Facette

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SSEF AT AUCTIONS / MOGOK EXPEDITION / NEW ASDI DIAMOND MACHINE
DNA IN PEARLS / COLOUR-CHANGE GARNETS / SPESSARTINE / SSEF COURSES
JOURNAL OF GEMMOLOGY / TEAM ACHIEVEMENTS / ON-SITE TESTING

SSEF
SCHWEIZERISCHES GEMMOLOGISCHES INSTITUT
SWISS GEMMOLOGICAL INSTITUTE
INSTITUT SUISSE DE GEMMOLOGIE

Dear Reader

Every year, the editing of the SSEF Facette is for me the moment to look back on the past few months and to share with you what we have recently achieved at SSEF. With this issue, I am also very happy to look back even further as the SSEF celebrates its 40th anniversary this year. Our history has been marked by many major achievements that have been of benefit to the trade and gemmological community, many of them accessible on our website (www.ssef.ch). Founded in 1974 by Swiss trade organisations, the SSEF has considerably grown in the past 40 years. Under the leadership of former SSEF directors George Bosshart and Henry A. Hänni SSEF became an internationally leading gemmological laboratory, setting standards in gem testing and gem research. I am very proud to have been a part of SSEF's growth for many years. Looking back at the last few months and the projects planned for the near future, I am very confident, that our mission will continue successfully and look forward to being part of new advancements in our field.

2013 has been the most successful year ever at SSEF, and this has been supported by the launch of new products such as the *SSEF Premium Appendix* and our smooth SSEF-Ferrari shuttle service offered in all major gemstone hubs. It has also been a year of considerable expansion of our organization, with now 20 staff members and our relocation into a new office in Bangkok for our on-site services. Having achieved these very positive developments in 2013, I would like to thank my staff members for their commitment and excellent teamwork, without which this success would not have been possible.

These last few months have shown a marked increase in auction prices for most gems, especially for rubies and natural pearls. This development requires independent and reliable expertise by gemmological laboratories, and I am happy to say that the SSEF has been the first choice for testing of coloured gems, pearls and jewellery items sold at auction for record prices. The main article of this issue focuses on this aspect, in which we unveil some of the "highlights" of the last season that we have had the pleasure of analysing.

Apart from this, we have again been very active in research and achieved major breakthroughs, notably with DNA-fingerprinting of pearls and with the development of an automated spectral diamond inspection machine for small melee diamonds (see articles in this issue). The latter invention was developed in collaboration with the Physics Department of the University of Basel. After the huge media coverage about small synthetic diamonds intentionally mixed into lots of melee diamonds, we are confident that this new SSEF invention provides solutions against this threat that the market faces.

Personally, 2013 has been very satisfying with my appointment as assistant professor of gemmology at the Mineralogical Institute of the University of Basel. This appointment will further intensify our close ties with Basel University and opens up new directions and possibilities in terms of collaboration and research.

Finally, I would like to wish you not only a very successful and exciting 2014, but also much pleasure in reading this 21st issue of the SSEF Facette.

Dr. Michael S. Krzemnicki
Director SSEF

COVER PHOTO ▷

Trader showing ruby in marble matrix at the Mogok gem market.

Photo © M.S. Krzemnicki, SSEF

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SSEF REPORTS AT AUCTION

Jewellery with SSEF reports sold for more than 230 million US$ at auction in 2013.

In the last two decades, the role of international auction houses has changed from being rather a player within the trade community into becoming a main driving force in the sale of high-end jewellery directly to private collectors. In recent years they have established or reinforced their structures in emerging markets in the Far East and in the Middle East, expanding access to new markets. Auction houses have considerably contributed to the fact that high-end jewellery, diamonds, pearls and colour stones are regarded as an interesting investment asset even for private collectors with only limited knowledge of the gems. The two main international players in this field are Sotheby's (founded 1744 by Samuel Baker) and Christie's (founded 1766 by James Christie), among a number of other auction houses specialised in fine jewellery such as Bonhams, Tiancheng International and Phillips de Pury to name a few. With their professional international marketing, they have created much interest in gems and jewellery in the public, further stimulated by the wide media coverage they receive when selling outstanding and exceptionally fine jewellery at record prices. The effect is even greater when such objects are backed by famous and historic provenance, such as the Peregrina pearl, sold in 2011 as part of Elizabeth Taylor's collection at Christie's New York, and the historic 34.98 ct Beau Sancy diamond, which was in possession of European royal dynasties for centuries, sold at Sotheby's Geneva in 2012.

For items of such significance (and value), an independent gemmological report is absolutely mandatory. In many cases, more than one independent certificate is presented in the auction catalogue in order for potential buyers to be confident about the nature of the offered jewellery object. The Swiss Gemmological Institute SSEF certifies an important part of these valuable jewels offered at auction. Building on our integrity and our continuous research on new developments in gemmological science, we have become an internationally trusted authority for coloured stone and pearl certification for auction houses, the buyers, and the public.

From our perspective, the last year has been very exciting in terms of quantity and quality of jewels sold at auction with SSEF reports. A detailed study of the results of Christie's and Sotheby's sales in Geneva and Hong Kong (spring and autumn sales) revealed that coloured stones and pearls which were tested and certified by SSEF, were sold by these two auction houses for more than 230'000'000 US$ (including buyer's premium). We are very impressed! It underlines the fact that, internationally, a SSEF report is regarded as the best choice when it comes to selling or buying gems and jewellery of exceptional quality.

Another result of our market position is that we have the unique opportunity of being able to study the most exceptional gemstones and pearls with scientific methods. Still after more than 15 years at the SSEF I am personally fascinated every day by the diversity of gems and pearls, but especially with antique jewellery and the artistic design and craftsmanship that was necessary to create these items.

In the following, we would like to present the reader a small selection of exceptional items tested and certified by SSEF and sold by Christie's and Sotheby's at auction in 2013.

At the November sale in Geneva, Christie's sold two outstanding emerald necklaces: **The emerald and diamond necklace by Cartier,** which was made from jewels of the Patiño Collection, containing twelve highly matching Colombian emeralds of 108.74 ct total (SSEF report 69531) and was sold for 9'125'000 Swiss Francs. The second **emerald necklace in art deco design was created by Van Cleef & Arpels** and sold for 3'861'000 Swiss Francs. It contained nine drop-shaped emeralds of impressive size and exceptional quality (SSEF report 68689).

△ **Emerald and diamond necklace by Cartier. © SSEF**

△ **Magnificent pair of pearl pendants from the collection of Miss Lollobrigida collection. © SSEF**

Also in November, Sotheby's Geneva sold the **Richelieu Sapphires, a pair of rare and magnificent sapphire and diamond ear pendants** containing two Kashmir sapphires of 26.66 and 20.88 ct for 7'669'000 Swiss Francs (SSEF report 69008). It is understood that the sapphires in these earrings were given to Odile de La Chapelle de Jumilhac de Richelieu as a wedding gift on the occasion of her marriage to Count Gabriel de la Rochefoucauld, Prince de La Rochefoucauld, in 1905. An **exceptional unmounted Burmese sapphire of 114.73 ct** (SSEF report 69915) was another highlight of the same evening and sold for a world-record prize of 6'549'000 Swiss Francs. With the **"The Star of Kashmir"** Christie's Geneva sold in May 2013 a rare Kashmir sapphire of 19.88 ct for 3'371'750 Swiss Francs. This sapphire was set with two diamonds in a ring and exhibits an exceptional purity combined with a highly attractive velvety blue colour (SSEF report 66221).

Furthermore, we certified a number of outstanding rubies, such as the 5.09 ct "pigeon-blood" ruby from Mogok (SSEF report 69836) which was set in a ring with pink coloured diamonds and was sold by Christie's for 2'405'000 Swiss Francs. The "Pigeon Heart Ruby" ring by Cartier, containing a 31.30 ct antique cushion-shaped ruby cabochon (SSEF report 68467) came from a royal collection and was sold by Sotheby's for 989'000 Swiss Francs.

△ Richelieu Sapphires, a pair of rare and magnificent sapphires set in diamond ear pendants. © SSEF

△ Pigeon Heart Ruby ring by Cartier. © SSEF

△ 5.09 ct pigeon-blood ruby from Mogok. © SSEF

Concerning natural pearls, the SSEF has tested and certified all of the most exceptional and expensive items offered by Christie's and Sotheby's in 2013. In May, Sotheby's Geneva sold a magnificent pair of pearl pendants from the collection of Miss Lollobrigida for 2'285'000 Swiss Francs. The two impressive drop-shaped saltwater natural pearls (SSEF report 68168) were reportedly part of the collections of the House of Habsburg. A second pair of natural pearls (SSEF report 66997) of very exceptional size (261.66 and 216.37 grains) were offered nearly at the same time by Christie's and sold for 2'363'750 Swiss Francs, in November a pair of natural pearl pendants by Harry Winston, sold for 1'325'000 Swiss Francs at the Christie's sale. These two saltwater natural pearls of 124 and 108 grains were characterised by a very fine pearl lustre and a perfect drop-shape (SSEF report 68746).

We have to mention three exceptional natural pearl necklaces which achieved world record prices. In May, Christie's successfully sold an impressive single strand pearl necklace for 8'187'750 Swiss Francs. This necklace contained twenty-three slightly graduated natural pearls of approximately 10.4 to 13.7 mm diameter of highly matching round shape and pearl lustre (SSEF report 66235). This price was even topped in November, when Christie's Geneva sold a **spectacular seven-strand natural pearl and diamond necklace** for 8'341'000 Swiss Francs. After having analysed so many natural pearls for so many years, even we were amazed by the quality and beauty of this outstanding necklace containing 614 natural pearls of subtle white to cream colour and partly with distinct rosé and green overtones (SSEF report 69866).

The last of these very exceptional natural pearl necklaces was sold by Sotheby's Geneva in November for 5'205'000 Swiss Francs which was sold by Sotheby's Geneva in November for 5'205'000 Swiss Francs. The described necklace consisted of 52 carefully selected natural pearls of remarkable size (from 7.95 mm up to 12.50 mm in diameter) and were highly matching in shape, colour, and quality of pearl lustre (SSEF report 69939).

In 2013, we also had the pleasure of analysing and certifying a highly exceptional pair of jadeite bead necklaces (SSEF report 69131) from circa Republican Shanghai period which was later sold in Hong Kong, by Sotheby's for 42'680'000 HK$ (4'948'923 Swiss Francs). These jadeite beads showed a vivid but well-saturated colour and a highly matching translucency and were a good example of the finest jadeite from the reputed mines close to Hpakan in Northern Burma (Myanmar).

To conclude, the last year's auction sales were a great success, not only for the auction houses, but certainly also for SSEF, further establishing our position as a world leader in gem and pearl testing. Although we are proud to have gained the confidence of the trade and private collectors in the premium jewellery segment, we continuously strive to deepen our knowledge in gem and pearl testing by applying new scientific instrumentation and investing in extensive research (see also the following articles in this SSEF Facette). With this, we aim to continue to offer you the excellence in our services that you expect from us. ✶ **Dr. M.S. Krzemnicki.**

△ Exceptional pair of jadeite bead necklaces from circa Republican Shanghai period. © SSEF

△ An impressive single strand pearl necklace that sold for 8'187'750 Swiss Francs at Christie's May sales. © SSEF

△ A spectacular seven-strand natural pearl and diamond necklace. © SSEF

EXPEDITION TO MOGOK

Mogok in Myanmar (Burma) is a mythical place in the world of gemstones. It has produced some of the finest rubies and sapphires the world has seen in the last few centuries. After nearly a decade of being off-limits to foreigners, developments in Myanmar now mean that foreigners with a permit can visit the Mogok Stone Tract. We had the privilege of visiting the area in January 2014 and getting a first-hand impression of mining and trading activity in and around Mogok. It was also a great opportunity to study the geological context of Mogok in more detail and collect samples first-hand. This area has produced so many fantastic gemstones and is such a rich area in terms of the gemstone diversity going far beyond just ruby and sapphire.

△ Trading session going for jadeite jade pieces at the Mandalay jade market. © Laurent E. Cartier

Laurent E. Cartier and Dr. Michael S. Krzemnicki of SSEF were accompanied by Dr. Walter Balmer of the Swiss Gemmological Society (SGS). We were lucky to have Kyaw Swar Tun from the AGGL lab in Yangon as a guide on this visit to Mogok as he is very knowledgeable of the local geology and Burmese gemstones.

We began our journey in Mandalay where we visited the Jade Market, the main jade trading place in Myanmar. It was also a great place to observe the cutting and polishing of jade and other materials.

△ On the road from Dattaw to Mogok, the entrance to the Mogok valley with the sign of welcome to Ruby Land. From left to right: Nay Hlaing Oo, Laurent Cartier, Michael Krzemnicki, Walter Balmer, Kyaw Swar Tun, Kothar Thu.

