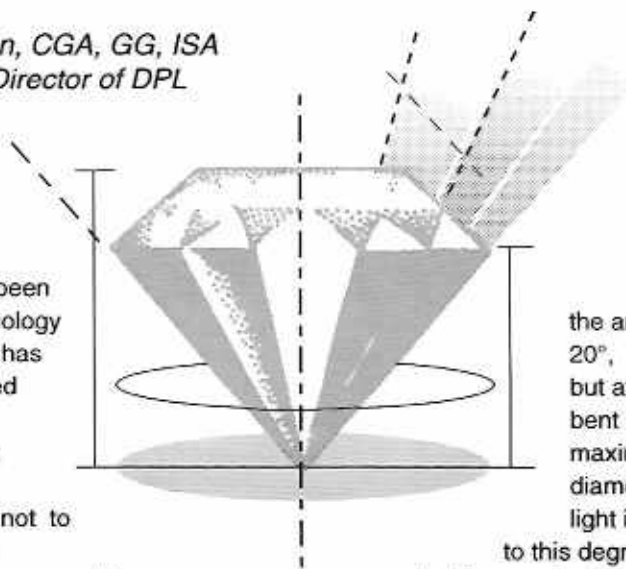


**Diamond Profile Laboratory****INTRODUCES****Dispersion Measurement  
in Diamonds**

by Al Gilbertson, CGA, GG, ISA  
Laboratory Director of DPL



the angle of incidence is  $20^\circ$ , light is bent  $2^\circ 13'$ , but at  $24^\circ 26'$ , light is bent  $12^\circ 57'$ , the maximum attainable by a diamond. It is only as light is nearly being bent

to this degree that we have what is perceived as strong "fanning out" of light into dispersion colors.

DPL uses an imaging spectrophotometer designed by LambdaSpec® Instruments. The GemSpec Imaging Spectrophotometer was demonstrated at the AGA Tucson conference two years ago. It merges two technologies, Image Processing and Spectrophotometry. The technical development team included Kevin Ding, Ph.D. Optical Physics; Kurt Schoekert, BSME; and Randall Wagner MSEE.

DPL approached LambdaSpec® regarding using the spectrophotometer for color analysis of diamonds. Subsequently, DPL asked LambdaSpec® to develop customized software for dispersion measurement. The imaging spectrophotometer first analyzes the body color of each pixel of the image of light returned by a diamond. Body color is determined and described in LAB or CIE or Munsell notations. The software then sets aside all pixels of an

**A notice from  
the Editor:**

This article alludes to a report. We felt that the technology described here could not be adequately illustrated with our standard black and white format and so we have included the report as an insert.

— DK

**D**iamond Profile Laboratory (DPL) has been applying existing technology to areas that our trade has questioned and debated since before Marcel Tolokowsky wrote about diamond cutting. The purpose of this brief is not to rehash those debates.

Tolokowsky's treatise was meant to refine cutting to improve two things: (1) light return and (2) dispersion. DPL has already provided us with an article about their early findings on light leakage and light return in Rapaport (Jan 1997). Dispersion is a much more difficult topic.

For the sake of understanding, we need to state that dispersion is dependent on the angle of incidence of light. Dispersion can be thought of as the "fanning out" of white light into spectral colors and the width of that "fanning" (width should be understood as the strength of the dispersion) is related to the angle of incidence of the light when leaving the diamond and passing into air. For diamond, this means that the angle of incidence must be less than  $24^\circ 26'$ , so that all light is refracted into the air and not reflected back into the diamond. However, it is only as the angle of incidence approaches the critical angle, that the fanning becomes strong. For example, if

**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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**Tucson 1998**

The AGA had a great Tucson event this year. We had 30 attendees at the Symposium and the speakers were enthusiastically received. Thanks to Barbara Leal, our Education Chair, for her organization of the event. The evening social was attended by approximately 60 people and once again, we got rave reviews on the social aspect, the abalone (thanks to US Abalone) and on Richard Hughes' presentation (both political and informative).

