

# The Opal Express

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



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**Volume #35 Issue #2**  
**February, 2002**

**In This Issue:**  
**Fire Agate**

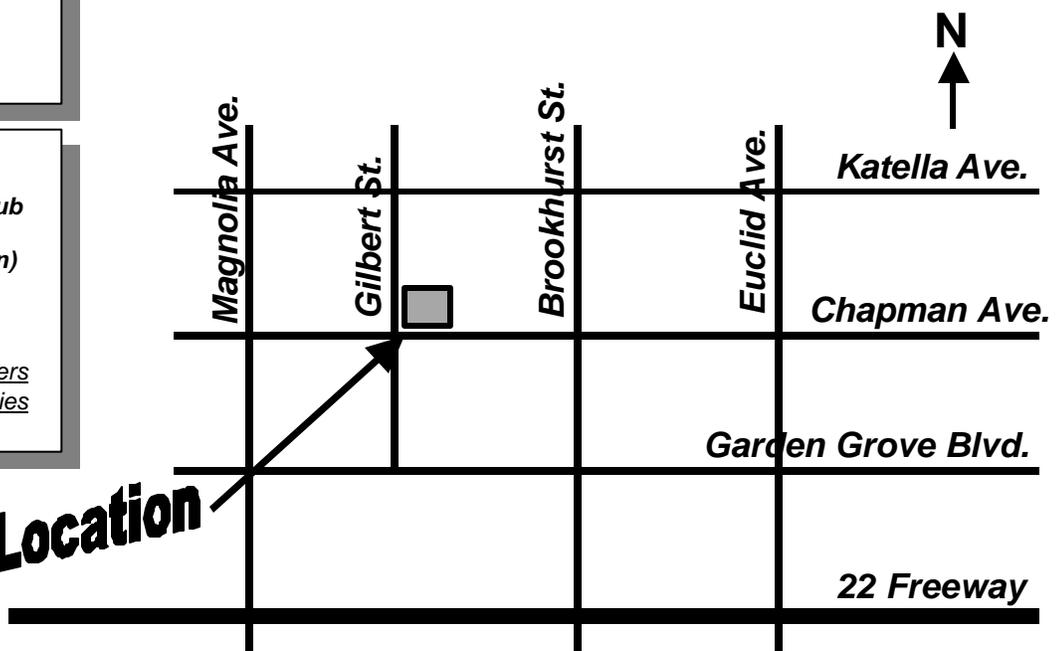
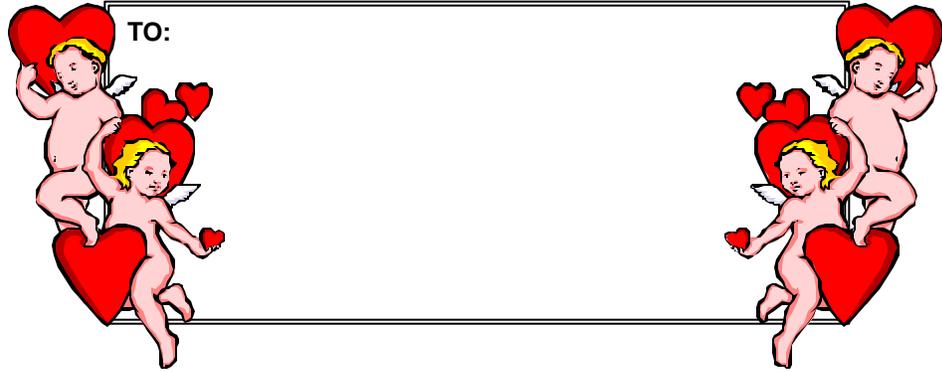
**Board Meeting-Monday, Feb. 11**  
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**General Meeting**  
**Thursday, Feb. 14**

*Speaker*  
**Fred L. Elsuau**  
**Gem & Mineral**  
**Collector**

— **GENERAL MEETINGS** —  
**2nd Thursday 7:00-9:00 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



**Meeting Location**



**The American Opal Society**  
<http://opalsociety.org>

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# American Opal Society Membership Renewal

*Thank you for continuing to support your American Opal Society!*

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1) All US Addresses including Alaska and Hawaii	\$25.00	
2) International Members = All addresses outside of US Addresses	\$30.00	
3) Additional Badges/each	\$5.00	
** <u>SENIOR DISCOUNT</u> = Age 65 or over deduct \$5.00	-\$5.00	
Name badge (optional) \$5.00 each-includes engraving (Badge free when joining)	\$5.00	

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**MEMBERSHIP ROSTER:** Yes, include my name and/or address and/or phone information in a published AOS membership directory...  
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**DEALER LIST:** Yes, include my name/address on a list provided to Opal Dealers selling at the most recent Opal Show.

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**NAME BADGE ORDER FORM:**  
PLEASE PRINT NAME AS YOU WISH IT TO APPEAR ON YOUR BADGE using up to two (2) lines of text for your name, nickname, or name of your opal related business.