During the journey to Mogok, we observed mining activity in the Mogok valley as we reached the town of Kin as well as in Kabaing, Kyat-pyin and all the way to Mogok. In the following week, we were able to visit many famous ruby and sapphire mines in the Mogok Stone Tract, such as Baw-mar, Chaung-Gyi, Dattaw, Kadoktat, Pyaung-Pyin, Yadanar-Kaday-Kadar and others. We were also able to visit the mines of Pyaung-Gaung that have produced some very fine peridots in the last few decades. It was especially interesting to see the very different mining techniques currently in use in Mogok, ranging from simple artisanal mining to mechanised large-scale mining.

We were hugely impressed by our visit to Mogok. The aura of Mogok clearly reaches far beyond just the gemstones themselves. The rich gemstone heritage is present in so many aspects of everyday life. The majority of the population has some link to gemstone mining or trading. We are grateful to the many mine owners and traders who opened their doors and let us visit their mining operations and show us their stones. We are especially grateful to Mrs. Miemie Tin Htut (Silken East Ltd., Bangkok) and Mr. Ko Choo for their help in organising this trip.

A full article on our research trip to Mogok is currently in preparation and will be published later in 2014. ✶ **L.E. Cartier & Dr. M.S. Krzemnicki.**

△ An overview of Mogok with the lake from the Ruby Pagoda. © Michael S. Krzemnicki

△ A rough sapphire being inspected from the Baw-mar mine in the Mogok Stone Tract. © Laurent E. Cartier

△ 20 metres deep in a shaft at Taung-Tut where mostly sapphire and spinel is found. The miners collect strongly decomposed eluvial material. © Laurent E. Cartier

△ The geology of the Mogok Stone Tract is highly complex, and much research remains to be done in understanding the specific formation and placement of gemstones in the area. Here, Dr. Michael S. Krzemnicki inspects folding structures in the Yadanar-Kaday-Kadar where both ruby and sapphire are mined. © Laurent E. Cartier

△ Primary ruby mining at Pyaung-pyin, where both large-scale secondary mining is combined with small-scale primary mining. © Michael S. Krzemnicki

△ Large-scale mechanised mining at Pyaung-pyin. The byon (gem gravel) is the dark brown material seen being removed. The material is stocked and will be washed during the rainy season. © Laurent E. Cartier

△ Rough gemstones at the morning Mogok market. Ruby, sapphire and spinel are commonly sold at the market. © Laurent E. Cartier

△ Peridot mining in Pyaung-gaung. This area has produced some beautiful and impressive peridot in recent decades. © Laurent E. Cartier

△ Local Kanase miners working the tailings of the Kyak-sound mine. It is a longstanding tradition in Mogok that local people can work the tailings of larger companies and keep what they find. © Laurent E. Cartier

ASDI (AUTOMATED SPECTRAL DIAMOND INSPECTION):

An efficient solution for the authentication of melee size-diamond batches

In 2013, numerous trade-press articles and gemmological laboratory alerts warned the diamond industry about the presence of synthetic diamonds mixed together with, or presented as, natural diamonds. These announcements pointed out that not only large diamonds, but also stars and melees are of concern. For simplicity in this article, we will name these two different categories "melees". Melees are generally regarded as round cut diamonds with a diameter of less than 3.8 mm.

The SSEF already foresaw these developments in 2007. This was a period that saw the arrival in the trade of larger quantities of synthetic diamonds and of synthetic diamonds that were no longer detectable based only on their specific UV fluorescence reactions. Thus, SSEF decided to develop a machine called ASDI, an acronym for Automated Spectral Diamond Inspection.

The goal of this ASDI machine was to serve the Swiss watch making and jewellery industry. We wanted to develop a fast and efficient solution to control and authenticate industrial quantities of colourless melee batches (up to several million melees per month in Switzerland). The aim of this machine is to authenticate the natural origin of melee diamonds and thereby keep synthetic melee diamonds out of the supply chain. The ASDI machine does this in two ways. Firstly, by automatically detecting and sorting out any colourless diamond imitation that might be present in a batch. Secondly, by automatically detecting and sorting out of any possible colourless synthetic diamond and any possible colourless HPHT treated diamond.

The instruments used in this machine have been used at SSEF for diamond testing for many years. Together with Michael Steinacher, an electronic engineer at the University of Basel, we adapted these techniques to the requirements of the ASDI machine. A Raman probe is used for characterizing diamonds versus diamond imitations. The inelastic scattering of diamond's carbon lattice gives rise to a characteristic diamond Raman peak at 572.6 nm. A short wave UV (SWUV) spectrometer is used for characterizing the SWUV transparency of each diamond. Colourless synthetic diamonds are of type II and HPHT treated diamonds are either of type II or of type IaB. Both types are typically transparent at SWUV. Thus, if a diamond is not transparent to SWUV, it is of natural origin.

In 2011, a prototype of ASDI was finally installed at the SSEF, but was not yet automatised; therefore, each single diamond had to be manually placed on the rotating glass and results were only displayed on two oscilloscopes, resulting in stones having to be sorted out manually. More than 10'000 melees were tested in such a way until June 2013. With this, SSEF gained unique experience with the testing of large quantities of melee diamonds. Each time a totally- to slightly- transparent SWUV transparent diamond was detected, it was first checked by infrared absorption spectrometry to evaluate nitrogen concentrations and secondly for its low temperature photoluminescence features.

△ The ASDI machine currently in operation at SSEF. © SSEF

Not one synthetic diamond was found, except one CVD synthetic diamond of 1.2 mm that was inserted on purpose into a tested batch by the director of the SSEF diamond department, as a way of imposing a blind test on the ASDI operating team. The ASDI machine easily detected this CVD synthetic diamond.

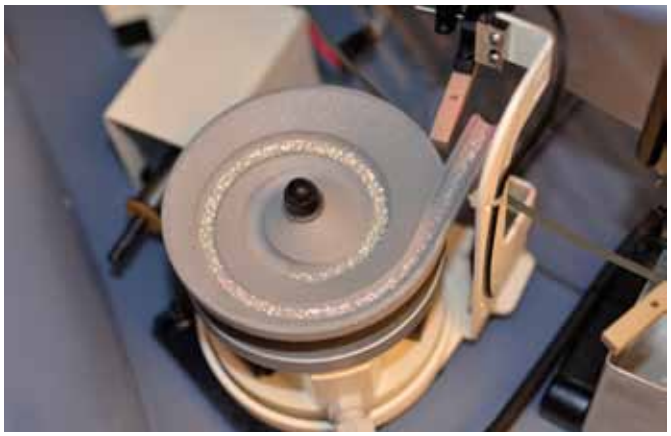
The electronics achievements required for the ASDI machine to function are impressive. For example, the power of the Raman signal, measured in only 30 milliseconds, is about $70x10^{-12}$W or 0,000 000 000 070 Watt). The electronic signal is treated in real-time. A built-in electronic algorithm pilots the electromagnetic arms that are responsible for sorting out diamond versus diamond imitations and SWUV transparent diamonds versus SWUV non-transparent diamonds with incredible reliability and speed.

For mechanical reasons, the use of the machine is restricted to melees with a diameter ranging from about 3.8 mm to 1.0 mm. The ASDI machine enables a testing rate of about 3'000-4'000 stones per hour once the combined analytical spectrometers - Raman and SWUV - have been successfully tested for their reliable and precise functioning.

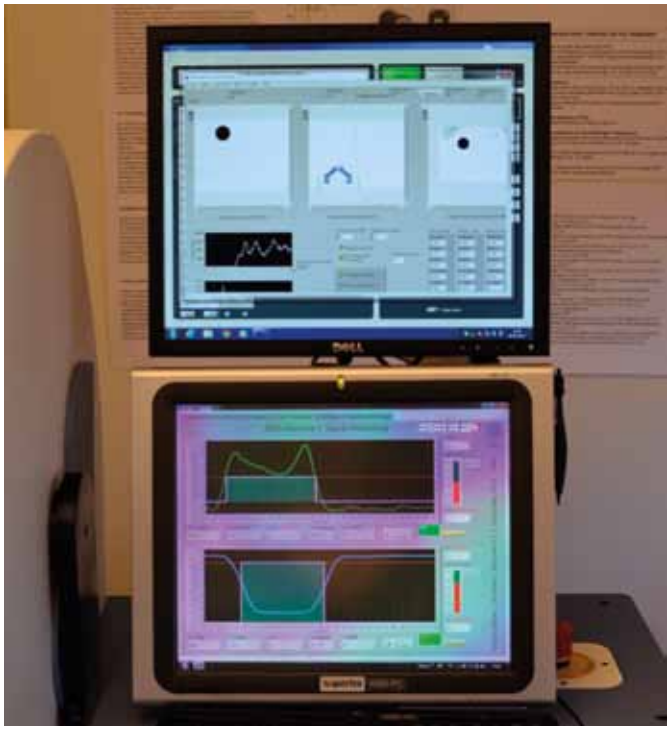
In addition to the authentication of melees provided by the SSEF analytical spectrometers, a series of two OPTEC cameras and an OPTEC built-in software gives 14 measurements for each individual authenticated diamond (maximum and minimum diameter, percentage of ovalisation, table size and percentage, crown size, percentage and angle, pavilion size percentage and angle, girdle thickness, etc.).

In September 2013, SSEF applied for a patent and four machines have been pre-ordered from SSEF and are being manufactured. In conclusion, based on thousands of tests performed by SSEF, the ASDI machine is a very efficient, fast, reliable and robust solution to overcome the unavoidable arrival of small colourless synthetic diamonds in the diamond trade. As of January 2014, the ASDI machine in place at SSEF has already authenticated more than 400'000 melee diamonds.

✶ **J.-P. Chalain.**



△ **Small melee diamonds are fed into a specially manufactured bowl that vibrates, gradually transporting the diamonds onto the rotating plate of the ASDI machine. © SSEF**



△ **The machine checks for the Raman signal and SWUV transparency of each individual diamond. Using two cameras, it also takes 14 measurements of each melee diamond © SSEF**

DNA FINGERPRINTING OF PEARLS

The past year has been exciting in terms of pearl research. In two collaborations with the Swiss Federal Institute of Technology Zurich (ETHZ), SSEF was able to achieve breakthroughs in DNA fingerprinting and age dating of pearls.

We were able to successfully extract oyster DNA from pearls, allowing us to trace and fingerprint pearls from different origins. This is the first report of oyster DNA extraction from a pearl, and the research was published in the international open-access journal PLoS ONE. The technology is currently being patented. We were able to recover minute amounts of DNA from a wide range of pearls. The amount of recovered DNA was sufficient to identify the mother oyster species of studied pearls. The sampled pearls came from Pinctada maxima, Pinctada margaritifera and Akoya oysters, which are the most important species in the trade of natural and cultured marine pearls. Samples also included Pinctada radiata pearls from the Arabian/Persian Gulf, Pinctada maxima from both Australia and Indonesia and Pinctada margaritifera from Fiji and French Polynesia.

By collaborating with the Institute of Integrative Biology (IBZ) of ETH Zurich, we had access to extensive DNA extraction expertise and technology. The project was led by Dr. Joana Meyer of ETH Zurich and Laurent Cartier of SSEF. This two-year research project funded by the Swiss Gemmological Institute SSEF was carried out to advance knowledge about pearls and to investigate the possibility of using DNA to carry out geographic origin determination of pearls.

An important part of this project was the development of a practically non-destructive technique to extract DNA so as to preserve the commercial value of tested historic and modern pearls. In one sample, 10 mg of drilled sample powder (see figure below) was sufficient to successfully identify the pearl-oyster species based on extracted DNA material. The recovery of sequences up to 675 bp in length indicates that DNA is well preserved in pearls even when pearls were harvested years earlier and stored for several years at normal atmospheric conditions in a drawer or safe. The organic material (OM) present in the $CaCO_3$ matrix in a pearl might be a source of DNA. The negatively charged DNA molecule is known to have a high affinity for the Ca^{2+} ion of $CaCO_3$, which might enhance its conservation in organic gems such as pearls.

This is a breakthrough in pearl science and opens up new and interesting opportunities for future pearl research and testing. We are constantly exploring new scientific methods to test pearls and are excited about this new method we have developed in collaboration with scientists at ETH Zurich, one of the world's leading universities. The findings of our pearl DNA research project were published in the open access scientific journal PLOSone in October 2013. Three press releases were issued by SSEF and ETH Zurich on October 16th 2013 about this discovery. This research breakthrough was widely reported by trade publications and the public media at an international level.

This DNA method can potentially be used to document the provenance of historic pearls and determine which oyster species produced either natural or cultured pearls. The ability to extract relatively large DNA molecules from pearls opens the possibility of applying next generation DNA sequencing (NGS) technologies to provide more extensive sequence data that would provide even more precise information on pearl origins. We anticipate that NGS technologies coupled with detailed population genetic analyses of reference oyster populations could enable individual pearls to be assigned to specific oyster populations, allowing a scientific assignment of a pearl's origin and providing more transparency for traders and consumers within the pearl industry.

