FALL 2000

CORNERSTONE

Journal of the Accredited Gemologists Association

TRUE COLORS:

Professional Gem Sciences Takes a Stand on the Effect of Fluorescence in Color Grading & Appearance of White and Off-White Diamonds

In the Spring/Summer issue of *The Professional Gemologist*, Tom Tashey, Professional Gem Sciences' (PGS) President, CEO and Executive Editor, took a controversial stand on blue ultraviolet (UV) fluorescence and its effect on the color grading, appearance and pricing of diamonds.

In his article, "The Effect of Fluorescence on the Color Grading & Appearance of White & Off-White Diamonds," Tashey summarizes his position. "I believe a change is needed in the current diamond color grading methods used by the gem laboratories. We need to either go back to a fluorescent tube designed to emit very little long wave UV fluorescence for the standard, or to use some sort of filtering screen to take out the UV component of the current standard of lighting used in the color grading process. This will allow diamond grading labs to assign stones their true body color grades, and help eliminate the market's practice of discounting top color gem diamonds that happen to have blue fluorescence. I also believe that by describing a diamond's color in its face-up position (regardless of shape), we will be advancing the professional image of our industry."

For a complete copy of Tom Tashey's article "The Effect of Fluorescence on the Color Grading and Appearance of White and Off-White Diamonds" as found in the Spring/Summer issue of The Professional Gemologist, *please contact Tom Tashey at (312) 920-1541 or via e-mail at* ttashey@hotmail.com.

Two Issues

Tashey points out that there are two issues involved in fluorescence and diamonds. The first issue is appearance and the fact that blue fluorescence is really a positive attribute for 95 to 98 percent of all diamonds that fluoresce. Diamonds displaying medium or stronger yellow fluorescence will have a slightly negative effect on their face-up appearance, along with very rare cases of "overblues" that have extremely strong blue fluorescence.

The second issue is the grading of body color. Because subtle differences in the face-up appearance of body color are extremely difficult to discern in the top-white to near-white color range ("D-K"), the Gemological Institute of America (GIA) teaches that diamonds should be color graded in the table-down position, viewing the diamond parallel to the girdle plane of the stone. GIA also teaches that it is extremely important to grade all diamonds in a lighting environment that has little or no UV radiation to prevent the subtle effects of fluorescence from influencing the color-grading process.

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AGA is a nonprofit research, education and ethics organization benefiting professional and avocation gemologists as well as consumer interest. Membership programs include advanced gemological education seminars, workshops, and the AGA Certified Gemological Laboratory Program.

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PRESIDENT'S MESSAGE

AGA "Demigods" Unite!

Yesterday I visited the GIA campus in Carlsbad, CA to give a lecture about my career as an independent appraiser/gemologist. The talk went well (at least I had a riot) and there were many questions asked both about the appraisal process and the process of becoming a gems and jewelry appraiser.

Like many of you, I see myself as a gemologist/appraiser and that's the way I make my living. And I recognize that we gemologists are buyers and sellers, storeowners and consultants, connoisseurs and auctioneers. In fact, we are professionals in a wide variety of fields. That variety contributes to making our passion (profession) so unique and probably so mysterious to the newcomer. Yet, we may no longer remember that when we first started our careers "mysterious" translated into unknown, impossible, impenetrable and unwelcoming.

The budding gemologists in my audience (there were about 70 who voluntarily attended) were bubbling over with enthusiasm and eager to graduate and apply their gemological knowledge in the work domain. We know that GIA puts its best foot forward to help place their graduates in industry jobs via their placement service and Career Days. But what seems lacking is post educational professional guidance. Real world "we work in the streets and gutters" stuff! In a word...*mentoring*.

Pure education (the ivory tower stuff) is always found lacking when confronted with real world experience. We know from our own experiences that a greenhorn GG isn't ready to cope with the decisions and actions required in the workaday professional world... and it's "sink or swim" in the beginning.

If the AGA has represented anything to me over the decades it has been support...the peer support that I have found along the way to help find my path. The path that helped me develop into the professional I am today. The opportunity to call associates and even "demigods" in the industry to ask "What would you do...?" Where can I find...?" "Why? When? How?" Well, you get the picture. The conferences have been great but the people and their assistance in my chosen profession have been priceless. It's time for payback!

