

# The Opal Express

American Opal Society  
P.O. Box 4875  
Garden Grove, CA 92842-4875



**Volume #37 Issue #9  
September 2004**

TO:

### Some Topics In This Issue:

- Disorderly Opal
- How to Photograph Opal
- A Little about Petrification
- Silicon, Silica, Silicates and Silicone
- Pearls Become Most Treasured Gem
- GPS Units in Rock Collecting
- Rocks vs. Minerals
- Lapidary Tips & Hints

### Important Info:

Board Meeting  
September 6<sup>th</sup>

General Meeting  
September 9<sup>th</sup>

**Presentation: Evaluation of  
Opal Characteristics from  
Slide Show Presentation  
By Mike Kowalsky**

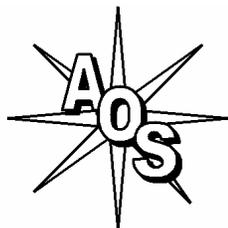
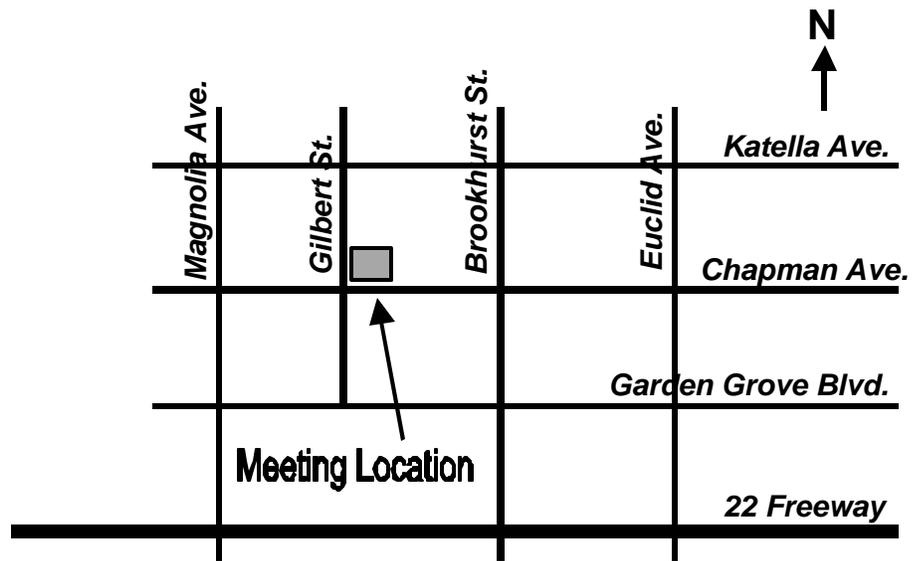
### — GENERAL MEETINGS —

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

## **Sept. 9th - General Meeting Presentation: Evaluation of Opal Characteristics**



## The American Opal Society

<http://opalsociety.org>

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Please make check or money order payable to "**American Opal Society**". Mail payment and application to:

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An optional, quicker method of payment is via the **Internet** using **PayPal.com**. To pay, just log onto your PayPal account and "Send Money" to the AOS account, **webmaster@opalsociety.org**. There is no transfer charge!

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**MEMBERSHIP ROSTER & DEALERS LIST:** The AOS publishes a membership directory once per year in its Newsletter, the *Opal Express*. Your name will be included. Please check what additional personal information that you want listed for other members. If it is different from the information above, please note that on the application.

Address     Phone     E-mail     Website

Include my name & address on a list provided to the Dealers selling at our Annual Opal & Gem Show.

Please sign here: \_\_\_\_\_ Date \_\_\_\_\_

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**Editor-Jim Pisani**

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## Are Your Dues Due Now?

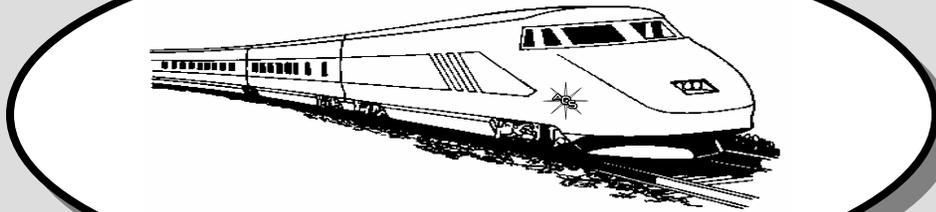
**PLEASE CHECK YOUR ADDRESS LABEL.** If your label shows the current month/year your dues are **DUE NOW**. If the date is older, your dues are overdue.

**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

Published  
monthly by  
The  
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September 2004

Volume 37 Issue 9

## Table of Contents:

President's Message	3
Proposal to Make the Opal Express Newsletter Electronic	3
Last Month's Speaker: Frank Gross in Australia	3
Opal Workshop	4
Members Only Website Password	4
Disorderly Opal	4
How to Photograph Opal	4
A Little about Petrification	6
Silicon, Silica, Silicates and Silicone	6
Pearls Become Most Treasured Gem	7
GPS Units in Rock Collecting	8
Rocks vs. Minerals	9
Lapidary Tips & Hints	10
September Gem & Mineral Shows	10

## President's Message

Hi Folks,

Its September and you know what that means.....Kids, grandkids, kids next door are all back in school. This means that you will have more time to grind on some OPAL. WHAT MORE COULD YOU ASK FOR??? It also means the annual OPAL SHOW is only two months away. Preparations are moving along very well. Should be a good show (as usual). I hope to see a lot of you there. It would make a dandy weekend outing.

In a move to help reduce our costs of running the Society, The AOS Board has approved a proposal to publish our monthly newsletter through the AOS website. There will be more detail on this forth coming.

Once again I am running late with my part of the newsletter, so I better shoot this little tidbit off to Mr. Pisani, or there will be OPALS to pay.

