

# **A G A**

# **PUBLICATION**

AN INTERNATIONAL NEWSLETTER

VOLUME SIX, NUMBER THREE  
JULY 1981

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**ACCREDITED GEMOLOGISTS ASSOCIATION** 

36 N.E. 1st Street, Suite 419  
Miami, Florida 33132  
Phone: (305) 374-2411

*TO DEVELOP AND PROMOTE PROFESSIONAL STANDARDS  
IN THE PRACTICE OF GEMOLOGY*

The initial message to all members from Joseph Tenhagen, F.G.A., G.G.,  
President, AGA:

I anticipate the growth and activity of the AGA in this coming year with a great deal of pride in my position as President of the Accredited Gemologists Association and faith in the activity and participation of the membership.

During my brief tenure, I have received a prodigious amount of mail that has been answered as promptly as possible, and, in the process, I find that I hold my predecessors in the highest esteem for their jobs well-done. It is a large undertaking and will hopefully grow as new members are acquired. However, without the help of each and every one of you, the success of the AGA will be limited.

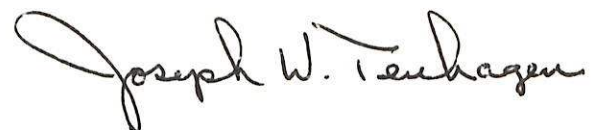
I have corresponded with a great number of members who simply took the time to sit down and write of their congratulations, complaints, or concrete suggestions. Thanks to them, this Publication contains a great deal more information than it would have, had they not shown an active interest. Being an International Organization, each of you has some point of interest or specific area of knowledge that could prove helpful to all of us, whether it be market trends in Sri Lanka; discoveries in South Africa; technological advancements in San Francisco. We have at our disposal the opportunity to learn about gemology and gemologists the world over.

I am changing the format of this first Publication and would appreciate hearing your comments. Some of the new columns are direct suggestions from those who wrote, and I welcome any and all others. The importance of this missile cannot be held too lightly; it is our major source of sharing our knowledge and expertise, keeping in touch with one another, aiding and abetting each of us in our profession. It cannot fulfill this without your help and contributions of time and information.

We need local chapters that can bolster the Organization and prevent it from becoming unweildy or too localized. Two new ones have formed so far: one previously announced in Washington, D.C. and another highly promising one in San Diego, California. I wish them both the best and look forward to their participation in this Publication.

We have nine new members up for approval before the Board, with new applications arriving daily. The possibilities of input from present and new members are endless, but it still will require that so-simple step of taking a few moments to sit down and transfer your thoughts to me.

I look forward to hearing from you and working for you and the AGA.



\*\*\*\*\* Corrections, Deletions, and Additions \*\*\*\*\*

Please note the following on your Membership Lists:

1. Alan D. Davis, G.G.; corrected to read:  
Terry Alan Davis, G.G.
2. Elaine C. Baker, G.G.; corrected to read:  
Elaine C. Baker, G.G., F.G.A., A.S.A.
3. Lewis Bannon received his F.G.A. degree in 1980. Add:  
Lewis A. Bannon, G.G., F.G.A.
4. Address and spelling correction:  
Jerrold Conaway  
D.D.S.I. Incorporated  
6100 W. 94th Street  
Bloomington, Minnesota 55431
5. Horace Simon, Jr.; corrected to read:  
Horace Simon, Jr., G.G.
6. Correction of spelling and company name and address of  
Daniel A. Sauer; corrected to:  
Lapidacao Amsterdam S.A.  
Rua Mexico 41-11º andar  
Rio de Janiero, Brazil 20031

\*\*\*\*\*

Publication releases from the AGA's San Diego Chapter:

Meetings have been held on March 30, May 12, and June 18. Further meetings are to be held on the third Thursday of each month at 2140 Garnet Avenue, San Diego, at 7:00 PM. The June 18th meeting concerned the formation of a nominating committee for their Local, and we look forward to hearing about their new officers.

Attending members have been: Pansy Kraus, F.G.A., G.G.; Dara Yost, F.G.A., G.G.; Norma Skroch, G.G.; Benjamin and Isabelita Angeles, G.G.; Merika Adams, G.G.; Elaine Baker, G.G., F.G.A., A.S.A.; and Luana Veo, G.G. Anyone interested in joining this newly (and highly) active local, please contact: Luana Veo, G.G.  
P.O. Box 2425  
La Jolla, California  
(714) 272-5800

\*\*\*\*\*

**FUTURE MEETINGS OF THE ACCREDITED GEMOLOGISTS ASSOCIATION!**

There will be a general membership meeting in Washington, D.C. on October 3rd, 1981, at the Sheraton Inn- Washington NW, 8727 Colesville, Silver Spring, Maryland.