Though unmanned, our booth was charismatic and almost all the AGA material was consumed over the show period. I think the unmanned booth worked well as it created zero stress on our membership and yet allowed interested parties to find out more about the AGA. After all, we're gemologists and want to be out looking at gems rather than hanging around a booth!

**Our Vision**

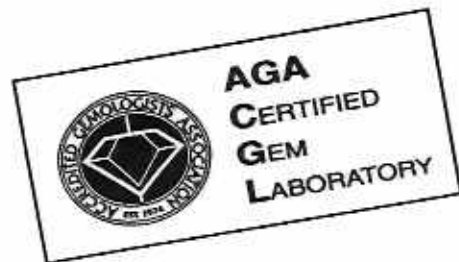
For many years now there seems to be the unanswered question "Who are we?" or "What is the purpose of the AGA?" At our annual General Membership meeting, there was discussion on this issue and the vision that evolved was sublime:



*The AGA is a peer group or society of professional gemologists with the purpose of supporting communication on gemological issues through education and publications.*



(And just as importantly, it is to provide opportunities for socializing amongst our peers! Let's have a good time together!)



**Certified Gem Lab**

The CGL program will be the focus of our organizational efforts in 1998. Jim Naughter has already begun the process of reorganization. The AGA central office has committed to assisting him with the mundane record processing aspect of bringing the CGL program in focus so Jim can focus on CGL issues, membership benefits and growth.

For example - to ease the renewal process for existing CGLs, Jim wants the application process to be streamlined. He recommends that we avoid the current necessity to relist equipment that has been previously listed in the original CGL application. We will discuss (and hopefully implement) this at our next Board meeting.

**JCK 1998**

Once again we plan to have an evening social during the JCK show in Las Vegas. If you are planning to be in Las Vegas this year, you won't want to miss this event. Last year was both fun and informative. The speaker and the date/time will be announced soon.

**Tucson 1999**

1999 is the AGA's 25th Anniversary (Yahoo!) and we aim to celebrate this with a dinner dance (remember those?) along with our usual Gemological Symposium. Karen Bonanno, representing the Gems & Jewelry committee for the American Society of Appraisers, has suggested that we celebrate together and we have embraced this invitation. Look for more news throughout the year about our Silver Anniversary Celebration and don't forget our AGA Tucson Symposium. Barbara Leal, our Education Chair, has scheduling already underway. ■



# Dispersion Measurement

Continued from page 1—

image that are body color notations, leaving only those pixels which are colors other than body color. Since this is an imaging spectrophotometer, the view on the screen will show all areas that lack dispersion colors as gray. This effectively becomes a map of where dispersion is being returned to the viewer.

There are some important limitations to this information:

**1** Tolokowsky did not include several considerations in his calculations. A viewer, looking at a diamond from overhead, blocks a certain amount of direct light. If the viewer is directly overhead, there is no light striking the diamond from 90° to the table (from a cone shaped area over the diamond, perpendicular to the table). The diamond must therefore gather light from around the viewer and return it to the viewer. This is simulated in the imaging spectrophotometer, in that the camera lens gathers the image and does not allow light to enter at 90° to the table (the light source used is a Xenon source that is reflected in a full sphere so that light enters from all angles 0° to 180°).

**2** Dispersion is only measured at 90° to the table, in a small arc. Essentially, one should imagine a viewer looking at the diamond through one eye, and slowly circling in a small circle over the diamond. At one point, a light amount of orange dispersion might start to appear, growing stronger as the eye travels, and eventually disappearing. At the same time, other "hot spots" of other colors might go and come. The imaging spectrophotometer places all of these images into one singular "map," showing what the eye saw in its entirety.

**3** Since dispersion can occur from light reaching at a number of angles and can be returned to a number of angles including those overhead at 90°, DPL's map of dispersion only maps that which an overhead viewer would see.

**4** DPL's dispersion measurement is based on spectrophotometry, not on the monitor's view or the print-out. (Most monitors have a limitation as to the display of very saturated colors in greens and blues and certain tones of saturated red.)

