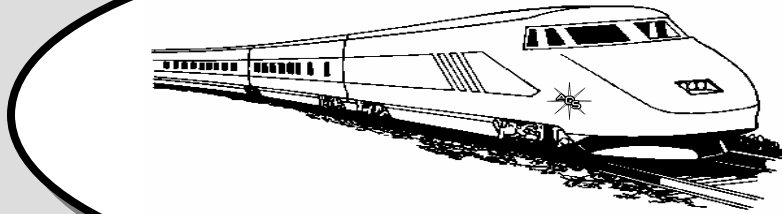


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President's Message

By Gene LeVan

Opal Pricing Made Simple

The Opal Smart Chart Australian Opals

July's 12th Thursday's meeting will feature a PowerPoint presentation on pricing opal by Gene LeVan your president. I will give free information sheets with samples of how it works and opal guides to assist you in the pricing of opals. Some guide sheets will show various, colors, shapes, brightness 1 to 5 and base colors.

Be sure to bring that **precious opal stone** to the meeting and use this very comprehensive program to value your opal stone.

As a group meeting we will weight your stone and comment on type, style and give you today's price. This should be a very interesting opal meeting and fun. If the members like this computer program I will order for the group.

Opal Society Workshop

The American Opal Society's workshop is open at Ball Jr. High School every Monday from 7:00 to 9:30 p.m. The school is located at 1500 W. Ball Road in Anaheim. If you are traveling east on Ball Rd. the parking lot entrance you need to use is just before the railroad tracks Room 37 is in the center of the campus.

Instruction will be given in cutting opal, wax models, lost-wax casting, fabrication, and setting stones. The workshop will furnish machines to cut and polish stones as well as a centrifuge for casting and a kiln for burnout. Please bring a roll of PAPER TOWELS with you for clean-up as the room is a science lab and needs to be kept spotless.

To attend, membership in the American Opal Society is a must due to insurance. A nightly fee of \$2 is asked to help keep the equipment in good running condition.

Second AOS Live Auction a Great Success!

We had a good turnout for the second AOS Live Auction at the June general meeting. We had a large number of items for auction, with a lot of rough opal parcels. Also, there was a fantastic inlaid money clip from Stan McCall, and a pair of fantastic Mojave flame opals. Bidding was fierce! Some of the opal parcels had up to 6 bids! The AOS gives a big thanks to Mike Kowalsky for donating a large number of opal parcels to the club for auction. Over \$250 was made for the AOS!

CFMS Convention and Show, Lancaster, California

June 15, 16, and 17, 2007

By Fran Todd

What a great job the Palmdale Club did in hosting the 2007 CFMS Convention and show at the new Antelope Valley Fairground in Lancaster, CA!! The weather started off hot (106°F) and cooled down to a comfortable 96°F. The wind was gusting 25 to 30 miles per hour. Unlike Chicago in the winter, the wind chill factor was greatly welcomed.

Two of the larger exhibit halls had the air conditioning turned up to near perfect. Many dealers, demonstrators and cases filled the buildings. People had a chance to catch up with friends, learn new skills and just relax. There were three brave souls who set up their booths outside, in the sun. One did have a window air conditioner turned to her spot to sit and collect money!

Highlights of the CFMS meeting were:

- 2008 show will be in Ventura. They would like lots of demonstrators, individual and club cases. Contact Richard Pankey through the website. (cfmsinc.org)
- Congratulations to Richard Pankey for running a tight and efficient meeting. We were done by noon!!!
- A reminder to submit articles for consideration in the editor's category. Individual articles and poetry are needed!!! As far as judging, the CFMS has different rules that the AFMS, so write on!
- For all of you who did not go on the Monterey Park's Gem & Mineral Society cruise in Jan 2007, get your passports updated! They are planning another this January. They have big plans this year. Contact the Monterey Park Gem & Mineral Society for more info.

I got many interesting items, and some opal at a great price. I just tucked it away so that my darling hubby doesn't know...

P.S. Next year in June gloom in Ventura. The show has gone from one extreme to the other. Just as Mark Twain said, "Everyone complains about the weather..."

Members Only Website Password

To log onto the website's members only area at: http://opalsociety.org/aos_members_only_area.htm type: Name: "member" and Password: "precious".

Australian Sedimentary Opal – Why Is Australia Unique?

By David Horton, Managing Director, Opal Horizon Limited
ABSTRACT

Australia currently produces about 95 per cent of the world's precious opal from widely scattered fields throughout central Australia. No other country on Earth has such an abundance of this rare precious gemstone.

The sedimentary opal deposits of central Australia occur along generally flat-lying horizontal layers within 30 meters of the earth's surface. They are a product of a unique set of geological events which occurred over a 100 million year period. These events can be summarized as follows:

1. Between about 122 million years ago (Ma) and 91 Ma, central Australia was covered by a vast shallow epicontinental sea. The sedimentary rocks which were deposited in this sea were derived from volcanic rocks and were organic-rich. These formed the principal host rocks for opal deposits in central Australia.

2. Following surface exposure through lowering of the sea level, these host rocks were subject to a prolonged sub-tropical weathering regime until about 40 Ma. Central Australia probably looked not unlike today's Amazon Basin. During this time, the water table was close to the surface and was acidic, releasing silica and iron from weathering of the host rocks.

3. The climate became more arid from about 40 Ma and, as a result, water table levels gradually lowered and the groundwater became alkaline. Mild tectonism at 24 Ma gave rise to subtle extremely long wavelength surface folds which facilitated both lateral and vertical migration under arid conditions of the earlier-released silica. Opal was preserved in the weathered profiles beneath the crests of the developing surface folds as water tables here lowered more rapidly due to tectonic uplift. Siliceous cap rocks discouraged erosion.

4. Over the last 10 million years, dissection and scarp erosion exposed the weathering profiles containing the opal.

Geologists believe that the volume of gems that have been produced over the past 150 years in Australia is but a minute fraction of the amount yet to be discovered.

INTRODUCTION

The opal is the National Gemstone of Australia. Australia currently produces approximately 95 per cent of the world's precious opal and probably has almost all of the world's opal reserves. The only other significant producers are Mexico and Brazil although the deposits in Slovakia and the Czech Republic once provided the bulk of the world's production for over 2,000 years. Other countries where opal has been recorded include Guatemala, Honduras, Nicaragua, the western USA and Canada, Indonesia, Turkey and Ethiopia (Figure 1). With the exception of deposits in Australia and Brazil where most opal deposits are contained in

The Opal Express

sedimentary rocks, almost all of the remainder are hosted by volcanic rocks. Volcanic-hosted precious opal is generally considered inferior to the more brilliant sedimentary rock-hosted varieties.