Tentative plans are being formulated to hold a general membership meeting in Tucson, Arizona in February of 1982. Even though this is premature, we are attempting to hold meetings that can be attended by those of you who find that the East Coast is rather difficult to get to.

\*\*\* CAP BEESLEY'S Speech, given before the attending membership in Washington, D.C., May, 1981. All quotes are direct quotes and the speech has been printed here in condensation. Mr. Beesley was a former Senior member of the GIA for many years and is now President of the American Gem Laboratories based in New York City.

Cap Beesley's highly informative speech and slide presentation covered four subjects: (1) Gem Identification Problems; (2) Burma-type Stones, (3) Heat-Induced Color Alteration; and, (4) the Color Grading Process.

One of the merits of any good gemologist is suspicion, and while one can certainly appreciate the aesthetic qualities, the geometry of a stone, as well as its history, this is not the true function of a gemologist. In this period of vast technological innovation, many methods from other industries are being used in the gem business. As an example, the electronics industry is implanting materials (like arsenic), and annealing them close to the surface with lasers; slow heating causes deeper penetration. The application of this in the gem industry is only too obvious.

Gem identification will continue to be a constant problem, compounded by these new techniques being used by the synthesizers. "The people who are making synthetics ought to be much more straightforward about their product in disseminating information about it, instead of waiting until it's circulated throughout the world and in a lot of bank vaults with a lot of people hung, because the information was not readily available."

#### GEM IDENTIFICATION PROBLEMS

The following information was made readily available to the members: The heat cracks and surface craze that automatically indicated standard, flame-fusion synthetics are being found in a number of Burma-type stones.

Included in Thai stones: a two-phase core that can vary in shape and can be liquid-filled, coated, spherical, or flattened at the surface, with a fingerprint plane radiating outward that resembles the rings of Saturn. Also seen in Thai stones are Morse-code-like lines running through the material that do indicate Thai origin, automatically, but may also run Cambodian. Cap noted, in reference to Country of Origin, that, "there's only two people that know for sure where it came from -- that's God and the guy that took it out of the ground, and even the guy that took it out of the ground is suspect". Thai stones also exhibit highly reflective twinning planes parting; and that two-phase, when turned to various angles, can show a solid core with a reflective, stair-like pattern.

Chatham stones exhibit hexagonally-shaped crystals or (platinum) platelets, due to the use of platinum crucibles

in the growth process.

Kashan does not use the platinum crucibles, ergo the absence of the platelets, but other characteristics include flux-filled cavities; fine, veil-like groups of inclusions comparable to those in naturals -- ("You cannot fly on fingerprints alone"). In this area of comparables, "there is evidence of the growth process entrapped within the material regardless of how it is grown". The problem becomes a lack of highly suspicious gemologists who will take the time to ferret out these comparables.

The smaller, finer, flux-filled cavities of Kashans have a translucency or semi-transparency not normally seen in natural materials. The dust that is characteristic of Kashans may be in streamers - seen as very fine particles scattered throughout the stone, and seems to be more prevalent in darker stones. Also evident in darker stones (as opposed to pink) is a tight, non-reflective type of twinning, (remembering that Thai stones have planes running through the material that are highly reflective -- a "venetian blind" appearance). Present also are bruise-type inclusions described as a core with radiating fractures issuing outward; but something similar to this could also be found in naturals. Dichroism in Kashans is considerably stronger than comparable colors in natural stones.

In sapphires, a bright red urano-pyrochloric hood and a radiating tail are indicators of Cambodian natural, but in this area, as all others, one must be very careful, as flux-sapphires not grown in platinum crucibles can very well be expected to have these types of inclusions.

Ceylonese sapphires which have not undergone heat treatment exhibit very coarse, highly reflective needles, a lack of rutile, and cavities within the material with standard-type fingerprints. Ceylonese and Burmese sapphires exhibit focal-type fingerprints. With no apparent explanation, there is fluorescence in certain, as strong as "straightforward flame-fusion synthetics".