So how can the AGA set up support mechanisms to assist and encourage new gemologists along their professional path? Got any suggestions? Want to participate in helping others exceed your level of success? Let's talk.

Warmest Regards,

Thom Underwood, President – AGA

Jennifer Thorton-Davis
Sherman Oaks, CA

Paula A. Fox
Bensalem, PA

Heidi Harders
Chicago, IL

Joseph V. Paul
Bremerton, WA

Stuart Robertson
Northbrook, IL

Janet Connors Stevens
Bellevue, WA

In addition, we have 12 prospective members with applications in-process.

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TRUE COLORS

To address this latter issue, in the early 1950s GIA commissioned a special light bulb, The Verilux™ Tube, which emitted a minimum amount of UV radiation. GIA used these Verilux Tubes in their specially designed color grading boxes, the GIA Gem DiamondLite™, and in one of the overhead lighting sources used with their microscopes.

In the mid-1990s, Tashey was working to establish a scientific method for grading color stones and diamonds. Using the Munsell Color Order System and MacBeth Lighting Products, he discovered that today's Verilux Tubes actually emit a good deal of UV light.

"Our lab acquired a sheet of transparent film that absorbs UV rays while passing other wave lengths of normal daylight (the same film placed over glass displays at the Smithsonian Institute to protect important documents from harmful UV radiation)," reports Tashey. "We took this film and placed it just below the Verilux Tubes in the GIA DiamondLite. Examination of diamonds with varying degrees of blue and yellow fluorescence with and without the UV absorbing filter produced amazing results. When we used the filter, a 2.15 carat round brilliant with very strong blue (VSB) fluorescence with a color grade of slightly high "H" shifted to a very low "J." Another 2.65 carat oval with VSB fluorescence shifted from a low "E" to a high "I" with the filter. Stones with a medium to strong blue fluorescence were affected less, generally with a shift of 0.5 to 1.5 grades."

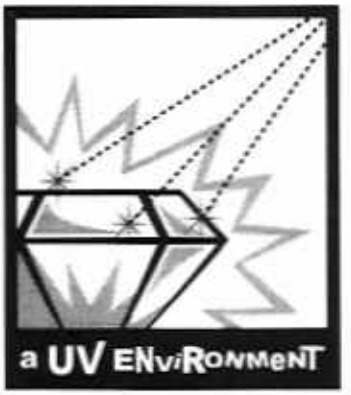
Although Tashey shared his findings with several layers of GIA Gem Trade Lab GTL) executives, GIA and the GTL gave them little attention. Even a 1997 in-depth study of fluorescence in *Gems & Gemology* did not address the possible reason why top color diamonds with blue fluorescence might be discounted in the market, that grading labs such as GTL might be greatly over-grading them, and that Verilux Tubes emit a good deal of UV fluorescence, thus reducing their effectiveness.

1. To assign a letter grade to all white and off-white diamonds table down, in a UV-free environment.
2. To also grade them (describe them in broad terms) in their face-up position in an environment that duplicates daylight and that includes a daylight equivalent of UV fluorescence. Grading under these conditions is done by comparing the stones to a one-carat set of masters, also in their face-up position, as the standard.

The PGS Approach

At the Professional Gem Sciences lab, steps have been taken to minimize the fluorescent effect for stones with medium to strong blue UV fluorescence. For stones with VSB fluorescence, PGS grades the diamond with the filter and one without the filter and then settles on a compromise grade that is between its highest and lowest color grade. Although viewed by PGS as an interim step, the exercise is designed to avoid seriously over-grading these VSB-type stones, while also not placing them two or three grades lower than where the GTL might grade them. For example, PGS graded the previously mentioned 2.65 carat oval diamond, which shifted from low "E" to high "I," as a "G."