**5** We have been taught that high dispersion is a goal of diamond cutting. However, when the light being returned to a viewer is broken into spectral colors, it is not as strong. Highly dispersive diamonds are not as 'bright' as a diamond with minimal light leakage that has low dispersion returned to the viewer. The intensity of white light being returned gives the diamond a 'brighter' appearance. Therefore, high dispersion is something that has to be subjectively desired by a consumer. While our reports rate dispersion from high to low (see tables inside our report cover), high dispersion is a visual experience that may or may not be as appealing as a bright diamond that returns light that is white. By the same token, an all-white light appearing diamond may not be as appealing as a moderately dispersive diamond to others.

DPL welcomes comments and discussion as we seek to further refine and define these developments. ■

## BULLETIN

### ALAN HODGKINSON

will be speaking at the ISA International Conference on March 23, 1998 at the Catamaran Hotel, 3999 Mission Boulevard, San Diego, CA 92109.

Call (619) 539-8700.

The AGA is sponsoring him, so give him your support.



**WELCOME  
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### Robert Lejman

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### Frank Pintz

1220 Meadow Road  
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*Raindrops play percussion on the streets of Tucson as huge palm trees carry a gray sky. The Doubletree juts above the fronds wearing that salmon color indigenous to Southwestern artwork. The hotel is surrounded by bulbous green cactuses with bright yellow blooms. Rain in the desert. Good day to be inside.*

*The gemologists have come for their symposium. They arrive in scatterings of ones, twos, and threes, umbrellas raised, heads bowed, feet splash as they dash for shelter and fellowship. An international mosaic of accents flavor conversations about techniques, technology, and technicalities. The gemologists are in their element, and the lights go dim...*

## HOCUS POCUS

Before I go any further, I have a confession to make: I'm not a gemologist. There. I'm out of the closet. Call off the dogs. I am, however, an observer. And it seems to me that modern gemologists are the most salient mating between the esoteric and the empirical since medieval alchemists. Here we have gems, whose value is primarily cosmetic, yet you folks have written volumes about the science of them. And the instruments — gemologists use more ometers than characters in B-sci-fi flicks: fantastic, ingenious little boxes and tubes with telescopic limbs, dials, lenses, and, as Colin Winter so gracefully demonstrated, corporate logos.

Of course there's always a shaman at a convention of alchemists. Alan Hodgkinson ecstatically applied grassroots gemology through his discussion of visual optics. He asserted that there was "no underhand trickery" to his naturalized approach, and lauded the ability to examine the stones "without the governs of lenses and mirrors."

I was left with the sense that by knowing what colors to look for, anyone could do this gemology stuff. Hey, I got three questions right during Alan Jobbins' quiz-show! Ironically, the first few days following the event offered me several opportunities to test my new knowledge. When I got back to San Diego, people expected me to appraise their wedding rings as if some gemologist-dust rubbed off on me.

# STRANGER IN A STRANGE LAND

by Douglas Kearney

I suppose just being an expert in something so esoteric and mysterious, yet so important to so many people, is half of the fun of it. People seek gemologists out like two-heads in the old south. You are the voodoo doctors, hidden in secret labs, divining secrets of love from a wedding ring and secrets of wealth from estate stones.

## SHINY ROCKS

The poet, Trugoy the Dove, says "A diamond ain't nothing but a rock with a name," but after five minutes in the symposium, it's clear that there is more to gems than that. As you're all aware, folklore is full of accounts of the magic properties of gemstones. Whole communities have migrated and murdered in pursuit of gems. And woe to the poor, Tucson convenience store clerk who was robbed sometime between January 30 and February 15, as it seemed the entire Tucson Police Department was at the gem show. We don't call 'em precious stones for nothing.

The feeling of security was so pervasive, gemologists and dealers didn't think twice about walking down the streets with thousands of dollars worth of shiny rocks in their pockets. One woman absently pulled out a string of fine Hong Kong pearls in a restaurant and passed them around the table. I cringed every time one of the drunken frat boys or ornery-looking locals began to turn toward our table. What if they saw a bit of light flash off one of the pearls? Lottery time. Forget the ticket, all he'd need is a big stick.