*Meyer P Goetz*

## Proposal to Make the Opal Express Newsletter Electronic

Due to the high cost of printing, the American Opal Society Board of Directors proposes to transmit The Opal Express newsletter electronically for those members who agree to participate.

There are a number of advantages for the AOS and members which favor distributing the newsletter via email. Reading the Opal Express electronically on your computer screen will save paper. Photos and pictures which are black and white in the printed edition appear in full color. A digital copy never wears out and can be printed over and over if desired. Also, copies are much easier to store. A CD will hold dozens of newsletters. Email eliminates postal service delivery time. Electronic distribution will reduce the monthly cost to the Society

significantly. Participation in receiving the electronic newsletter will be voluntary.

For those who agree to participate, the process will be as follows. Members will receive e-mail with The Opal Express as an attached file in pdf format. Adobe Acrobat Reader will be required by the recipient to read the newsletter. The Adobe Acrobat Reader software program is available free of charge via the Internet at the following website:

<http://www.adobe.com/products/acrobat/readstep2.html>

We will send a letter and/or e-mail to the AOS membership requesting your agreement to participate in electronic newsletter distribution. Please respond, and if possible, agree to receive future editions of The Opal Express electronically. This will help your Society! Thank you!!

*The AOS Board of Directors*

## Last Month's Speaker: Frank Gross in Australia

The Society would like to thank Frank Gross for giving an impromptu talk on his recent trip to Australia. Frank talked about his trip to Lightning Ridge and how he purchased opal. Frank also showed us some of the excellent rough that he had purchased. Frank also discussed traveling in Australia, staying at caravan parks, etc. Frank got our opal juices flowing bt demonstrating how Americans can buy their own opal directly from the source.

## This Month's Presentation: Evaluation of Opal Characteristics from Slide Show Presentation

*By Mike Kowalsky*

**START MAKING PLANS  
IT'S COMING!!!**

**The American Opal Society's 37th Annual  
ANNUAL OPAL & GEM SHOW  
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**Sat. & Sun., November 6 & 7, 2004**

**Saturday 10AM - 6PM**

**Sunday 10AM - 5PM**

**Location: Clarion Hotel Anaheim Resort**

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## Opal Workshop

The AOS opal workshop is at Ball Jr. High School on 1500 W. Ball Rd., Anaheim, CA. It can be open for members on Monday. Contact Stan McCall at (714) 220-9282.

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## Members Only Website Password

To log onto the website's members only area at: [http://opalsociety.org/aos\\_members\\_only\\_area.htm](http://opalsociety.org/aos_members_only_area.htm) type: Name: "member" and Password: "koroit".

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## Disorderly Opal

*By Dr. William S. Cordua*

Minerals are crystalline solids, having regular long-range arrangements of their atoms repeating predictably in three dimensions. But there are a few substances, called "mineraloids", which have mineral-like occurrences, properties and consistency of composition but not a long-range crystalline structure. One of these is opal. Opal, a hydrated form of silica with variable amounts of included water. It is often described as amorphous (literally "without form"). Recent studies, have clarified opal's atomic nature, subdividing it into categories such as "opal-CT" that read like an alphabet soup. Recent articles, such as one on the origin of thunder eggs from Colorado (Kile, 2002), use these terms, so it is worth-while finding out what they mean.

Opal's lack of long-range atomic structure is verified by its response to xrays. When xrays pass through a mineral, they are affected by that mineral's internal atomic structure. When the x-rays emerge, they make a pattern that is recorded on film or graph paper and reveals the mineral's internal symmetry. In opal, the pattern that emerges is diffuse and not very regular. But "not very regular" is not the same as "random". Some opals do show a short-range arrangement of their atoms. This allows subdivision of opals into categories based on the type and extent of this order/disorder. The pattern in opal apparently consists of small spheres or chains of linked Si and O atoms. These structures are surrounded by more silica in a gel-like matrix. The arrangement of the spheres is similar to that of some high temperature forms of SiO<sub>2</sub> - namely cristobalite and tridymite. The type of material found in the opal is the key to the alphabet soup.

Opal A is opal that is truly amorphous, having little if any arrangement of atoms. Much gem opal is of this variety. Opal AG is the least structured, being all amorphous gel (= AG. Get it?). Opal AN has a vague network structure in the gel. A lot of hyalite opal, thought to form as vapor condensate, is of this type.

Opal CT has intermixed tridymite and cristobalite structure along with unstructured gel. It gives broad x-ray patterns, so at least is "aspiring" to true crystallinity. Lots of common opal and some gem opal is of this variety. Within this is Opal CTm (massive structure), opal CTp (platy structure) and opal CTI (fibrous structure). In case you are wondering where the "I" came from, (or what the "I" is going on) this fibrous structured opal has been termed "lussatite".

Opal C has a pattern dominated by a diffuse structure resembling cristobalite. Agate at the base of Uruguay amethyst geodes has some of this, so many of you have specimens of this.

Over time opal becomes less disorderly. Its structure is not one that will last, as the atoms are more stable when arranged in a real crystal structure. Burial with moderate temperatures and pressures speed the breakdown process. Eventually opal passes form Opal A to Opal CT to fine-grained quartz or chalcedony. Much chert was probably common opal at one time or another. This nomenclature allows mineralogists who study opal to focus t

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their attention of various types. Each type of opal has its own conditions of formation, and its orderly to disorderly pattern is often a window to those geological conditions.

Bill Cordua, University of Wisconsin at River Falls, <http://www.uwrf.edu/~wc01/welcome.html>

#### References:

Graetsch, H., 1994, "Structural characteristics of opalline silica and microcrystalline silica materials" in Silica: Physical Behavior, Geochemistry and Materials Applications, edited by P. Heaney, et. al., Reviews in mineralogy, vol. 29, Mineralogical Society of America, p. 209-232.

