



# CORNERSTONE

A Publication for the Accredited Gemologists Association

## DIFFUSION CONFUSION

by Anne Hawken

In recent months a remarkable number of articles regarding Diffusion Treated Sapphire terminology have been published. Among wholesale gem dealers, use of the term "diffusion" was questioned in a February petition signed by 180 members of AGTA.

The preferred alternative now under discussion is "synthetically coated sapphire." In 1981, Nassau commented that unlike other sapphire treatments, diffusion does not have a natural counterpart. He observed that diffusion treatment (versus heat-treated sapphire) had an appearance more like "Lechleitner synthetic emerald overgrowth on a natural beryl [rather than] heated aquamarine."

Nassau in his 1984 book on enhancements opined that "surface-diffused corundum with color added can be considered to fall into the composite gemstone category." He has been quoted more recently as maintaining that "ideally, these stones should be sold as composite gems with synthetic surface-diffused color" (MJ, Feb., 1992).

That stance has been echoed in trade press editorials asking that diffusion treated corundum be referenced as composite stones. The logic of this argument is taken a step too far when comparison is made between the diffusion treatment process and the plating of base metal with gold, concluding that "whatever is praiseworthy about them is synthetic" (*Modern Jeweler*, Jan. 1992).

Process analogies aside, the jewelry industry certainly has had its share of problems with the term synthetic. Whether understood as the scientific term (synthesis), or the common usage (artificial), "synthetic" may be inappropriate for diffused sapphire.

It would be ironic were the term synthetic selected to describe diffusion stones. This usage would require relying upon the common meaning of the term "artificial" despite the industry's history of careful scientific definition and marketing semantics for true laboratory-synthesized gems.

Nomenclature guidelines are intended to clarify, rather than confuse. Are "synthetic sapphires" and "synthetic coated" diffusion sapphires of similar quality to the consumer? All parties in the terminology debate are to be congratulated on their concern for consumer education, but the use of "synthetic" for artificial and "coated" to indicate shallow surface also are problematic.

What is missing in the conceptualization of diffusion stones as "synthetic coated" is the fundamental chemical definition: a synthetic is a compound formed by chemical reaction.

Surface diffusion requires no solution and/or growth from a melt. Is it accurate to describe the artificial inducement of color via ion migration as the creation of synthetic material? And what of the term "composite"? Ian Campbell, Editor of *The South African Gemmologist*, stresses that diffusion sapphires are the "result of molecular bonding, and thus are not made up of separate pieces." In both the common and gemological senses, composite materials are those composed of two or more disparate parts or elements.

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## KANCHANABURI SAPPHIRES

by Richard B. Drucker

There are many viable sources for blue sapphires today which has made pricing them a difficult task. Many factors such as economic conditions of different countries, vast differences in mining output, buying habits of dealers and consumers, and new treatment technologies are just some of the things affecting price.

For many years, the major producer of sapphires was Thailand. There were still many sources but the Thai market was clearly dominant. Australian sapphires were consistently too green in hue or too dark in tone and therefore never sold well. Then, with the ever advancing technology of heat treat-

ment, the Australian stones became better looking and were selling very well. Ceylon stones which tend to be lighter in tone were also selling well. But where have all the buyers gone today? They don't seem to be in Australia and hence the market there has reportedly dropped some 70% in volume. They aren't in Thailand or Ceylon either. It seems that they are all running to Kanchanaburi and with very good reason.

According to Dallas-based dealer David Rose, the prices of Kanchanaburi sapphires have dropped by as much as 50% in the past year. The reason for the big drop is simple...mechanization.

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# President's Message

by Cortney Balzan



**T**hanks to the officers and members who volunteered their time to **AGA** this past year. Their dedicated support in sponsoring programs, publishing newsletters, maintaining a library of conference video and cassette tapes and conducting research on issues that benefit the gem and jewelry community is what makes the **AGA** the valuable organization it is. **Cap Beesley**, Standards and Disclosure Chair, remarked, "It's miraculous what **AGA** accomplishes when looking at its annual budget."

In Tucson this year, **AGA** showed its true potential to the gem and jewelry community. The **AGA** and its' members were visible for two weeks giving conferences and seminars. It took some of our volunteers a few weeks to recover from the demanding schedule that comes from participating in over a hundred hours of educational offerings (how was your drive home Leo?).

The Chairpersons of Education, Certified Laboratory Program and Software Review deserve applause for their contributions. The topics were timely on what the **AGA** does best...hands-on seminars on the Issues of the Day. Many of our seminars had overflowing crowds.