This paper examines the depositional, palaeo-weathering, and tectonic history of central Australia in an attempt to define the factors that made Australia a unique environment for the formation and preservation of precious opal.

GEOLOGICAL AND PALAEO WEATHERING RECONSTRUCTION OF THE AUSTRALIAN OPALFIELDS

Early Cretaceous Host Rocks

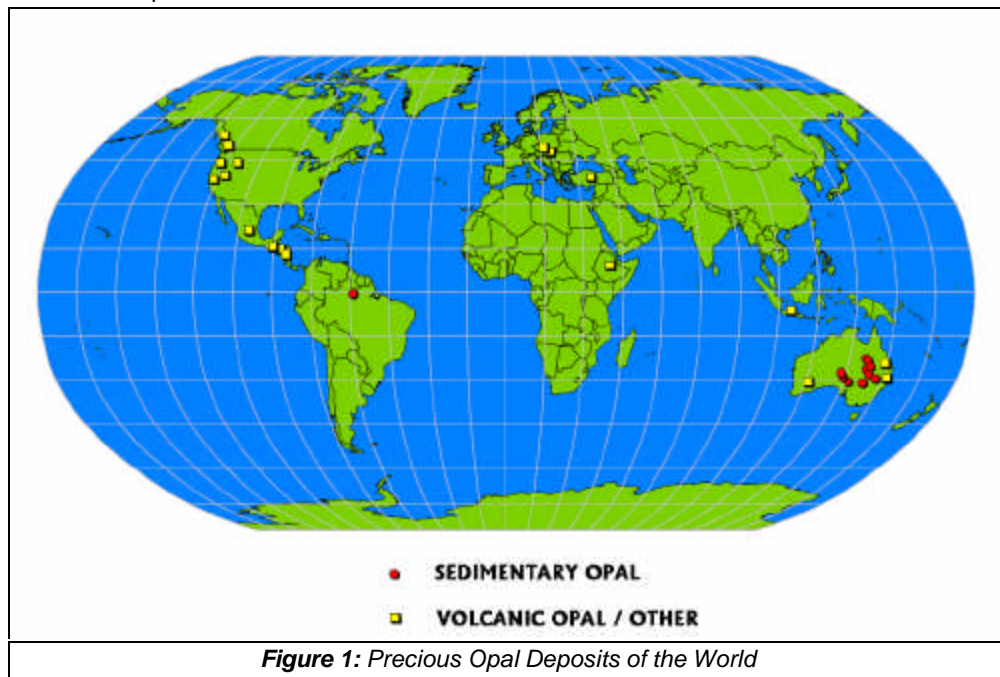
In central Australia, with the exception of the deposits of the Mintabie opal field in South Australia, opal is almost entirely hosted in chemically-weathered rocks of Cretaceous age (Figure 2) representing the maximum extent of the Eromanga and Surat Basins at this time. More specifically, the host rocks range in age from Barremian to Cenomanian (approximately 122 Ma to 91 Ma). The Mintabie opal field is hosted by kaolinised ?Ordovician sandstones which lie stratigraphically beneath the Cretaceous rocks.

Based on the compilation by McKellar as well as data from other sources, the ages of the various host rocks to the opal fields in Australia are shown in Table 1. Note that the host rocks generally become younger in age towards the north-east of the continent.

The opal deposits themselves are much younger than their dominantly Cretaceous age host rocks. Consequently, it is important to understand why weathered rocks of this 30 million year period are preferred hosts to opal mineralization.

The most extensive marine transgression to affect Australia since the early Palaeozoic occurred during the Early Cretaceous (Figure 3) with the peak of transgression occurring in the Late Aptian. The provenance of the Early Cretaceous sedimentary rocks also changed at this time from being derived from siliceous basement rocks and sediments (Aptian) to andesitic volcanics (Albian). This change is also reflected in the composition of their contained ground waters with sodium bicarbonate waters predominating in the older rocks and sodium chloride waters (with higher salinities) in the younger rocks.

The Cretaceous host rocks, shown in Table 1 and the central part of Australia in Figure 2, comprise a mixture of sediments deposited in a large shallow epicontinental sea partially surrounded by a wide belt of deltas, brackish lagoons, estuaries and wide coastal plains. During this period, the sea level was higher than it is



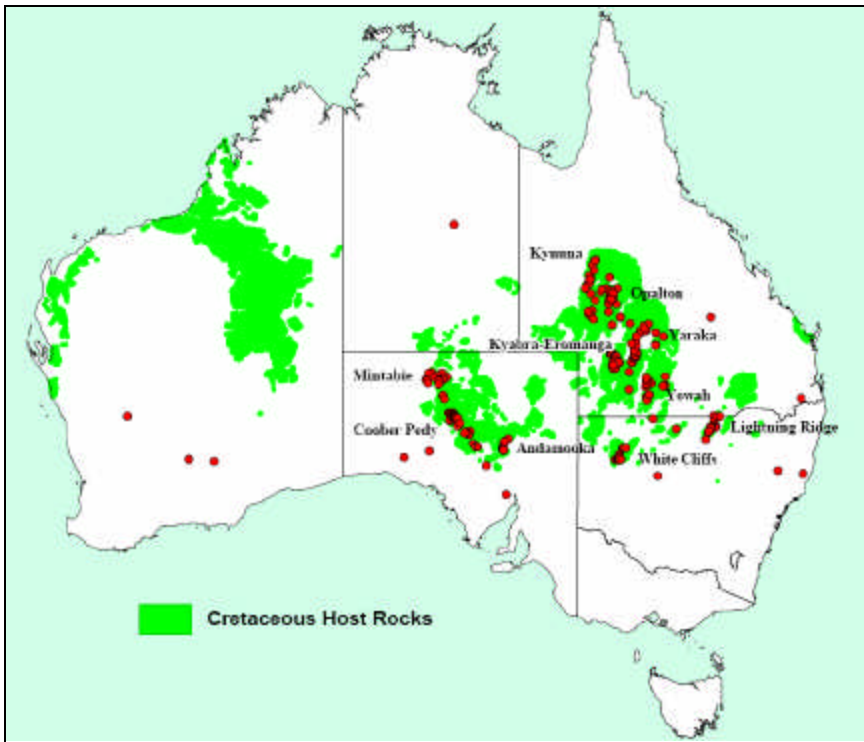


Figure 2: Australian Opal Occurrences

today and successive episodes of high and low global sea level were manifested as regional marine transgressions and regressions. Glauconite, a rock containing rounded green grains with a variable mixture of illite, montmorillonite and chlorite, has long been recognized as characteristic of the marine Cretaceous sequence in this region. Of the host lithologies listed in Table 1, the Winton Formation and portions of the Griman Creek Formation are freshwater, while the remainder are marine.