Combining this DNA fingerprinting method with recent breakthroughs in age determination of pearls offers new ways of documenting the provenance of both cultured and natural pearls, but will also be helpful in documenting historic natural pearls. These new methods give us a considerable advantage in distinguishing different types of pearls. We hope to add them as client services in future. ✶

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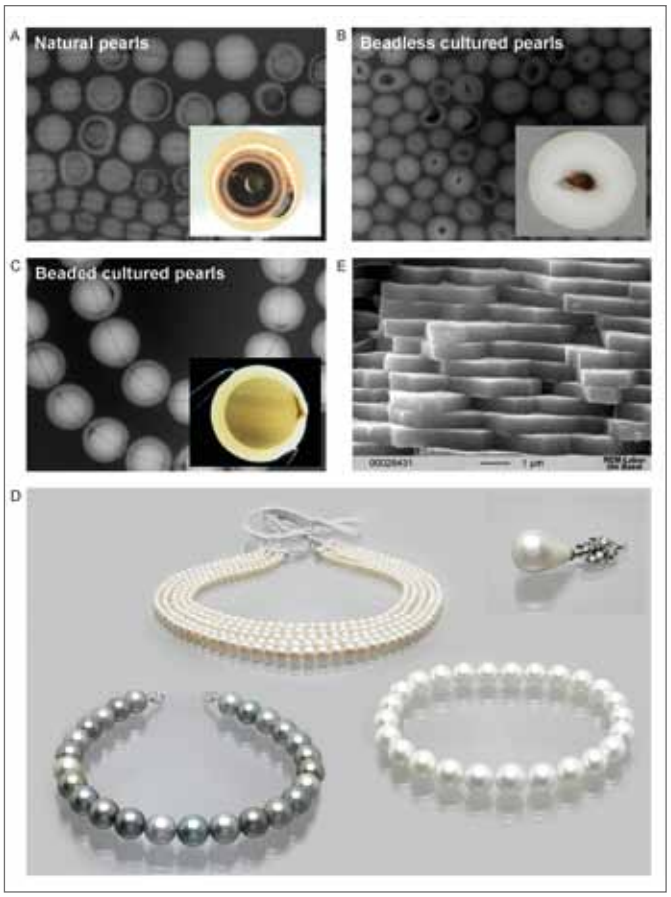
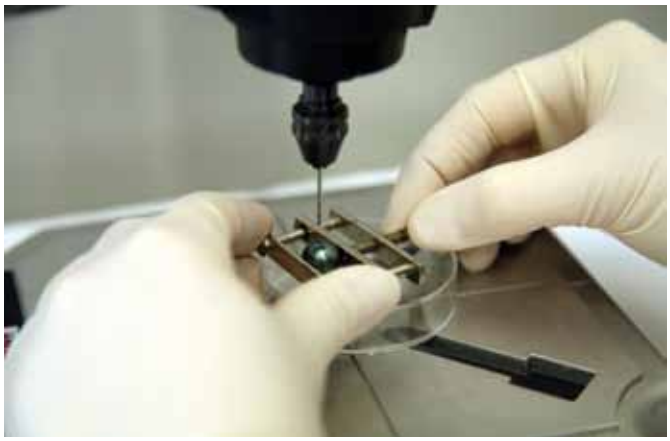
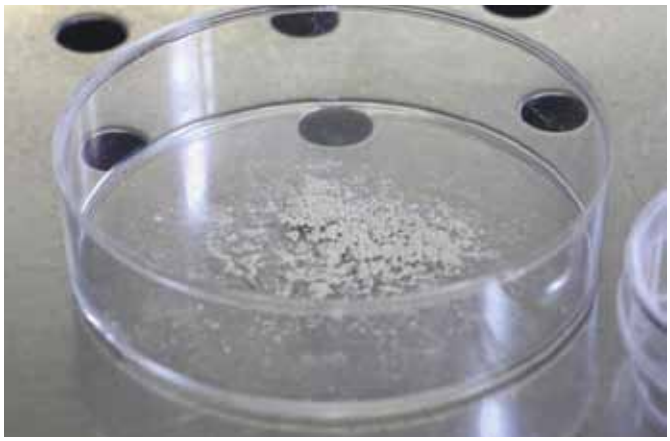
Meyer JB, Cartier LE, Pinto-Figueroa EA, Krzemnicki MS, Hänni HA, et al. (2013) DNA Fingerprinting of Pearls to Determine Their Origins. PLoS ONE 8(10): e75606. doi:10.1371/journal.pone.0075606.



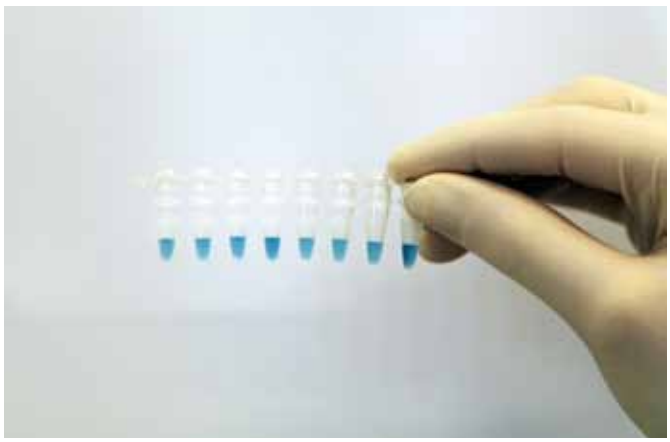
△ **Figure 1A-C**: X-ray shadow images and cross-sections of natural pearls, beadless cultured pearls and beaded cultured pearls. Figure 1D shows necklaces of pearls of Pinctada margaritifera, P. maxima and P. radiata. Figure 1E shows a scanning electron microscope side-view image of aragonite tablets of the nacreous layer of a P. margaritifera pearl (Photos: Swiss Gemmological Institute SSEF and Marcel Düggelin, ZMB, Basel University).



△ **Figure 2**: Pearls are drilled in a practically non-destructive manner to extract material that contains oyster DNA



△ **Figure 3**: Small amounts of recovered pearl powder from pearl samples that contains DNA.



△ **Figure 4**: The extraction of DNA from sample material extracted from 8 tested pearls.

BLUE COBALT SPINEL FROM VIETNAM

We would like to congratulate Ms Carina Hanser from the University Freiburg im Breisgau in Germany for the successful completion of her bachelor thesis on cobalt-spinel from Vietnam. Under the supervision of Dr Krzemnicki, Prof de Capitani (University Basel) and Prof Bucher (University Freiburg i. Br.) she investigated eight samples from Vietnam and three synthetic blue spinels (including a Verneuil-synthetic bluish spinel coloured by nickel). Apart from chemical and spectroscopic characterisation, she also used LA-ICP-mass spectrometry (University of Berne), UV-Vis spectrometry, confocal Raman microspectrometry, photoluminescence and UV-luminescence spectroscopy.

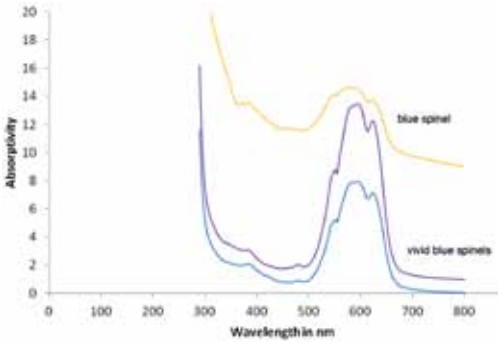
△ Vivid blue cobalt-spinel from Vietnam (left) and blue cobalt-bearing spinel (right) showing a colour change from blue in daylight to purplish blue in incandescent light. © M.S. Krzemnicki, SSEF

We were especially interested to gain a better understanding of the slight to moderate colour change from blue in daylight to purplish blue and lavender colours in incandescent light which is observed in part of these samples.

As a result of this study, the natural blue spinels could be subdivided into two groups: a) vivid "electric" blue spinels and b) lighter bluish to purplish blue spinels with a slight colour change (Figure 1). The vivid blue spinels are characterised by a high concentration of cobalt (approx. 250 - 630 ppm) resulting in distinct cobalt-related absorption bands in the UV-Vis spectra (Figure 2) at approx. 623 nm, 597 nm, and 579 nm 544 nm and 480 nm (see also Shigley & Stockton 1984), overlaying any iron-related absorption, even though they contain up to approx. 1.05 wt% FeO. These spinels show no colour change.

The natural blue spinels showing a slight colour change (group b) contain much less cobalt (5 to 20 ppm). Especially in combination with their distinct iron concentration of approx. 0.7 to 2.5 wt% FeO, their UV-Vis spectra are a complex combination of absorption bands due to cobalt and iron (Fe-related bands notably at 460 nm and 555 nm). Interestingly, only the colour-changing blue spinels react under the SWUV light with a weak greenish fluorescence, also detected as an emission band at about 520 nm in the UV-luminescence spectra.

To conclude, this study contributes to the understanding of the causes of colour in blue spinels, where cobalt at even very low concentrations (few ppm) may distinctly contribute to their colour. An article with detailed results is in preparation and will be published in 2014. ✶



△ Absorption spectra of two vivid blue spinels (blue and purple traces) showing distinct Co-related absorption bands and a blue spinel showing a Co-dominated absorption spectrum (orange trace) superposed with small Fe-related peaks at 460 nm and 555 nm. © C.S. Hanser, 2013

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ETHIOPIAN OPAL STABILITY EXPERIMENT

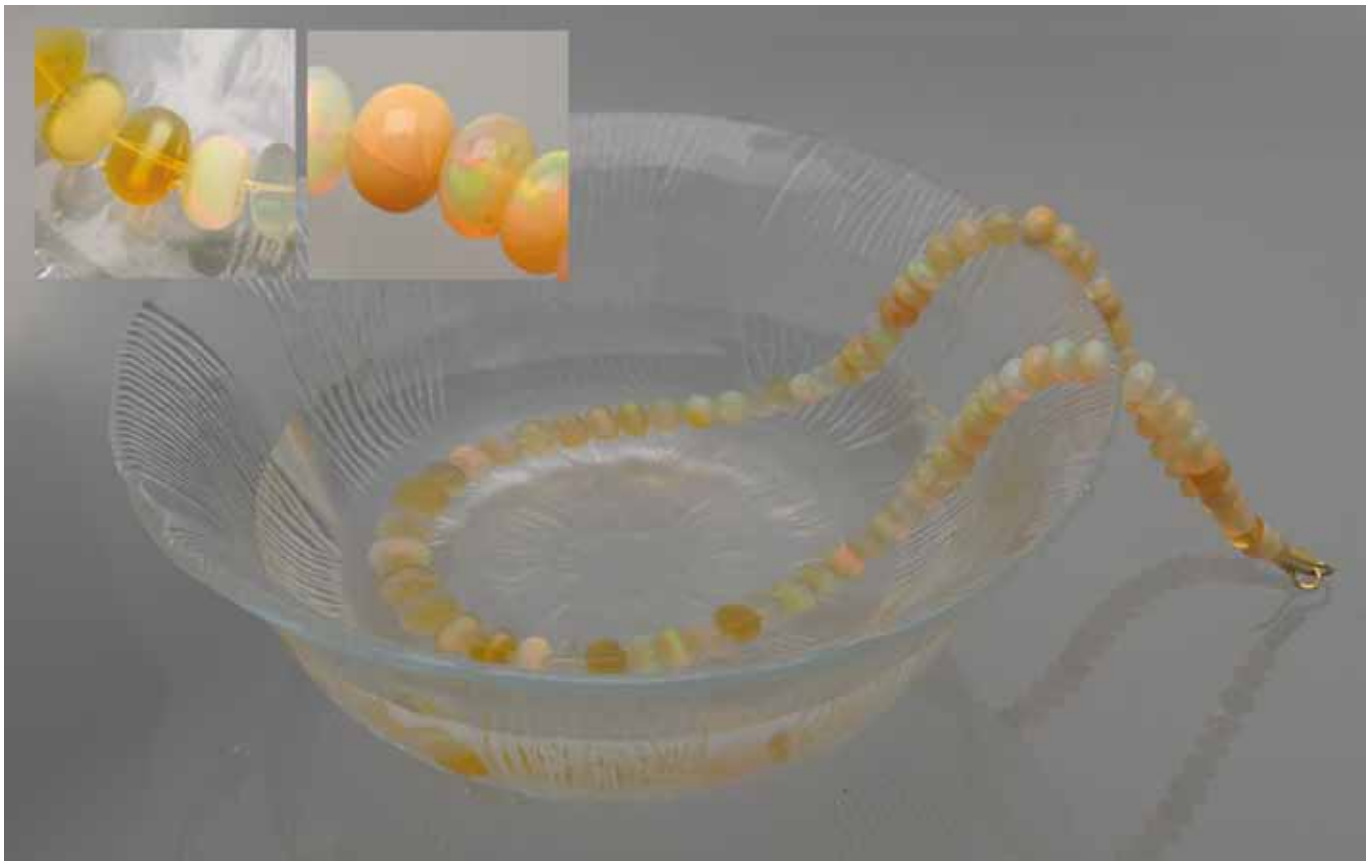
For the past few years, large quantities of opal from Ethiopia have entered the gem trade. Two main sources are known, which offer distinctly different opals. Brownish nodules with patches of precious opal have been found since 1993 near Mezero in the Shiwa Province, whereas the deposit discovered in 2008 near Wegel Tena in the Wollo Province of Ethiopia produces mostly white opal partly of outstanding quality.

