COLOR FILTERS: USEFUL TOOLS THAT GEMOLOGISTS SHOULD USE BUT OFTEN DON'T

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All qualified gemologists will have encountered color filters. This 'encountering' may take place during their gemological studies and might be as far as they get. They are losing attention and though there are obstacles, we should return to their teaching.

The specific filter that gemologists get their first look at is most likely a Chelsea Color Filter, an instrument that for a period of perhaps 25 years from 1935 could identify a natural emerald, but quickly fell foul to the myriad of synthetics being produced as well as emeralds from other sources with other dominant chromophores. We should remember that as late as 1966, no less authority than Basil Anderson was saying that only beryl colored by chromium could legitimately be called emerald. At this point Brazil, Zambia, Zimbabwe, Pakistan, and Afghanistan were all on-stream and successfully selling what they called emerald. There have been points where the trade and the laboratory maintained different positions for years with the market seemingly oblivious. Looking back, it is interesting to be reminded of a time when laboratory reports were not a compelling sales tool.

Getting back to color filters, irrespective of their formal training, most gemologists will have made some effort to use filters beyond their coursework, generally through deliberate and academic interest, or through a specific need in their working role. The best source for filters beyond the Chelsea Color Filter has been the products of the late Dr. Bill Hanneman, and we are very fortunate that his family have continued to supply the market since his passing in 2019.

Dare I suggest that most of us who purchased these filters have consigned our purchases to the desk drawer, even if our CCF retains its place in our gem kits simply because it was there when we were issued the kit. This happens because the exceptions and anomalies are frustrating, the nuances are fine, and we are disinclined to put in the work required to achieve a level of confidence and competence in their use.

This is a shame, but something that can be remedied by taking a different approach. Having examined this situation recently when researching a talk for National Association of Jewelry Appraisers (NAJA,) I reached an interesting conclusion. If one were to view the way the topic of color filters is taught, the deficiency is clear and there is little wonder why they leave students and experienced gemologists alike ambivalent in their use. Now this is not to detract from the incredible efforts of many good tutors and the many great

FIGURE 1. *Original Chelsea Color Filter. Gem-A archives.*

FIGURE 2. *Chelsea Colour Filter spectrums slide. Photo by Hanneman and Harris.*

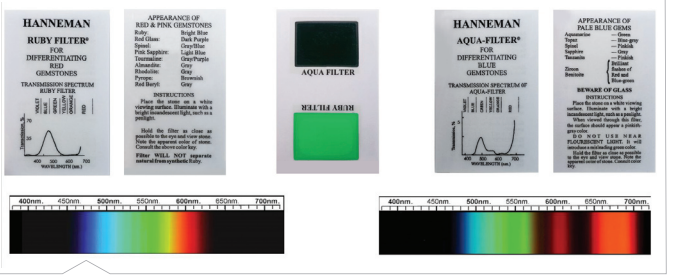

FIGURE 3. *Aqua and ruby filter. Photo by Hanneman and Harris.*

proponents of filters; we all know who they are. However, despite our best intentions, and theirs, somehow that nagging ennui returns fairly swiftly.

The teaching of light filters or 'the filtering of light' which includes the use of spectroscopes, polariscopes, and dichroscopes, is done in a competent manner primarily because results can be definitive. A gemologist is left with a clear answer direction in their quest for the identity of a gem.

Therefore, a student or experienced gemologist feels well-equipped to deploy these instruments to their advantage. Through our careers we reinforce this knowledge with practice and CPD.

The teaching of color filters, on the other hand, leaves much to be desired. It is made clear it is a 'second tier' instrument and it simply does not retain our attention. GIA notes as of 2021, indicated the incorrect technique for use (filter near stone rather than the eye). Gem-A notes celebrate the history of the filter, excluding mention of Ross Popley, who actually made the first one. The German courses have dropped color filters, preferring to fill a student's hours with more advanced gemology; the Italians too. In Belgium, where students are lucky enough to work with immersion microscopes as standard, they use generic color filters in the manner documented by Richard Hughes of Lotus Gemology; using them to help accentuate internal features, like the curved growth lines in Verneuil synthetics.

The discussion of the usefulness of the CCF and whether it even deserves a mention in this day and age appears to rage on in the anglosphere while our contemporaries have made up their minds and moved on. Not to suggest they are mistaken, but I still believe there is a valid place for the teaching of color filters. However, it needs to be done in a manner that compliments a student's learning about color, light, absorption, and chromophores.

Their use should be tightly linked to an understanding of the wavelengths of light that each filter will allow to pass and what those wavelengths signify in the materials observed. Gemologists already have a good grasp of the filtering of light and the filtering of color is merely an extension of that rather than a separate discipline. We have, after all, become familiar with the idea of a chromium spectrum or an iron spectrum. Since a color filter is blocking areas of the spectrum, getting a student to link the spectroscope view to the color filter counterpart would make more sense. By understanding this, the application of a filter to other stones can be done intelligently and the filter's usefulness might be enhanced in the manner suggested by Richard Hughes and adopted by the Belgians.

There are a couple of major obstacles, neither insurmountable. Firstly, there is not a single clear reference resource to mimic in value, the size, simplicity and accessibility of the OPL, "A Student's Guide to Spectroscopy" handbook by Colin and Hilary Winter. The incredible work of John Harris in Carlisle (www.gemlab.co.uk) needs to be taken one small step further. The longstanding research of John Harris is available to us all, published in helpful, downloadable spreadsheets on his website. All the major filters have had their spectra perfectly photographed by John and these spectra are the missing link to maximising the usefulness of filters by improving understanding of how they work. They need to be conveniently packaged into a small reference book.

The second challenge would involve pulling the Hanneman/Hodgkinson color filters a little more into the mainstream. I do not know what patents exist on the HH filters, but it is time for them to step from the shadows and become an integral part of the gemologist's equipment. It is time for the big teaching bodies to come to an agreement with the people who hold the patents – Alan Hodgkinson and the family of Dr Hanneman, and find a way of getting a carefully curated set into a student's hands. The teaching needs to flow from a discussion of light and color. The lessons taught need to focus on the wavelengths that are visible through a filter and get away from the, sometimes quirky, names. (Bead Buyer and Parcel Picker's Filter anyone?) By focusing teaching on the spectrum that they transmit we will heighten our understanding of what they are doing to the light that comes off the stone. We are all familiar with graphs showing absorption and emission spectra these days. I would suggest by visualising the filter as an emission graph, laid in transparency against the stone we look at, we are elevating our application of the things we already know and applying an additional analytic sequence to our thinking. ◆

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