The period from Aptian to Albian was the time large quantities of black shales and organic-rich sediments accumulated in many oceans and basinal settings.

For example, McKirdy & others note that the Bulldog Shale is one of several organic-rich Early Cretaceous units in the Eromanga Basin sequence that, given appropriate dispersed organic matter and adequate thermal maturity, could be effective source rocks for petroleum hydrocarbons. The lower one-third of the unit, which is time equivalent to the Doncaster Member, is particularly dark and shaley.

In the absence of comparative whole rock geochemical data, there could be several reasons why weathered Cretaceous rocks of this particular 30 Ma period from the Barremian to the Cenomanian are preferred hosts to opal mineralization. These factors could be:

1. the high organic content of the host rocks. However, this is variable and could have more to do with the type of opal found (e.g. black opals).
2. their andesitic provenance which is reflected in their clay mineralogies. However the type and content of clay species differ from opal field to opal field.
3. their presumed high sulphide content. Relict sulphate minerals are still present in many weathered profiles (e.g. Coober Pedy) but are rare in others (e.g. Lightning Ridge).
4. the presence of occasional carbonate. Coquina layers, for example, are present in the

base of the Griman Creek Formation and calcite nodules are common in the Winton Formation.

5. the presence of glauconite. However Exon & Senior note that while it is abundant in some units (e.g. Doncaster Member), it is rare in others (e.g. Winton Formation).

6. a combination of all five above.

Late Cretaceous/Early Tertiary Weathering

The period from the mid-Cretaceous (mid-Albian) to the mid-early Eocene (105 Ma to 55 Ma) was one of the warmest times in the late Phanerozoic. The average global temperature was probably about 6°C higher than that of today allowing polar regions to be free of permanent ice. The mid-Cretaceous was also a time of globally high sea levels and extensive areas of shallow shelf seas favoring moderate climates and increased evaporation and precipitation. This is in contrast to the middle Jurassic to early Cretaceous which was cool

Following lowering of the sea level (shown diagrammatically in Figure 3) a prolonged sub-tropical (warm and wet) deep weathering event affected central Australia from the Late Cretaceous to at least the mid-Eocene. However sedimentation in the Lake Eyre Basin (Eyre Formation, Glendower Formation, Marion Formation) from the Late Palaeocene to the end of the Middle Eocene impeded the uniform development of deeply weathered profiles over much of central

Australia during this time.

Prior to the deposition of the Eyre Formation, the Morney Profile, a weathering profile of Late Cretaceous and Palaeocene age, affected western Queensland and the Lake Eyre and Eucla Basins. This profile, believed to be caused by acid leaching of Cretaceous rocks, is in excess of 90 m thick and is characterized by pedogenic siltcrete overlying a kaolinite-rich profile with a lower ferruginous zone often containing concretions or accumulations parallel to bedding. Some of the ironstones may have replaced former calcareous horizons. Often the siliceous duricrust cap of the Morney Profile is thin, sparsely distributed or missing.

Idnurm & Senior using palaeomagnetic studies of ironstones from the lowest zone of the Morney Profile point to a Late Cretaceous to Early Eocene age for this profile, consistent with stratigraphic relationships. The Eyre Formation unconformably overlies the Morney Profile. Basal strata of the Eyre Formation contain clasts of the Morney Profile. It is likely that weathering of the Morney Profile was partly contemporaneous with deposition of the Eyre Formation in structural depressions.

The association of opal mineralization with kaolinised Cretaceous host rocks has been noted by all previous researchers. It is likely that these rocks would have been subject to particularly

Table 1: Ages of the Respective Host Rocks to Opal Mineralisation (*with the exception of Mintabie, stratigraphic ages shown are subdivisions of the Cretaceous Period)

Opal Field	Host Unit	Stratigraphic Age*	Absolute Age Equivalent
Queensland fields	Winton Formation	Cenomanian	98 - 91 Ma
Lightning Ridge	Griman Creek Formation	Late Albian	103 - 101 Ma
White Cliffs	Doncaster Member	Late Barremian - Aptian	120 - 110 Ma
Andamooka	Bulldog Shale	Barremian - Early Albian	122 - 103 Ma
Coober Pedy	(Marree Subgroup)	(Barremian - Albian)	(122 - 98 Ma)
Stuart Creek			
Lambina			
Mintabie	Mintabie Beds	?Ordovician	

intense weathering, exacerbated by both biota and acid leach conditions (marsh-like environments) during the development of the Morney Profile and time equivalent profiles. The high organic and sulphur contents of these rocks would have promoted this type of weathering. It would also help explain why rocks immediately adjacent to Cretaceous host rocks (e.g. the underlying ?Ordovician sediments at Mintabie) might also be affected by this style of weathering and also host opal mineralization.

GEOLOGICAL RECONSTRUCTION

Late Tertiary Weathering, Warping and Dissection

From the mid-Eocene, the climate in Australia became progressively drier (Figure 3) until by Miocene times central Australia was dominated by alkaline lakes. The sub-tropical style of weathering prevalent in the Early Eocene also slowly changed and resulted in the development of more arid siliceous and ferruginous duricrusts. The materials for these were derived, to a large extent, from the earlier weathering profiles. Drier conditions also allowed the formation of minerals such as alunite and gypsum in the weathered profiles.

Several weathering surfaces (including silcrete horizons) formed during the ?Late Oligocene. These include the Canaway Profile of western Queensland, silcrete of the Cordillo Surface of northern South Australia and siliceous duricrusts of the Curalle and Haddon Silcrete Profiles. Similar silcrete horizons can be found in the coeval Glendower Formation of western Queensland (Ingram, 1968) and the Eucla Basin in southern Australia. In eastern Australia, silcretes of comparable age can be found beneath basalt cover. Many of these surfaces may be time equivalents as exact dating of them is imprecise.