#### BURMA-TYPE STONES

"Burma-type" is a term being used to describe Thai material that is classified as such because of peculiarities of: a general lessening of fluorescence in comparison to the normal fluorescence experienced with Burmese materials; variations in inclusions which are more angular; and the presence of the two-phase Saturn-like inclusions. All else about the material indicates Burmese -- general inclusions, very fine silk -- so the term Burma-type came into existence.

The explanations for the existence of these Burma-type stones may be: (1) new sources - (Pakistan and Afghanistan are mining material, and have been since the 1800's to early

1900's, that is Burmese in appearance, but very "pinkish"; (2) heat-treating of Burmese stones - (a certain result of such action being the lessening of fluorescent properties).

#### HEAT TREATING

60%-70% of heat-treated sapphires, especially Ceylonese, develop a fluorescence under Short Wave. "It (fluorescence) absolutely, positively, unequivocally can be used as one of the reliable tests for establishing whether or not a stone has been heat treated". Conversely, heating rubies causes the fluorescence to subside somewhat. The heat wave effect is exaggerated during the heating process, and textures within the material can even be controlled!

In determining heat-treated sapphires, the "cookers" are now coating materials with a borax-based substance to reduce the amount of internal damage. In essence, a mini-reactor is formed and the stone stews in its own juices. The Ceylonese do not heat their stones to as high a temperature as in Bangkok, so the heat-induced changes are more subtle than in the typical treated material. "I'd lay money on the fact that they're probably even heating Kashmir stones." Highly risky business, to say the least, but the rewards can be phenomenal.

Heating generally causes grossly exaggerated dichroic effects that can cause the stone to look "fakey"; there are also diffused color zones as in naturals, so take care. Opening 50-100-200- stones that look exactly alike is indicative of heat treatment. There are also surface treated sapphires with color diffused into a shallow concentration which can be polished out, and does kill the fluorescence. Testing is accomplished by immersion in a 3.32 liquid, where the stones tend to take on a black rind - a very thin line.

Preparing documents for all of the above is indicated by Mr. Beesley in his laboratory under the rule: there have to be changes in the observable properties of the material. The indication of "HICAP" on documents refers to Heat Induced Color Alteration Present.

#### COLOR GRADING SYSTEM

Tolerances are a key issue and not all laboratories grade according to the same basis. Plus or minus one-half grade is "dynamite grading", and it is only right to inform a customer that a stone is at a transition point, or border-line grade. "We're going to have to start knowing about the in-betweens, because for the long-term good of the business, particularly from a - quote, unquote - investment standpoint, those issues are going to have to be dealt with."

Lighting is absolutely crucial and one must be aware of various light sources and results on the stone's appearance and be able to eye-adjust for this.

There are sufficient constants within gem materials that can be used to establish a very reproducible grading process. First, establish the quality of color, then the quantity. Even with different colors, there is an element of lightness-darkness in every gem material. A color scan will give the approximate percentage of the visual color components of a material, and the fewer the number of components, the better the material.

Establish the primary color, then the secondary, and finally the intensity modifiers of browns and grays. A stone is 100% color, but 85% is the approximate maximum primary color in any material.

On a total grade, 80 is ideal for ruby, 70-75 for emerald, and the ideal for sapphire is 80-85.

In Cap's Lab.:

Color grade is a summary of color scan and clarity is based on: size, nature, number, location, and effect on durability. Texture is used to describe sleepiness in a material, and in over-all grading, his Lab. is more specific than "good; fair; poor", with a three grade numerical spread in the "good" category alone.

#### IN SUMMATION

The future portends a tremendous movement toward instrumentation: spectrophotometry; computerized color judgements. The trained human eye is not to be denigrated, however, for its ability to discern and integrate is "light years beyond" the instruments.

"The gemological process has been equated to throwing stones at dinosaurs. Where, at one time you could take your laurels and wear them for awhile, and then sit on them and nobody ever noticed, now you can't get away with it any more. You've got to perform. And that's how it ought to be, as a matter of fact. But information is going to be one of the key elements for us all. The challenge and competition bearing down is going to force us to innovate."

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DUES ARE DUE -- GET YOUR CHECKBOOKS OUT!!