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Email: editor@bovagems.com**

**Article Deadline is the 15<sup>th</sup> of the month prior to each issue**

### OPAL SOCIETY WORKSHOP

**The workshop at Walker Jr. High is available for the use of AOS members on Wednesday nights. Please call Stan McCall at Gems & Opals (714) 827-5680 if you plan to attend a shop session.**

**WORKSHOP RULES**

1. Shop may only be used by AOS members.
2. Shop users must sign liability waiver.
3. Shop users must sign in. Shop supervisor will maintain sign-in list and collect usage fees.
4. Shop usage fee is \$3 per session.

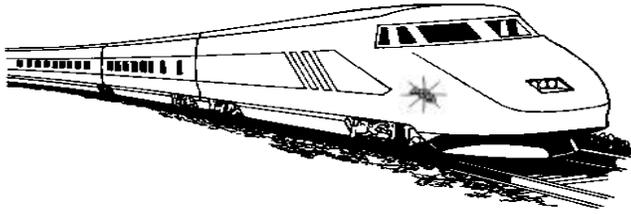
To assist us in scheduling, please call Stan or a board member in advance to reserve shop time. Thank you!

# The Opal Express

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## PRESIDENT'S MESSAGE *Mike Kowalsky*

Each trip to Quartzsite is different. There was more emphasis on people this year than on Opal. Maybe it was because in Quartzsite I saw so many people that I saw in Australia last year. It started with being able to have the company of Barbara McCondra and Gwen Burney on my trip from LA to Quartzsite. I was able to time my trip at the same time they were going. We had a nice trip with a delightful stop for lunch in Palm Springs where I showed them the latest place to have brunch. In Arizona we met other Opal Society members that Barbara knew; John and Mary Jane Hiller. We had some very nice conversations and talked about their trip to the Australian Opal mines. John is an avid opal collector and opal cutter with many tales about his challenges in cutting. He also had collected some Ethiopian opal samples, which was on my list to find. We all enjoyed a great meal in their motor home. It would be nice if that could be a place where Opal Society members could meet. I'm sure many more come to Quartzsite but we need a way to plan on meeting and getting together.

Actually I did find some interesting opal at the main show. I was able to view a number of samples of Ethiopian opal and obtained a sliced nodule with bands of crystal opal inside. One of the bands has excellent fire while the other band is clear with no fire. The other nodules I looked at had a brown base color and red, orange and green fire across the base. I also obtained another sample of opal from Alpine Texas from SDG Designs. It is a larger sample than my other sample with precious opal. Pete Goetz went to Alpine Texas last year and was able to provide me with large samples of common opal. The last sample I obtained was sample of rough from the Royal Rainbow Opal Mine in Nevada. Jim Pisani had provided samples for our display of Opals from the Americas which made it to three gem shows last year. Of course I obtained a few pieces of rough opal also.

I am looking forward to the Tucson Show in February and my two presentations at the Opal Seminars at the Holiday G&LW show on Feb 9<sup>th</sup> and 10<sup>th</sup>. It was good to see a number of the Australian miners have decided to come to the US for either or both Gem Shows. Many hadn't decided until the last minute. Some of the miners

from the Yowah area were at Quartzsite and I am looking forward to seeing more at Tucson.

## *Safety Report* **Rusty Nail**

*by Cathy Gaber*

You've always been told to get a tetanus shot if you step on a rusty nail. Then nail could be contaminated with tetanus (also called lockjaw) and infect you. Well actually rust has nothing to do with it. Tetanus bacteria spores are most commonly found in soil, dust and manure, so any scratch, puncture or other wound that has come in contact with these substances are the most likely to cause tetanus.

Headache and spasms of the jaw muscles are the first symptoms of tetanus. Irritability and spasms of the neck, arm, leg and stomach muscles may follow. Convulsions can be severe enough to break bones and victims may end up being hospitalized for several weeks. Up to 30 percent of victims in the US die.

Only about 50 to 100 people get tetanus in the US each year, but most of those cases are under-immunized older adults. When was your last booster shot? A booster is recommended at least every 10 years for adults. If a wound has been contaminated by dirt more than 5 years after immunization, then an immediate booster is advisable. If you have any doubt, discuss it with your doctor. When properly immunized, the prevention against tetanus is over 95 percent effective.

In addition to keeping your boosters up to date, proper care of any wound or break in the skin, including burns and frostbite, can help prevent the risk of becoming infected with tetanus. Clean the wound thoroughly with antiseptic and remove all dirt and debris. Tetanus symptoms can occur in as little as two days or as long as a few months with 2 weeks being the average onset time frame. More serious cases manifest more quickly.

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## NEWSLETTER ARCHIVES ONLINE

There is one password for all members: "opalsrus".