At least one period of mild tectonism is recognized in central Australia during Late Oligocene-Early Miocene times. This is represented by broad-wavelength folding and faulting (warping) Fold wavelengths are of the order of 2 to 50 km or more with amplitudes of the order of 20 to 200 m. Many of these surface anticlines are covered with silcrete and several early authors interpreted this to mean that the silcrete horizons had been folded

It appears more than coincidental that Late Oligocene-Early Miocene tectonism is more or less contemporaneous with the main period of silcrete development. Several authors have independently noted that silcrete of this age is best developed on the crests and flanks of these surface anticlines and weakly developed or absent in the intervening synclines which are often sediment-filled. Weathering profiles which developed during this period also show a similar distribution with the best-developed profiles on anticlinal crests. The silcrete on the crests of the anticlines is dominantly pedogenic (e.g. Curalle Silcrete Surface) and that on the flanks is of groundwater origin (e.g. Haddon Silcrete Profile) (Figure 4). The groundwater silcretes often occur as multiple layers which are interpreted as being caused by lowering of the water table. That is, they are contemporaneous with folding.

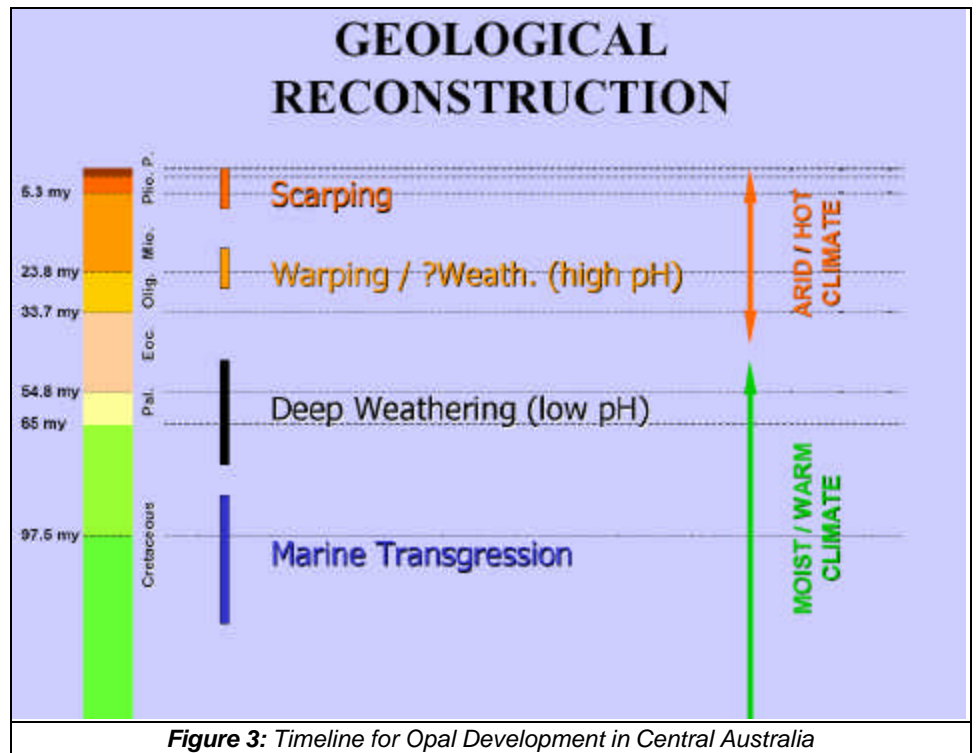
A variety of ages have been ascribed to opal development in central Australia, from the Late Cretaceous to Pliocene with a mid-Tertiary age (Late Oligocene or Early to mid-Miocene) considered most likely. This age is more or less contemporaneous with warping and silcrete development. However it is important to realize that, in general, the ages of opal mineralization at individual fields are poorly constrained.

While it is possible that there may be several ages of opal formation in central Australia, it appears most likely that the bulk

of central Australia's opal formed either contemporaneously with, or immediately following, the folding event at approximately 24 Ma. This period meets all the requirements for opal formation and affords an environment for its preservation:

- There is strong evidence of silica mobilization in and around anticlinal crests (as demonstrated by the deposition of groundwater silcrete adjacent to the anticlines) (Figure 4). Note that the gradients on these topographic highs are extremely slight. The steepest grades are of the order of 1 in 20 but commonly they may be 1 in 1,000 thus allowing for slow groundwater movement under arid conditions; an ideal situation for silica deposition.
- Weathering profiles, with which opal has a close association, are most strongly developed on the crests of the anticlines.
- The water tables in these anticlinal regions lowered at this time (as demonstrated by stacked multiple groundwater silcretes on their flanks and corresponding multiple opal horizons in the higher parts). Opal formation seems to be an immature phase in the development of a silicification profile with opal precipitated in voids at the bottom of the profile and quartz towards the top. Preservation of opal can either be through silica (silcrete) plugging the upper part of the profile or through a permanent lowering of the water table.
- Pedogenic silcrete on the crest of the anticlines considerably slowed their erosion.

There is a clear relationship between the distribution of opal mineralization and subtle topographic highs in most parts of central Australia. However, because of their subtlety, anticlines are not always recognized. For example on the Coober Pedy 1:250,000 Geological Sheet, silcrete forms a capping to a north-west trending anticline with a wavelength in excess of 50 km and an amplitude of 50 m. Opal mineralization at Coober Pedy is restricted to the uppermost portion of the anticline. The north-eastern portion of this anticline has been eroded. Similar anticlines contain opal mineralization at Andamooka, Mintabie and elsewhere in their crestal parts. At Lightning Ridge, a possibly more complex anticlinal feature is evident as a low ridge 25 m high extending in a northeasterly direction into Queensland (the "Lightning Ridge trend"). Similar extremely broad anticlines with opal mineralization in the fold crests can be found in Queensland.