What Tashey advocates as a solution, and that which he is working toward implementing at PGS, is a two-step approach to describing color:



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Snake Oil:

AGL Reports Widespread Use of Oil Type Fillers to Clarity-Enhance Rubies and Sapphires

Although clarity enhancement of emeralds with oil, waxes and polymers is well documented, few within the trade are apparently familiar with the use of these clarity enhancing agents to alter the appearance of ruby and sapphire. According to C.R. Beesley, President of AGL, "We have been tracking this process for some time and have found that few individuals realize how common organic (oil type) fillers are used as clarity enhancing agents in corundums." In recent months, AGL has observed an increasing population of oiled rubies and sapphires in the marketplace. Most dealers express disbelief that their materials have been subjected to these appearance altering techniques. In contrast to typical "glass" type enhancement agents (see photo: Figure 1) which are very stable in fractures, organic oil type fillers will evaporate over time.

Unfortunately, even the laboratory community seems to be unaware or unwilling to address this sensitive issue. A trade lab recently issued a document on a 10carat, reportedly Burmese ruby, and indicated Raman had been used to determine their conclusion of no enhancement. Unfortunately, this testing procedure failed to identify the obvious organic signature of significant amounts of oil laced through the labyrinth of fissures in the stone (see photo: Figure 2). Examination in a standard binocular microscope exhibited characteristic "sweating" of oil at the surface, as the temperature of the material was elevated by the heat of the microscope bulb (see photo: Figure 2). Numerous areas across the surface of the ruby clearly indicated "pooling" of oil. "From an instrumental standpoint," Beesley suggested, "the organic window in the ruby and sapphire spectra is significant and should be easily detectable. However, basic microscopic examination could have easily identified this level of filling."

"Cleaning out the organic component is the simplest and most efficient technique for confirming the type and extent of filler..."

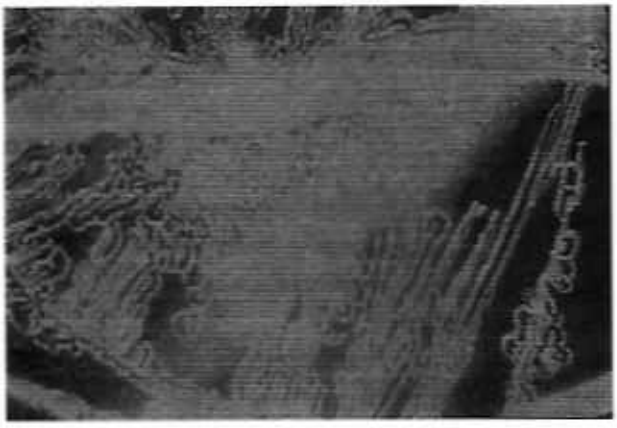

Figure 1

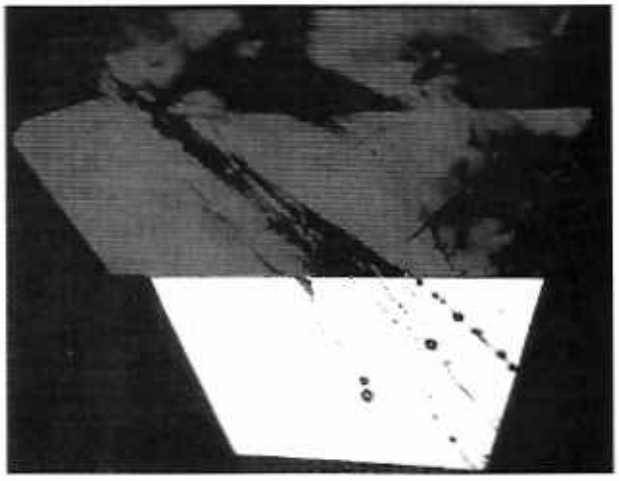

Figure 2

In many cases, a 48-hour solvent bath will confirm the presence of oil type fillers. According to Beesley, "Cleaning out the organic component is the simplest and most efficient technique for confirming the type and extent of filler present. Obviously, seller approval is absolutely essential prior to cleaning, but the conclusions are unequivocal."

Typically, this oil filling technique is encountered in high chromium content materials which tend to exhibit more significant fracture systems, like those associated with Burma/African rubies and Colombian emeralds. In many cases, the oils are very volatile and will not have the same longevity as a high molecular weight cedarwood oil. Beesley pointed out, "This practice is not new, the Burmese typically use 'sesame' cooking oil or whatever is in the house to reduce the reflectivity of glassy fractures or fissures." The industry can expect this issue to become more significant as the general awareness of this treatment technique

becomes more commonplace. In addition to ruby treatments, open fissures in sapphires can also be altered in appearance with oil-type fillers. Recently, an 8-carat Kashmir sapphire, submitted to the Laboratory that had exhibited significant thermal shock, was heavily oiled to mask the fracture system.