\*\*\*\*\* Treating Opal Matrix

Dag B. Johnson  
P.O. Box 7555  
Tahoe City, California 95730

1. Cut and polish opal matrix as desired. Cerium oxide or tin oxide is best for polishing. Diamond polish can also be used.
2. Wash stones in a strong detergent. Rinse thoroughly.
3. Dry stones on a wire rack in the oven at 200° F. for a minimum of 12 hours. (24 or 36 hours would be better.)
4. While stones are drying, mix a soaking solution of 4 parts lactose, glucose, or sugar with 2 parts water. Heat to a temperature of approximately 190°-200° F., using a glass or enamel lined sauce pan or bucket with cover.
5. Put solution in oven where the stones are drying, and when the solution is close to the temperature required, transfer the stones into the solution in the oven. (If you make the transfer outside of the oven, the stones will absorb moisture from the damp atmosphere.) Don't touch the stones with anything oily, such as hands. Use a clean, dry spatula, tongs, or other non-contaminating device. Cover and let cook 12 to 24 hours. Stir occasionally when convenient. For maximum results, put stones and sugar solution at a temperature of 190° F. for several weeks.
6. Remove stones from soaking solution and place in oven at 200° F. for 2 to 3 hours to dry. Longer is okay.
7. Remove stones from oven and place in clean, dry soaking container. Cover stones with sulphuric acid (H<sub>2</sub>SO<sub>4</sub>). Cover container and place on hot plate at medium heat - 200°-300°F. Let cook in well-ventilated place for 8 to 12 hours. Keep covered but DON'T seal.
8. Remove from heat and let cool to room temperature.
9. Pour off acid. Rinse stones in baking soda and water solution. Wash stones, pot and tools with detergent and water. Rinse in clear water, soak in solution of soda and water 6 to 8 hours to neutralize acid. After soaking stones in the solution, rinse in clear water and soak in clear water for 24 hours.
10. Place stones in a solution of 1/3 vinegar and 2/3 water. Let soak 6 to 8 hours. That's all there is to it!

Cautions: Wear rubber gloves, safety glasses and plastic raincoat for protection when working with the acid. Flush with running water if some acid should contact your skin. DO NOT mix acid with water or pour acid over a container that has water in it-- it becomes combustible. The above procedure is to be carried out at your own risk.



++++ This Publication needs pertinent information from you for our September Publication. Please be apprised that every effort will be made to faithfully and professionally reproduce any drawings, maps, diagrams, graphs, etc., that you may send.

\*\*\*\*\* We hope to have a column for member's comments, the success of which will be up to you.

\*\*\*\*\* Our thanks to Lewis A. Bannon, G.G., F.G.A., of Baton Rouge, Louisiana for the following item of interest:

A meteorite taken from the Antarctic ice cap in the region of the Allan Hills in 1977, was found to contain tiny diamond crystals. This discovery was made evident when scientists of The Smithsonian Institution, in an attempt to saw the iron meteorite for extensive studies, encountered areas where the saw wouldn't penetrate. X-ray negatives showed the diamond crystals.

The proposed theory of the formation of diamond crystals in another meteorite found in Arizona, that formed the mile-wide Meteor Crater, was that the massive impact with the Earth caused tremendous pressures on that carbon-bearing meteorite. The smaller, 10.4 kg iron meteorite of the Antarctic may have had the diamond crystals form after a collision in the asteroid belt.

(Excerpted from: "Science News", Vol. 119, Page 376.)

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THE COWELL NEPHRITE PROVINCE

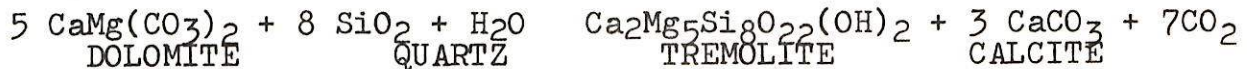
Grahame Brown, F.G.A., F.G.A.A.  
Brisbane, Australia

The existence of a vast commercial deposit of nephrite in Australia has been known since Schiller discovered the original outcrops near Cowell (South Australia) in 1965. Cowell is a small fishing and farming center located on the Eastern coast of the Eyre peninsula (Fig. 1). The nephrite deposits, which contain over 100 individual outcrops, are located in an area 9 km<sup>2</sup>, located 22 km north of Cowell. Here, the nephrite occurs as lenses and pods (ranging up to 70 M long by 3 M wide), in association with tight, isoclinically folded dolomitic marbles and calc-silicate rocks which have been assigned to the upper 'Gneiss' Complex of the Cleve Metamorphics. These Precambrian crystalline basement rocks lie on the eastern margin of the Australian Precambrian Shield.