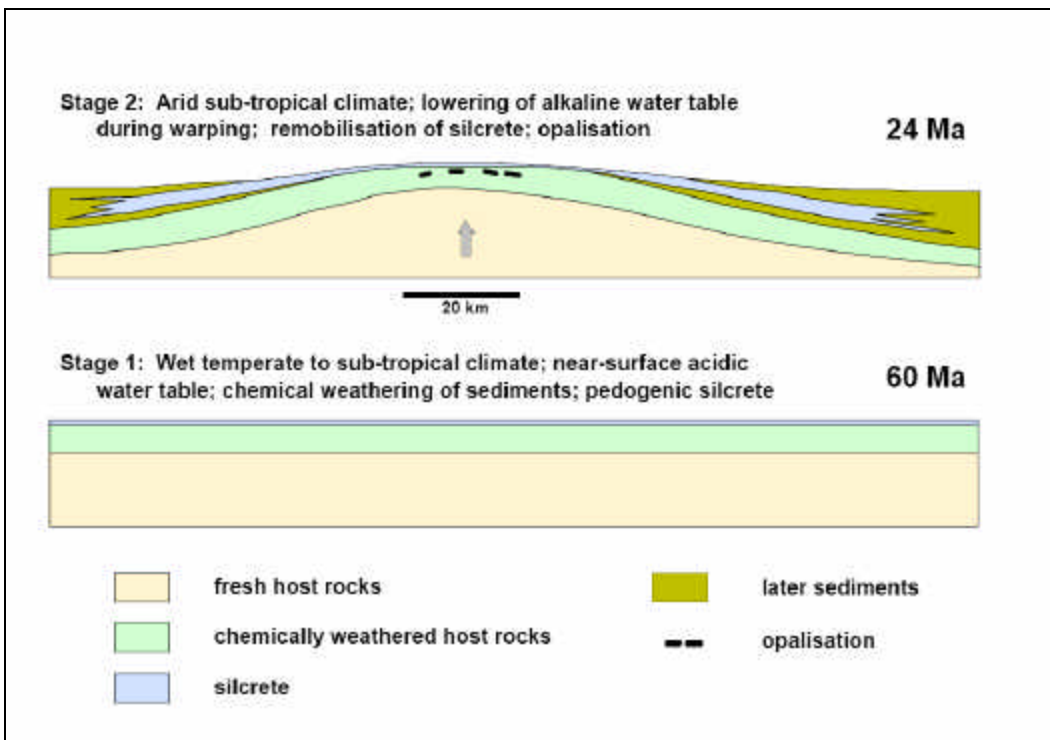


Figure 4: Model of Silcrete Formation and Opal Deposition / Preservation in Central Australia

A lengthy Plio-Quaternary erosion scarp, approximately 20 m high, situated immediately north-east of the opal fields of South Australia forms the south-eastern watershed of the Lake Eyre catchment. This limits the distribution of opals here to the north-east. It is the formation of scarps such as this that has allowed precious opals to be found in the dissected profiles.

Preservation

Darragh & others note that opal cannot survive exposure to the effects of surface weathering for any appreciable period. Under those conditions, hydrated amorphous opaline silica tends to lose water and to become cracked and opaque. Likely there are also other environmental conditions in nature which will result in the destruction of opal. For example, altered groundwater conditions, either through a change in pH or through the water being silica charged may be sufficient to destroy opal or convert it into other forms of silica. Little is understood about these processes. An understanding of the environmental conditions that can destroy opal is as important as understanding the factors that influence its formation.

Extremely low rates of denudation (0.2 meters per million years) in central Australia in the Tertiary and Quaternary has allowed Tertiary and older weathering profiles to be preserved to the present day.

DISCUSSION

A unique combination of geological events appear to have taken place in central Australia over the last 100 million years to form precious opal. These are:

1. deposition of volcanic-derived organic-rich sediments over a 30 million year period during the Cretaceous,
2. weathering under warm wet acidic conditions from the Late Cretaceous to the mid-Eocene which released silica and iron,
3. remobilization of the silica under warm arid alkaline conditions during a period of tectonic instability during the Late Oligocene-Early Miocene, and
4. preservation of the opal forming in the weathering profile through lowering of the water table.

There is still much that is not understood about the specifics of the genesis of precious opal particularly at the micro scale. How does it form in the weathering profile? For example, is bacteria involved? Irrespective of the method, there is now general consensus for two styles of opal formation – void fill and

replacement. Deposition of precious opal occurs mostly by replacement of layer-silicate clays, gypsum, calcite, goethite, fossils and organic material as well as by infilling of voids particularly in ironstone.

One point of interest to come out of this study is that not only does there appear to be one age of opal formation for sedimentary rock-hosted opal in Australia but there are indications that the isolated occurrences of volcanic-hosted opal in the eastern part of the continent is also of the same age. While further age dating will be required to confirm this point, it is nevertheless interesting to speculate on what environmental or biological conditions were present in Australia 24 Ma to promote the formation of precious opal in such a wide variety of environments.

ACKNOWLEDGEMENTS

I wish to express my appreciation to Dr Paulo Vasconcelos, Director of Research and Analytical Facilities, Department

of Earth Sciences at the University of Queensland for allowing me full use of the University's facilities to research this paper. In addition, I would like to thank Bob Besley, Neil Krosch, Jack Townsend and John Watkins for many meaningful discussions on opals and opal genesis. This paper is published with the permission of Opal Horizon Limited.

From <http://www.opalauctions.com/images/info-pages/geological-survey.pdf>

Pipe Opal Discovery a Rare Find

5/11/2007

By Vicki Wilson

A discovery of pipe opal in the state's south-west has left opal explorers beaming with excitement.

David Horton, managing director of Brisbane opal exploration company, Opal Horizon Limited, believes the company has found the first major pipe opal deposit in Queensland for decades.

Pipe Opal is actually crystal opal cut in distinct pipe-like structures.

The pipes can be up to several centimeters in diameter and are either hollow or opal filled. Opal Horizon Limited has been exploring near Jundah,



southwest of Longreach, for around two years now. Mr Horton says its "Raindance" deposit is around 400 meters long by around 200 meters wide.

He says they have also found a second smaller deposit near by and believes the quality of the opal is so high that it could rival Australia's best.

From <http://www.abc.net.au/rural/qlld/content/2006/s1920788.htm>

Treating Andamooka Color Matrix The No Acid Method

By Ray Tollefsen of Cutters Table

Step 1:

PLEASE look at your stones(s) WET & IN DIRECT SUNLIGHT. The treating penetration usually gets into the stones about 1/4 of an inch at best, this varies with individual stones due to various stones due to various matrix host rock being different in hardness and porosity. With a lot of my material, I treat the larger size rough blocks first then clean a couple of faces to expose the colors. Then I cut for the best color flash etc. and treat again. OR you can just slice your stones and treat. OR slice and shape to your finished jewelry item then treat... OR shape down already treated material and then treat again if you loose the black background from the treatment. What you need is an electric slow cooker a Crook Pot, they have internal heating element inside the base of the machine and a removable ceramic bowl with lid. Cook on Keep Warm setting not High setting or you end up with Toffee! My machine holds about 3 liters of liquid. Pour about this amount of boiling water into the ceramic bowl and then add about 3 pounds of brown sugar and stir until you get a very saturated dissolved sugar solution, the more sugar the better really, as if your stones end up brown and not black just add more sugar and re-cook. I usually throw my stones in the cooker as I cut them in the morning. Take stones out, do not wipe any of the sugar off and you do not have to let them cool down. Wrap the stones individually in foil wrap.

