.com |
| East African | www.eastafricangemacademy.com | info@eastafricangemacademy.com |
| Scandinavian | www.scandinaviangemacademy.com | info@scandinaviangemacademy.com |
| South American | www.southamericangemacademy.com | info@southamericangemacademy.com |
| Spanish | www.spanishgemacademy.com | information@spanishgemacademy.com |
| Indian | www.indiangemacademy.com | information@worldgemfoundation.com |
| West African | www.westafricangemacademy.com | info@westafricangemacademy.com |

World Gem Foundation

Plaça de Quadrado 1, 4B
Palma, Mallorca 07001
Spain

Australian Opal Centre

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

Please Support

www.australianopalcentre.com