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**Feb 15-24, Indio, CA;** San Gorgonio Mineral & Gem Society, Riverside County Fair & National Date Festival; fairgrounds Gem & Mineral Bldg, 46-350 Arabia Street, 10 -10, Don Grisham (909) 795-7289

**Feb 16-17, Stockton, CA;** Stockton Lapidary & Mineral Club, "Earth Treasures", Scottish Rite Temple, 33 W. Alpine Ave., 10-5 both days; Jim Dunlap (209) 478-0747; E-mail: [jimsopals@jps.net](mailto:jimsopals@jps.net)

**Mar 1-10 El Centro, CA,** Imperial Valley Gem & Mineral Society, Imperial Valley Expo & Fair, M-Th 4-10, Fri-Sun. 10-10

**Mar 2-3, Arcadia, CA,** Monrovia Rockhounds, The Arboretum of Los Angeles County, Ayres Hall, 301 N. Baldwin Ave., Arcadia, CA 91007, 9-4:30, Show Chairman: Jo Anna Ritchey (636) 359-1624, [j.ritchey@verizon.net](mailto:j.ritchey@verizon.net)

**Mar 2-3, Ventura, CA,** Ventura Gem and Mineral Society, Seaside Park (Ventura Co. Fairgrounds), 10 West Harbor Blvd., Sat 9-5 Sun 9-4, Jim Brace-Thompson (805) 659-3577/[jbrace@juno.com](mailto:jbrace@juno.com)  
Web Site: <http://www.vgms.org/>

**Mar 9-10, Spreckles, CA,** Monterey Bay Gem & Mineral Society, 55th Annual Gem & Mineral Show, Veterans Hall, 10-5, Peter Sherrill (831) 449-6242, [Petkatmat@aol.com](mailto:Petkatmat@aol.com)

**Mar 9-10, Turlock, CA,** Mother Lode Mineral Society, Stanislaus County Fairgrounds, 10-5, Ted Magee & Bud McMillin, (209) 522-8231 or (209) 527-8000

**Mar 9-10, Vallejo, CA,** Vallejo Gem and Mineral Society, Solano County Bldg. Solano County Fair-grounds, 10-5 both days, Ed Hoffmark (707) 642-8754 E-mail: [vams@ncal.veria.com](mailto:vams@ncal.veria.com)

**March 15-17 Stoddard Wells Tailgate, Victor Valley Gem & Mineral Club,** 26th annual Tailgate, held off Stoddard Wells Road in Apple Valley, Doug Arnold, [oldjasper@earthlink.net](mailto:oldjasper@earthlink.net)

### You're Probably A Practicing Rockhound If ...

You're probably a practicing rockhound if three or more of these signs apply to you... If ten or more apply you are advised to seek professional help immediately!

- The sign on the side of the road says "Falling Rock" and you pull over to wait.
- You accessorize your black & white cat with a collar that you made from the most FABULOUS snowflake obsidian for "dressy" days... then there's the turquoise for "casual" walks, carnelian and leopardskin jasper for "outdoorsy" fun... and don't forget the rose quartz, chrysoprase and blue lace agate for picture day!
- The severe sunburn acquired on your last vacation was a one inch wide strip of skin at the gap between the tail of your shirt and the top of your pants.
- Watching the movie Armageddon while New York is being destroyed, all you can think about is all the great specimens there would be if that really happened.
- Your kids bring you a "pretty stone" they've found, and you contrive to steal it. And you know you've done it. Don't lie.
- You are convinced that buried deep in some secret government archive is a document that will conclusively prove that the entire US Apollo space program was conceived and developed for the sole purpose of getting a moon rock for a certain Presidential rock collection... The truth is out there!
- You care more about what happened to the diamond in the movie "Titanic" than the people.
- You sob uncontrollably watching "How the West was Won" at the part where the farmers are clearing rocks and casting them off.
- You bring a catchers mitt and a hand lens to a rock fight.
- Your son hits his hand with your rock hammer, your wife screams it broken, and you reply it's a fracture, it has good cleavage, and has produced some unusual streaks in your son's underwear.
- You've been found guilty of trespassing on BLM land. The judge sentences you to 10 years' hard labor breaking rocks. You fall to your knees and beg him, "Please, your honor, let it be in Franklin, New Jersey!"
- Your spouse asks how the soup tastes and you reply, "variable color, greasy surface, low specific gravity, texture smooth with bits of ductile material."
- When you lick a dirty rock to show off the wonderful colors, without stopping to realize that you are the only rockhound in the group.
- Someone talks about cleavage and you don't think about women.
- The USGS calls to tell you they've discovered a gravitational anomaly centered on your house and to ask if you might know the reason why.