Step 2:

Place the wrapped stones inside a cast iron container with lid and place this on top of lighter gas burner ring and fire bake for about 2 hours. It will smell a bit for the first 1/2 hour. An hour is optimal time for the camp oven size that I have. Mine measures about 6 inches base internal diameter, to an 8 inches diameter at the lid rim and about 3 inches high sides. After firing take the stones out. Allow about 1 hour to cool, open the foil packages and clean your cut face or where ever a grinding stone wheel with water to expose the colors trough the finished black background. The actual firing carbonizes the sugar in the stone turning it black. You know like a Black Opal.

Finishing Hints:

Due to a lot of this material being porous, it is hard to polish out the small porous pits on the surface of your finished stone. A product called OPTICON can be used to seal the stone in conjunction with polishing and buff etc. Presoak as it says in description on product. You can reuse the mix. Pour it on a bottle. Or use a non-yellowing acrylic lacquer: an automotive aerosol product that comes in aerosol spray from the auto accessories shop at about 3-4 \$ works great on most. Called TOP COAT CLEAR" dries very hard and can take a buff, etc.

Thanks to Stew

From http://reviews.ebay.com.au/Treating-Andamooka-Color-Matrix_W0QQugidZ10000000001029091

The AOS has not tested this method – try it at your own risk! Let us know how it works. It's a lot safer than using acid.

The Editor.

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Vietnamese Mountains Home to 4000-Year-Old Opal Relics

May 15, 2007

Story from Thanh Nien News

Doctor Bui Chi Hoang said his staff have collected at least 100 opal tools, including hoes and axes, in the hills of Nam Ha commune, Lam Ha district.

He said the scientists were also surprised to find an opal mine near the workshop. Opal mines are very rare in Vietnam's southeastern region.

The institute has asked the Ministry of Culture and Information's

permission to conduct a large-scale study at the site, hoping to unearth more artifacts.

Source: Tuoi Tre – Translated by Luu Thi Hong

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Household Products That Can Be Used As Rock Cleaners

By Betsy Martin

Safety: Always use plastic containers, rubber or nitrile gloves, eye protection, good ventilation, and great care when handling these products.

1. Zud or Barkeeper's Friend cleansers (contains oxalic acid) - Warm or hot solutions will remove iron stains and are helpful with clay deposits. These cleaners can be used with a toothbrush on sturdy surfaces.
2. Toilet Cleaner (the hydrochloric acid type) Dissolves calcite rapidly. *** after treating anything with an acid, rinse very carefully and soak in ample fresh or distilled water for a while to leach out any acid remaining in crystal seams and fractures. You can then follow up with a final soak in dilute Windex to neutralize remaining traces of acid.
3. Lime Away (dilute hydrochloric acid) dissolves calcite more slowly. Rinse as you would for other acid treatments (see above).
4. Calgon - Dissolve this powdered water softener in water. Use for clay removal.
5. Vinegar (Acetic acid), soda water, colas (carbonic and phosphoric acids) - Will slowly etch out very delicate fossils in limestone. Rinse as you would for other acids (see above)
6. Iron Out (iron stain and clay remover) Mix with warm water and use with good ventilation. It will lose strength if stored. Rinse with plain water.
7. Bleach– Dilute solutions of bleach can remove organic deposits and disinfect minerals collected in areas used by livestock. Rinse with plain water.
8. Hydrogen peroxide– Use to remove manganese stains. Rinse with plain water.
9. Citric acid- Use to remove manganese stains. Rinse as above for acids.
10. Windex (with ammonia) A good clay deposit remover and final surface cleanup. Works well in ultrasonic cleaners. Rinse with plain water.
11. Distilled Water– Use to clean sensitive species and as a final soak after acid treatment.

Removing Thin Coatings:

12. On moderately hard minerals – use toothpaste (a feldspar abrasive) and a toothbrush.
13. On hard minerals – use toothbrush with pumice powder and water.
14. On calcite (including bruised places) - quickly dip in vinegar or **Lime Away** and rinse thoroughly. Repeat. Soak in plain water afterwards to leach any acid from cracks.

Cleaning Tools:

Toothpicks, seam ripper, bamboo sticks, sewing needles in a pin vise, old dental tools, old toothbrushes, periodontal brushes, canned air, Exacto knife, single edge razor blades, cheap small stiff bristle brushes.

From the Breccia, June 2007, via The Collecting Bag, 12/06.

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Gem Substitutes

Often, one gemstone is substituted for another of similar appearance because of price or availability. Such gem substitutes may be natural or manmade. Manmade gem materials may have nearly identical natural counterparts, in which case they are referred to as synthetic stones, or they may have no similar naturally occurring counterpart. Here are some materials made by man that are commonly used as substitutes for natural stones. Some are quite easy to identify; some are quite difficult. Buyer beware! While

the major producers of synthetic gems actively support the full disclosure of their stones' laboratory origin, and the jewelry industry officially insists on such full disclosure, there are still too many jewelers and gem dealers who are not so forthcoming with this information. Federal Trade Commission rules and the policies of jewelry industry organizations are actively demanding full disclosure of origin and treatments. When you buy gemstones, you should specifically ask about the origin of the stones and whether they have been treated in any way other than cutting and polishing.

Synthetic **corundum**, in the form of synthetic **ruby**, was the first gemstone reproduced by artificial techniques. Auguste Victor Louis Verneuil invented the flame-fusion technique (now known as the Verneuil method) of melting aluminum oxide and allowing it to recrystallize in a cone-shaped boule, the color of which can be controlled by the addition of chemical additives. This material is abundantly and inexpensively created and used routinely in class rings, birthstone rings, etc. Such material is rather easy to distinguish from natural material by the presence of curved growth striations and spherical gas bubbles or by the Plato method, in which repeated twinning lines appear when the material is immersed in high R.I. (refractive index) liquid and examined under magnification between crossed polarized filters.

Other methods of growing synthetic corundum, such as flux-grown, Czochralski pulled, and hydrothermal methods, produce more realistic imitations, which are primarily identified by characteristic inclusions. They are much more expensive than the Verneuil synthetics but considerably cheaper than the rubies and sapphires that they imitate.

Synthetic **spinel** is produced by the Verneuil method and is used most often to imitate stones other than spinel, such as blue sapphire or aquamarine. It is easily identified by its R.I., spherical gas bubbles, and characteristic strain lines seen between polarizing filters. It is quite inexpensive and widely used in inexpensive jewelry.