As it is well known in literature, volcanic opals such as the material from Ethiopia may be distinctly hydrophile, i.e. they can de- or rehydrate easily. This property of these so-called hydrophane opals may not only considerably change their weight when immersed in water, but may also be used to impregnate the opal material with any coloured dye (see article in SSEF Facette 20, 2013). A more dramatic effect is that dehydration may, in some cases, produce cracks in the material. Already in 2011 (SSEF Facette 18), we had described such cracked opal from the Shiwa Province in Ethiopia that had been stabilised using an artificial resin filling.

The most recent case was a necklace submitted to SSEF for analysis and description of apparent damage - including a broken opal bead -, which had occurred after the item was sold to the client. The necklace consisted of 83 button-shaped drilled Ethiopian opal beads of white to brownish yellow colour partially showing distinct play-of-colour. First, a microscopic inspection identified a few beads with incipient fracturing.

With the permission from our client we then started an immersion experiment in water (Figure 1) to further study the development of cracks in the material. For this, part of the necklace was immersed in water for two days and then dried under ambient conditions. Immediately after immersing the opal beads into water, they started to absorb water and consequently slowly became transparent. After three hours in water, most beads still contained a small whitish (dry) core, surrounded by a colourless rim (hydrated). After a few more hours, all immersed opals were completely transparent with more or less visible play-of-colour. After two days, the necklace was slowly dried at room temperature and returned visually more or less to its original state; however, a few beads which had not showed cracking features at the beginning of this experiment now showed distinct fracture features after the drying, thus damaging their visual appearance and even their stability. Most beads however remained unchanged and turned back to their original state.

Based on this immersion experiment, it is obvious that the more or less hydrophile nature of Ethiopian opal (and ultimately of all volcanic opal) may in some cases be responsible for fracturing in some of these stones. In spite of this, it has to be stated that we have analysed numerous outstanding opals from Wegel Tena in recent years that have not shown any such damage. When following normal care recommendations, these deposits will continue to be a source of excellent quality opal in future.
✶ **Dr. M.S. Krzemnnicki.**



△ Opal necklace partially immersed in water for a stability test. Small inset photo on the left shows the situation after three hours in immersion, with a whitish core surrounded by a transparent rim. Small inset photo on the right shows a newly developed crack in an opal bead after drying. © M.S. Krzemnicki, SSEF

EXCEPTIONAL COLOUR CHANGE GARNETS SHOWING THE USAMBARA EFFECT

△ **Figure 1**: Colour-change gemstones in daylight (always top left of the pairs) and incandescent light (always bottom right of the pairs). This picture has been combined from several pictures. The relative size of the stones is not maintained. The colours in daylight and incandescent light have been corrected (Adobe Photoshop®) to best match the observed colours. © M.S. Krzemnicki, SSEF

Colour change, also known as "alexandrite effect" has been studied extensively since it was first described in 1831 for alexandrite (chromium-bearing variety of chrysoberyl) from Russia (von Pott, 1842). Since then, numerous minerals or gemstones with colour change have been documented (Figure 1), including corundum, spinel, zircon, fluorite, monazite, bastnäsite, garnet, diaspore, kyanite, epidote and kornerupine, to name a few.

Traditionally, we speak of a colour change when the main hue of a mineral in daylight differs from that seen in incandescent light (LMHC 2010, Infosheet No. 9). With the advent of new light sources (fluorescent and LED lamps), and recently with the ban of incandescent tungsten bulbs, this definition may need further specification in future. The main factors for observation of colour change in a gemstone/mineral are: a) two white light sources of distinctly different emission spectra (e.g. daylight versus incandescent light), b) a material that shows two transmission "windows" in its absorption spectrum separated by an absorption band at approximately 570 nm, c) an observer whose brain interprets the incoming residual light energies into an according colour sensation (White et al., 1967; Nassau, 1983; De Valois & Jacobs, 1984). Apart from colour change, there are further colour effects, which may considerably contribute to the colour perception of a mineral or gemstone, namely pleochroism (Liu et al. 1995) and the Usambara-effect (Halvorsen, 2006). Pleochroism describes the effect of different colours due to different selective absorption along the two or three vibrational directions within an anisotropic mineral (very distinct in alexandrite), whereas the Usambara effect is a colour change effect related to the path length of light transmitted in a stone (Halvorsen & Jensen 1997).

In 2013, we received for testing a few exceptionally large colour change garnets (50-100 ct) that showed a distinct and attractive colour change from brownish green in daylight to red in incandescent light (Figure 2). Based on the information of the suppliers of the stones, these came from southern Tanzania. Chemical and spectroscopic analyses confirmed that these garnets belong to the pyrope-spessartine solid solution series with marked concentrations of chromium and vanadium, well-known in literature to produce a colour change in garnet. We had analysed many similar garnets from East-Africa (Krzemnicki et al. 2001) in the past, but mostly in the range between 1 - 5 ct and only very rarely larger than 10 ct.

◁ **Figure 2**: Two colour change garnets (100 and 57 ct) in daylight (left) and incandescent light (right) showing a distinct colour change (alexandrite effect). Note the reddish brown colour along the girdle in daylight (left) in both samples, which in fact is a result of the Usambara effect. This brownish red colour is due to the "doubling" of the path length of light by internal reflections on certain pavilion facets. © M.S. Krzemnicki, SSEF

Apart from their very outstanding size, these new samples showed another very attractive colour change effect, the so-called Usambara effect. This specific effect, first noted by Manson & Stockton (1984) as "colour-shift" on colour-changing garnets was only later fully described by Halvorsen & Jensen (1997) on Cr-bearing tourmaline from the Usumbara mountain range, and thus named the Usambara effect. It describes the property of a material to change colour in relation to the path length that light travels through the material. In the case of our garnets of equally greenish colour in daylight, we can observe a dramatic change of their transmission colour into red when held together and illuminated with a strong light source from behind (Figure 3). This specific "colour change" is not related to different white light sources (as is the alexandrite effect, i.e. classical colour change), but is directly linked to the different path lengths that light travels through the material when viewed alone or when put together (resulting in a "doubling" of the path length).

Although garnets showing a classical colour change superposed by an Usambara effect have already been described (Manson & Stockton 1984), it is to our knowledge the first time, that this effect is so easy to see - even without superposition of a second stone. Due to their exceptionally large size, these colour-change garnets display a brownish-green colour in daylight in the main part below the table (+/- simple light transmission through the volume of the stone), but reddish facet reflections around the girdle as a result of increased ("doubled") path lengths of light by internal reflections (Figure 2). This effect is not visible when illuminated by an incandescent light source, resulting in an overall reddish colour of the garnets due to their colour change (alexandrite effect). ✶ **Dr. M.S. Krzemnnicki.**

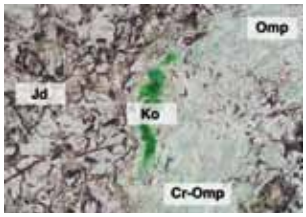
△ **Figure 3: Usambara effect (red transmission colour) shown with two superposed colour changing garnets (each brownish green in daylight). Garnets courtesy of Anthony Brooke, Gem Dreams Ltd., Bangkok © M.S. Krzemnicki, SSEF**

△ **Figure 4: Alexandrite in daylight showing a greenish colour and brownish to red facet reflections along the girdle due to its strong pleochroism. © M.S. Krzemnicki, SSEF**

JADEITE FROM KAZAKHSTAN

We would like to congratulate Ms. Kristina Ernst, student at the University of Basel (Switzerland), for the completion of her Bachelor thesis on jadeite rocks from Kazakhstan. This research project was under the supervision of Dr. Michael S. Krzemnicki (SSEF) and Prof. Dr. Leander Franz (Mineralogical and Petrographical Institute of the University Basel). For her thesis, she investigated a number of samples from Kenterlau-Itmurundy near Lake Balkhash (Kazakhstan), kindly provided by Mr. Nikolai Kouznetsov (Jade Resources Co., Hong Kong) and Dr. George E. Harlow (American Museum of Natural History, New York).

The petrographic, petrologic and geochemical investigations revealed five different rock groups: 1) jadeitites with medium-grained white sections of jadeite and fine-grained aligned chromium-jadeite, 2) pale green omphacite jadeitites with randomly oriented jadeite crystals overgrown by omphacite on their rims and along fractures, and three more complex types of jadeitites and 3-5) containing phlogopite, analcime, omphacite, albite, and even kosmochlor.



△ **Thin section photo of a foliated shear band containing kosmochlor aggregates (vivid green), slightly greenish Cr-omphacite, and omphacite, which cuts through the coarse-grained jadeite matrix. Photo: © K. Ernst, University of Basel**

As it is evident from these investigations, almost pure jadeite formed pre-tectonically under static growth conditions. During subsequent deformation, Ca- and Cr-rich fluids led to the formation of omphacite, Cr-omphacite, Cr-jadeite and eventually to kosmochlor. The largest amount of kosmochlor formed pre- and syn-tectonically in chromite-bearing layers of the rocks. Analcime, albite and phlogopite formed post-tectonically and during late brittle deformation. ✶

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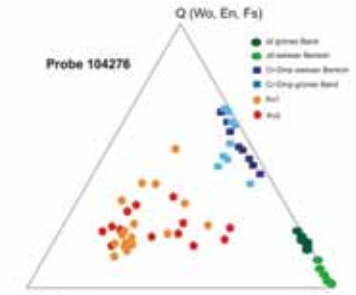


△ **Ternary diagram showing electron microprobe data of kosmochlor aggregates (orange and red), foliated Cr-omphacite (blue) and jadeite (green dots) from the adjacent thin section photo. © K. Ernst, University of Basel**

△ **Part of the investigated jadeite samples from Kazakhstan. Photo: © N. Kouznetsov.**

LION VS. SPIDER

△ **Figure 1:** The contest between a lion and a huge spider. © SSEF

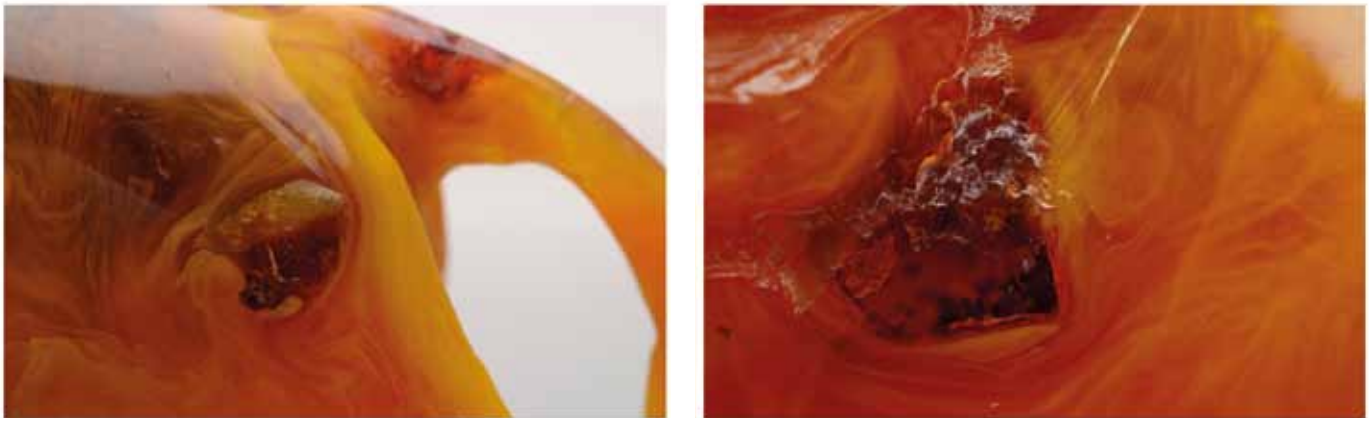
Who would be the winner, in a contest between a lion and a huge spider? This question seems more fitting for a fairy tale book or a zoological article rather than a gemmological topic. In the summer of 2013, SSEF had a chance to have such an event in the lab (Figure 1).