-----Opal Express Advertisement-----

## **Excellent Retail Opportunity!**

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**Assorted Len Cram  
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**E-Mail –**

**[TomQuiring@earthlink.net](mailto:TomQuiring@earthlink.net)**

- Your family puts the birthday candles on a slab of amethyst instead of cake.
- A truck throws a rock into your windshield and you examine the rock first.
- Considering the purchase of a spectacular specimen at a mineral show, you wonder if all three of your kids really need to attend college.
- You can pronounce the word "molybdenite" correctly on the first try.
- You think the primary function of road cuts is tourist attractions.
- You own more pieces of quartz than underwear.
- You associate the word "hard" with a value on the Mohs scale instead of "work".
- The rockpile in your garage is taller than you are.
- You have a strong opinion as to whether pieces of concrete are properly called "rocks".
- The local university's geology department requests permission to hold field trips in your back yard.
- You associate the name "Franklin" with New Jersey instead of "Ben".
- There's amethyst in your aquarium.
- Your wife has ever had to ask you to move flats of rocks out of the tub so she could take a bath.
- Your spelling checker has a vocabulary that includes the words "polymorph" and "pseudomorph".
- Your children are named Rocky, Jewel, and Beryl.
- You were the only member of the group who spent their time looking at cathedral walls through a pocket magnifier during your trip to Europe.
- They won't give you time off from work to attend the Tucson Gem and Mineral Show and you go anyway.
- You begin fussing because the light strips you installed on your bookshelves aren't full spectrum.
- You've ever purchased an individual, unfaceted rock, regardless of the price.
- You've ever spent more than ten dollars for a book about rocks.
- You shouted "Obsidian!" to a theater full of movie-goers while watching "The Shawshank Redemption".
- The polished slab on your bola tie is six inches in diameter.
- You find yourself compelled to examine individual rocks in driveway gravel.
- The USGS identifies your collection as a major contributing factor to isostasy in your state.
- You know the location of every rock shop within a 100 mile radius of your home.
- When they haven't seen you for a week, the shop owners send you get well cards.
- You're retired and still thinking of adding another room to your house.
- Your idea of a "quiet, romantic evening at home" involves blue mineral tack and thumbnail boxes.
- You're planning on using a pick and shovel while you're on vacation.
- You can point out where Tsumeb is on a world globe.

- You think Franklin, New Jersey might be a cool place to go on a vacation.
- You associate the word "saw" with diamonds instead of "wood".
- You begin wondering what a complete set of the Mineralogical Record is worth.
- When you find out, you actually consider paying it.
- You've fabricated a backpack for your dog.
- You've installed more than one mineralogical database program on your computer.
- The baggage handlers at the airport know you by name and refuse to help with your luggage.
- You receive a letter from the county informing you a landfill permit is required to put anymore rocks on your property.
- Your Internet home page has pictures of your rocks.
- There's a copy of Dana's Manual next to your toilet.
- You still think pet rocks are a pretty neat idea.
- You get excited when you discover a hardware store that stocks 16 pound sledge hammers and 5 foot long pry bars.
- You debate for months on the Internet concerning the relative advantages and drawbacks of vibratory versus drum tumblers.
- Your employer has asked you not to bring any more rocks to the office until they have time to reinforce the floor.
- You decide not to get married because you'd rather keep the rock.

*Thanks to rockhounds Mel Albright, Neil Auty, Richard Busch, Jenny Calloway, Paul Gilmore, John Hammack, Gene Hartstein, Max Hunt, Dan Imel, Tom Isenberg, Mariam Khaljani, Paul Kline, David Kraut, Martin Malahy, Daniel Russell, Mark Sexton, Cliff Vermont, Kelly Watkins, and Dave Watts for their contributions to this list!*

*From Bob's Rockshop at*

*<http://www.rockhounds.com/rockshop/meander.html>*

### **Shady Myrick Museum Update: Winter Report\***

*By John Lightburn*

Well winter is here indeed! The recent snowstorm was brought about by temperatures well into the mid-teens. After several days now, the snow is still on the ground, at least on the north side of the Museum. It was so cold that the water line in the bathroom burst. Fortunately, I was here at the right time to catch it. When the frozen water in the line started to melt the leaks began to appear. One can only imagine what the old prospectors went through back at the turn of the century. By 1916, there were over 1200 residents in Atolia, men, women and children. The vast majority lived on the ground in canvas tents. Those early Atolians had it real good compared to the early pioneers who came through Death Valley in the winter of 1849. Even though it was winter, water was scarce and food so lacking that they literally ate their worn-out shoes. After they had eaten their shoes, they would in turn, kill one of their oxen to keep from starving and maintain the requisite strength to forge ahead. Out of the fresh ox hide, they would make a new pair of shoes. As a result of these hardships, and fewer oxen to pull the wagons, much of what they brought

with them had to be discarded along the trail. And so they went on their way to the gold fields of Northern California.

Tennis anyone: The story on the Atolian tennis court brought many responses to our email box. Two of those emails pointed out a couple of shortcomings in my scholarship. First, Dennis Casbier, a noted desert historian, brought to my attention that he new of at least one tennis court on the Mojave dating back to 1902. Whether that one still exists is a question I need to ask Dennis. Alas, I should have said one of the oldest tennis courts. Thanks again Dennis. Second, and no less important, I heard from my Big Island friend and colleague, Alan Axelrod, who gave me the correct spelling of Bernard Barouch, the famous financier and noted philanthropist. I had incorrectly spelled his name "Barouk". According to Alan, "barouch" means "blessing" in Hebrew. As you may recall, I jokingly mentioned that no doubt someone probably hit a tennis ball over the fence and into a mineshaft. Well, the other day, while on the south side of the tennis court, I noticed something at the base of a large creosote bush. To my surprise, it was an old tennis ball! Now, how old it is purely conjecture at this point. But, looking at its wear and the color tells me that it has been there for sometime. I seriously doubt that much tennis was played in Atolia after Barouch's tenure. One never knows what one may find on the desert, even an old-time tennis ball, perhaps one of the oldest on the desert.