Synthetic **diamond** is produced under high pressure and temperature and, to date, has not been produced at low enough costs to be used as a natural diamond substitute. However, there are indications that we may begin to see gem quality synthetic diamonds within the next few years. Synthetic diamond is used very extensively (two-thirds of the world production) for industrial purposes as abrasive diamond grit.

Synthetic **emerald** is produced in some abundance by flux-growth, hydrothermal, and Lechleitner overgrowth methods and sold under trade names such as Gilson and Chatham. It can sometimes be difficult to distinguish from its natural counterpart, but the presence of characteristic inclusions is usually the giveaway.

Synthetic **opal, coral, lapis lazuli, jade, turquoise, and quartz** have only in the past few years appeared on the market in fairly good imitation of the natural material. Microscopic examination usually reveals their identity. Recently, synthetic **amethyst** has become very abundant, mixed into parcels of natural stones; it can usually be detected by the absence of twinning, but recent improvements in synthesis are making it more difficult to detect, and the relatively low cost of both natural and synthetic amethyst makes it prohibitively expensive to do routine testing of large quantities of amethyst.

Synthetic **alexandrite** has come into the market in greater abundance in recent years and is produced by the Czochralski or "pulled" method and by the "floating zone" or "floating point" method. It is more realistic and more expensive than the cheap color changing Verneuil corundum that has usually been used as a substitute for alexandrite.

Glass, sometimes called "paste," by virtue of its wide range of color and low cost, has been used for centuries to imitate natural gemstones. It is easy to identify by its R.I., spherical gas bubbles, swirled growth patterns, and characteristic strain lines seen between crossed polarizing filters.

Cubic zirconia (CZ) is the most abundant diamond imitation and is produced very inexpensively. It has no close natural

counterpart. CZ is fairly convincing as a diamond substitute but is not difficult for a trained eye to detect. Thermal "diamond probes" provide quick and easy separation from diamond. CZ is now produced in a wide variety of colors and often sold under a variety of company trade names.

Moissanite in mid-1998 began to make a huge splash in the gem world as the latest and greatest diamond simulant. This synthetic silicon carbide crystal was discovered by a materials scientist at North Carolina State University and is being developed by Charles & Colvard (formerly known as C3) and Cree Research. Its natural counterpart has been found only in meteorites and is deep green, but the synthetic moissanite is near colorless and will probably continue to fool quite a few jewelers and jewelry buyers. Its high refractive index and extreme hardness (second only to diamond) make it an effective diamond simulant, and the popular diamond probes that test thermal conductivity fail to distinguish it from diamond. Charles & Colvard is also marketing a detector that can distinguish between moissanite and diamond. Another way to identify it is by its double refraction -- look through the stone from several different angles and you should see double images of facet lines or objects viewed through the stone. If you look directly through the table, you're not likely to see the doubling, though, since it's oriented on the optic axis. Keep your eyes out for this one!

Manmade garnets such as YAG (yttrium aluminum garnet) and GGG (gallium gadolinium garnet) and other materials such as synthetic rutile and strontium titanate preceded cubic zirconia as diamond simulants but were never very convincing in that role. With the advent of CZ and, more recently, moissanite, their role in the market has declined considerably.

From <http://tradeshop.com/gems/substit.html>

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The Many Uses of Gypsum

When you bake baking powder biscuits or use self-rising flour, do you know that you are using food containing a ground-up mineral called gypsum? There is nothing toxic about it; it dissolves to form harmless liquid in your stomach and supplies your body with calcium.

It is used in toothpaste, in the heads of matches, in cement, in chalk to write with, in splints for broken limbs, in the brewing industry to help settle and clarify their products, in peanut fields, in mushroom beds, and in our houses as wallboards. It is used as molds for dishes, knives, forks, spoons, bathroom fixtures, and aircraft ductwork. The White Sands proving grounds in New Mexico is a gypsum deposit. It is estimated that if ever needed, there is enough gypsum there to supply the world for 60,000 years at its present rate of consumption.

From *Hellgate Breezes*, 4/1993, via the *Breccia* 6/2007

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Polishing Talc

By *Richard Chappell, Jr., Houston Gem & Mineral Society*

The natives of Brazil have used the talc found there to make common utensils such as cooking appliances. Professional talc carvers from Anapolis-Goles, Brazil, showed me this quick method when they visited Houston, Texas, in a nation-wide tour.

1. CUT the talc into size desired with hand saw (even the pros didn't use any electric equipment except a lathe for hollowing out bowls and pots). Sometimes this step may be skipped if the piece is of the correct size.
2. CARVE the talc into approximate shape with a knife.
3. SAND with 220 or 400 grit sandpaper.
4. SMOOTH with quadruple zero (0000) steel wool, the finest available.
5. HEAT in strong sunlight or warm oven until slightly warm to the touch.
6. RUB with clear paste wax while the talc is still hot, and you have got yourself a finished carving.

Reasonably pure talc is required, but impurities give it a delightful marking or pattern. This method may be used for cabs,

statues, or anything else. The finished product may surprise you, as you can't tell how it will turn out until the paste wax is on.

Form via Eolap News, 3/99, Via the Pegamite, 2003-01

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July 2007 Gem & Mineral Shows

6-8--FLAGSTAFF, AZ: 21st annual show; Flagstaff Gem & Mineral Society; Little America Hotel, Butler Ave. and I-40 (Exit 198); Fri. 11-6, Sat. 10-6, Sun. 10-4; adults \$3, children under 12 free; contact Val Latham, 840 W. Charleston Ave., Phoenix, AZ 85023, (602) 466-3060; e-mail: dstuart@bmol.com.

12-15--NYSSA, OR: 42nd annual show, "Thunderegg Days"; Nyssa Chamber of Commerce; school grounds; buy, sell or swap rocks, slabs, gemstones, jewelry, field trips Thu., Fri. and Sat., contact Nyssa Chamber of Commerce, 112 Main St., Nyssa, OR 97913, (541) 372-3091; email: nyssacofc@fmtc.com.

13-15--PORTLAND, OR: Show, "Bead Faire"; Gem Faire Inc.; OR Convention Center/Exhibit Hall E, 777 N.E. MLK Jr. Blvd.; Fri. 12-7, Sat. 10-6, Sun. 10-5; admission \$5 (weekend pass); contact Gem Faire Inc., (503) 252-8300; e-mail: info@gemfaire.com; Web site: www.gemfaire.com.