The lion statuette was claimed by a client as being made from a whole piece of amber. However, after analysis, we concluded that it was actually a manufactured product, assembled from plastic and resin fragments. Under higher resolution, the detailed features of the lion statuette show uncommon swirl-like structures in the plastic part and dark brown cubes that we assume to be resin fragments (Figure 2).

The hot needle test applied on the surface gave off a distinctly unpleasant smell. The lion had a relatively low specific gravity (around 1.2) and FTIR analysis confirmed its artificial identity and that it was not amber.

The spider (Figure 1), on the other hand, is an attractive brooch designed by Hemmerle that mimics the natural tarantula spider and has also been described in the book "Pearls" (Bari and Lam, 2009, Page 177). The whole item weighed around 320 grams. The round belly of the spider is from a non-nacreous natural pearl with a fabulous brownish orange colour. It has an extraordinary weight of around 110 ct and is around 3 cm in axis length. The upper body is made from fancy sapphires and the legs are decorated by small diamonds.

So guess, who is the winner? ✶ **Dr. Wei Zhou.**



△ **Figure 2:** The detailed features of the swirl structure and cubic-like resin fragments. © SSEF

DIDY RUBIES

Since 2012, a new gem find near Didy (Madagscar) has produced some sapphires and rubies of outstanding size and quality (Pardieu et al. 2012, Peretti and Hahn 2012). This material originates from a remote area in the jungle south of the small village of Didy, near Ambatondrazaka in central Madagascar. The finding of gemstones in the area immediately created a "gem-rush" with hundreds of miners and buyers attracted by the perspective of fortune, but was soon after closed down by authorities as it is located in a conservation area. To our knowledge, there is – after the first rush with a notable quantity of fine stones - only a limited supply of additional material presently. Nevertheless, material from this new source has left its mark on the gem-trade, mostly because of the high quality and large size of some of the gems found during the gem-rush in 2012. The SSEF has analysed a number of very attractive rubies from Didy in the range of 5 to 26 ct, all of them characterised by an outstanding purity. This material is in many aspects reminiscent of rubies from Winza and is similarly related to amphibolites – and can sometimes present characteristic short prismatic greenish amphibole inclusions.

△ An exceptional ruby specimen from Didy, Madagascar. © SSEF

Additionally, the investigated rubies from Didy have a slightly orangey red colour hue and weak greyish to bluish colour zones, but lack fine rutile needles (silk) commonly found in rubies from Mozambique and other sources. The rubies analysed by SSEF were exceptionally pure. They showed a rather low luminescence reaction due to their iron content that is quite similar to rubies from Winza and Mozambique. They also often show a characteristic peak at 3160 cm^{-1} in the FTIR spectrum, attributed to structurally bonded OH^- associated with Mg^{2+} (Smith and Van der Bogert, 2006).

With this new source of rubies and sapphires of fine quality, Madagascar has again proven its importance as a source of fine gems for the gemstone trade. Madagascar has a strong geological potential and we are very likely to see new gemstone finds from there in the future.

✶ **Dr. M.S. Krzemnicki.**

EXCEPTIONAL SPESSARTINE GARNETS

In 2013, the SSEF tested a number of very outstanding spessartine garnets. This manganese dominated member of the garnet group commonly shows a highly attractive and vivid orange colour and is thus also known and described in the trade as "Mandarin garnet". These gems can also be found as stones of exceptional size and clarity. Furthermore, they do not undergo treatment (as there is no successful treatment known to date, except possibly fissure filling which could be applied for any fractured stone). We think that these factors add greatly to their attractiveness.

△ Spessartine garnet from Burma and Nigeria (34 ct), arranged on the print out of the chemical analysis (EDXRF) of the Nigerian sample. The main peaks in the XRF-spectrum are due to the presence of manganese within their crystal structure. Photo © M.S. Krzemnicki, SSEF

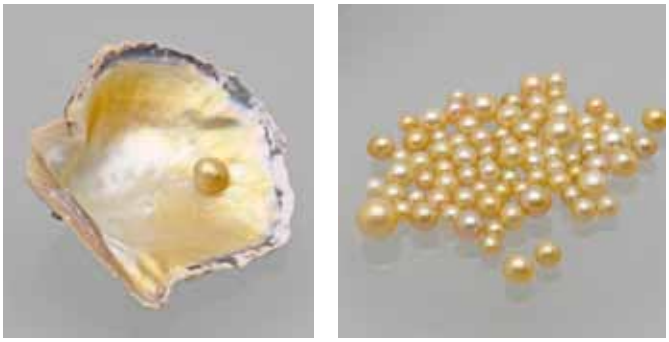
In the last few months, we had the pleasure of analysing not only a few outstanding spessartine garnets of up to 100 ct, but also a unique collection of 16 stones (total weight approximately 320 ct) of exceptional quality and highly matching vivid orange colour. The gems had been carefully pre-selected for future use as a jewellery set, consisting of a necklace, a pair of ear-pendants and a ring.

There are only very few gem deposits worldwide which have produced gem quality spessartine. Three of them are located in Africa with the Kunene area in Namibia, Loliondo in northern Tanzania and the gem mines close to the village of Iseyin in western Nigeria. From these three sources, the deposit in Nigeria stands out as it has produced some of the largest and purest spessartines ever found, such as the ones described above.

In addition to this, we had also the opportunity to investigate a number of spessartine garnets originating from Mogok (Myanmar). Our samples were provided by SilkenEast Co. Ltd. (Bangkok) and Yavorskky Ltd. (Bangkok) and showed a beautiful orange to slightly reddish orange colour, due to a higher iron concentration. A number of these stones have been added to our SSEF reference collection that already contains samples from the other mentioned main sources of gem-quality spessartine. ✶ **Dr. M.S. Krzemnicki.**

PIPI PEARLS FROM THE PACIFIC

Recently the SSEF received a lot of beautiful small so-called Pipi-pearls from the Pacific. These natural pearls are generally rather small, up to about 8 mm in diameter. This is not astonishing as they are formed within the rather small shell of the Pinctada maculata, a species which is widespread in coastal waters of Southeast Asia and the Pacific. However, these pearls are interesting for the pearl trade, as they may show very attractive yellow to golden colours and often rather round shapes. The internal structures of these pearls are very similar to those of Pinctada radiata, thus they often contain organic-rich internal zones with radially arranged columnar calcite, overgrown by the nacre of densely packed aragonite platelets. We would like to thank Mr. Isam Samin (Australia) for donating a number of these pearls to the SSEF collection. ✶



△ A nice selection of Pipi pearl samples, together with a Pinctada maculata shell sample. © SSEF

VANADIUM CHRYSOBERYL

Vanadium-bearing chrysoberyl of light green to saturated green colour has been known in the trade since the mid 1990s. Originally first described from Tunduru in southern Tanzania (Johnson & Koivula 1996, Pfenniger 2000), similar attractive "mint green" chrysoberyls have been subsequently found in Ilakaka (Madagascar) and Sri Lanka. Recently, similar chrysoberyl have also been reported from Mogok in Myanmar (Schmetzer et al., 2013), although these are in fact historic Mogok samples that were kept in public and private collections in England since the 1970s (Schmetzer et al. 2013a). Apart from these natural gemstones, Kyocera Inc. (Japan) had introduced synthetic V-bearing chrysoberyls of green colour more or less at the same time (see also Krzemnicki & Kiefert 1999).

Recently, we analysed a number of samples in a joint research project under the lead of Dr. Karl Schmetzer and have just published our results in the latest issue of the Journal of Gemmology (Schmetzer et al. 2013b). The focus of this detailed study is the comparison of the trace element composition (mainly V^{3+}, Cr^{3+}, Fe^{3+}), absorption spectra, and internal growth structures of the samples. At SSEF, we were mainly interested in analysing the few solid inclusions within these samples, which are mainly from the H.A. Hänni gemstone collection housed as a reference collection at the SSEF. Using our Renishaw InVia Ramanscope, we analysed a number of inclusions, identified as apatite (Tunduru and Ilakaka) and calcite (Mogok).

For more details about natural and synthetic vanadium-bearing chrysoberyl, we would like to refer the interested reader to this publication. For reprints, please contact SSEF at gemlab@ssef.ch

✶ **Dr. M.S. Krzemnicki.**

△ **Figure 1**: Vanadium-bearing "mint green" chrysoberyl from Tanzania of exceptional quality before (45 ct) and after cutting (40 ct). Photo © M.S. Krzemnicki

△ **Figure 2**: Small apatite inclusion on a short growth tube in a V-chrysoberyl from Tunduru (Tanzania). Photo © M.S. Krzemnicki

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BARBECUED TOPAZ

Apart from the normal testing routine, we sometimes stumble upon curiosities such as the following that we received from a Swiss jewellery brand. One of their customers returned a topaz set in a pendant, which she had bought a few weeks before in their boutique. To the astonishment of the boutique staff, the topaz of originally light blue colour had become dark brown (Figure 1). A first investigation by the in-house gemmologist revealed strange brown patches on the surface (Figure 2), immediately offering clues as to the reason for this change in colour.

△ Light blue topaz set in a pendant before and after being "barbecued". Photo © M.S. Krzemnicki, SSEF

For a more detailed investigation, this topaz pendant was submitted to the SSEF together with a few other blue topaz samples that were 'burnt' using a cigarette lighter. These burnt topaz samples showed brownish patches of smut after burning, similar to those found in the originally submitted topaz.

Raman microspectrometry analyses on the smut patches of all these samples revealed broad Raman bands at approximately 1350 cm^{-1} and 1590 cm^{-1} (Raman-shift), thus clearly indicating that it is mainly amorphous carbon, characteristic for ashes or charcoal. A simple cleaning with a brush and some detergent easily removed the smut coating and turned it back into a beautiful light blue topaz.

Although the customer who brought back the pendant claimed to have no idea about the reason for this brownish smut, we have a sneaking suspicion that it might actually have been the result of a small accident (topaz falling into the charcoal) during a barbecue. ✶ **Dr. M.S. Krzemnicki.**

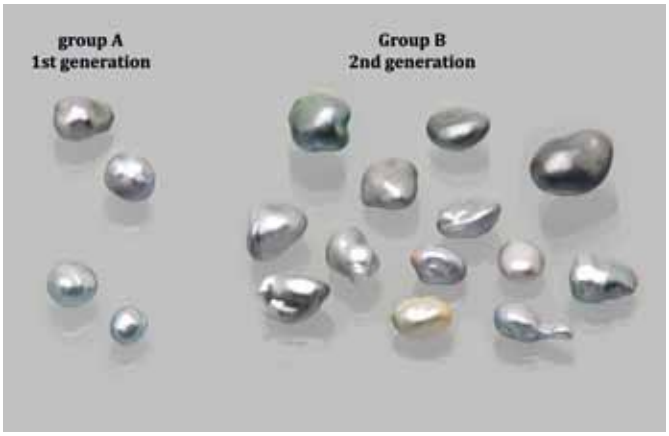
△ Details of the smut patches on the surface of the topaz, which caused the apparent dark brown colour of the topaz.

NEW BEADS IN CULTURED PEARLS

We were presented with samples of a new type of pearl product from French Polynesia by a pearl trader during the 2012 BaselWorld show. These pearls had unusual shapes, came in large sizes (up to 23 mm) and were characterised by a high visually appealing lustre. These pearls were called "Keshi baroque" cultured pearls. However after we carried out radiographic analysis, it was already clear that these were baroque-shaped beaded cultured pearls, making the use of the term "Keshi" wrong. Similar baroque- shaped beaded cultured pearls were later encountered at the September Hong Kong Jewellery show in French Polynesia and Switzerland. Samples were donated to the SSEF and we were able to carry out closer examination of these cultured pearls in 2013 to understand their formation mechanisms.

△ Baroque-shaped beaded cultured pearls examined during the BaselWorld 2012 show. The sample on the left has a diameter of 23 mm © L.E. Cartier

For this investigation, we studied and analysed two new pearl products: 1) a first generation product using an organic nucleus, so far not described in the gemmological literature (group A pearls in this study) and 2) a second generation product using freshwater shell pieces as beads for large baroque- shaped cultured pearls. The innovation (by Imai Seikaku Co. Ltd., Japan) to use organic nuclei in the first generation has two main reasons. First, to increase the growth rate and size of a pearl sac in a first generation and thus to be able to produce large sized cultured pearls faster than by the traditional method of grafting beads of increasing size from one generation to the next. Inserting a small nucleus also means that a smaller incision into the gonad is necessary, thereby reducing the risk of rejection and oyster mortality. A second reason for using this type of inflating bead is that a relatively young pearl sac has a better capacity to secrete nacre and produce a pearl with good colour and lustre, as statistical studies of pearl harvests have shown. When comparing a third generation pearl harvest to that of a first generation harvest, it is obvious that the average lustre of pearls is higher in first generation pearls. The rationale behind this innovation in nucleus technology is simple: reduced pearl growth time lowers costs and a potentially larger high quality pearl brings more income to a pearl farmer.