Rocks, rocks and more rocks. While doing my duty surveying off-highway routes on the West Mojave Desert, I had the occasion to do a little rock hunting. And not to my surprise, I found many interesting gemstones. While near Opal Mt., northeast of Barstow, I found many quality specimens of opal. My survey team members Dan and Scotty were eager to join in on this rock-hunting foray. These gem-size stones were mainly the common variety of various hues and colors. Some specimens appeared to my eye to be fire opal and maybe even hyalite opal. In the past precious opal has been found near this location at Scouts Cove. In order to determine the gemstone quality of these specimens they will have to be proven-out by cutting and polishing. On another trip, south of Kramer Junction, my driver (Lost Dave) and I pulled off the highway to wait for technical help to arrive from the base camp. Meanwhile, I took a little walk out to a sandy playa (dry pond) and began to not ice a few pieces of jasper, agate, and chalcedony. Like the opal specimens, these too were gemstone size and very pretty to my eye. I returned several weeks later and picked up 2-3 pounds in twenty minutes. There they were just waiting to be picked up, no digging required. After every rain a new crop appears ready to be raked up and put into your rock bag. Like the opal specimens, the gemstone quality of these nuggets will rest upon my lapidary skills and Mother Nature. There is so much yet to be discovered on this most wonderful Mojave Desert. It will be a most terrible shame if the government closes off all of these access routes to gem fields yet to be discovered.

John Lightburn  
[fmmyrick@earthlink.net](mailto:fmmyrick@earthlink.net)

*\*The Shady Myrick Museum Report has been an on-going report of John Lightburn's effort to establish a rockhounding museum in the Mojave Desert in honor of his great Uncle, Shady Myrick, the famous Mojave Gem Prospector, who is considered the "Father of Rockhounding". - Editor*

*Speaker for Feb. 14 General Meeting*

## **Fred L. Elsuau Gem & Mineral Collector**

*Feature Article*

### **An Opal Lover's Perspective on Fire Agate**

*by Jim Pisani*

As an opal lover, fire agate has always been attractive to me for the same reasons I like opal; the bright, iridescent colors that rival the best opal are beautiful to me. It is, however, more durable than opal, being considerably harder and tougher. It won't easily scratch or crack. It also has a three-dimensional look, something that is rare in opal. A good description that I have heard of it is of honey poured over bubbles. It can also have colors that are as bright and sometimes more beautiful than opal. "Burning coals" is also an analogy used to describe a fire agate. Anyone who has seen white-hot coals in a fire will note the similarity in a top-rated fire agate.

Fire agate is also described in ways that opal is. Terms such as "broad flash" and "pin fire" are used in describing the play of color. "Peacock" is also a term for fire agate that shows four or more colors. Descriptions depart from opal when a "lizard skin" or "raw brains" stone is seen, with colors from green to the sought after blue, which is the most common opal color. Pinfire consists of hundreds of tiny bubbles of color. Broad flash usually occurs on a single bubble and has a directional flash.

It is not well known, even though it is rarer than opal, only occurring in a few spots in North America. Even those who know about do not appreciate it, making it an affordable gemstone for the lapidary hobbyist or collector, or jewelry maker. Fire agate was unknown to most jewelers until after World War II and is still considered a "regional" gemstone. This fact and it being difficult to cut correctly contributes to its unpopularity; the wholesale value of good quality finished fire agate reflects this being only around \$20-\$50 per carat. Compare this to the hundreds to thousands of dollars for a good quality opal, which is much more prevalent.

Fire agate is chalcedony, composed of microscopic layers of microcrystalline quartz. It is formed in cavities or veins almost always within a volcanic basalt matrix and from hot water saturated with dissolved colloidal silica. What makes fire agate different from other agates is an interleaving within the agate layers of coatings of limonite, a form of iron oxide, also in solution. The growth pattern is a botryoidal (grape-like) form, often looking like bubbles crowded together. The "bubbles" can be of various sizes and many layers, where each layer can be thousands of an inch thick. The iron oxide coating is even thinner, causing an interference pattern of visible light between the layers, resulting in colors of gold, green, red and rarely, blue or violet. A similar effect can be seen when looking at the surface of a soap bubble, a film of oil on water, or mother of pearl.

As the fire agate is formed, the availability of the iron oxide in the solution may change, adding the iridescence in some layers and not in others. Often it runs out completely, creating colorless or white chalcedony. The

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combination of iron oxide colored layers and the clear chalcedony produce the typical brown and white colors of rough fire agate.

My research has found Fire Agate in only a few spots in Western North America, and nowhere else in the world as far as I know. Currently, most high quality commercial rough comes from Arizona and Mexico. There are single locations found in California and Idaho.