**Leo Schmied** professionally taped many of the seminars and is editing them for distribution. If you want to "listen in" on those Tucson events give him a call and place your order. A particularly hot workshop was the **AGA/GIA** Advanced Diamond Grading session that clarified many grading issues **AGA** members have been asking for years.

Some questions couldn't be answered or clarified easily. We found out that the **GIA** diamond grading system is not black and white and that some points need clarifying. Want to hear more? Call Leo for your copy of the tapes.

Since **AGA's** founding, nearly 20 years ago, our membership had a need to know...to narrow the information gap on the Issues of the Day. Many members can't participate readily but still have a need to know or enjoy reading about **AGA** events and activities. My immediate objective is to bring this to the membership quickly. **Cornerstone** will be mailed four times a year to help in this task. **Thom Underwood**, Software Chair, has taken on the challenge of publishing the **Cornerstone** with the help of his wife, Lynn.

I wish all **AGA** members a great 1992.



## ACKNOWLEDGEMENTS

### FOR A JOB WELL DONE!

At Tucson's '92 Dinner Dance, held at the Park Tucson Hotel, **AGA** recognized past and present officers for their volunteer work and contributions. Thanks to: Antonio "Tony" Bonanno, Joseph Tenhagen, Neil Cohen, Donald Palmieri, Tom Tashey, Robert Rosenblatt, Brenda J. Caldwell, Dana Richardson, Young McQueen, Anne Hawken, Leo Schmied, Tom Seguin, Thom Underwood, and Cap Beesley for their contributions to **AGA** and the field of gemology.

## EDUCATION PROGRAM A HIT!!

The spirit of AGA came alive in Tucson this year with five days of advanced and continuing education programs provided by the Education committee. These programs were demanding, exciting and by attendee accounts, timely, well-structured and well-taught. *Editor's Note: see Susan Whitaker's personal report.*

Alfredo Molina gave an excellent presentation on transparent gemstones and Cap Beesley gave his usual "five star performance" on detection of treatment and country of origin. Thanks to Don Palmieri for co-ordinating the event and to Ted Themelis and Michele Hallier who contributed materials for the AGA Ident-At-A-Glance Transparent Gemstones Manual.

The GIA was commissioned to present a special three day advanced course on diamond and colored stone grading. This course provided many with the experience of their gemological lives and much to think about. (See Antoinette Matlin's article in the April 1st issue of *National Jeweler*, page 41.)

After all the courses came the practical test for the Certified Master Gemologist (CMG) program. Most of the candidates for the CMG test had spent the previous five days honing their practical skills. Forty-six hours of education and hands on training in gem ID, treatment ID, and grading diamonds and colored stones.

The practical test of identifying and grading five items of diamond and colored stone jewelry (5 hour test) is only part of the requirements for a candidate to become certified. All candidates must have a certified lab as well as write a thesis on an approved gemological subject. The program is up and running! No doubt there are some details that need tending to and refinements that will be made as we gather more momentum. We welcome the challenge.

### *The successful CMG candidates are:*

Riki Goodden, Kansas City, MO  
Michele Hallier, Phoenix, AZ  
Charles Helm, Concord, NC  
Richard Huntingdon, Las Vegas, NV  
Winfield Jones, Boise, ID  
Tess Koach, San Diego, CA  
Angelica Koczek, Carmel, CA  
Alfredo Molina, Phoenix, AZ  
Donald Palmieri, Pittsburgh, PA  
Larry Phillips, Albuquerque, NM

Dana L. Richardson, Salt Lake City, UT  
C. Kirk Root, Austin, TX  
Tom Seguin, Bradenton, FL  
Eric Shelton, Albuquerque, NM  
Nancy Stacy, Walnut Creek, CA  
Richard Teel, San Jose, CA  
Thom Underwood, San Diego, CA  
Sue Whitaker, Charlotte, NC  
Christine York, Houston, TX

AGA salutes those who made up the inaugural class of CMG candidates. Your thesis is your new goal for 1992-93. Good luck!

## Tucson was the Right Place to be

*by Susan Whitaker*

In the spring of 1984, I received my certificate and was told that was all you need to be a G.G. Go home.

Is that all there is? How could I ever hope to attain the proficiency of a GIA instructor? Their response was to work for GIA and then work in the trade.

Since I couldn't, I returned to North Carolina with the words "you did well-you'll be fine" ringing in my ears. So with trade magazines, I thought I could keep up with what was happening in the industry. As time passed, it became clear that many new gem enhancements and equipment had come on the market. I knew someone, somewhere, had to be teaching about them.