Kyle, Dan, 2002, "Occurrence and genesis of Thunder eggs containing plume and most agate from the Del Norte area, Saguache County, Colorado", Rocks and Minerals, vol. 77, #, p. 252- 268.

*From the 2003 Leaverite News of the St. Croix Rockhounds*

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## How to Photograph Opal

Editor – Here some good tips from

<http://www.opalshop.com.au/forum> on how to photograph opal.

### Some General Ideas about Getting Better Pictures

Posted: Sept. 19, 2003

From: Robert Short

Here are a couple of rules/ideas that some times work.

For a flat stone, put the light high. For a domed stone, put lower and out to the side more. Use the exposure settings. I find by putting the camera on an under exposed setting the wash out decreases The best (to date) light bulb I am using is called a day light / craft bulb. The glass is see through not pearl. The thing is though the glass is a blue colour which makes the light daylight white. I am sure there should be something similar over there. The frustrating thing, what you do today doesn't work tomorrow or so it seems.

Also use the one light source not overhead, window and the spot on the desk. When using Macro use the setting with the lens on as wide angle as possible for greater depth of field don't try and increase the size of the stone by zoom. Use a tripod or an enlarger table.

I hope that is a start.

Good luck,

Robert Short (Nobby Bob)

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From : Auriga

Posted: Feb 11, 2004

### Use A Gray Or Neutral Background

I've found that using a standard automatic digital camera with a neutral color background on an overcast day with the "daylight" type spectrum lighting works well. There is one special secret I will cover later... Also a "blue-white" type fluorescent light works very well to bring out the reds & blues. Not a cool white, but one that looks slightly blue as compared to the standard "cool white" bulb. Any Halogen flood works nicely, though watch out you don't cook the stones. They run very hot!

*Opal Express, September, 2004 Page 4*

Now, for my special secret, Microsoft has a program they call "Microsoft Photo Editor", now you have to be honest with your editing, and not over do it, but this or any photo editing software, can really make those all to commonly overexposed opal pictures glow with color.

Altering the actual original is a questionable practice, however, the process does & can give you what you were looking for IF you use a neutral background and don't over expose the stone. Adjustments are the normal color saturation, hue, black & white levels, contrast & gamma. Good luck, [auriga@verizon.net](mailto:auriga@verizon.net)

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**From: James**

Posted: Jun 20, 2003

**Photo Tips For White Opals**

I saw you mention that you would invite any tips that might help to show your white Opals a little better.

That sure is a tough one. I have been trying this and trying that for some time now since I started buying cutting and selling about two years ago.

In my trying different ways to improve photos of whites I found that it kind of depends on the type of lighting and photo editing software you use.

For me the best results came with using a small 50 watt Halogen flood light in one of those table mounted lamps that can be moved about. To highlight the colors I move it around to see which position best suites a particular stone or parcel. Now this of course depends on whether you are using a camera or a scanner.

Secondly and equally as important is the photo editing software. This you can or will use regardless of the photo source as mentioned above (camera or scanner).

There are all kinds of different programs that work well for photos for just about anything, but then as we all know, white Opal is a horse of a different color. Personally I think the worst thing a seller can do is to go fussing with the photos trying this and trying that and end up with a pic that doesn't actually represent the stone as it actually will look in person. In most cases a slight increase in the photos contrast and an equal reduction in the lighting helps significantly. Of course all programs don't give the option of changing a photos contrast. If you have a program that will allow you to do this you will be able to see what I mean by just giving it a try for yourself.

As you know some photo editing programs work better than others and are more user friendly. For me, I have found that I have had to size and crop, etc. the photos in one program and when I get them close to what I think will work for the page where they will be published as a last touch up I have to open them in a program that allows me to adjust the contrast and lighting as I described earlier.

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To sum it up:

1. Proper lighting is essential ...Halogen flood of 50 watts works for me, although natural sunlight is always best (avoid fluorescent lighting).
2. A good photo editing program that will allow you to increase the contrast in slight increments and decrease the brightness in an equal fashion. Undo feature will allow you start over again if needed without messing up your original. (don't mess with colors or shading (that's a no-no).
3. Copy several pics to choose from as they don't always look the same once they are published.
4. Lots of practice and a lot of patience.

Sorry if I was a little bit wordy, LOL. This photo thing has become a real pet project of mine. I haven't shot any Opal since I installed this new PC and I have been very busy with jewelry auctions as of late. Can't wait to get started cutting again.

Hope this helps although your PICS aren't too bad either. Keep up the great work. Us Yanks just love that Opal.

G'Day,  
James

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**From: Aquadennis**

Posted: Sept. 02, 2003

**Photographing Opal**

Opal is one of the most difficult subjects to photograph as many of us have encountered using digital cameras. I have taken well over 7,000 photos of opal to sell on eBay. As James has pointed out one of the key elements is lighting. I find that incandescent bulbs in general give the white opal a yellowish tint that does not show the real colors of the stone well. A halogen lamp does show the colors to be more true to life and are an acceptable light source in my book. For the most part I use either direct sunlight or in most cases I use a 12 volt DC lamp #1156. This lamp is used in automobiles for a brake or signal lamps. The best thing is that these bulbs are cheap and easy to obtain. This is an incandescent bulb but I use it differently to avoid the yellowing effect. The power supply is set up using a transformer that runs off of the common house current or your basic 120 volt AC outlet in the USA, 240v input would be needed in Australia. The transformer output is adjustable so I can go from dim to very bright lighting with the turn of a knob. The light fixture itself is a weighted base with adjustable arms and a moveable head. I have found that a bright lighting source works well on white base opal and being able to adjust the angle of the light helps even more.