Nephrite-  $\text{Ca}_2(\text{MgFe})_5\text{Si}_8\text{O}_{22}(\text{OH},\text{F})_2$  - - a felted, fine-grained tremolite-actinolite member of the amphibole group, is a hard, tough gem material which has considerable value for carving decorative objects. To form nephrite, crystals of tremolite must be first formed; these being subsequently recrystallized into a felted micro-structure by mechanical tectonic forces.

Although most of the world's nephrite deposits, (Alaska, British Columbia, California, Siberia, New Zealand) are associated with ultra basic mafic igneous rocks (eg. serpentinites) that have been recrystallized by intense shearing forces, the Cowell nephrite deposit has no such paragenesis.

Nephrite from the Cowell Nephrite Province appears to have a unique origin. It has been suggested that this nephrite was formed by the metamorphism of a siliceous dolomite of sedimentary origin.



Segregation of the newly formed tremolite into lenses and pods could have occurred as a result of the intense folding and metamorphism. It is believed that the second phase of nephrite formation - the conversion of crystalline tremolite into a fine felted microcrystalline structure - was produced by dynamic metamorphism, when pressure was released from these isolated water saturated tremolite bodies.

Cowell nephrite has a bulk composition which is similar to the composition of nephrites from other locations - approximately 56% SiO<sub>2</sub>, 1% Al<sub>2</sub>O<sub>3</sub>, 2 to 8% FeO/Fe<sub>2</sub>O<sub>3</sub>, 13% CaO, 23% MgO, and traces of Na<sub>2</sub>O and K<sub>2</sub>O. The colors of Cowell nephrite are entirely related to their total iron content; yellowish-green colors (1.38 %) deepening to various shades of green, with the ultimate black nephrite containing 7.91 % iron. Overall, eighteen distinctive colors and forty varieties of Cowell nephrite have been identified. The most abundant colors mined are the dark green and the black nephrites - the black being the most valued. Color zoning commonly occurs throughout the lensoid masses, with oxidation rinds forming on surfaces exposed to weathering.

The texture of nephrite determines its mechanical properties and its polishing characteristics. Recently completed SEM studies of Cowell nephrite have illustrated the direct relationship between hardness and toughness and the microstructure of the nephrite. Variations in toughness would seem to depend on such factors as: the length and diameter of the tremolite fibres; the size of the tremolite bundles; the orientation of the fibre bundles.

Nephrite containing randomly oriented fine fibres (140 μ x 5 μ) had superior hardness (6 to 6½ Mohs Scale), and superior toughness (1000 Pennsylvania University Scale) to jadeite or other forms of nephrite. Weakly foliated nephrite, or nephrite containing large tremolite crystals had poor mechanical properties.

Inclusions of other materials in Cowell nephrite are relatively rare. However, some inclusions of crysotile asbestos, epidote, hematite, pyrolusite, pyrite, and tremolite have been observed within the nephrite bodies.

The nephrite at Cowell is being mined predominantly by open cut methods. Over-burden is removed by the controlled use of explosives and a back-hoe, while a relatively simple technique of drilling into joints and wedging is used to pro-

duce large blocks. These blocks are subsequently reduced in size by diamond sawing.

With 2% of the nephrite being of prime marketable quality, and with estimated reserves of  $4 \times 10^6$  tons of nephrite lying within 5 M of the surface, the Cowelk Nephrite Province seems assured of a viable commercial future.

References:

Nichol, D. (1974) Min. Resour. Rev., S. Aust., 141, 11-26  
 Nichol, D. (1975) Quart. Geol. Notes, Geol. Surv., S. Aust., No. 54, 9-12  
 Scott, D.C., Wildy, R.L., and Harris, R.J. (1978) rept. Bk. No. 78/65  
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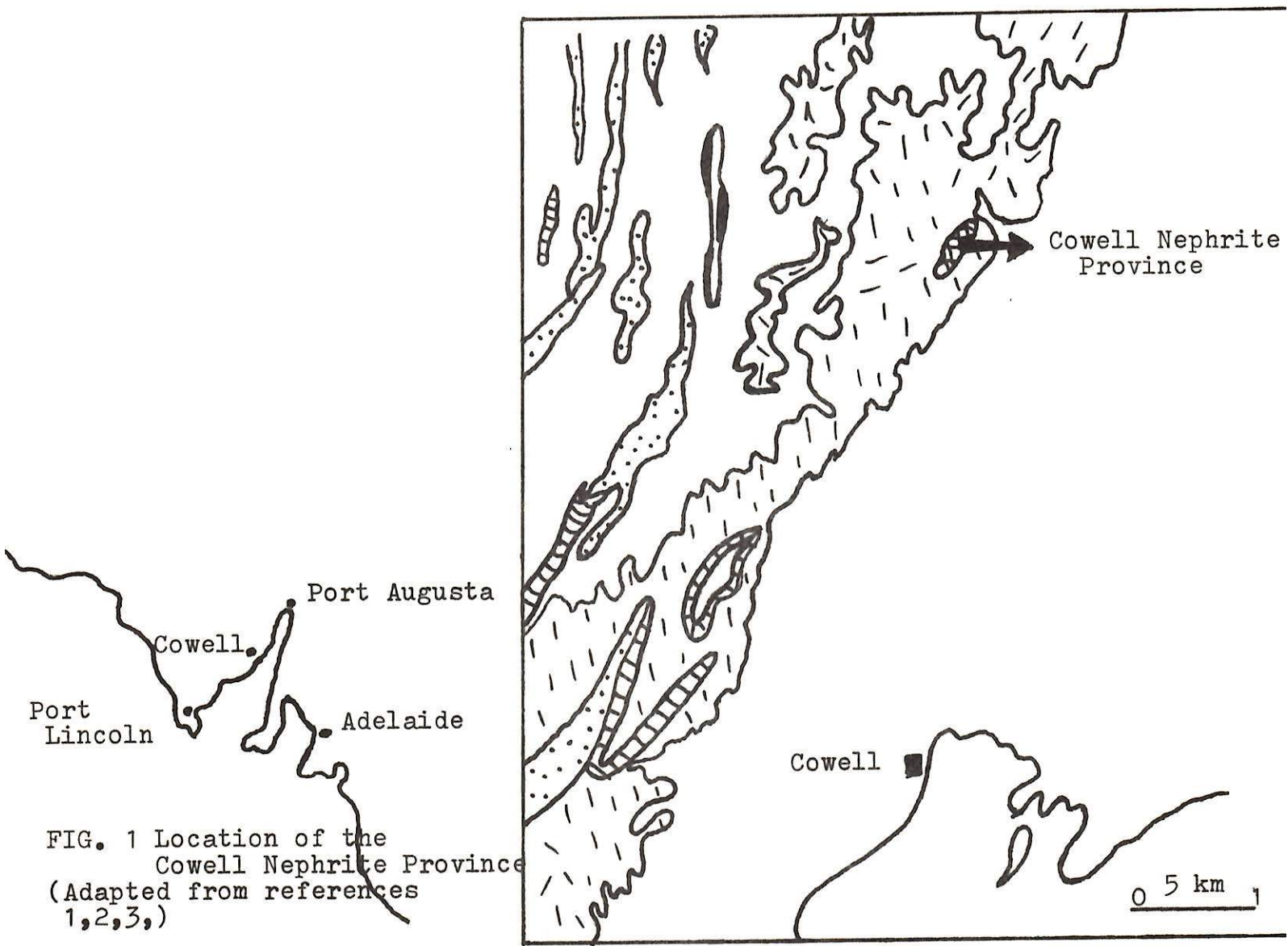
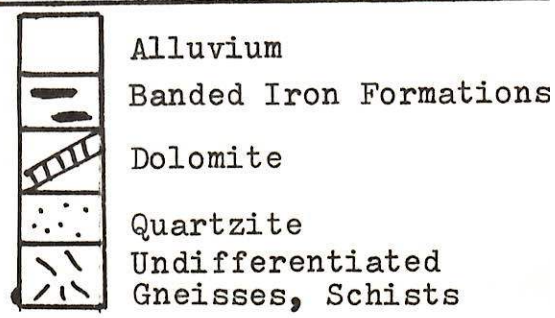
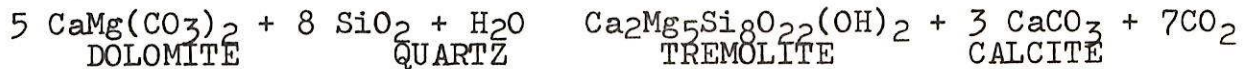