The sites in the United States are generally only in California and Arizona. There are sites reported in New Mexico and Idaho, but I couldn't find any information on these, other than a cryptic reference on the Internet for Idaho fire agate near Gooding. California has excellent quality fire agate found in the Mule Mountains in an area called Coon Hollow near the Wiley's Well area. It has an active mine called Opal Hill where fee digging is allowed.

Arizona has supposedly 15 locations, but I could only find information on a few. The Oatman area of Northwestern part of the state has two areas. There is also a site 35 mile southeast of Quartzsite in the Little Horn Mountains. The two more famous areas of Arizona is the Deer Creek region in the Galiuros Mountains and the Slaughter Mountain site, entirely located on the San Carlos Indian Reservation and mined only by the tribe. Other areas in Arizona include Saddle Mountain near Phoenix, the Day Ranch between Bowie and Duncan, the Joy Well site, and a site east of the town of Safford. (See the table below for a complete list).

### **Picking Fire Agate Rough**

Though not as popular as opal, fire agate rough is still not cheap and not that easy to find. Shows such as Quartzsite and Tucson are good sources. Ads in Rock & Gem and other gem and mineral magazines can be a source as well as Ebay auctions on the Internet, but caution is required. Fire agate is like opal – it really should be seen with the naked eye before being purchased.

When buying fire agate rough, there are basically two types to buy – uncut rough and windowed rough. Uncut, or rough as it appears as it does right after it is mined, can be sold as a lot or piecemeal. By a lot or parcel will be cheaper than piecemeal, but you may have more waste than by piecemeal. The advantage is piecemeal is that you only buy pieces, by your best estimates, will yield you better stones with less waste. Also, as a hobbyist, you may not find yourself cutting large amount stones, giving the large amount of labor that a proper cut fire agate takes.

When examining rough, make sure you have good, bright light and water to wet the agate. Look for the at least some iridescence somewhere on each piece; lots of fire agate rough may just be dull and brown with no fire. Look at the cross sections of the agate to reveal multiple layers and a flash of fire within one of the layers. Some agates have few layers with fire – this is undesirable; multiple layers that are thick and dark is desirable; examine it against a back light for a dark area. This helps for a couple reasons – many layers gives you a better chance of finding a layer with better color and brilliance. Also, a dark layer acts in a similar manner of brightening the color as does a black opal.

Buying fire agate with a "window" cut in it already to show fire is a more foolproof way of getting better quality rough. Windowed fire agate is rough that has been pre-selected for agates that have fire. Then, the top layers of clear or white chalcedony have been ground off down to

fire layer to expose it, then polished, giving a "window" into the stone. One still has to be careful with windowed agates, examining the stone to make sure that the fire layer is thick enough and consistent. Windowed agate is more expensive than plain rough, but allows you to save time and maybe money by starting with a known winning stone – you hope!

After buying non-windowed rough, one method of finding the planes of fire in each piece can be used for large quantities to save time. With a rock hammer, remove matrix and obvious non-fire layers, then though the agate into a tumbler. Very large pieces should be broken up. Then tumble the rough until it is has a polish. By tumbling, many layers are exposed and smoothed, allowing visibility into the stones for further cutting. Sometimes, an area on a stone can just be trimmed and touched up to have a finished stone. Be easy on the abrasives and duration when tumbling – the object here is to polish the surfaces, not to round out the pieces. Not everyone agrees with this method – more careful cutters may work each piece individually with a trim saw and lapidary wheel.

A special type of fire agate contains inclusions of sagenite. Sprays of needles of sagenite are multicolored and form interesting patterns in the agate. They are highly prized and should be watched for.

### **Buying Finished Fire Agate**

When buying a finished stone, always view it, like opal, in various light conditions. Be aware that the bright spotlights in shops show the color better than normal wearing conditions. Take the stone out of that light; look at it in dim light, sunlight, incandescent light and fluorescent light. Hold it as arms length, or at a distant an observer would see it when it is being worn. If it sings to you in various conditions, you have a winner!

Make sure that the stone is cut botryoidally and not a typical oval and domed cabochon shape which would be considered desirable in opal. It should have a superb polish; fire agate has excellent polishing potential.

Of course, look for the stones that have bright colors and a beautiful and interesting pattern. The color pattern should be well defined and even throughout the stone. Blue, purple and red are considered more desirable, with gold the least. However, like opal, color choice is often a matter of taste and need.

Unlike opal, most fire agate is cut freeform; consider buying a finished piece of jewelry instead of loose stones if you are not inclined to go through the trouble and expense of a custom setting.

### **Cutting Fire Agate**

Be forewarned: fire agate is difficult to work with. Here is where it differs from opal in a significant way. In fact, other than faceting, it is probably the most difficult type cutting that the hobbyist (or professional) will ever work with.

Like with opal, you will need some basic lapidary equipment and some special tools: a trim saw, lapidary wheels, preferably 6 inch diameter or larger, a Dremel or Foredom flexible shaft set, and various shaped diamond bits, preferable sintered bits. Foredom is a much better tool but also much more expensive. I have found that Dremel flexible shaft hand pieces can heat up to the point that you can't hold them.