△ The cultured pearl samples investigated in this study. The pearls from group A were formed as a 1st generation product with an organic gelatinous nucleus. These cultured pearls are not introduced into the pearl trade but are only created to produce an inflated pearl sac. The upper two pearls are from Pinctada margaritifera (Micronesia), the lower two from Pinctada fucata (Japan). The cultured pearls of group B are the 2nd generation product and all come from French Polynesian Pinctada margaritifera production. The 2nd generation pearls contain a baroque shaped bead made from a freshwater shell. © M.S. Krzemnicki

Although the pearls seen in Figure 1 were first described as "Keshi" baroque cultured pearls, the use of this term is wrong. These pearls contain a baroque-shaped shell nucleus and are therefore beaded cultured pearls. This innovation in nucleus material and the resulting pearls are also interesting samples to study in order to better understand formation of the pearl sac and of pearls.

Although the cultured pearl samples (of second generation) studied in this article come from Pinctada margartifera, these nuclei are also reportedly being used in Pinctada maxima production in Indonesia. The baroque-shaped beaded cultured pearls described in this article are a niche product on the market at present. They have been produced to also meet demand for large baroque cultured pearls. It will be interesting to follow what developments new types of nuclei, such as the organic nuclei described in this article, will lead to in the production of cultured pearls. Both generations of these new types of pearl product can be clearly identified as beaded cultured pearls using the techniques available in a gemmological laboratory. ✶ **L.E. Cartier.**

△ A pearl oyster operating technician inserting an organic nucleus into a Pinctada margaritifera oyster. © L.E. Cartier

The full article of this research can be obtained by contacting us (gemlab@ssef.ch).

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Cartier, L.E., Krzemnicki, M.S., 2013. New developments in cultured pearl production: use of organic and baroque shell nuclei. Australian Gemmologist, 25, 1, 6-13.

△ Organic nuclei used for the 1st generation cultured pearls. The three stages of swelling show how these organic nuclei would inflate when soaked in water for five hours. When inserted into the gonads of an oyster, they expand less rapidly. © L.E. Cartier

SSEF COURSES
in 2014

2013 was a busy year for the SSEF Education Department. Our courses have a high international reputation and we see more and more gemmologists, jewellers and gemstone professionals from very different countries attending our courses. It's interesting to have participants from so many different gemmological and international backgrounds.

In 2014, we will again be offering a wide range of courses. The SSEF Basic Training Course (30 June - 15 July) and the SSEF Basic Diamond Course (20 - 24 October) offer good introductions, and participants can graduate with a diploma after taking theoretical and practical examinations. For more in-depth courses we offer Advanced Training Courses on coloured gemstones (13 - 17 October), pearls (23 - 25 April; 10 - 12 November) and small diamonds (27 - 29 October).

ADVANCED PEARL COURSE

This three day pearl course takes place twice a year (23 - 25 April; 10 - 12 November). It is ideally suited for participants (max. 6) who want to know more about how pearls are formed, about possible treatments, and how natural and cultured pearls can be identified and separated. SSEF's important collection of shells and pearls offer a good opportunity for practising and expanding your skills and knowledge of pearls. The course also offers an introduction into the use of UV-visible spectrometry, EDXRF, X-ray radiography and luminescence for pearl testing in a scientific laboratory.

ADVANCED COLOURED GEMSTONES COURSE

The advanced coloured gemstone training course (13 - 17 October) is an intense gemmological programme that offers a detailed hands-on approach to identifying treatment and origin of ruby, sapphire and emerald. In this course we demonstrate the possibilities and restrictions of treatment detection and origin determination of corundum and emerald. Participants will have the opportunity of analysing and testing numerous samples from our reference collection.

SMALL DIAMOND COURSES

The SSEF small diamond course (27 - 29 October), which focuses on diamonds of a diameter between 0.7 and 4 mm, mainly used in the watch industry, enables participants to themselves perform the quality control of such small diamonds. These courses are aimed at people working in the jewellery and watch industry, and can be tailored to your company's specific needs. Previous gemmological experience is welcome but not a requirement.

SCIENTIFIC GEMMOLOGY COURSE

In 2014, the one-week Scientific Gemmological course will take place 3 - 7 February. During this course, participants learn about techniques and applications of instruments like X-Ray fluorescence spectrometry, UV-Visible-NIR spectroscopy, LIBS (Laser Induced Breakdown Spectroscopy), Raman and FTIR spectrometry in the field of gemmology, as performed at the SSEF Swiss Gemmological Institute. Advanced gemmological education is a requirement.

SSEF "À LA CARTE" COURSES

The SSEF Swiss Gemmological Institute can personalise a course based on your or your company's specific requirements. This course format is especially suited for companies that need specific gemmological training for their employees. In 2013, several companies and authorities, such as Bulgari , Cartier, DYB and Windler Pearls benefited from such courses that were tailored to specific topics such as small diamond quality control, diamond treatments or learning to identify coloured gemstones from different origins.

If you or your company are interested, please contact us to discuss how a gemmological course can be tailored to your needs. ✶

CONGRATULATIONS

SSEF Swiss Gemmological Institute wants to express its congratulations to the following persons for graduating from the following courses:

SSEF Basic Gemmologist Certificate:

- Mohamed Kake, Switzerland
- Anna Hügli, Switzerland
- Michel Abouchar, Switzerland
- Bigi Uhl, Switzerland

SSEF Basic Diamond Certificate:

- Pronini Olivier, Rolex SA, Switzerland
- Myint Myat Phyo, Myanmar
- Florence Flühmann, Switzerland
- Susanne Scheer, Germany
- Stéphanie Hühne, Rolex SA, Switzerland

Only participants that pass the final exam receive the SSEF Basic Gemmologist or Basic Diamond Certificate. The qualification requires theoretical knowledge as well as practical skills in gemstone testing or diamond grading.

Advanced Gemmologist Certificate:

COURSES ON PEARLS

- Bettina Braun Goldinger, Switzerland
- Hans Pfister, Switzerland
- Antonio Seijo Navarro, Switzerland
- Anna Grünwald, Germany
- Ute Blasche Guntern, Switzerland

COURSES ON TREATMENT AND ORIGIN OF COLOURED STONES

- Daniel Struyf, Christie's Geneva, Switzerland
- Patrick Cervantes, Christie's Geneva, Switzerland
- Filippo Battino, Christie's Geneva, Switzerland
- Chan Chin Pong, Christie's HK, Hong Kong
- Keith Penton, Christie's London, UK
- May Lim, Christie's HK, Hong Kong
- Alexander Klumb, Germany
- Sebastian Hänsel, Austria
- Farah Adam Alsuhaily, Sweden
- Maria Carla Manenti, Italy
- Michael Edward Hing, UK
- Phornthip Saksirisamphan Rimml, Switzerland
- Dr. Tashia Dzikowski, Canada
- Omelchenko Iryna, Ukraine

COURSES ON SMALL DIAMONDS

- Claude Thiebaud, Cartier, Switzerland
- Nieves Princivalle, Cartier, Switzerland
- Delizia la Corte, Cartier, Switzerland
- Annalisa Furini, Bulgari Gioielli SPA, Italy
- Alessandra Marzoli, Bulgari Gioielli SPA, Italy
- Angelo Santini, Bulgari Gioielli SPA, Italy
- Giuseppe Varriale, Bulgari Gioielli SPA, Italy
- Fabiana Geromin, DYB SA, Switzerland
- Maria Fonesca, DYB SA, Switzerland
- Christelle Kolly, DYB SA, Switzerland
- Paulo Jorge Robalo Gomes, Dior, Switzerland
- Lucia Musilli, Bulgari, Italy
- Giuseppina Di Lorenzo, Bulgari, Italy
- Maria Cristina Barioglio, Bulgari, Italy

△ **ATC Coloured Gemstone Course participants in November 2013 at SSEF.**

SSEF AT SWISS GEMMOLOGICAL SOCIETY SGG

For many years, the SSEF, as a member of the Swiss Gemmological Society (SGS) presents several talks each year about our current research. The programme of the annual meeting in May 2013 - perfectly organised by Nicole Stadelmann, president of the SGS, and Michael Hügi, president of the scientific commission of SGS - was very interesting with presentations by Richard Hughes about gem deposits in East-Africa, Federico Baerlocher giving an insight into the current situation in Mogok, and Mrs. Katia Djevahirdjian, revealing to the audience the "alchemy" of the industrial production of synthetic corundum among many others.

From the side of SSEF, we gave presentations about corundum and its varieties (H.A. Hänni, former director of SSEF), the treatment of corundum and news from the SSEF (M.S. Krzemnicki), the detection of CVD synthetic diamonds mixed in lots of small diamonds (J-P. Chalain) and finally Fair-trade in the gem trade (L. Cartier). Special thanks also to Mr. Ronny Totah (member of the SSEF Foundation Board), who gave a highly amusing and interesting talk about the historic trickery involving Henri Lemoine against DeBeers, also known as the "diamond-factory" at Arras-en-Lavedan.

SCHWEIZERISCHE GEMMOLOGISCHE GESELLSCHAFT
SOCIÉTÉ SUISSE DE GEMMOLOGIE
SOCIETÀ SVIZZERA DI GEMMOLOGIA

As in former years, we recommend interested persons to join SGS, as it provides unique possibilities for gemmological education but also an ideal platform for networking in the Swiss jewellery trade. Interested persons can apply to be guests at the upcoming SGS conference taking place 5-6 May 2014 in Flüeli-Ranft, Switzerland. Please contact the SGS at www.gemmologie.ch. ✶

25%

PROFIT FROM REDUCED TARIFFS FOR SSEF REPORTS

The Swiss Gemmological Institute SSEF offers a 25% reduction on listed tariffs for SSEF members (see also www.ssef.ch). You will also receive the annual SSEF Facette.

Apply to become a member of SSEF (Swiss Foundation for the Research of Gemstones) and pay the annual membership fee of 550.- Swiss Francs and you are already taking full advantage of our member tariff for a whole year.

For more information, please contact our administration by phone +41 61 262 06 40 or e-mail admin@ssef.ch.

NEW SSEF - FERRARI SHUTTLE SERVICE

New attractive worldwide shuttle services: SSEF collaboration with Ferrari Express Inc.

The shipping of goods to the SSEF became easier and cheaper than ever before in 2013 when we launched our SSEF-Ferrari shuttle services. This worldwide network of shuttles has connected the SSEF to all major international trading hubs since February 2013.

This network has been set up in collaboration with Ferrari Express Inc., our premium partner for transportation. Ferrari Express Inc. - with more than 50 years of experience in the jewellery business - guarantees you a fast, smooth, and safe shipping service door-to door for all your valuable goods. Whether you send one item or several does not matter, you will only be charged one round-trip fee and possibly a liability fee depending on the total declared value (for details see next page). Shipping (and liability) for goods is invoiced by SSEF.

The service includes pick-up at your office – temporary export/import in your country and Switzerland; airfreight cargo for valuable items; Swiss customs fees; delivery to SSEF – and return transport with delivery to your office. The goods have to be insured by the client. If required, then Ferrari Express can offer you a customized insurance for 0.08% of the value. Please specify this when you order the shuttle.

Your advantages using the SSEF shuttle:

- Easy ordering: just dial one of the below indicated Ferrari phone numbers.
- Personalized service: speak to our contact person at your local Ferrari office.
- Smooth transportation: fast and safe door-to-door delivery.
- Simple accounting: SSEF testing and shipment charges, all on just one invoice.

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INSTITUT SUISSE DE GEMMOLOGIE

Daily shuttle between Geneva - SSEF

(call Ferrari Geneva office +41 22 798 82 60)

Costs: 80.- Swiss Francs per round trip.
For values > 500'000 Swiss Francs, an additional liability fee of 0.025% is charged for the amount exceeding this limit, based on the declared value.