The joke is, it wouldn't matter if the pearls were the rarest Tahitian or just spit-polished pachinko balls, because guess what readers: us laymen, your customers, *don't really know how much any of these rocks are worth!* That's right. You see, most of us figure that the bigger or shinier it is, the better it is. We assume that every gem is extremely expensive. We know nothing of the four Cs. Let me give you an example of this.

Thom Underwood suggested that I check out the big tent across from the convention center (hereafter referred to as the tent) to pick up some shiny rocks for my wife. (Retailers, you might know my wife, she's the woman with her face pressed longingly against your store windows). Well, after participating in the elaborate tent security clearance ritual (ID, business card, show pass, blood sample), I entered the marketplace.

Veeeeeeeeerrrrrry shiny.

I soon realized that I was quite unqualified to shop there. There were rows of gems, bags of beads, jewelry dangled like Christmas ornaments, glittering in all of their glory. When I would be bold enough to inquire about a price, it was often so low, I assumed I'd be laughed at for actually purchasing it. I spent most of the hour wandering around with my pupils dilating. I bought her some garnets and wandered blindly back to the soothing, dimly lit convention center. Enough shiny rocks for one day.

## TRUE LOVE

It seems you all don't ever get enough of them. That's the one thing that remained consistent throughout the symposium. Gems filled your conversations beyond mere shop-talk. Through the very technological instruction of Mr. Winter, to the naturalistic Hodgkinson; from Richard Hughes' provocative presentation, to Stephen Kennedy's reserved, academic stance, there flows a love of gems. Their color, texture, mystique. It is a passion that transcends equations and formulas and a level of analysis that seems foreign to magic. It is this fascination coupled with deep study that marries the gem to the gemologist; a marriage of true love that goes beyond superficial cosmetics. The rest of us are just looking through the shop windows, pining away. ■

## TUCSON 98 at the SYMPOSIUM...

Hours of education, interaction, fellowship,  
corporate plugs, stumped GGs, hot drinks,  
“a bit of a moan,” book signing, fine dining,  
door prizes, discount prices —  
oh yeah, and abalone.

And this was just  
the AGA's 24th Anniversary!



# AGTA to the Rescue

Sure, Gotham has the Batman. Metropolis has the man of steel. Even Atlantis has a superhero in Prince Namor the Submariner. But what about the cities beyond the limits of these urban playgrounds? They were pretty much stuck, waiting for super-powered defenders to commute while villainous forces leveled city blocks unchecked. The United States' battle against devious emerald treaters has been similar—yeah, we could handle the pick-pockets and liquor store stick-up kids, but we've been pretty much stymied by the Lex Luthors. When one of those treaters reared its ugly head in the trade, we've had to call Europe and Asia for back-up; but, if the American Gem Traders Association (AGTA) has its way, the United States will soon have its own super-powered champion.

In March, the AGTA will open its new technologically advanced lab, including instruments like the Raman laser spectrometer, right where all of the US's colored stone action is—New York City. To lead the lab, the AGTA has recruited the Asian Institute of Gemological Studies' Ken Scarratt, a gemologist with a reputation for efficiently integrating new technology into his gemological pursuits. Like many comic book super groups, the AGTA's lab promises to exercise its potential power with responsibility, by adhering to a strict code of ethics (one of which is preserving the anonymity of gemstone submissions to avoid any bias).

Although organizational sponsorship of a lab is not a precedent (check the AGS) and there are other technologically strong, well-reputed, American gem labs (Los Angeles' GIA), AGTA's lab is slated to be the first US lab to rival Europe and Asia's labs on all fronts. So, emerald-treating crooks beware, there's a new super-powered sheriff in town. ■



## Good News

The good folks at *Appraisal 2000* have been busy; not only in reference to weeks spent traveling throughout America, but back across the pond as well. How busy? Well it's all there in black and white. The publication, *Appraisal 2000*, designed and produced by active AGA members Peter Buckie and Barbara Leal (along with Brian R. Dunn of London's Garrard & Co. Ltd.), is compact, but packed with updates and information regarding activities, events, and ideas. *Appraisal 2000* is dubbed as 'The Newsletter for Professional Jewellery & Silver Valuers & Appraisers'; yet its content transcends areas of specialization. The January 1998 edition includes topics ranging from appraising pocket watches to a loving tribute to Diana, Princess of Wales, who, as Dunn points out, "was



good for the jewellery trade."

