The Value of a Gemstone's Name
寶石名稱的價值

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單就寶石的名字就可能在我們的腦海中留下對該寶石的印象。當我們想到鮮豔的綠色寶石時，可能首先想到的是祖母綠。但它是哪隻綠色？明亮的祖母綠和綠色綠柱石之間的分界線又在哪裡？有否顏色標準？誰來替該標準作定義呢？

A gemstone's name alone may create an impression in our mind's eye. When we think of a vivid green gemstone emerald is quite likely to be the first stone to come to mind. But just how green should it or must it be? Where is the border between what is a bright emerald and a green beryl? Are there colour standards and who defines these?

The case of Emerald

In this age of Corona there is ample time to watch TV. I find programmes about selling rare items very compelling. I'm not so very interested in pictures or old furniture but the ones about jewellery are a favourite of mine. Recently a nice brooch set with a 5 carat emerald came up on one of these programmes. When shown to the dealers one of them immediately commented that the stone was a green beryl rather than an emerald. This was not my impression, but I understood where the dealer was coming from, as he was concerned principally with the price level! He had no white light source nor a comparison stone to help him reach his judgement. His argument was purely pejorative.

The most famous emeralds are of Columbian origin. Emerald is a green variety of beryl, its colour caused by the interaction of traces of chromium (Cr) and Vanadium (V) in similar parts. Higher amounts of Cr and V result in a darker colour, lower amounts produce lighter tones. Often light green emeralds are named green beryls. But where is the border between the two? And stronger saturations fetch higher prices!

Fig. 1 From emeralds to light green beryl, the amount of chromophores Cr and V depends on the geological circumstances of the stone's formation.
從祖母綠到淺綠色綠柱石，致色元素 Cr 和 V 的數量取決於寶石形成的地質情況。
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Important to know. Size matters! Given equal amounts of chromophore, larger stones appear darker because the longer path of light leads to more absorption and thus deeper colour. When a larger gemstone is cut in two, an emerald may end up as two green beryls!

The term green beryl can also mean a material that is green due to a mixture of blue and yellow, both created by traces of iron but lacking Cr and V. But this green material looks quite different. So, the term green beryl actually just complicates the situation and is not self-explanatory. When the colour comes from Cr and V it would be better simply to speak of dark and light emerald. Afterall, this is how we deal with the question of lighter and darker varieties when it comes to blue sapphire.

The case of Ruby

We can compare the situation to that of ruby, where a similar problem exists. Ruby is corundum with admixtures of Cr. Bright rubies are called pink sapphire in the trade, but where is the border, the dividing line, between pink sapphire and ruby? Pink sapphire is less expensive than ruby. International organisations like ICA, CIBJO or GILC have formed working groups to find solutions to the nomenclature problem. Competent members of laboratory teams have held meetings over years to come to practical solutions and reach harmonisation. But there were objections from the trade and the solutions were refused in every case. So, back to the drawing board - the research started all over again. In 1980 ICA distributed master sets comprising synthetic pink to dark red facetted pink sapphire / ruby. Unfortunately, however, these standard series sets are no longer available.

Interestingly there has never been a problem with blue sapphire. Dark to bright sapphires are still sold under the same name. It is the same with aquamarine where the trade has no problem with lighter or darker tones.

The case of Diamond

The question of the colour grading of diamonds was addressed and a solution making use of reference stones was reached and agreed in 1978. For GIA, HRD and CIBJO, near to identical diamond master stone sets of brilliant cut stones from D to Z are kept safe in the major trade laboratories. The SSEF Swiss Gemmological Institute holds the CIBJO diamond colour master-stone set C1 in safekeeping. This is the prototype used for later copies for other laboratories.

Possible Solutions - Conclusion

I consider it important that the same term should be used for all gemstone varieties where and whenever they are described in a report or on an invoice. At SSEF, the Swiss Gemmological Institute, colour references are used for definition of the variety name of gemstones like ruby, emerald, alexandrite a.s.o.. These may

Fig. 2 Verneuil synthetic corundums with varying contents of chromium, from ruby to pink sapphire. This set was distributed by ICA. The black line separates rubies from pink sapphires.
鉻含量不同的維爾納葉焰熔法合成剛玉，從紅寶石到粉紅色藍寶石。該組樣本由 ICA 分發。黑線將紅寶石與粉紅色藍寶石區分開。
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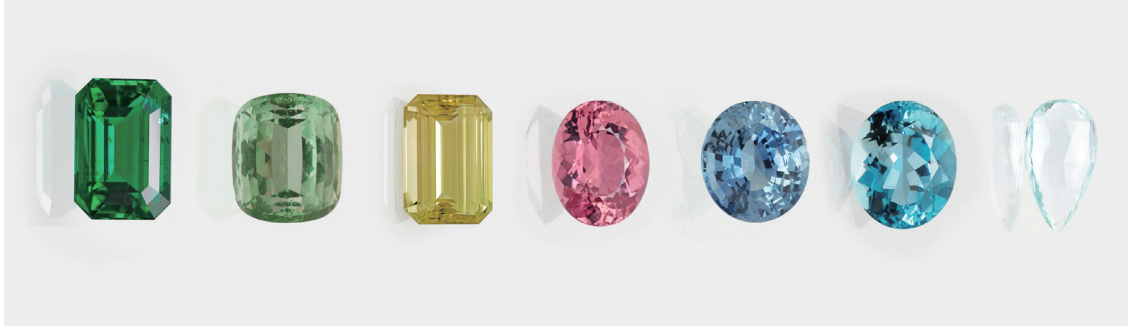

Fig. 3 Members of the beryl group. Sort and amount of trace elements produce the colour. Nature flavours the crystals “cum granum salis”, just as it comes!
Naming these colours is a different matter.
綠柱石組別的成員。微量元素的種類和數量引致不同的寶石顏色。大自然為晶體的色彩調節得恰到好處！
但為這些顏色命名卻是另一回事。
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be from master stones as in the case of ruby, or colour grading cards (Munsell Colorsystem, Color Codex™, ColorScan or colour grading app Gemewizard).

Finally, UV-VIS spectroscopic data or EDXRF chemical data may help to achieve reproducible results. Illustrating this, Dr Michael Krzemnicki (SSEF) gave a comprehensive lecture at the 2019 EGS European Gemmological Symposium about standards on colour variety descriptions (see https://www.ssef.ch/presentations/).

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