FIG. 1 Location of the Cowell Nephrite Province (Adapted from references 1,2,3,)



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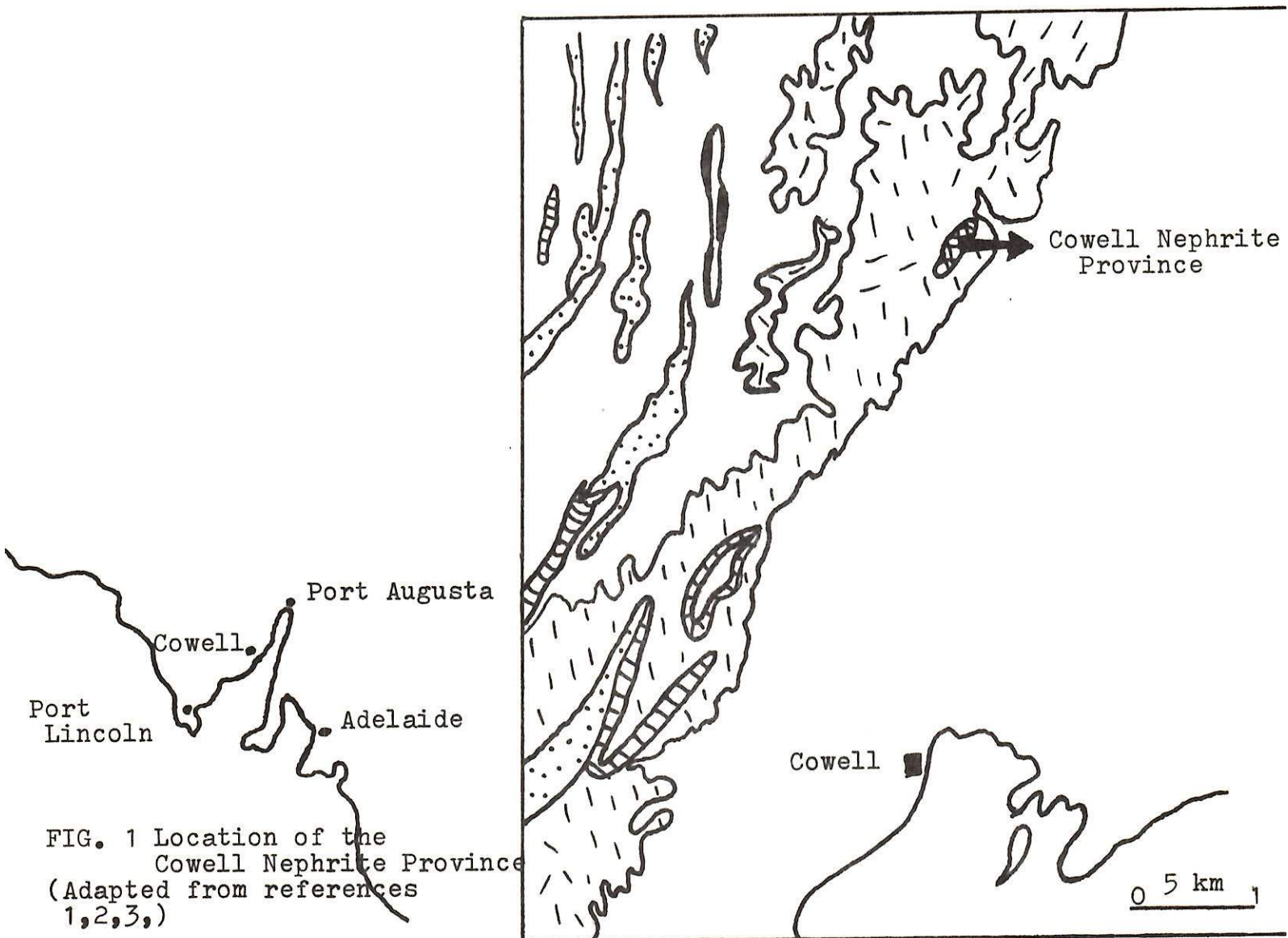
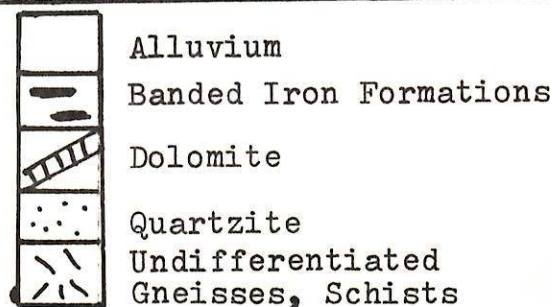