The light bulb needs to have some type of shade to prevent the light from shining back at the lens. This is similar to a lamp shade for a track light where the light is directed out of the open end of a cup shaped enclosure. My setup gets very hot and the

bulb will melt plastic if I forget to turn it off, it will also burn out the bulb very quickly if I make it too bright by turning up the voltage past the bulbs 12 volt rating. The other problem I ran into was burning up the transformer if the lamp was left on for extended periods of time (approx. 5 minutes is all it takes). For a safety device I installed a thermo switch that opens the circuit when the temp at the transformer gets to 280F. This seems to work out fine and I have not had any problems since.

I take most my photos with the opal sitting on a piece of black laminate that is adhered to a piece of plywood. This Formica laminate has a dull black finish so the light does not reflect off of it as much as a glossy finish would allow. The black is a good contrast and if it changes the appearance too much like on say a piece of crystal opal then I simply take another photo with the opal sitting on a blank piece of copy machine paper or on the aluminum ruler.

One final and important tip on photographing opal is the distance from the lens. For rough opal I take a group shot with a measuring ruler in the foreground or towards the rear. This photo does not capture the color of the rough very well but gives a good indication of the size and pieces of each parcel. The photo is taken at a distance of approximately 10" from subject to lens. All photos should be zoomed in to where the opal just fills the

frame to minimize cropping the photo. To capture the color I use a magnifying lens placed over the regular lens. The focal length is very short and there is only a few thousandths of an inch between focus and blur. I can take photos of opal with the lens as close as 1" to the opal this way on full zoom and get a few mm square to fill the entire frame. It is at close up range where the reflection of the light is overcome and the color of the opal comes burning through. Attention still must be given to the reflective light. You do not want the surface of the opal to have a white zone of pure direct light reflecting back at the lens. This is why it is good to have an adjustable head on the lamp and I have found that the best photos are taken when the angle just misses the direct reflection of light. In other words zoom in and find the reflection then gradually move the lens to the side and right when you see the reflection disappear is when you hold the camera steady and take the photo.

I take photos of rough opal wetted down with water, Polished opals are photographed dry and all finger marks are removed with a polishing cloth. Faceted opals are shot using a four prong holder and the reflection of the light is used to lightly outline the facets on a portion of the stone otherwise it looks like it is a cabbed opal. It takes a lot of practice to get it down and the more variables you have the better. Most of all trust what you see through the viewfinder. If you don't see any color in the view finder then don't expect the camera to capture it. A lot of cameras will see something different from what you can see with your naked eye. When you see color in the view finder then by all means take a photo.

Nikon Coolpix is a great camera for photographing opal. I use an older Sony MVC FD7 that uses floppies for film but otherwise is slow and awkward. It's quality is fair but nothing like the Nikon Coolpix. The Coolpix are excellent especially the models with the built in close up settings. Hope this helps and good luck!

Best regards,

Dennis Marinac, The American Facetor

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## A Little about Petrification

*By Michael J. Papay*

Have you ever wondered how petrification occurs? How does wood turn into stone? In so far as I can tell there are several events that occur in the process of petrification.

Aside from the fact that the trees must first grow to provide the wood, the first step in the process of petrification is burial. The wood must be deeply buried either while still standing or soon after falling in order to prevent its destruction by the activity of ants, beetles, termites, and fungi. The environment in which the wood is buried must also be anoxia (without oxygen) otherwise microorganisms would soon destroy the wood.

The matrix encapsulating the deeply buried wood must be rather firm in the sense that it not be too plastic. A thick mud would not be stable enough to maintain the shape of the wood through the vagaries of time. Instead the matrix would have to be rather like a porous concrete or consolidated sand. The porosity is important because porosity allows the introduction of water.

Once the wood is deeply buried in a consolidated, porous matrix in an anoxic environment it can only be transformed from wood to stone if quartz and water are present under the right conditions. No quartz, no water, no petrified wood.

Fortunately, quartz is a common and abundant mineral, and even the deserts have their days in the rain. And as the fallen rain passes down through the ground, it picks up and carries a little quartz dissolved in its waters. This solution then permeates the buried wood. Now the miracle happens. A little wood dissolved into the water and a little quartz is deposited in its place; and the water moves on its way carrying away a little carbon, leaving behind a little quartz.

The slow process of removing organic material while depositing quartz may take thousands of years to reach completion. In fact, petrification may not reach completion before the favorable conditions end.

If you have collected petrified wood in the field you will know first hand that not all specimens are the same. The most sought-after petrified wood are specimens in which the process went to completion leaving behind highly agatized or opalized wood. These specimens can be sawed and the sawed ends given a mirror polish to reveal the beauty of the specimen. Specimens too small for sawing are tumbled to mirror finishes which are highly attractive.

Wood that was not agatized or opalized may be shunned by collectors that fail to see the rugged beauty of the uncut, unpolished specimens. Other collectors favor these exquisite specimens as fossils of a bygone age and as natural works of art wrought by nature and not the hand of man.

Believe it or not, some portions of a specimen may be preserved as the original wood while other portions of the same specimen are lignified or petrified to various degrees. While the rockhound may not appreciate these specimens, scientists may rejoice over the intact wood for it may reveal through their

methods the ancestry and biology of the tree which otherwise they could never behold.

*From Rockhound Roundup Nov 94, Via The Glacial Drifter Feb. 98 Ventura GMS 7-1998*

## +++++ Silicon, Silica, Silicates and Silicone

*By Dr. Bill Cordua*

*University of Wisconsin at River Falls*

People get confused about the differences between silicon, silicate, silica and even silicone. What is it exactly that we collect, cut and polish??

Silicon is a chemical element, one of the 97 natural building blocks from which our minerals are formed. A chemical element is a substance that can't be subdivided into simple substances without splitting atoms. Silicon is the second most abundant element in the earth's crust, making up about 27% of the average rock. Silicon links up with oxygen (which makes up 55% of the earth's crust) to form the most common suite of minerals, called the silicates. Quartz, feldspars, olivine, micas, thomsonite,

*Opal Express, September, 2004 Page 6*

jadeite, and prehnite are all silicates. There is so much oxygen around that pure native silicon is almost never found naturally.