Then I discovered AGA and its ongoing learning programs and talked to Don Palmieri. I felt this was the direction in which I needed to go. My idea was to go see Tucson; catch up on the past with GIA; find out what every one found so interesting there; confirm the fact I was on the right track; and go home and carry on business as usual.

Most people in my area and my family regarded this idea as a waste of time and money. No one was supportive. I am so thankful I didn't listen to them.

I like to use the analogy of my brother "the doctor". I'm sure in medical school he

read about an appendectomy before he was faced with assisting in surgery. I learned about Yehuda filled diamonds and emeralds from reading, but seeing them in Tucson was an experience you must have first hand before encountering them in the trade.

My only disappointment was with the GIA advance diamond grading class. I had assumed it would make diamond grading more precise, instead of more liberal. Before Tucson GIA was always the first and the last word. Now I see it somewhat more objectively.

Information learned from the other AGA members at lunch and breaks was priceless, from Leo's stress on diamonds; Nancy's dos and don'ts in appraisals; Thom's software information (which has already paid off) and Christine's pit-falls of pearl appraisals. The list can go on and on.

Thanks to everyone, I came back home more confident. I have sung the praises of AGA every day since Tucson, so much that the same ones who thought it was foolish before are now asking, "Why didn't you go earlier?" Believe me I have asked myself the same question. The answer is I didn't know about AGA before.

I truly feel I'm on the right road now and its name is AGA.

# CHATHAM GETS AWARD

*As reported by Alan Hodgkinson, FGA in a March, 1992 article for Retail Jeweler (Great Britain):*

During the Tucson Gem and Mineral Show, the Accredited Gemologists Association held their annual dinner at which the main presentation of the evening was made to Tom Chatham in recognition of the contribution made to the international jewellery industry by this second generation company of gemstone creators.

Tom Chatham, like his father before him, has always gone out of his way to help those interested to gain a better understanding of the gemstones he creates. As a teacher of gemmology, I can personally vouch for the generosity of the man in helping the trade to gain a clearer picture of these man-made gems, so that we can distinguish the one from the other, though it often calls for experienced microscope use.

The AGA is a body of qualified gemmologists, American in the main, who have set extremely high standards for their profession as with qualification in gemmology, diamond grading, colour assessment, etc., and the encouragement of fully equipped laboratories to back up their work. The Americans have much to teach us, particularly in the matter of professional customer service. Little wonder that the AGA sought to recognize Tom Chatham.

**Editor's Note:** Alan is well known for his Hodgkinson Method of sight identification, a technique for deriving, without the aid of instrumentation, information concerning the RI, birefringence, dispersion, and spectral absorption of a gemstone. His thin film diamond coated CZ also created a great deal of interest at the Tucson Show (this was accomplished at a nuclear facility near his home in Scotland).

## DIFFUSION

*Continued from page 1*

No doubt this forest/tree terminology debate is born of frustration produced by the term diffusion, which is itself easily misunderstood. Diffusion has one very specific meaning in physics and chemistry:

*This term denotes the process by which molecules or other particles intermingle as a result of their random thermal motion. Diffusion in solids is a phenomenon which occurs rather slowly, but can be observed. Three basic processes may be responsible: (a) direct exchange of atoms on neighboring sites; (b) migration of interstitial atoms; (c) diffusion of vacancies."*

**(Encyclopedia of Chemistry, 1984).**

Yet in common usage, the first meaning of "diffusion" is "to scatter widely"; or even more confusing, "a reflection or refraction of light, an erratic dispersion through a surface." This latter definition--reflection and refraction--has been used to advantage by sellers when presenting the material to prospective clients.

It is a highly questionable practice to market diffusion treated stones as "especially refractive." But if we are to engage in terminology uses which rely on common general meanings, rather than specific scientific ones, this type of misleading "sales rap" becomes harder to combat.

As you know, in corundum the diffusion process is accomplished by packing colorless material in iron and titanium, subjected to extreme heat, aided by a reducing atmosphere which allows "the thermally energized transitional metal ions to migrate into a layer at the surface" (*Gems & Gemology*, Summer 1990).

The Union Carbide scientists developing and patenting the process (July 29, 1975) correctly identified it as "diffusion treatment." Four patents were transferred to Astrid Corporation of Bangkok. These early generation stones (1976-1980's) exhibited color alteration to depths of approximately .20 mm (total) with .07 mm primary color layer. GemSources has provided the market with a second generation of diffusion sapphire.

Documented depths of color alteration are almost double those of the earlier stones (.42 mm total depth, with .12 mm primary color layer). Recent debate has focused on exactly where this migration will end. No one wants to be directly quoted, but there are those who report that the diffusion treatment may eventually penetrate to depths which do allow for recutting and repolishing.