Example 1: declared 100'000 SFr ▷ shipping costs: 80 SFr
Example 2: declared 1'000'000 SFr ▷ shipping costs: 205 SFr

Twice-a-week shuttle between New York, Hong Kong - SSEF

(call Ferrari New York office +1 212 764 06 76)
(call Ferrari Hong Kong office +852 2 264 20 01)

Costs: 160.- Swiss Francs per round trip and an additional liability fee of 0.025%

Example 1: declared 100'000 SFr ▷ shipping costs: 185 SFr
Example 2: declared 1'000'000 SFr ▷ shipping costs: 410 SFr

Weekly shuttle between London, Paris - SSEF

(call Ferrari contractor London office +44 1753 28 78 00)
(call Ferrari Paris office +33 1 499 66 060)

Costs: 160.- Swiss Francs per round trip and an additional liability fee of 0.025%

Example 1: declared 100'000 SFr ▷ shipping costs: 185 SFr
Example 2: declared 1'000'000 SFr ▷ shipping costs: 410 SFr

Twice-a-month shuttle between Italy, Bangkok, Mumbai, Jaipur, Taipei - SSEF

(call Ferrari Italy office +39 0131 208520)
(call Ferrari Bangkok office +66 22674755 to 8)
(call Ferrari contractor Mumbai office +91 222 3873659 / 60)
(call Ferrari contractor Jaipur office +91 141 2561002)
(call Ferrari Taipei office +886 2 25098511 310)

Costs: 160.- Swiss Francs per round trip and an additional liability fee of 0.025%

Example 1: declared 100'000 SFr ▷ shipping costs: 185 SFr
Example 2: declared 1'000'000 SFr ▷ shipping costs: 410 SFr

On demand shuttle between Doha, Dubai (UAE), Bahrain, Singapore - SSEF

(call Ferrari contractor Doha office +974 44074777)
(call Ferrari contractor Dubai office +971 4 2183211)
(call Ferrari contractor Bahrain office +973 1782 8631)
(call Ferrari Singapore office +65 6547 5560)

Costs: 600.- Swiss Francs per round trip and an additional liability fee of 0.05%

Example 1: declared 100'000 SFr ▷ shipping costs: 650 SFr
Example 2: declared 1'000'000 SFr ▷ shipping costs: 1100 SFr

On demand shuttle between Tel Aviv, Colombo (Sri Lanka) - SSEF

(call Ferrari contractor office in Tel Aviv (D2D Val express Israel) +972 3 575 4901)
(call Ferrari contractor in Colombo (Dart global logistics Ltd.) +94 11 460 09 600)

Costs: 400.- Swiss Francs per round trip and an additional liability fee of 0.05%

Example 1: declared 100'000 SFr ▷ shipping costs: 450 SFr
Example 2: declared 1'000'000 SFr ▷ shipping costs: 900 SFr

NEW!

For all details about the new SSEF shuttle with Ferrari Express Inc., including departure days, round-trip schedules, contact person, order information: please check our website http://www.ssef.ch/services/shipping-shuttles/ or call the SSEF +41 61 262 06 40 or send an email to admin@ssef.ch. ✶

INSURANCE POLICY

We would like to remind clients that all items sent to the Swiss Gemmological Institute SSEF for testing need to be insured for all risks by the client. Please note that by signing the blue order form, you confirm having an all-risk insurance for your items. This includes the time the item(s) is/are shipped to SSEF, during the evaluation time of the item(s) at SSEF (including possible transport and analysis at an external specialized laboratory) and during the shipment of goods back from the SSEF. In cases where you do not have the required insurance coverage for items that you would like to be tested by SSEF, we offer an all-risk insurance in collaboration with the Swiss National Insurance Company. For more information regarding this, please contact SSEF Administration (admin@ssef.ch or tel.: +41 61 262 06 40). ✶

CIBJO

In 2013, the CIBJO Congress was organized in Tel Aviv (Israel) from 07 - 09 May and the pre-congress where all meetings, commissions and committees prepared took place from May 5th to 6th.

On the 7th, Dr. Cavalieri opened the congress. A main goal of the 2013 Congress was the harmonisation of the five blue books, the Diamond book, the Gemstone book, the Pearl Book, the Gemmological Lab book and the Precious metals book.

Aside the General Assembly, the Board of directors and several steering committees, the following meetings took place: Presidential Council, Executive committee, Diamond commission, Coloured Stone commission, Pearl commission, Gemmological commission, Precious metal commission, Association Executives Networking Commission, Marketing commission, Sectors 1, 2 & 3.

More information and important trade documents are available on the CIBJO website (www.cibjo.org), The five CIBJO Blue books may also be downloaded on the CIBJO website. ✶

LMHC

The Laboratory Manual Harmonisation Committee (LMHC) currently consists of representatives from CGL (Japan), CISGEM Laboratory (Italy), DSEF German Gem Lab, Gübelin Gem Lab (Switzerland), GIA Gem Laboratory (USA), GIT (Thailand) and Swiss Gemmological Institute - SSEF (Switzerland). LMHC does not entertain formal relationships with special interest or trade organisations.

Conforming to decisions taken in 2013, LMHC successfully met twice by videoconference (VC) in recent months. The second VC meeting was held in November 2013 and members agreed on the Information Sheet #12 "Organic filler substances". IS12 should be soon uploaded on LMHC website (www.lmhc-gemology.org). Information Sheet #13 on the nomenclature of hydrophane opal is pending. The various light sources for gemstone observations were considered and the group decided to meet in 2014 for comparing the effect of different light sources on various gemstones. ✶

DR. KRZEMNICKI APPOINTED ASSISTANT PROFESSOR OF GEMMOLOGY

In December 2013, Dr. Michael S. Krzemnicki received the so-called "Venia docendi" as assistant professor in gemmology at the University of Basel after having passed his habilitation. Having been teaching the last few years gemmological courses at the Basel university, this appointment is a further step in strengthening our long-established collaboration with the Mineralogical and Petrographical Institute (MPI) of the University of Basel. Furthermore, it opens up new possibilities to offer students gemmological research projects at Bachelor-, Master- to PhD-levels in the near future. ✶

INTERNATIONAL GEMMOLOGICAL CONFERENCE IN VIETNAM

This biennial conference was held 12–16 October 2013 in Hanoi, Vietnam, and was attended by invited delegates, observers, and Vietnamese honorary attendees. It was organized by Vietnam National University and DOJI Gold & Gems Group. There were 41 talks and 16 posters presented. The oral presentations focussed on gem corundum (10 talks), pearls (7), diamond (4), beryl (3), spinel (2), garnet (2) and other coloured stones (chrysoberyl, jadeite, topaz, quartz, zoisite and labradorite). Additional talks covered applications of new technology to gemmology (3), gem localities (2), historical jewellery (1), and glass (1). The poster presentations dealt with gem corundum (5) and a wide variety of other gem materials (beryl, diamond, ivory, jadeite, peridot, spodumene, zircon and colourless gems), as well as historical jewellery and pegmatite gems.

Two field trips were organized in conjunction with the IGC. A pre-conference excursion to Halong Bay took place on 10-12 October, in which the group visited the retail showroom of VietPearl and then boarded a ship for an overnight tour of the bay that included visits to a pearl farm and a large limestone cave. A post-conference excursion on 17-19 October took participants to Luc Yen in the Yen Bai Province of northern Vietnam, to visit the Cong Troi mine and the local gem market. Cong Troi is a primary deposit that is worked mainly for mineral specimens of pink-to-purple spinel crystals embedded in white marble. Some lucky participants found pieces of spinel-bearing marble in the extensive mine tailings.

The conference abstracts are published in a 182-page proceedings volume that can be downloaded at www.igc-gemmology.org. The next IGC conference will take place in Lithuania in 2015. ✶ **Brendan M. Laurs. Editor-in-Chief, The Journal of Gemmology.**

△ **Figure 1:** This group of IGC participants attended the excursion to Vietnam's Halong Bay. Photo courtesy of B.M. Laurs.

△ **Figure 2:** A local dealer offers spinel, ruby and sapphire in the gem market at Luc Yen, northern Vietnam. Photo by B.M. Laurs.

SSEF AND GEM-A JOIN FORCES IN NEWLY REVAMPED JOURNAL OF GEMMOLOGY

The Gemmological Association of Great Britain (Gem-A) enlisted the help and support of the Swiss Gemmological Institute (SSEF) to contribute toward a new look Journal of Gemmology in 2014. The move signals greater editorial cooperation across the U.K., U.S. and Europe in the publication of the most-circulated academic journal on gemmology.

Gem-A also appointed editor, geologist and gemologist Brendan Laurs as its new editor-in-chief of The Journal of Gemmology. Laurs, the former editor and technical specialist at Gems & Gemology, began his new role September 1, replacing Dr. Roger Harding who has edited the journal for the past 19 years. With the same focus on in-depth, academic content, detailing the latest developments in the study of gemmology, this move indicates an invigorating fresh era in global collaboration. Laurs said, "I look forward to working with the international gemmological community to facilitate the publication of high-quality research in The Journal of Gemmology. In the future, the Journal will be evolving to include additional sections and a wider variety of content of relevance to practicing gemologists, researchers and enthusiasts."

Gem-A's CEO, James Riley explained the new relationship with SSEF. "We're delighted to have the team at SSEF working with us on the new look of the Journal. We have cooperated for many years and share the same goals of promoting gemmological knowledge around the world. We are indebted to SSEF without whom we would not have secured the services of Brendan. I'm sure that working together we will provide a wide range of up-to-date relevant gem knowledge and will in consequence raise the standard of The Journal of Gemmology even higher."

The director of SSEF, Dr. Michael Krzemnicki, said, "We are very happy to join forces with Gem-A for this new area of The Journal of Gemmology. Research has always been part of our mission at SSEF. We look forward to this collaboration that aims to strengthen the position of The Journal of Gemmology as the publication with the highest impact within the international gem community."

The current issue of The Journal of Gemmology became available through Gem-A and the SSEF in January 2014. To find out how to get your copy, visit Gem-A's website at: www.gem-a.com. ✶

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Gem-A
THE GEMMOLOGICAL ASSOCIATION OF GREAT BRITAIN

NEW CONDITIONS FOR THE QUALITY CONTROL OF MELEES

Since 2004, SSEF controls the quality of batches of colourless small diamonds, including melees, small baguettes, or small fancy-shaped diamonds. "Small" implies that the individual weight of each diamond found in the batch is below 0.20 ct.

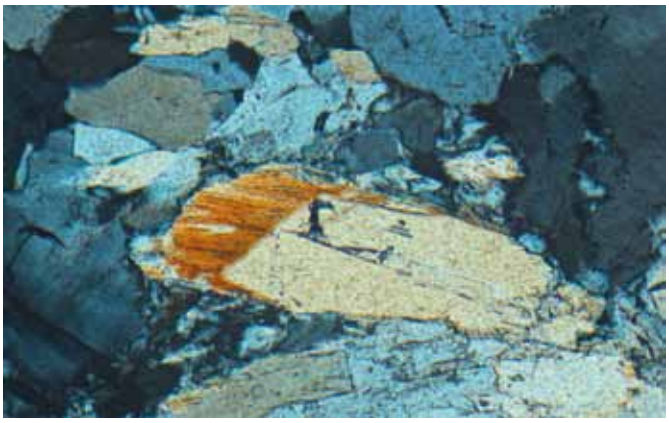
In accordance with our "conditions for the quality control of small diamonds" in use at SSEF, our clients are aware that the authentication of small diamonds in a batch is the very first mandatory control step. In order to efficiently identify the announced arrival of masses of synthetic diamonds and of possible HPHT-treated diamonds in melee batches, SSEF developed a unique machine called ASDI (see our article entitled "ASDI (Automated Spectral Diamond Inspection) - An efficient solution for the authentication of melee size diamond batches" in this issue.

For batches of more than 91 melee diamonds, where a quality control per sampling applies, the ASDI machine is now part of the authentication process. This new approach has called for an application of new conditions for the quality control per sampling. SSEF will now authenticate the sampling only, providing that melees are larger than 1.0 mm.