In fact, that phrase best encapsulates the theme of the newsletter's content: if it's good for the jewelry trade, it's in there. For example: in the article 'Provenance & Value,' Richard Cartier explores the integration of an item's historical value with the appraisal of its physical value. To illustrate, he alludes to the difference in perceived value between a plain, old, wooden bed, and the same bed displaying the placard "George Washington slept here." Barbara Leal's 'Gemstone Colour Grading,' discusses the practical necessity of standardized color grading systems while frankly explaining the danger of more subjective color communication like

"lollipop pink" or "orange pinkish brown." Peter Buckie explains the important technical and legal distinctions between the terms valuation and estimate, in 'Valuation at High Auction Estimate.' This is a cautionary article that warns the reader to be extremely clear about the distinction in order to avoid nasty negligence charges.

Still, the central axiology of *Appraisal 2000* is education. For those who seek to increase their knowledge beyond the scope of the four page newsletter, there is a registration form and schedule for the acclaimed Master Classes. These seminars seek to enlighten and involve participants by examining topics like 'Problems in Evaluating Antique Silverware' and 'How to Evaluate Jade' among many others.

For more information, contact Peter or Barbara at: Peter R. Buckie & Associates, Sidney House, CAMBRIDGE, CB1 1PA. ■

# ➤ GEM ALERT! ⚡

## New Treated Topaz Now In the Market

by Thom Underwood

Two different lots of diffusion treated topaz were showing in Tucson this year. Early observations of the topaz led me to conclude that they are being treated by two different laboratories and indeed, they were presented by two different suppliers.

One lot of material has a fairly consistent blue-green color which is moderately attractive; however, it has some residue remaining on the surface (we have since learned from Alan Hodgkinson that it is cobalt) which you can 'feel' by simply rubbing the gem between your fingers. This material was selling for \$2.50 per carat. Microscopic examination also revealed color centers just under the surface of the gem.

Another material displayed by a different supplier had a range of colors from an

electric blue (nicer than any irradiated blue topaz I have seen before) to an emerald green and included a full range of hues in between. Several bi-color gems were viewed as well. There is no residue remaining on the surface of these gems and no apparent color centers. The surface is 'slippery' to the touch as you would expect from topaz. This material is not yet on the market and is not yet for sale; so no price was quoted.

It is interesting to note that the refractive index line on the refractometer when viewing the treated topaz is either diffused (no fine line but a shaded area) for the first material described above or not visible at all for second material described. This may be due to the effects of the diffusion process on the molecular structure of the

surface of the topaz. Whatever the reason, it was disorienting and disconcerting as my first impression was that the RI for the gem was off the scale (1.8+).

Expect to see many articles in the trade over the next several months about this diffusion treated topaz and much discussion about the differing colors achievable. But remember, you read it in the *AGA Cornerstone* first! ■

*Note: We hope to provide you with a more complete article on this new topaz treatment in the next issue of the Cornerstone. There are several noted gemologists working with the material now.*

### Certified Gem Laboratory Update

## Words from the Eastern Front

On March 5, 1998,

Jim Naughter sounds a bit more at ease than he did months before. His office at the A & A Gemological Laboratory is quieter. Reinforcements have arrived, the situation is under control, and the mission has gained more definition. You see, in the battle to increase participation in the CGL, Naughter has been named the general. Thus, he can spend less time digging trenches and more time devising strategy.

This decision was made official at the board meeting in Tucson, when President Thom Underwood suggested that the staff at the AGA headquarters adopt the minor tasks—mailings, filing, data entry—leaving Naughter to do what he likes most.

"I like to call people," Naughter says. "I think members appreciate that more than if you just send a letter...I'd much rather pick up the phone." Seems that would be the case, as Naughter says he's probably called 60-70% of the members to introduce himself (as he said he would do last issue) and to gather suggestions regarding the CGL.