We do not at present have such a durable product on the market. Therefore, the Certified Gem Laboratory Committee recommends the use of the following disclosure statement in all AGA-CGL grading reports:

**DIFFUSION TREATED SAPPHIRE:** *The color of this gemstone is artificially produced by diffusing color enhancing chemicals into the surface layer by heat treatment. Recutting or repolishing this stone may significantly degrade its appearance.*

This statement is meant for the trade gemologist, and is not intended to replace complete sales disclosure. The terminology debate continues.

**Editor:** *In a conversation with Susanne Patch of the Federal Trade Commission, she indicated that because diffusion is not permanent, it must be disclosed on invoices and in sales brochures. The FTC currently recommends the use of the term "surface colored sapphire".*

## Coming Up...

On April 1st (April Fools Day) the EGL lab in Los Angeles announced that they would begin assigning SI-3 as a diamond clarity grade. Did *National Jeweler* get the whole story? Find out in the next issue of *Cornerstone*.

Also, a discussion of Argyl's new suggested color grading system for their "Champagne" diamonds. Don't miss the article on weight estimation issues and formulas for fancy shaped stones by **Richard Homer**.

Have comments? Want to complain? Want to acknowledge someone or bring attention to an issue? Write us or fax us! Our fax number is (619)291-2773.

# Q&A

## A Specialized Publication of the Accredited Gemologists Association

This issue of Q & A is included in the CORNERSTONE. As your interest and participation warrant, we will expand.

**Q:** How do I calculate the weight of rose cut diamonds?

**A:** From David Atlas: Use the formula for cabochons. The one he uses:  $L \times W \times D \times SG \times 0.0026$ . You can adjust the factor depending upon shape. If round substitute the diameter for L(ength) and W(idth).

**Q:** Koss Diamond in Israel claims to have a filler process for included diamonds that is undetectable.

Has anyone seen any? Opinions? Experience?

**Q:** Has anyone seen the Russian synthetic aquamarine in the commercial market?

**Q:** Does anyone have the serial numbers for Rolex watches from 1987 to 1991?

*Comments on Cameos: If you appraise or authenticate cameos you must read Anna Miller's new book, CAM-EOS OLD AND NEW. Even if the only lesson learned is that 98% of us should not attempt to authenticate or appraise archaic cameos.*

## THE GEMOLOGIST AND LOWER BACK PAIN

The daily routine of a gemologist is a near perfect formula for problems of the lower back. The human anatomy is not designed very well as far as the back is concerned. To prevent problems, the body depends upon the muscles of the stomach and back to support the spine.

When these muscles are no longer strong enough to perform this function, exceptional force is exerted on the spine and especially the disks. This can cause a herniation (bulging) or a rupture of the disk. Especially vulnerable is the lumbar region of the spine. The position that exerts the most stress on the lumbar is sitting, especially sitting without support of the lumbar.

Read: "Sitting up, leaning over, and looking through a microscope". Ironically it is almost 100% preventable. The "secret" is to keep the stomach and back muscles strong. This is attainable for the most desk bound of us by 15 minutes of daily exercise. If you are a runner or walker, you are not immune. Do the exercises too.

Last summer after a 45 minute drive on a Friday, I experienced a sharp pain in my back upon exiting the car. By Monday I could hardly walk. I spent 9 weeks in bed, endured an MRI examination among other things and felt lucky when I slowly returned to work a few hours a day over several months. I still undergo weekly therapy. I am lucky I avoided surgery. With daily exercises and weekly therapy it will probably be a year before I am back to normal and can run or play tennis.

If I only knew then what I know now I would not be in this fix. In my company, of the four gemologists, three have had back problems and two have had surgery. The only one to escape is 25 years old.

I beg you, take preventive action!. Send me a SASE and I'll send you a copy of exercises that can prevent the problem with an investment of just 15 minutes a day.

Please send your comments, replies, questions, and answers for Q&A to the editor: B. Young McQueen, 5613 University Blvd. W., Jacksonville, FL 32216

## NOTES FROM THE CGL COMMITTEE

During the first quarter, the Chair of the Certified Gem Lab served as clearing house for revision recommendations to the AGA Code of Ethics; the new Code was approved by Board vote on February 7, 1992. Thanks are extended to all involved in this much needed revision.

AGA welcomes Sharon Wakefield of Boise, Idaho to the CGL Committee.

The Gemstone Enhancement Guide and the FTC Guides for the Jewelry Industry are available from the CGL program, for \$1.50 each. Contact Anne Hawken, 512/328-9411.

In the area of practical gemology, next quarter we are focusing on accurate calibration of measuring and weighing devices for participating member labs, along with some suggestions.