The authentication of a whole batch – smaller than 20'000 stones - will be made by ASDI. Further authentication using FTIR and photoluminescence at low temperature is no longer included in the quality control per sampling and, if required, will be charged separately. ✶

FEI CUI (JADEITE) SEMINAR IN HK

In March 2013, Dr. Michael S. Krzemnicki was invited as a speaker at a seminar about Fei Cui (jadeite-jade), co-organised by the Gemmological Association of Hong Kong, the Hong Kong Council for Testing and Certification, and the Hong Kong Trade Development Council. The speakers were well-known experts and researchers mostly from Hong Kong and Mainland China. They spoke about Fei Cui testing and certification in Hong Kong, and the latest developments in standard testing methods of Fei Cui. The presentation of Dr. Krzemnicki presented a western look on Fei Cui and jadeite nomenclature, emphasizing the compositional complexity of jadeite rocks and the importance of international harmonised terminology and nomenclature. The seminar was attended by many participants including numerous trade journalists and was very well received. ✶



△ Jadeite grain with brownish omphacite ongrowth (Ca-metasomatism) in jadeite-jade from Kazakhstan. Photo with crossed polarizers. © K. Ernst, University Basel

PEARL LECTURE FOR SOTHEBY'S HK

In June 2013, Dr. Michael S. Krzemnicki was invited by Sotheby's Hong Kong to give a lecture about pearls for their private clients. The lecture highlighted the most recent findings of our pearl research at SSEF, including age dating and DNA fingerprinting. The foremost aim was however, to expose the beauty and rarity of these true gems of nature and to reveal an insight into some of the scientific methods needed to identify natural pearls in a gemmological laboratory. This event from Sotheby's was a great success, as could be seen from the interested reactions of the audience. ✶

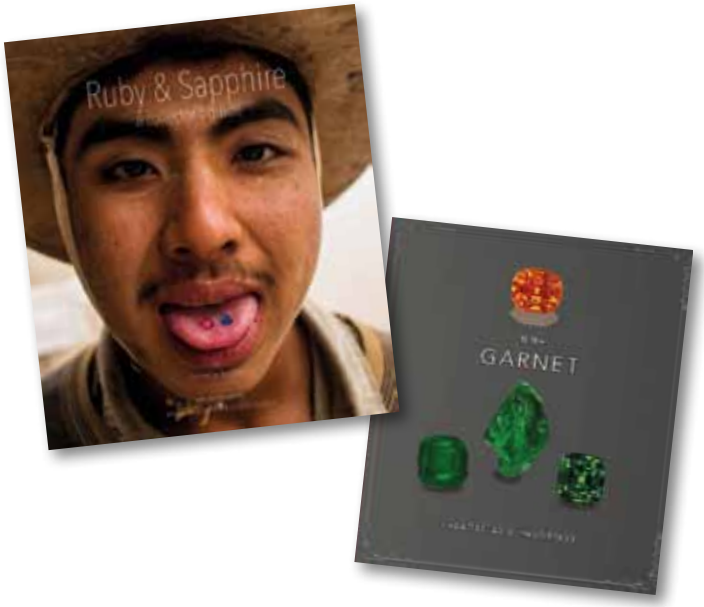
If you would like to organise a similar event with an SSEF lecture, then please contact us at admin@ssef.ch

NEW BOOKS ON SALE AT SSEF

Following the publication of the beautiful book Terra Spinel Terra Firma, V. Yavorsky has just brought out a new book called Terra Garnet. It has wonderful photos showcasing the beauty and diversity of garnets. This book is an impressive tribute to garnets and will raise the profile of these gems.

Richard W. Hughes, a leading expert on ruby and sapphire, has also just brought out a wonderful new book entitled 'Ruby & Sapphire, a collector's guide' in collaboration with GIT. This is a beautiful coffee-table book taking the reader on a journey to the sources of rubies and sapphires around the world. This book highlights some of the most beautiful specimens ever seen together with pictures of the lands and peoples behind these stones. Mr. Hughes is a hugely talented writer and photographer, and this book is a must-have for any lover of gemstones.

These books and more have been added to our list of products for sale and can be ordered at SSEF (phone +41 61 262 06 40, email: admin@ssef.ch) ✶



SSEF ON-SITE IN 2014

In 2014 we will be exhibiting and/or offering our on-site testing services as follows :

Paris	18 - 21 February
Hong Kong	27 February - 09 March
BaselWorld	27 March - 3 April
Paris	28 - 30 April
Bangkok	19 - 23 May
Paris	03 - 06 June
Hong Kong	16 - 22 June
Bangkok	18 - 22 August
Hong Kong	11 - 21 September
Paris	07 - 10 October
Paris	25 - 28 November

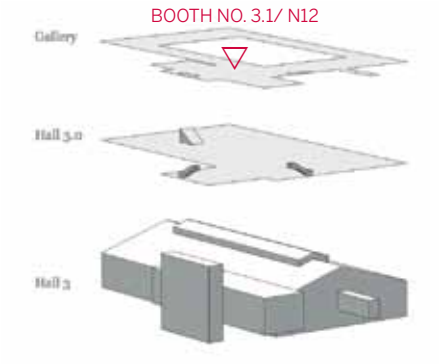
Further on-site services will be communicated through our website and in newsletters. Please subscribe to our newsletter on our website www.ssef.ch to be updated regularly about our on-site schedules, other services and news. ✶

BASELWORLD 2014

During BaselWorld 2014 (March 27 – April 03), the SSEF will be once again offering its convenient gemstone testing services.

Following the renovation of the whole BaselWorld we are now at a new location. You can find us in the first floor of Hall 3 at booth No. 3.1/ N12, close to the moving stairways. The phone number at our booth (+41 61 699 51 29) remains the same, as does our high-quality express service, which may even include a nice cup of coffee and some Swiss chocolate.

We are looking forward to meeting you at our booth and to testing your stones and pearls (48h for testing) during the Basel Show. If you would like to have a number of items analysed, we suggest you call us in advance at the SSEF office (tel. +41 61 262 06 40) to fix an appointment. This is also strongly suggested if you would like to have your items tested shortly before the show. ✶



△ Photo copyright BaselWorld 2013.

SSEF PRESENCE IN ASIA

Our presence in Asia has been very successful in 2013, as our services have gained importance for clients in the Far East and South East Asia, who ask for accurate and internationally renowned reports.

In 2014, the Swiss Gemmological Institute will again offer its services at two locations in Asia:

Bangkok

In Bangkok, we will be testing your prestigious gemstones in our Bangkok office at Silom road between 19 - 23 May and 18 - 22 August. Please check our website regularly or subscribe to receive our electronic newsletter to be updated regularly about our on-site schedules (www.ssef.ch/newsletter-signup).

Bangkok
dates
to remember!

Hong Kong

The last year has again shown how important Hong Kong has become as a major hub for the gemstone and jewellery trade. For many years, the SSEF is offering its services in Hong Kong for the local and international trade of prestigious gemstones and jewellery. In 2014, we will again be very active in Hong Kong, offering services at the three main Jewellery Shows in March, June and September (at AsiaWorld and at the Convention Centre), but also at our location in Central during several pre-show periods. This pre-show service is only by appointment, so please contact us (phone +41 61 262 06 40, admin@ssef.ch) if you need further information about our Hong Kong services or to confirm an appointment.

Hong Kong
dates
to remember!

Apart from offering our on-site services regularly in Hong Kong, you may also use the new Ferrari shuttle services to send us your gemstones, pearls or jewellery smoothly to the SSEF (for details, see shipping instructions on the services section of our website www.ssef.ch). ✶

NEW SSEF OFFICE IN BANGKOK

As of January 2014, the Swiss Gemmological Institute SSEF has a new and more spacious office in Bangkok. We are now offering our periodical on-site services in Bangkok in our new modern premises in the Silom 19 building, Soi 19 Silom Road, Bangkok, which was constructed during the last year (building on the right in the photo). Our laboratory premises are located just a few meters from our old location at the Maneesap buildings and just across the side-entrance of the Jewellery Trade Centre (JTC-Tower). Being in this brand-new and secure building, we are proud to offer you even more comfortable and safe testing services.

Swiss Gemmological Institute SSEF

Silom 19 Building, Unit 313 (3rd Floor)
45/1 Soi Silom 19, Silom Road, Bangrak
Bangkok 10500
Thailand

Phone: +66 (0) 22 36 56 39
Mobile: +66(0) 812 577 520

Please note that we offer our Bangkok on-site services by appointment only. To make an appointment or for any further inquiry, please contact our Far East representative Ms. Judy Tu judy.tu@ssef.ch or our headquarters in Switzerland (phone +41 61 262 06 40, email: admin@ssef.ch). ✶

For 2014, the following Bangkok on-site services are scheduled:

20 - 24 January 2014
12 - 16 May 2014
18 - 22 August 2014

Close up:

JEAN-PIERRE CHALAIN

In 2014, Jean-Pierre Chalain will celebrate his 20-year anniversary at SSEF. We are happy to congratulate him on his long-standing loyalty and want to thank him for his commitment to the SSEF laboratory over all these years. Looking back, he started to work at SSEF - located at that time still in Zurich – two years after completion of his DUG (Diplôme Universitaire de Gemmologie, Nantes). In the following years, he strongly contributed to the development of SSEF and is now deputy director of SSEF.

Since the beginning, one of his main fields of interest and research has been diamonds. He has achieved major breakthroughs, especially on treatment detection of coloured diamonds and HPHT treated diamonds. He has been director of the SSEF's diamond department for a decade, and in this time has trained many young colleagues at SSEF in our meticulous diamond grading procedures. Jean-Pierre Chalain also actively works on coloured gemstones and pearls in the laboratory, and was part of the SSEF research team that achieved a breakthrough in the detection of emerald treatments in 1999. He was central in putting together the SSEF Standards & Applications that was first published in 1998. He has represented SSEF for many years in international organisations such as LMHC (Laboratory Manual Harmonization Committee), CIBJO (The World Jewellery Confederation), and CEN (European Committee for Standardization) to name a few.

The last few months have been very exciting for all of us due to the successful development of the "Automated Spectral Diamond Inspection" (ASDI), for which he was our project manager. We are very proud to have achieved, with this high-tech instrument, a much needed technical solution to scan large amounts of small diamonds. Ultimately, this is to protect the trade against the threat of synthetic diamonds (see ASDI article in this issue).

Although there exists a lake Chalain in France (Lac de Chalain, département Jura, France), Mr. Chalain seems to have no ties to the local dynasty but is a proud original citizen of Paris ("Nobody is perfect" is his saying when speaking about his place of birth). Thanks to this, our staff members have been happily introduced by him in all fine dining aspects ("Baba-au-rhum, soufflets, etc.") but also cultural aspects (various Parisian exhibitions, theatres) whenever we are in Paris for our on-site testing services. ✶

TEAM ACHIEVEMENTS 2013

In 2013, there were a number of notable team achievements at SSEF.

First we would like to congratulate Mr Piotr Halicki, member of the SSEF team since 2010, who completed his Master thesis at the University of Basel focussing on the chemical characterisation of sapphires from different deposits by LA-ICP-MS.

A few months later Dr. Wei Zhou successfully passed the FGA exams, and received the prestigious FGA diploma in summer 2013. This diploma blends in perfectly with her sound understanding of mineralogy and by this, she will further strengthen our research activities. We would like to congratulate Dr. Zhou on her FGA diploma.

And finally, Dr Michael S. Krzemnicki was appointed assistant professor of gemmology at the university of Basel, Switzerland, after completion of his habilitation thesis. This step is important not only for him, but also for the SSEF, as it allows us to further deepen the collaboration with the Earth Science department of the University of Basel by working on research projects to interested students who may eventually become future staff members of SSEF. ✶

TEAM EVENT

In November 2013, the whole SSEF team travelled for two days to the Parkhotel Bellevue in Adelboden, a well-known mountain resort in the Swiss Alps. The main focus of this team event was to present and discuss the upcoming project of relocation of the SSEF into a new and more spacious building in Basel. Apart from the brainstorming team sessions, we also had enough time to discover the pleasures of the in-house spa and the wine cellar, rounding the day off with a sumptuous dinner.

The SSEF team hiking in Adelboden

NEW TEAM MEMBERS AT SSEF

2013 was a very successful year at SSEF and we recruited some new team members in order to meet the increased demand for our gemmological services. Ly Phan joined us in January and works for the diamond department. He is a trained diamond grader and involved in the quality control of small diamonds. He has been heavily involved with the new ASDI machine.

Sebastian Hänsel from Austria joined SSEF in April and is currently being trained as a gemmologist. He is a trained geologist, having studied at the University of Graz. He has a FEEG gemmological diploma that he completed in Linz, and is thus a perfect addition to our team of gemmologists. Gina Brombach began working at SSEF in June as an analytical technician. She assists Judith Braun in all the analytical measurements required for the testing of gemstones and pearls in our laboratory. Finally, David Horstmann from Basel is a new member of our administration team since July 2013.

The SSEF Team wishes all friends and customers a succesful year 2014
and would like to thank you for your continued support of the SSEF laboratory.

SSEF

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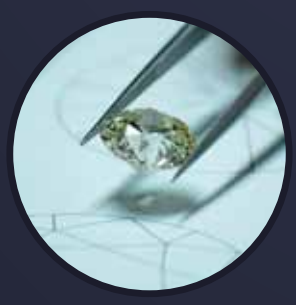

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DONATIONS

As in previous years, we are grateful for numerous donations we received in 2013 from many pearl and gemstone dealers around the world. These donations not only support our research but also add to our collection of specimens to be used in our courses, with the aim to educate the participants and to give them the opportunity to learn gemstone & pearl testing on a wide variety of untreated and treated materials.

We would like to especially thank the following persons and companies:

FOR PEARL DONATIONS:

José Casares (Shanghai Gems, Geneva), Andy Muller (Hinata Trading Co., Japan), Konrad Schmid (Chur, Switzerland), Dr Wolf Bialoncyk (Vienna, Austria), H.A. Hänni (GemExpert, Basel), Glenn Schwendinger (USA), Hubert Bari (Bali) and the Qatar Museums Authority (Qatar, UAE), Isam Samin (Glamour of Nature, Australia).

FOR GEMSTONE DONATIONS:

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