A note on tools with fire agate: Fire agate is a very hard and tough stone. It can eat up your diamond bits and

ruin your diamond lapidary wheel. Again, make sure you use sintered diamond bits, plenty of water while cutting, and low pressure. Also, the bigger the lapidary wheel, the better. Using a four-inch diameter wheel (like mine) for a lot of cutting is probably not a good idea! When forming the stone to start your precision cutting, cut with a saw as opposed to grinding.

The first step is examining the piece of rough and work out a plan of attack before you start cutting. Establish a plane of fire that you want to work. Carefully grind around sides of the plane, trying to establish the lay of the plane of fire. It may be a single bubble or botryoidal, or multiple bubbles that may have a complex shape. Because of the odd shapes that the fire layer may take, fire agate is usually cut freeform. Special custom jewelry settings are usually made for it, so don't try to envision a calibrated oval as you would with opal. Sometimes it is obvious what the layout of the gem will be and you can then proceed to trim excess, non-needed material such as matrix or the clear chalcedony off the piece. Often, however, it is not obvious exactly how the finished piece will turn out, so don't remove too much material, otherwise you may find yourself in a situation where there isn't enough backing for the stone to be mounted. If you concentrate of facing the stone, as you proceed, it will become obvious as to how to modify the remaining part of the stone.

After you have ground the edges of your stone where you can follow from the sides the fire layers, you can start working on the face of the stone. Cut the fire agate botryoidally. This means to carve along the fire layer's natural shape. These layers are very thin, with thickness around the width of a sheet of paper, and can easily be cut through. Very carefully grind through the clear chalcedony layer with the grinder down to just above the color layer. Then you switch to the Foredom tool with a diamond bit, carefully removing the material, following the layer surface. Be patient – a stone may take hours to cut. Also, always look more that you cut. A stone can be ruined with a heavy hand, spoiling hours of work. Only use the Foredom tool if you have to. Some stones have smooth, gradual botryoidal bubbles that can be cut with a wheel alone, as well as polishing. This is a much easier way to go. However, on other stones, to bring out the fullest color, you have to follow the color through the peaks and valleys of the adjacent bubbles.

Often the color layer you want is below duller layers and you have to cut through them to get to them by examining the sides of the layers. Again, be careful! Sometimes you don't really know what color or how bright the face is until you remove the layer above it. You have to make an educated guess when to stop cutting. Many a good stone has been ruined by grinding a bit too far. As a side note, to see the full effects of color, one has to polish as one cuts, examine what he has, then cut again, removing another layer.

The order of color in the layers, in general (but not always!), is orange, red, or yellow, followed by green, and then purple and blue. A stone does not have to be one color from one layer. You can cross through various layers on purpose to give the stone a beautiful effect. Sometimes, you can get all colors sequenced together a stone.

To put the final polish on fire agate, use wooden tips in your Foredom impregnated with diamond compound with extender of various grits. Grind a wood dowel to the shape and diameter you need and coat it with the grit

you want to use. Start with the coarse grits and move to the fine grits. Keep the wooden dowels of various grits separate and do not allow cross contamination from one grit to another. Wash your hands, the work and the stone area every time you change grits. Otherwise, you may get scratches in you finish polish.

As a substitute, there are pre-made stick-on diamond pads of various grits and diameters available that will fit onto a flat-ended rubber Dremel bit. This makes the job much cleaner but is more expensive and may not fit into the smaller holes on the stone as easily.

After the face of the stone is finished, remove all unneeded bottom material and shape the stone a appealing freeform that fits the bubble pattern. When finishing a stone, one does not round off the edges like one does with opal. The edges should be fairly sharp, with just a very slight corner polish to keep it from being sharp to the touch. The sides of the fire agate should be beveled in, so that they are not seen from viewing directly overhead. Make the bottom flat. Always polish the sides and bottom for a finished, professional look.

### **Fire Agate Gemological Data**

Family: Quartz/Agate group  
Chemical Composition: silicon dioxide (SiO<sub>2</sub>) (same as quartz) with traces of Iron Oxide (limonite)  
Luster: vitreous  
Hardness: 6.5 to 7 on Mohs scale  
Crystal structure: trigonal  
Crystal System: None. Will occur in the botryoidal formation.  
Fracture: conchoidal to granular  
Cleavage: none  
Streak: White  
Specific Gravity: 2.58-2.64  
Refractive Index: 1.53-54  
Birefringence: 0.004  
Heat Sensitive: No  
Wearability: Excellent  
Localities: The arid regions of Mexico and southwestern U.S.A.  
Formation: Hydrothermal environment  
Unusual Properties: Optical illusion of depth and play of color.  
Transparency: Opaque  
Special Identifying Properties and Tests: Optical property generally diagnostic. Should not be confused with opal due to SG and RI. And once you have seen it you will always know it.  
Synthetics & Imitations: None  
Description: Usually a rusty-brownish color, with fire bubbles that are visible after cutting and polishing. The iridescent colors of the fire bubbles are caused by thin layers of iron oxide crystals.

