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

Volume #37 Issue #5
May 2004

Some Topics In This Issue:

TO:

Important Info:

Board Meeting
May 10th

General Meeting
May 13th
Speaker: To Be Announced

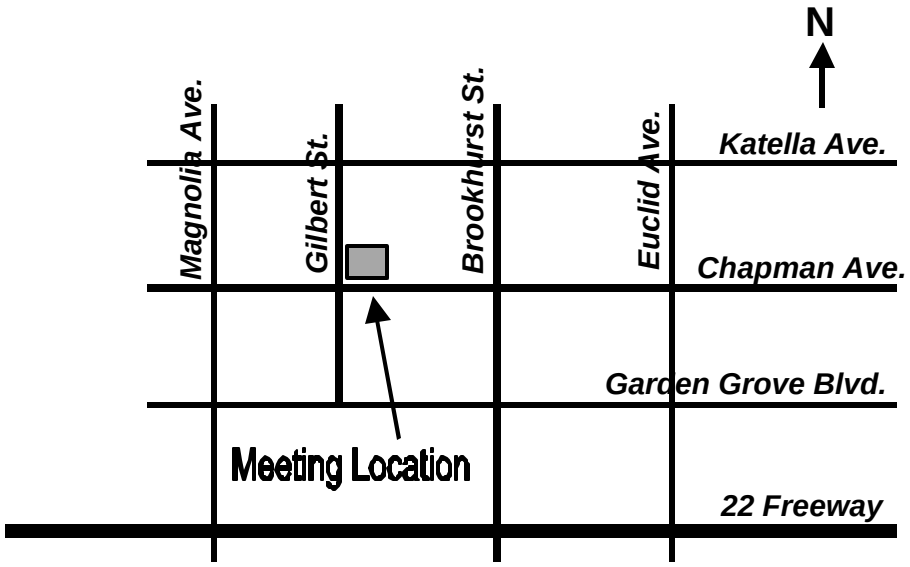
Field Trip: Walker Jr. High Rock Pile – May 15th

— 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

May 13th - General Meeting
May 15th - Field Trip: Walker Jr. High



The American Opal Society
http://opalsociety.org

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Please address all inquiries and exchange newsletters to:

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Email: webmaster@opalsociety.org
Article Deadline is the 20th of the month prior to each issue

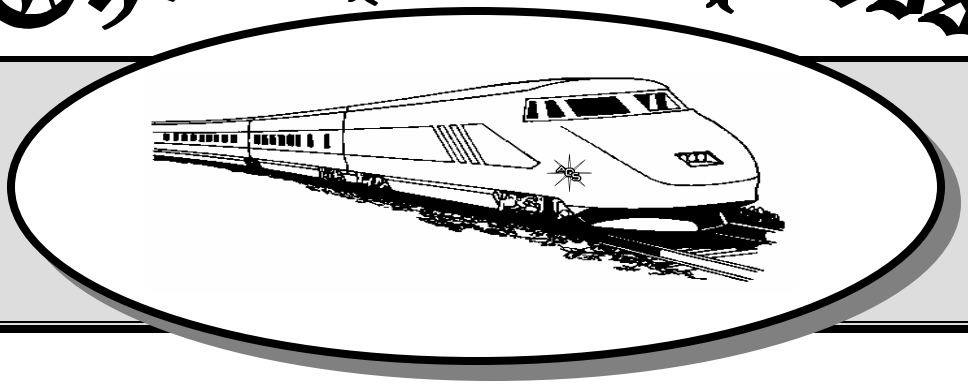
Are Your Dues Due Now?

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

A Renewal Grace Period of two months will be provided. If your dues are due now you will receive two additional issues of the newsletter. Please note, however, that as the system is now set up, if your renewal is not received you will be AUTOMATICALLY dropped from membership thereafter. It is your responsibility to assure your dues are current.

Thank you,
The Editor

The Opal Express



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President's Message

By Pete Goetz

Hi Folks,

Once again we are going to tackle the **ROCK PILE** at **Walker Jr High School. May 15th, 8AM** be there or be square. This will probably be our last chance to obtain some excellent cutting material for the outrageous price of FREE. If you don't want pick rocks, come on down and chat awhile.

Summer is near. If you and yours have already planned your vacation and you are in the area, plan on coming by a general meeting. Lots of good conversation and friendship available. If you need a last minute suggestion, why not plan a trip to Garden Grove, for the sole purpose of coming to a general meeting. Main topic is OPAL, so be for warned. How can lose (or is it loose)?

The American Opal Society display case was on display last weekend at the Searchers annual show. Looked pretty good. The temperature played a little havoc with our signing program however, but we have a fix for that.

Show preparations seem to be going well. Jay and Fran are doing a stellar job getting things read. Not much to say this month, things are kind of quiet... More later.

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Last Month's Speaker: Bill Burns on Virgin Valley

Bill Burns, member of the Whittier Gem & Mineral Society, gave a great talk and slide show on Virgin Valley opal, its history, his mining experience there over the last 40 years, and other opal stories. Bill also showed his excellent opal collection with many one of a kind opals.