14-15--PAGOSA SPRINGS, CO: Show, "Pagosa Springs Gem & Jewelry Show"; High Country Trader; Archuleta County/Pagosa Springs Fairgrounds, 1/4 mile south of Hwy. 160 on Hwy. 84; Sat. 10-7, Sun. 10-4; free admission; crystals, gems, minerals, fossils, CO specimens, jewelry, beads, artwork, lapidary, spheres, pyramids, carvings, fountains, indoor and outdoor vendors;

contact Sandy Cleveland, P.O. Box 5172, Buena Vista, CO 81211, (719) 395-3884; e-mail: hcstrader@chaffee.net.

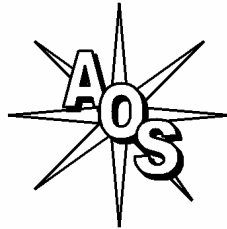
20-22--SAN RAFAEL, CA: Show, "Gem Faire"; Gem Faire Inc.; Marin Center/Exhibit Hall, 10 Avenue of the Flags; Fri. 12-7, Sat. 10-7, Sun. 10-5; admission \$5 (weekend pass); contact Gem Faire Inc., (503) 252-8300; e-mail: info@gemfaire.com; Web site: www.gemfaire.com.

21-22--SANTA MONICA, CA: Show, "Bead Faire"; Gem Faire Inc.; Santa Monica Civic Auditorium, 1855 Main St.; Sat. 10-6, Sun. 10-5; admission \$5 (weekend pass); contact Gem Faire Inc., (503) 252-8300; e-mail: info@gemfaire.com; Web site: www.gemfaire.com.

27-29--SANTA CLARA, CA: Show, "Gem Faire"; Gem Faire Inc.; Santa Clara Convention Center, 5001 Great America Pkwy.; Fri. 12-7, Sat. 10-7, Sun. 10-5; admission \$5 (weekend pass); contact Gem Faire Inc., (503) 252-8300; e-mail: info@gemfaire.com; Web site: www.gemfaire.com.

28-29--FREDERIC, WI: 40th annual show; Indianhead Rock & Mineral Society; Frederic High School; Sat. 10-5, Sun. 10-5; free admission; contact Roy Wickman, (715) 357-3223, or Vernon Peterson, (715) 349-2241, or Dan Beal, (715) 472-8809.

28-29--TENINO, OR: 13th annual show, "Rock & Gem Rendez-Vous"; WA Agate & Mineral Society, Tenino Rock Cruisers; Parkside Elementary School, Stage St. S, I5 Exit 88; Sat. 9-6, Sun. 9-5; during the Tenino OR Trail Days; contact Daniel DeBoer, 5107 Brenner Rd. NW, Olympia, WA 98502, (360) 866-3940; e-mail: keylock@comcast.net.



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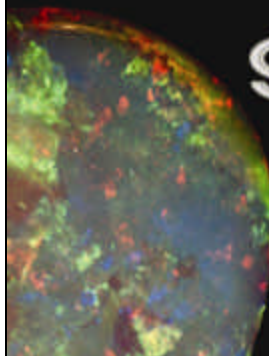
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Are Your Dues Due Now?
PLEASE CHECK YOUR ADDRESS LABEL. If your label shows the current month/year your dues are DUE NOW. If the date is older, your dues are overdue.
A Renewal Grace Period of two months will be provided. If your dues are due now you will receive two additional issues of the newsletter. Please note, however, that as the system is now set up, if your renewal is not received you will be AUTOMATICALLY dropped from membership thereafter. It is your responsibility to assure your dues are current.
 Thank you,
The Editor

The Opal Express

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**Volume #40 Issue #7
July 2007**

TO:

Some Topics In This Issue:

- AOS Live Auction Great Success!
- CFMS Convention in Lancaster, CA
- Australian Sedimentary Opal
- Pipe Opal Discovery a Rare Find
- No Acid Treating of Andamooka Matrix
- Vietnamese 4000-Year-Old Opal Relics
- Gem Substitutes
- The Many Uses of Gypsum
- Polishing Talc

Important Info:

Board Meeting – July 2nd

General Meeting - July 12th

Speaker – Gene LeVan on
Opal Pricing Made Simple and
the Opal Smart Chart

Bring in your opals for price
evaluation!

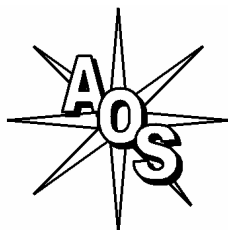
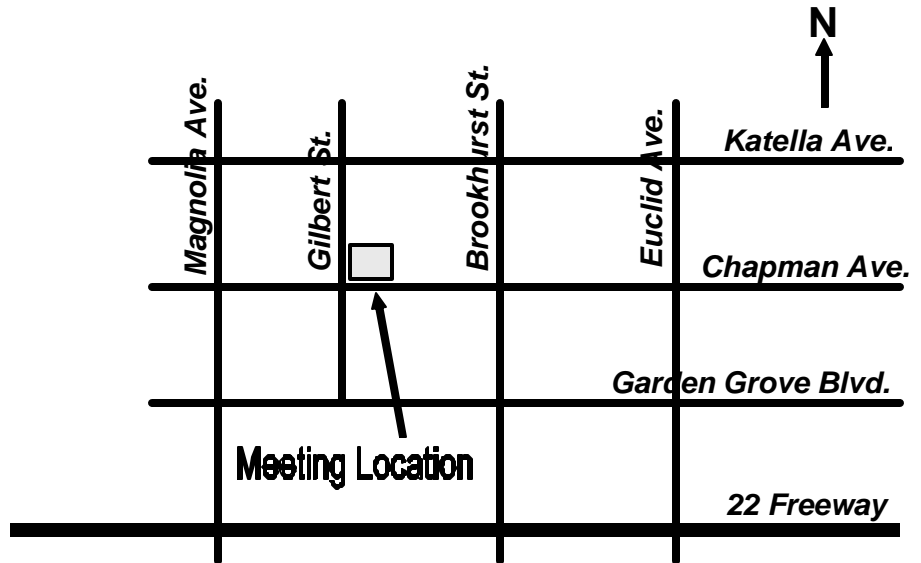
— GENERAL MEETINGS —

2nd Thursday of the Month
7:00 pm - 9:00 PM
Garden Grove Civic Women's Club
9501 Chapman Ave.
(NE corner of Gilbert & Chapman)
Garden Grove, CA

MEETING ACTIVITIES

Opal Cutting, Advice, Guest Speakers,
Slide Shows, Videos, Other Activities

July 12th: Opal Pricing Made Simple By Gene LeVan



The American Opal Society

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