Silica is a bit trickier concept. It refers the combination of silicon plus oxygen. The mineral quartz is silica. But so are the minerals tridymite, coesite, cristobalite and stishovite which are mineral forms of silica that are stable at high temperatures and pressures. All these minerals are also silicates. In other words, quartz is a silicate made of pure silica. But feldspars contain sodium, aluminum, potassium and calcium in addition to silicon and oxygen. Thus feldspars are silicates but they aren't pure silica.

Geochemists also use the term "silica" to refer to the overall silicon and oxygen content of rocks. This is confusing, but stems from the fact that in rock analysis and sample is dissolved, the solution treated, and the amount of silicon present is determined by precipitating it as silica. So a geologist may say "This rock is 48% silica". A rockhound will look at the rock and say "How can that be? I don't see any quartz in it!" Both are right. The rock will not have the mineral quartz because the silicon and oxygen are tied up with other elements to make silicate minerals like feldspar. Its a bit like looking at a cake and saying "I don't see any eggs in there!" The eggs are cake ingredients but are present now in different forms.

Now, what is silicone? Its a synthetic polymer of silicon with carbon and oxygen that could be in solid, liquid or gel form. It has all kinds of medical uses, such as in antacids, artificial joints, pacemakers and implants of various notoriety, but is not, as far as anyone knows, found in rocks.

Can pure silicon be found in Nature? Yes, rarely. Recently Russian geologists were sampling gasses from Kudriav volcano on the Kamchatka Peninsula. Here they drove quartz tubes into vents jetting out gases of over 900 degrees C. Their tubes filled with minerals precipitating from this gas. Among them were pure silicon metal embedded in masses of salts such as halite. The silicon formed crystals up to 0.3 mm across. It was associated with pure aluminum metal, Si-Al alloys and other rare minerals. This find was unusual enough to warrant a note in the prestigious science journal, Nature.

So unless you are in Russia sampling hot volcanic gases, you can be sure that what you are finding are silica and silicates, but not silicon or silicone.

#### Reference:

Korzhinsky, M.A., et. al., 1995, "Native Al and Si Formation", Nature, vol. 375, p. 544.

From the 1998 Leaverite News of the St. Croix Rockhounds

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## Pearls Become Most Treasured Gem

### The Mystery and the History

By Charlotte Higgins, Topeka Gem and Mineral Society

#### IRRITANT

Jean B. Chishoim

*When oysters are annoyed by grit,*

*They lift their lids a little bit,*

*Admit the grit, then calmly sit*

*And start to make a pearl of it.*

*This seems to me quite ample proof*

*It sometimes pays to raise the roof!*

This little poem has been a favorite of mine since it appeared in Together Magazine in 1967, and seemed an appropriate way to introduce the second installment of this series on pearls.

"The oldest surviving pearl necklace dates from around 350 B.C. and was unearthed at Susa in western Iran, site of the

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Persian kings' winter palace", writes Nigel Sitwell in Smithsonian Magazine. Its exact origin remains a mystery, but one thing is certain.., as regional and world trade increased, so did the popularity of pearls. Early Romans and Russians adorned their clothing with pearls and flaunted them as signs of affluence. Pearls "were even used for medicinal purposes. They were sometimes ground and drunk by early rulers to improve virility and even to restore sanity," according to Sitwell.

It did come as a surprise to learn that pearls were found at Monte Alban in Mexico, dating from about 500 B.C., some 150 years before the find in Iran, and ancient sites in Peru. For some time after Columbus' discovery of America, the new land was known in Cadiz and Seville as "The Land of Pearls," according to Sitwell. Many of these pearls undoubtedly found their way to Europe, just as did vast quantities of gold from the new world.

Early pearling was a brutal business. The diver, without modern diving gear, would take a deep breath, make his descent on a rope, harvest as many oysters as he could before he ran out of breath and had to be hauled up for a brief rest. These dives lasted only a minute or so each, but the divers repeated the dives as many as 30 or 40 times a day. If the diver was particularly lucky, he might harvest as many as 400 oysters in a day, but only one of 40 contained a pearl, and only a small portion of these were marketable.

I found no statistics on how many divers failed to survive this harsh regimen, but apparently there were plenty of divers to take the risks, because the pearl trade flourished around the world.

Local politics naturally played a part in pearling, with the wealthiest and strongest controlling the pearling industry in his area. Man's greed and the seeming insatiable desire for pearls created a frenzy and oysters were harvested greedily with little concern for where the next generation of pearl bearing oysters would come from. After a time, this indiscriminate harvesting put extreme pressure on the oyster population. Many oysters were harvested before they had a chance to reproduce... and before they had a chance to "grow" a marketable pearl. Oyster beds were often harvested almost to extinction. These pearl "barons" little understood or even cared that they were depleting the oyster population and actually eliminating their source of income... a blind spot that is all too prevalent in many businesses today. Sadly this practice of over harvesting was not limited to salt water pearling, but extended to fresh water pearling as well, putting fresh water mussels at risk as well. Managed harvesting of resources is a lesson that must be learned again and again by succeeding generations.

Although we have dwelt thus far mainly with oysters and salt water pearling, we should not overlook the importance of freshwater pearls in the history of the industry. It has been suggested that the presence of fresh water pearls in Scotland

may have been responsible for Julius Caesars invasion of Britain in 55 B.C. Freshwater pearls have been found in many places around the world. In America, "fresh water mussels were present when The Appalachians were still forming" and our freshwater mussels persevered especially in the Southeast which escaped ice age glaciation," according to Adele Conover writing in the January, 1998 issue of Smithsonian Magazine. To the Native Americans these freshwater mussels provided not only food, but pearls and shells that could be used in a variety of ways including jewelry, decorations and as material for tools Conover writes.