One of the ideas that Naughter is discussing with the board is the issue of certification—more specifically, the issue of whether individuals working within the lab should be certified, or whether the lab itself should be certified (Naughter cites legislation in Hawaii that addressed appraiser certification versus lab certification as a precedent). Naughter feels that having the seal of AGA accreditation would be appealing to a lot of labs, but that the "sell behind saying the 'AGA accredited lab' is inconsistent with certification being bestowed on one person." The difficulty is to create a structure that would support laboratory accreditation.

That's all for this update. We'll be back with more later! ■

*If you have any ideas, comments, or ideas related to this or any other issue, please call Jim Naughter at (518) 438-8872. He would love to hear from you.*

# FROM THE EDITOR

My name is Douglas Kearney, I am an editor, writer, and illustrator with a bit of design experience. You'll note that among my modest catalogue of skills, 'gemologist' does not appear. If it helps any, I've bought a gem or two, and I've seen 'em on TV. No, I'm not a gemologist or appraiser. Fortunately, it's not my job to appraise anything except the quality of an article, its style and substance, and whether or not the author crosses the Ts and dots the Is. These things, I can do fairly well.

Sometimes, you're not going to agree with my decisions. Sometimes you will wonder how an article you don't like sneaks through to the printers. To this, I can only offer one option. Write in! Write in with comments when you like or dislike something. If you have an idea about what should be printed in the *Cornerstone*, don't keep it to yourself; write an article or send me abstracts or press releases.

My vision for the magazine? Well, I want to make it more visually appealing (that doesn't mean eye candy will take the place of well-written articles). I want to make it a source of information and ideas that truly reflects the quality and diverse backgrounds of our membership. I want to show that there's more to the gemological industry than what you can

see through a microscope (Thom assures me that this is true). Finally, I want to help organize a publication that we'll all be so proud of, we'll want to show it to our friends and colleagues.

Now, on the subject of writing in, someone beat me to the punch. I'm thinking about calling the reader response section "Reader Appraisals". I'm open to suggestions. —DK

## LETTERS

It's one thing to verbally let a curse word slip in anger - it's another to put it in our journal. It is unprofessional in a quality newsletter. To say he's controversial is insufficient. We do not need this - if necessary - edit it! That's what editors are for!

Sincerely,

James Jolliff  
Member AGA

*Thank you for taking the time to write in, Mr. Jolliff. We appreciate input from our members.*



*This next letter isn't a reader response, but we thought we should print it.*

Dear Thom,

On behalf of the Gems and Jewelry Committee of the International Society of Appraisers, I would like to express our thanks to the Accredited Gemologists Association for their sponsorship of Mr. Alan Hodgkinson as a speaker at our annual conference.

We are honored to welcome Mr. Hodgkinson and look forward to hearing his presentation on the 'Hodgkinson Method' of Visual Optics.

Please extend our sincerest thanks to the members of your organization and our invitation to join us free of charge for this wonderful opportunity!

Sincerely,

Katherine Vandygriff,  
ISA-CAPP, GG, NJA



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### Please send me a membership application for Accredited Gemologists Association

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#### Application Guidelines

Membership with full voting privileges is available to professionals holding gemological diplomas from accepted institutions.

Associate Membership is available to students of gemology and avocational gemologists.

Supplier Membership is available to providers of goods and services to the gem & jewelry industry.

**AGA will not discriminate against any applicant based upon race, creed, color, national origin, age or gender. Applicants are required to meet substantial member qualifications, and to adhere to the AGA Code of Ethics.**

#### Application Guidelines

\$25 Processing Fee (one-time, non-refundable) will be retained by AGA.

\$100 Voting Member Dues.

\$75 Associate Member Dues.

\$50 Student Member Dues.

\$150 Supplier Member Dues.

Make checks payable to Accredited Gemologists Association, in U.S. funds.

Membership is renewable annually (Voting \$100, Assoc. \$75, Supplier \$150).

#### Return This Request to:

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