FIG. 1 Location of the Cowell Nephrite Province (Adapted from references 1,2,3,)



++++++NEW MEMBERS++++++

It is with great pleasure that we announce the following approved members, and look forward to their active participation in the AGA:

- Merika Adams, G.G. 2222 Fourth Avenue, San Diego, Cal. 92101  
Interests: Investment rarities and gem auctions.
- Tannis M. Bilkoski, G.G. 25-301-8 Avenue SW, Calgary, Alberta, Canada. Interests: Canadian Gemological Association; Southern Alberta Jewelers Association.
- Donald A. Brownell, G.G. 735 Dennis Avenue, Chula Vista, Cal. 92010. Interests: Identification of synthetics; photographic records of unusual inclusions.
- Charles I. Carmona, G.G. 1100 Glendon Avenue, Los Angeles, Cal. 90024. Interests: Jewelry appraisal; laboratory standards and ethics; author "Gem Stories", (publ. Guild Laboratories); co-owner, gem trade laboratory.
- Steven A. Injayan, G.G. 210 Post Street, San Francisco, Cal. 94108. Interests: Member, American Society of Appraisers; MA in Anthropology; world traveler.
- Frank P. Klauda, G.G. 2003 - 13th Avenue NW, Rochester, Minn. 55901  
Interests: Standardizing colored stone grading; owner, operator of gem lab.
- Patricia J. Kostowski, G.G. 506 Main Street, Humble, Texas 77338.  
Interests: Gems; participation in the AGA in any area.
- John C. Piunno, G.G., F.G.A. 4530 Connecticut Avenue NW, Washington, D.C. 20008. Interests: Member Gem and Mineral Society, D.C. Chapter.
- Alan E. Roditi, G.G. 100-26 Casals Place, Bronx, New York, 10475.  
Interests: Color photomicrographs and photographs of gems; formerly with GIA-NY as gemologist, part-time instructor, photographer.
- S. James Thal, G.G. 1100 Glendon Avenue, Suite 2051-55, Los Angeles, Cal. 90024. Interests: Independent lab. owner; ethics in the gem trade; development of a placement committee for new G.G.'s.

+++++++ NEW MEMBERS, CON'T.+++++++

Wendy Toni Wenger, G.G. 11838 Parliament, #212, San Antonio,  
Texas, 78216 Interests: gems and  
mineral specimen.

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One last message concerning dues: Please send all checks to  
the main office at: 36 N.E. 1st Street, Suite 419, Miami,  
Florida, 33132. Photocopy records are being made of all  
payments and then the checks are forwarded to Mrs. Hidaka  
for deposit in the Accredited Gemologists Association  
account; please, of course, make checks payable to the  
organization.

\*\*\*\*\*

If any errors have been made in names, addresses,  
degrees, etc., please notify me immediately. Most in-  
formation has been gleaned from old records and we don't  
wish to continue repeating errors... remember the  
Hapsburgs? (My apologies to any of their descendants -  
no offense meant).

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NEXT ISSUE - - SEPTEMBER, 1981. We look forward to your  
contributions.

Amendment to the By-Laws: See page 13.

BY-LAW AMENDMENT:

For the AGA to be able to have any positive effect on our industry, it is apparent we must expand our membership base. To that end, the Executive Committee has unanimously voted to amend the By-Laws as follows:

ARTICLE III (Add Section 4); A non-voting Associate Member status may be obtained by anyone currently engaged in the study of gemology at either the GIA or the GAGB, provided they meet the other requirements of the organization. Upon the completion of these studies, they would automatically be eligible for full membership.

For your information, ARTICLE XI of the AGA By-Laws is quoted here:

The Executive Committee shall submit to the membership, via the Newsletter, any proposed amendment(s) to the Bylaws. Such proposals shall be incorporated into the Bylaws unless opposed in writing by a minimum of 10% of the members in good standing.

Unless this proposal is opposed by 10% of the membership, in writing, prior to August 1, 1981, it shall be incorporated into the By-Laws.