The accidental discovery in 1857 of a pearl nearly one inch in diameter in a mussel from Notch Brook in New Jersey, sparked a run on the creek and as the word of this find spread, so did people's interest in the rivers and creeks near them. Freshwater pearls were subsequently found in nearly a dozen states. Many streams were entirely stripped of mussels by over zealous pearl hunters.

Further pressure for survival of freshwater mussels occurred when a pearl button factory was begun in Muscatine, Iowa. It is reported that 40 million gross of the highly prized buttons were manufactured in 1916. This popularity, however, signaled the decline in the numbers of freshwater mussels. But again, just when the mussels were in grave danger of extinction, man came to the rescue, introducing plastic buttons to the world of fashion in the 1940s.

The supply of natural pearls dwindled with the dwindling oyster and mussel population. But into this void, rushed Kokichi Mikimoto, not the first to produce cultured pearls, but probably one of the best known because of his marketing ability. Cultured pearls were marketed at prices well below the cost of natural pearls, and were condescendingly dismissed by many as worthless fakes. But then reality set in, as they realized the cultured pearls were genuine, although produced by the oyster with some help from man.

In natural pearls, a bit of sand or some other irritant finds its way into the oyster's shell, and in response to the irritant, the oyster begins to deposit layers of nacre (the same material that comprises the shell) around the offending object. It may take as many as ten years for an oyster to produce a natural pearl the size of a pea. Little wonder that they are so highly prized.

In producing cultured pearls, the "irritant" or foreign object, is introduced by man and the pearl-bearing oysters are tended much as livestock, until the pearl fanner decides to harvest the pearl. The length of time the pearl remains in the oyster determines the thickness of the nacre and thus the quality of the pearl. So we learn that quality cannot be hurried.

Then the Japanese discovered that American freshwater mussel shells made ideals nuclei for their cultured pearls. But again, change is in the wind and the future of the freshwater mussel industry is uncertain. Has man's greed threatened the



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cultured pearl industry, as well?

In the next article in the series we'll take a look at pearl farming, the quality of the product and the affect of over production on the world's economy and the cultured pearl industry in particular.

From via THE GLACIAL DRIFTER 4-03

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**GPS Units in Rock Collecting**

*By Tom Horton*

A GPS unit is a small, self-contained piece of electronic hardware, which is capable of calculating where it is on the face of the earth and displaying this position in a variety of formats. For example, the position of my house in Sun City West is North 33° 41.41' Latitude and West 112° 21.39' Longitude. These values of Latitude and Longitude denote a specific position on the surface of the earth. However, they might be difficult for the person who delivers my mail, so they use the more conventional system of street numbers. Both of these systems (and a number of others) can be used to specify the location of my house.

Now suppose that I am trying to specify the location of a site so that other folks can find it. To do this, I could give the Latitude and the Longitude (i.e. GPS coordinates) of the approximate center of the site. I could also include the GPS coordinates of the parking area and access roads.

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In general, access roads into a site zigzag their way along and are intersected by other, unmarked dirt roads. I could specify the coordinates for the turnoff from the major highway or road, the coordinates of the junctions with other roads that are encountered along the way, and the coordinates (see above) of various points of interest at the site itself. These individual coordinates along the "route" into the site are called "waypoints". Each "waypoint" of the "route" into the site denotes a specific location on the face of the earth that can be used in navigating to the site. All that remains in a set of directions is to specify the major roads taken to reach the starting "waypoint" which is the entrance road into the collecting site.

Suppose, for example, the road was similar to the 4X4 road down into the Agate Mountain collecting area southeast of Payson. This is a 12 mile excursion down a dirt road (a two hour trip), which encounters many little off-shoot roads which can be very confusing if you are not familiar with the route. On this road, a set of GPS Waypoints would be very useful. A set of waypoints for a route such as this enables the GPS Unit to "point" to a selected waypoint in the set. It will then point to the "next" waypoint along the route, preventing you from taking a wrong turn.

The "waypoints" comprising the "route" can either have been inputted previously by someone traversing the route and "punching" them into the unit or they can be established within a computer base software program and "downloaded" into the handheld unit.

The GPS units perform this kind of magic utilizing a system of navigational satellites circling the earth. From any point on the earth where the sky is visible, there are at least four such satellites visible to the unit. The satellites were put up by the United States Air Force in the 1970s and after for the purpose of global navigation. There are six standard orbits containing four satellites each. The latter are spaced ninety degrees apart in their orbits allowing global coverage. In general, the navigational positions obtained by using these satellites are accurate to within about twenty feet. This is more accurate than all previously used navigational methods, and essentially every entity that travels across the surface of the earth, including airliners and ocean going vessels, now uses GPS for their navigation.

United States Air Force stations around the earth maintain the GPS satellites. Each of the satellites knows specifically where it is with relation to the earth and what time it is. Special coded messages from an Air Force transmission station can cause each of them to transmit a highly precise set of location parameters to United States Military receivers, such that the accuracy of the position obtained by those receivers is accurate to within a tolerance of a few inches. This system, when balanced properly, can guide a GPS controlled bomb to a target about the size of a postage stamp anywhere on the surface of the earth.

The science of how all this is achieved is termed "Differential Trilateration". This subject is much too large and complicated to be discussed here. Suffice it to say that a GPS receiver can determine its latitude, longitude and altitude. If it is moving (i.e. on the dashboard of your rock collecting vehicle), it can determine the route traveled, the average speed, the distance traveled and so forth. Some of the fancier units can tell you the location of the nearest gas station, post office, police station, Burger King Restaurant, etc, making these units very useful

In my Xterra, I have a permanently mounted dashboard GPS Unit that is powered by the vehicle's 12-volt power supply. This antenna plugs into the serial port on my wife's laptop computer, which typically is running DeLorme Topo 3 software. When it is running, it points to the vehicle's location on a

computer screen topographical map and keeps track of my traveled route. Thus when I come to an unmarked junction in the road, I do not have to guess which fork to take.