### **Fire Agate Metaphysical Properties**

Healing Properties : A grounding stone that can take the edge off of emotionally charged problems.  
Astrology: Associated with the sign of Aries.  
Chakra: 2nd-Social center.  
Feng Shui: Increases ones energy.  
Legends & Folklore: Fire agate is found only in the American Southwest and Mexico and wasn't brought into commerce until after World War II. Any legends or folklore attached to Fire Agate are unknown.  
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**North America Fire Agate Locations**

<b>Name</b>	<b>County</b>	<b>State</b>	<b>Country</b>	<b>USGS Maps</b>	<b>GPS Coordinates</b>	<b>Comments</b>
Ash Peak Creek		Arizona	USA			Region somewhere in Arizona
Day Ranch	Cochise	Arizona	USA		32 19' 38" N, 109 28' 41" W	The Day Ranch between Bowie and Duncan
Castle Dome	Yuma	Arizona	USA		35 05' 04" N, 114 08' 34" W	Castle Dome Mountains
Opal Hill Fire Agate	Riverside	California	USA	Thumb Peak	33 27' 30" N, 114 52' 30" W	AKA as Coon Hollow, or Mule Mountain Fire Agate. The Wiley Well region of southern California, Southwest of Blythe Fee Digging - Contact Nancy Hill and Howard Fisher, Opal Hill Mine, P.O. Box 497, Palo Verde, CA 92266
Cuesta Fire Agate	Mojave	Arizona	USA	Mount Nutt	N 1/2, sec. 18, T. 19 N., R. 19W.	AKA Oatman or Sitgreaves (Meadow Creek) Pass Fire agate. Send a SASE to Cuesta Mines, 4582 N Sierra Rd., Kingman, AZ 86401. They are near Kingman, AZ north on I-40 South to Oatman, AZ. ds between Oatman and Kingman on old Route 66. About a mile below the peak of the hill.
Deer Creek Fire Agate	Graham	Arizona	USA		32 54' 28" N, 110 27' 55" W (Creek beginning)	Deer Creek Fire Agate Mining Co., Southwestern Arizona This mine has been closed for over 15 years.
Joy Valley Agate	Graham	Arizona	USA	Martin Well	32 28' 18" N, 109 16' 37" W	Near Joy Valley Well
Kofa Fire Agate	Yuma	Arizona	USA	Arch Tank	33 7' 30" N, 114 10' W	Named from Kofa National Wildlife Refuge. Localities are about at McPherson Wash.
Slaughter Mountain Fire Agate, AKA Apache Fire Agate	Graham	Arizona	USA	Ash Creek Northeast	33 23' 00" N, 110 06' 00" W 33 07' 22" N, 109 45' 55" W	Located on the San Carlos Indian Reservation; mining only allowed for tribal members.
Pacheco Fire Agate		Arizona	USA			Region somewhere in Arizona.
Round Mountain Fire Agate	Greenlee	Arizona	USA	Round Mountain	NW 1/4 sec. 29 and NE 1/4, sec. 30, T. 10 S., R. 32 E.,	
Saddle Mountain Fire Agate	Maricopa	Arizona	USA	Saddle Mountain	Sections 11, 12, 13, 14, 23, T. 1 N., R. 8 W.	Near Phoenix.
Safford Fire Agate	Graham, Greenlee	Arizona	USA	Tollgate Tank, Ash Peak	SE 1/4 sec. 32 and SW 1/4 sec. 33, T. 6 S., R. 29 E., C, N 1/2, sec. 12, T 7 S., R. 29 E	20 miles east of Safford. Access: Drive east of Safford for 10 miles along US Highway 70, then take US Highway 191 north to a point just beyond milepost 141. You will see the entry sign on the left. Follow the dirt entry road for 2 miles to the sign at the center of the rockhound area.
Sheep Wash Fire Agate	Greenlee	Arizona	USA		33 17' 06" N, 105 29' 54" W,	Near the Apache National Forest.
Ward Canyon Fire Agate	Cochise, Greenlee	Arizona	USA	Chiricahua Peak, Doubtful Canyon, and Clifton	31 51' 50" N to 33 02' 55" N, 109 07' 24"W to 109 20' 18"W	
Gooding Fire Agate	Gooding	Idaho	USA		See Comments	In Idaho, drive north out of Gooding on state highway 46 about 18 miles to the "Little City of Rocks." Turn onto the dirt road that goes behind the "Little City of Rocks." Drive about 10 miles to a cattle watering trough. At the watering trough turn right and go to the top of the hill, about 1 mile.
Hidalgo Del Parral		Chihuahua	Mexico			High altitudes of Sierra Madre.
Calvillo		Aguascalientes	Mexico			Famous location for fire agate mines.
Tula Hill, Vilella		San Luis Potosi	Mexico			"Tula Hill" is the name applied by American collectors for this area.

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