## VISION ALERT

During the Farnsworth/Munsell Color Sensitivity testing provided in Tucson, we learned from the ophthalmologic staff which administered the test that a medication regularly prescribed for rheumatoid arthritis, Plaquenil Sulfate, can cause decreased corneal sensitivity and retinal changes. Those of us using our vision to make sophisticated discriminations need to remain aware of the conditions and medications which may reduce visual acuity.

## GEMSET REVIEW

At Tucson, Ken Roberts of GemSet, Inc. thanked those members who had participated in the review of his product. He commented that it was a fair review with several useful suggestions, specifically mentioning that there would be additions to color samples in future sets. At the time of our testing, no "trade quality grades (A-D)" were published in the GemSet manual; those "trade grades" now published require further investigation.

**Sapphires:** *Continued from page 1*

Previously, mechanized mining was not allowed in that region and was ruled illegal by the government. Now, mechanization is legal and it is causing an oversupply.

Since these sapphires tend to be similar to Ceylon stones or somewhere between Ceylon and Thai, they sell very easily. When mechanization reduced the price, dealers were even quicker to purchase these stones.

Fine one carat sapphires that were \$1,200 per carat are now selling for \$600-800 per carat wholesale. Interestingly many sapphires over five carat are also available for only \$850-1,000 per carat.

When a major price reduction occurs in gems, prices do not always respond at all levels. What I refer to by this is that the end wholesale price may not show the same decrease in price.

Right now, many big dealers are buying up the Kanchanaburi supply and so prices may already be firming up. When they return to sell to other "middle" wholesalers they often take the opportunity to make a few dollars more. After all, the comparable sapphires from other sources are still selling for more. They may be taking advantage of a short lived glitch in the market.

If prices remain low for a longer period of time the result may be increased pressure on other sources to also reduce price. Then we see a unilateral reduction in the sapphire prices.

As an appraiser, tracking these temporary price fluctuations can be a difficult task. There is the need to be able to accurately identify the sapphires as Kanchanaburi. This is often an impractical or impossible task for most appraisers as there are many sources with overlapping gemological properties. Outside of the few collector stones with accredited papers stating Kashmir, we tend to group all the other sources for pricing. If you say Australian sapphires cost less it is probably due more to its intrinsic properties such as greenish blue hue rather than to its location. Ceylon or Burma stones may cost more due to their better appearance. So at the moment one is likely to value a Kanchanaburi sapphire at a higher price if its quality rating warrants it. It then becomes a "good deal" to the dealer or consumer who purchased it.

Appraisers should be aware of this

situation and watch the sapphire prices closely. The recent volatility of prices as noted can greatly affect the outcome of an evaluation. Prices of sapphires have had much downward pressure and the additional oversupply of Kanchanaburi at low prices could add to the pressure eventually dropping all prices. Note that the upper end are still holding up in price (stones that The Guide rates as "extra fine").

As a side note to this article, the diffusion sapphires also threatened sapphire prices when they first entered the market. Now, these stones have also gone down in price by about half. One carat diffusion stones that sold for about \$125 per carat a year ago can now be purchased for about \$60 per carat. Two years ago one company who no longer sells these was asking about \$250 per carat for one carat stones.

**Editor Note:** *Richard Drucker, a member of the AGA, is publisher of The Guide, a gemstone pricing publication which is updated quarterly. He writes for Jewelers' Circular-Keystone and has contributed articles to various other trade publications.*



SOFTWARE REVIEW  
COMMITTEE'S  
QUARTERLY REPORT



# Education Committee Expands

*by Don Palmieri*

As First Vice President of AGA, I will be running for President of AGA this summer/fall. With this in mind, I have selected two Co-Chairman, one for Education—Alfredo J. Molina of Phoenix, AZ, and one for the Certified Master Gemologist Program—Larry Phillips of Albuquerque, NM.

Provided I am elected President this year these Co-Chairs will become Chairs. The membership of these committees will be as follows:

**Education Committee:**

Alfredo J. Molina, Chair;  
Michele Hallier and  
Brenda J. Caldwell are members.

**CMG Committee:**

Larry Phillips, Chair;  
Eric Shelton  
others to be appointed.

In addition, two committee advisors will belong to both committees. Ted Themelis will remain as "technical gemology advisor" and Nancy B. Stacy of Walnut Creek, CA has been appointed curriculum advisor to both committees.

This division of the Education and Certification Committee will allow faster and greater expansion of our goals, while spreading the tremendous workload onto more shoulders. As the year draws to a close, I hope to have both committees operating under their own auspices.