I also carry a Garmin Vista handheld GPS unit, which will hold over 500 waypoints. My Garmin cost around \$450 dollars, but such an expensive unit is probably not needed for how I use it (it's fun to explore its usages). Adequate GPS units, both Garmin and Magellan, can be obtained from Outdoor Outfitters (when they have their periodic sales) for about \$100. The dashboard-mounted antenna (Garmin) was about \$200 and works very well. The software for the microcomputers is about \$100. All of this stuff is very useful in keeping track of and planning rock collecting field trips, however, don't buy it retail. The places that sell GPS units have three to four sales events throughout the year when the prices are reduced.

*From The Rockhound Record, 1-04*

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## **Rocks vs. Minerals**

### **Minerals**

A mineral, by definition, is any naturally occurring, inorganic substance, often additionally characterized by an exact crystal structure. Its chemical structure can be exact, or can vary within limits. Elements that occur naturally are also considered minerals. All minerals belong to a chemical group, which represents their affiliation with certain elements or compounds.

The classified chemical groups are known as: Elements, Sulfides, Oxides, Halides, Carbonates, Nitrates, Borates, Sulfates, Chromates, Phosphates, Arsenates, Vanadates, Tungstates, molybdates, and Silicates. Some of these chemical groups have sub-categories, which may be categorized in some mineral references as separate groups.

All minerals belong to various crystal structure groups, classified according to the way the atoms of the mineral are arranged. Minerals also have distinctive properties, such as color, hardness, crystal habit, specific gravity, luster, fracture, and tenacity. Many of these properties can vary among a single mineral, within limits. Many minerals exhibit certain properties that others do not, such as fluorescence and radioactivity.

Minerals are an economic commodity; they are mined because of the need for a valuable element they contain or an intrinsic property they may have. Other minerals are mined for their beauty and rareness, thus giving many specimens an accepted worldwide value. There are about 3,000 different types of minerals, and new ones are constantly discovered. Most of them are not known to professional mineral collectors, because they are rare, have no economic purpose, and for the most part do not make good specimens.

### **Rocks**

The best way to define a rock is to say that it is an indefinite mixture of naturally occurring substances, mainly minerals. Its composition may vary in containment of minerals and organic substances, and are never exact. They can range from tiny microscopic grains of minerals or organic substances to coarse agglomerates of different minerals, where the individual minerals are easily discernible. They may range in size from tiny pebbles to huge mountains. Rocks make up the earth's crust. Many rocks are not solid -- such as magma, soil, and clay. In general, the only people interested in rocks are geologists and paleontologist who are interested in the scientific nature and dating of the rocks. Different mineral deposits can be found in related rock formations, providing use by estimating what minerals rock formations may contain.

The term "rock collection" is usually misused for "mineral collection". Although a few people collect rocks, the amount of people collecting minerals is much greater.

*From the Nugget, Culver City Rock & Mineral Club March, 2003*

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## Lapidary Tips & Hints

To keep the crystal centers of geodes free from grit when flat lapping, place paper towels in the deep bottom of the cavity. Then use a bar of soap and rub the soap bar onto the crystals; smooth them down with a damp finger. Small holes and cracks can also be filled with the soap. They brush out when finished.

*Via Drywasher's Gazette, 3/98, via The Ventura Gem & Mineral Society*

## POLISH PROBLEMS?

Many people think of polishing as comparable to shining a shoe. Actually, each grit used on a stone leaves scratches in the surface of the stone. So, when you go to a finer grit, it's purpose is to remove all the scratches from the last grit. An estimate of the depth of scratches left on the stone by each grit is:

80 grit - 2.6 mm	180 grit - 0.86 mm
220 grit - 0.6 mm	325 grit - 0.3 mm
600 grit - 0.16 mm	1200 grit - 0.07 mm
3000 grit - 0.03 mm	

With reflected light, the unaided eye can see imperfections far smaller than 0.03 mm. On a cabachon, small grit scratches are hidden by surface imperfections and the stone looks shiny.

*Via AFMS Newsletter, 4-98, via The Ventura Gem & Mineral Society*

## SAVE THAT WATER FROM BOILED POTATOES!

Drop your tarnished jewelry and table silver in it. Leave it for an hour or two and it will shine!

*Via Breccia (date unknown) via The Ventura Gem & Mineral Society*

## TROY WEIGHT...

1 Pennyweight (dwt) - 1/20 of an ounce - 24 grains - 1.55 grams

1 Troy Ounce - 20 dwt - 480 grains - 31.1 grams

1 Troy Pound - 12 troy ounces - 5,760 grains - .823 pounds (US)

*by Chad Gurney, March 1998, via The Ventura Gem & Mineral Society*

When you use fine steel wool on a (silver) piece, be sure to rinse the silver thoroughly in water before continuing the next step of soldering. Even the heat of the torch will not eliminate the steel wool dust that accumulates on the piece, and if you drop it uncleaned into the pickle, you will get a fine cast of copper plating, covering the silver entirely.

*Via Lapidarian 9/89, via The Ventura Gem & Mineral Society*

Polish metal and stones with an electric shoe polisher! Remove the existing shoe polisher brushes, attach a spindle on each shaft end and then install polishing buffs. Don't forget to obtain right and left hand thread spindles so that the buffs won't spin off. Most shoe polishers spin slowly, just right for polishing.

*From Dusty Rocks 4/92, via The Ventura Gem & Mineral Society*

Why place knots between beads? The obvious answers - to prevent beads rubbing against each other and to prevent loss in case the string breaks. Be sure to knot if the beads are valuable. Knotting is also a way to extend the length somewhat. Most knots will take up about 1/8 inch of string. When calculating the amount of thread needed, figure the length of beads, add about 1/8 inch per knot (count the beads to find out how many are needed), and add about 18 inches. Now double the amount because you should use a double thread. Besides, it's easier to knot the double thread. Also the double thread lends extra security.