When clarity masking agents are present, AGL reports characteristically call the type of filler present and indicate the amount of enhancement agent in one of nine quantification categories. This information is contained in AGL's Gem Enhancement Report® along with an enlarged digital image and a clarity grade of the stone under investigation to minimize the possibility of altering the material after the report has been issued. ■

"Typically, this oil filling technique is encountered in high chromium content materials which tend to exhibit more significant fracture systems..."

In light of David Federman's article in the April issue of Modern Jeweler, *I thought that I should send you copies of my response. If you have any questions, please don't hesitate to contact me.*

Also, please note that some of the "sophisticated techniques" to which I refer in my letter (but did not mention there) include biochemical analysis of the conchiolin scleroprotein; viewing cross-sections at exceptionally high magnification to examine growth structures between layers of aragonite crystals and to detect aberrations that might reveal re-polishing of "pearl" nuclei; possibly even DNA testing, to name a few that were suggested to me. If anyone would be interested in helping me acquire a large number of samples for such testing, I would welcome your help. One thing you can rely upon, I will make the results known to the trade, regardless of the outcome.

Antoinette (Matlins)

To The Editor
Modern Jeweler
New York City

David Federman's article pertaining to my commentary on Chinese freshwater cultured pearls in "The China Syndrome" (April, 2000) requires clarification. His assertion that they are trying to prevent an "industry meltdown" strikes me as editorially melodramatic, but I find the race to defend the pearl industry very curious. Are we interested in the truth of the matter or simply stonewalling the investigative process? As a knowledgeable observer, I would assume that Modern Jeweler, the marketplace, and the gemological community share my interest in seeking the truth and not just defending a trade position.

After reviewing my conversation with Federman and then reading the article, I wondered if I was a party to the same conversation; I am not "backing off my theory" nor have I conceded that the practice "probably isn't as widespread as [my] letter makes it seem." Federman has taken unwarranted liberty with his quotes, putting his own spin on them.

Contrary to the impression Federman creates, my original letter was not penned lightly, nor was it based solely on the observation of distinctive color "zones" (not a 'tree-ring' effect) exhibited in two pearls. My conclusions follow numerous conversations with marine biologists—both inside and outside the pearling industry, information appearing in aquaculture magazines, and my own experience visiting cultured pearl farms to observe and learn implantation techniques. I have also had corroborative discussions with producers and dealers, not to mention my own knowledge of how long it takes for "natural" pearls to reach the sizes we are seeing in Chinese freshwater cultured pearls.

It was Federman's article on China's "new breed" of freshwater pearls in the April '99 issue of *Modern Jeweler* that raised questions I could not ignore and prompted my investigation. In the 1999 article, based on what he was told by the trade, he unquestioningly created a glowing account of large, round Chinese pearls of the finest quality, in an array of "natural" colors. He described how one company had to sort through "six tons of pearls just to assemble 200 strands in 9—10- millimeter sizes," and stressed that these pearls "must stay in the shell for at least four years to reach 9 millimeter size...and

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Summer Social

(l-r) Paula Fox and Jennifer Thorton-Davis (our newest AGA members)

Group of people looking at HTHP treated diamonds

(l-r above) Kirk Root, Corey & Ted Shaughnessy

Greg Sherman (Speaker)

(l-r) Richard Huntington, David Harris, Young McQueen

Your ballot will be mailed to you in November

Nominees for AGA Board positions are as follows:

President ..... David Harris
Vice President ..... James Naughter
Treasurer ..... Richard Huntington
Secretary ..... Lorraine Lopezzo

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TRUE COLORS

"This seems to be the best of both worlds and the truest for both methods," says Tashey. "You really do want to know what the true body color of the stone is and certainly without any effect from any blue or yellow fluorescence. You want to know what the fluorescence levels and color are, if the diamond happens to have any. And, you want to know how the color appears in the face-up position and in the stone's typical and best lighting environment—daylight or daylight equivalent lighting that has a UV component."