Take your beads along when buying thread to be sure to get the right thickness. Work as tightly as possible and in the same direction. Of course you let the strand hang overnight before knotting so all the stretch is completed.

*From Petrograph 2/97, via The Ventura Gem & Mineral Society*

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## September Gem & Mineral Shows

**3-6 — FORT BRAGG, CA:** 42nd annual; Mendocino Coast Gem & Mineral Society; Town Hall, Main and Laurel; Fri. 12-9, Sat. 10-6, Sun. 10-6, Mon. 10-4; free admission; Don McDonell, 643 N. McPherson, Fort Bragg, CA 95437, (707) 964-3116.

**4-6 — SILVER CITY, NM:** 21st annual show; Grant County Gem & Mineral Society; Silver City Recreation Center, 1016 N. Silver St.; Sat. 10-5, Sun. 10-5, Mon. 10-5; free admission; more than 40 dealers, 80 tables, rocks, minerals, gems, beads, jewelry, equipment, books; contact Jim Lett, Grant County Gem & Mineral Society, 2213 Ponderosa St., Silver City, NM 88061, (505) 538-3216; e-mail: jameslett@zianet.com.

**11-12 — MISSOULA, MT:** Show, "Sapphires in September" Hellgate Mineral Society; Ruby's Inn & Convention Center, 4825 N. Reserve; Sat. 10-6, Sun. 10-5; contact Bob Riggs, 14 Holiday Ln., Missoula, MT 59801, (406) 543-3667.

**17-19 — DEVORE, CA:** 3rd annual tailgate; Orange Belt Mineralogical Society; Western Regional Little League Park, 6707 Little League Dr.; contact Bob Woodcox, Chairman, (909) 874-3697.

**18-19 — COOS BAY, OR:** Show and sale; Far West Gem Society; downtown, 160 Central Ave.; Sat. 10-5, Sun. 10-4; free admission; dealers, displays; contact Carolyn DeMetz, (541) 267-5008; email: czdemetz@earthlink.net.

**18-19 — PASO ROBLES, CA:** 13th annual show, "Rockhound Roundup" Santa Lucia Rockhounds; Pioneer Park and Museum, 2010 Riverside Ave.; Sat. 10-6, Sun. 10-5; free admission; dealers, demonstrators, displays, kids' activities, silent auction; contact Mike Doherty (805) 466-4061; e-mail: mdoherty@tcsn.net.

**18-19 — REDWOOD CITY, CA:** 38th annual show, "Harvest of Gems" Sequoia Gem & Mineral Society; Community Activities Bldg., 1400 Roosevelt Ave.; Sat. 10-5, Sun. 10-5; free admission; contact Walter Skinner, (650) 589-3505.

**23-26 — McDERMITT, NV:** 1st annual show, "Rockhound Rendezvous" Illyssa I. Fogel, Diamond A Motel, City of McDermitt; Diamond A Motel; Thu. 10-6, Fri. 10-6, Sat. 10-6, Sun. 10-5; free admission; many dealers, agates, jaspers, opals, petrified wood; contact Illyssa I. Fogel, P.O. Box 437, McDermitt, NV 89421, (775) 532-8551; fax (775) 532-8552; e-mail: lisa@diamondamotel.com.

**24-26 — HUMBLE, TX:** 51st annual show; Houston Gem & Mineral Society; Humble Civic Center, 8233 Will Clayton Pkwy.; Fri. 9-6, Sat. 9-6, Sun. 10-5; adults \$5, students, teachers and seniors \$3, children under 12 free, for all three days; exhibits, dealers, demonstrations, gem and fossil ID, dino dig, silent auction, door prizes; contact Scott Singleton, (713) 664-9033; e-mail: show@hgms.org; Web site: www.hgms.org.

**25-26 — DOWNEY, CA:** Show; Delvers Gem & Mineral Society; Women's Club of Downey, 9813 Paramount Blvd.; Sat. 10-6, Sun. 10-4; displays, gemstones, tocks, grab bags, jewelry, minerals, boutique, raffle; contact Steve Miller, (562) 633-0614.

**25-26 — MONTEREY, CA:** 45th annual show; Carmel Valley Gem & Mineral Society; Monterey Fairgrounds, 2004 Fairgrounds Rd.; Sat. 10-6, Sun. 10-5; adults \$3.50, children free with adult; contact Sky Paxton, (831) 755-7741; e-mail: sky@familystones.net; or Janis Rovetti, (831) 657-1933; e-mail: fjrovetti@aol.com; Web site: www.cvgms.org.

**25-26 — SAN DIEGO, CA:** Annual Show; San Diego Lapidary Society; Bernardo Winery, 13330 Paseo Del Verano Norte; Sat. 10-4, Sun. 10-4; free admission; gems, minerals, fossils, beads, jewelry; contact Don Erpelding, (858) 278-5865.

**25-26 — VISTA, CA:** Show; Vista Gem & Mineral Society; Bregle Terrace Community Recreation Center, 1200 Vale Terrace; Sat. 10-5, Sun. 10-5; free admission; 13 dealers with gems, fossils, equipment, slabs, rough material, carvings, jewelry, opal, faceted stones, beads, and blown glass, 40 exhibit cases, 10 demonstrators, wheel of fortune, opportunity drawing, country store, gem identification; contact Mary Anne Mitah, (760) 758-4599, or Lois M. Harr, (760) 724-0395.

**29-3 — JOSHUA TREE, CA:** 29th annual show; Sportsmans Club of Joshua Tree; 6225 Sunburst St.; Wed. 8-5, Thu. 8-5, Fri. 8-5, Sat. 8-5, Sun. 8-3; free admission; more than 50 dealers, rocks, minerals, fossils, jewelry, equipment, crafts, raffle; contact Sportsmans Club, (760) 366-2915.