Problems with the effect of Shape, Size and Cut

Fancy-shaped diamonds show more color face-up than round brilliants of the same size and body-color. This is a reason fancy shapes trade at a discount compared to similarly sized and graded round brilliants.

When GTL *faces up* a fancy shape, they compare its observed color to the round, brilliant-cut masters in the *table-down* positions. For example, a 1.5 carat marquise, which table-down is better than the "K" master and thus warrants a "J" color grade, will then be faced-up and compared against the "K" and "L" masters table-down. If the stone's face-up color is darker than the "K," but better than the "L," it will be assigned the "K" grade. If it faces up with more color than the "L" master, table down, it will be assigned the "L" color grade.

"I'm not sure this is the best, most scientific approach to the problem—but at least it is a system," summarizes Tashey. "What bothers me is that the GTL does not inform the trade that this is their practice, nor does the GIA educate their students about using this system for the color grading of fancy-shaped diamonds. I think my proposed system, which compares fancy shapes face-up against the round brilliant standard, also face up, is much better. It gives the traditional single letter grade describing the table-down body of color of the stone, but then also describes the face-up body color appearance of that stone—while accounting for the effects of fancy shapes and fluorescent stones." ■

To The Editor

— *Continued from page 5*

true wide bodies ... for up to seven years." According to Federman, the lengthy cultivation period and rarity of the finest quality pearls were factors justifying their "high net worth."

In his opening paragraphs in the same article, however, Federman noted that large, round Chinese freshwater pearls had been seen the year before (1998), but were so scarce then that no one was prepared for the 'deluge' that hit Tucson just one year later. Was I the only one who found these opening comments inconsistent with his subsequent references to rarity and long time-tables to produce such pearls? And now, am I the only one noticing that there are ever-increasing numbers of large, round Chinese freshwater pearls, in ever-increasing sizes and improved qualites?

The timetable—as reported by Federman—was the first red flag for me. And now, just 13 months later, and in the face of my observations, Federman and his sources are denying such lengthy cultivation periods. As Schechter stated in response to the possibility of a 3- to 8-year growing period (almost exactly the timetable presented by Federman and other trade journals a year ago), "this would be the longest growing time for any cultured pearls in the world." So who, and what, are we to believe?

Regarding "timetables," let me also correct the erroneous impression created by Federman and Schecter with regard to my estimate of production times. Either Schechter and Federman have not read what I wrote, or don't understand what they read. The process I described would take approximately eight years for farmers to perform several reinsertions and have several harvest periods from which to begin building large stockpiles of all-nacre nuclei, in any size they needed. With each successive year, these stockpiles would get larger and larger. During the startup period there would be virtually no additional costs since they would still be producing pearls for the jewelry trade, using only the rejects for nuclei. Once they have sufficient stockpiles in all sizes, the cultivation period would be greatly reduced. In fact, very large pearls could be produced in a much shorter time than is currently the case. Some estimate that they could produce 8—9-millimeter pearls in under one year.

As for the laboratory findings, according to Federman these are based primarily on conventional x-radiography. The reliability, however, of conventional testing techniques to determine how these unconventional pearls have been produced is suspect. Scarratt and Moses say that 45,000 pearls were x-rayed, but how many were sectioned? And for these, what testing techniques were used? According to my sources—marine biologists and scientists outside the gem field—x-radiography techniques and other conventional techniques will not be sufficient to disprove the use of all-nacre nuclei. To arrive at conclusive findings will require unconventional, sophisticated testing techniques. The gemological information currently available is incomplete and inadequate to refute my contentions.

The real issue here is not Chinese freshwater pearls per se. I have always maintained that fine quality Chinese freshwater pearls are very beautiful, and offer another exciting pearl product for consumers. The real issue is that the pearl industry in general needs a more meaningful set of reference standards to control the quality of their products and to disseminate reliable information about what people are buying and selling. This is the only way that retailers will be able to represent their products honestly and accurately. I hope that serious, unbiased research will be conducted in the near future and provide some much needed answers.

Antoinette Matlins, PG
Author of The Pearl Book
Woodstock, VT