Bill talked about his experiences at the early days at the Bonanza mine and some of the great finds he had. He also mentioned the Roebling Opal in the Smithsonian institute, one of best opals ever found. Bill brought up the fact that Mrs. Lockheed, the mother of the Lockheed brothers who founded the aircraft company, was a regular opal digger in the valley and loved it so much that she actually lived in a mine tunnel in the Valley for months at a time.

Bill stated that most Virgin Valley opal was unstable, being of high water content. This means that it would crack of craze when allowed to dry out. Though claims have been made, no treatment actually worked to prevent the crazing.

The American Opal Society wants to thank Bill for a wonderful talk and presentation.

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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 type: **Name:** "*member*" and **Password:** "*lambina".*

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Field Trip: May 15th - Walker Jr High Rock Pile

The American Opal Society is announcing a Southern California field trip this March 15th at 8:00 AM (Saturday). This filed trip will again be at the Rock Pile of Walker Junior High School. The pile measures approximately 25 feet long, by 4 feet wide by 3 feet deep. This rock pile was accumulated in the last 30 years by Dr. Walt Johnson to be used as raw material for the classes he taught on the lapidary arts.

50% of the pile is still there, after our first trip and two other clubs on visiting it. There is still a LOT of good stuff left, especially on the bottom. At our last trip, we Dr. Johnson identified dozens of different types of gem & minerals. So far, at least 5 rubies have been found and there are rumors that rough diamonds are there. The school is not responsible for any injuries that occur, nor is the Opal Society. Bring 5-gallon buckets, hat, first aid kit, gloves, screen, spray bottle, and a shovel. If you plan on attending, please reserve a spot. Contact Pete Goetz, at (714) 530-3530 (leave a message), or e-mailing at mgoetz2@socal.rr.com.

Walker Junior High School is located at 8132 Walker St., La Palma, CA. To get there from South Orange County, go North on Walker St. (see map) from Lincoln Ave. about 2 miles. Walker Jr. High will be on the right hand side of the street (East side). There is a driveway that extends through a chain wire gate (it will be open) on the right hand (South) side of the school. Take that driveway and follow it to the back of the school and parking lot. The workshop is in the back. School personnel will let us in the locked courtyard for access to the rock pile.

Lets Talk Gemstones – Opal: Part 2

By Edna B. Anthony, Gemologist
P.O.# 62653; Colorado Springs, CO. 80962

The first article on opal *(see Opal Express 04-2004 or http://www.ganoksin.com/borisat/nenam/opal.htm)* described the definitions and provided explanations of the terms and the vocabulary peculiar to this gem species. Australia now stands as the world's major source of opal.

Early in 1997, Fred Ward's fascinating work on this subject was published. For everyone, especially the lay person interested in opal, Fred Ward's book is indispensable. He gives us a guided tour of the opal mines and introduces us to some of the extraordinary people involved in the unique methods of production. He also relates the unusual marketing practices of this beautiful gem. Fred weaves technical information and geological terms into the prose with consummate skill, and he illustrates with such clarity that one is hardly aware of having grasped sophisticated concepts. AND THE PHOTOGRAPHY IS SUPERB!

More than half of the eastern sector of Australia lay under the waters of the Great Artesian Basin during the Jurassic and the Cretaeceous Periods. As the sediments accumulated, many layers of sandstone, shales, and limestone were deposited. After the recession of the sea, the vast area became a desert. Tiny spheres of silica from saturated solutions seeping through these weathering deposits precipitated into cavities, sometimes replacing shell, wood, and bone. A regular alignment of these spheres, having a uniform size and shape caused by the constant slow rate of deposition and evaporation, produced precious opal. A variation in the size, shape, or alignment of these spheres resulted in the formation of common opal.

Australia's most famous opal mines lie on the periphery of this Great Artesian Basin. Mintabie, Coober Pedy, Andamooka, White Cliffs, and Lightning Ridge form an arc along its southern edge. Yowah, Quilpie, and Opalton project on a line north/northwest from Lightning Ridge. Some believe that untold riches, just waiting discovery, lie beneath the unexplored areas of this vast region. However, Dr. Joel Arem, (in the context that "worldwide demand is putting tremendous pressure on opal prices") states in his COLOR ENCYCLOPEDIA OF GEMSTONES that "opal deposits have been worked so intensely that they are becoming depleted" and that "new discoveries are rare."

Mintabie, not as well known as other mines, is unique for its good quality light, dark, and black opal. Sometimes, all of these colors are found together in the same pocket. About twenty percent of the production from Mintabie is black opal. Opal that is free of its matrix-sandstone is also recovered from there.

Some underground mining for opal does take place. However, the random distribution of opal material to a depth of 100 feet in hard sandstone dictates the exploration of an entire claim. Open cut or strip mining is the method used most frequently. Since restoration of "Precious Stone Fields" is not required by the Australian government, miners are free to walk away from the devastated land. Such shredded earth from exhausted claims has created a surreal moonscape on the abandoned area.

Horizontal seams of light opal, as well as some crystal opal, deposited in the soft clays of Coober Pedy make extraction by tunnel machines economically feasible. Blowers bring the material to the surface for further processing and sorting.

Coober Pedy was exploited in the 1960s by an American, George Manning. He had large quantities of light-colored opal material cut into calibrated cabochons in Hong Kong, then shipped them to eager buyers in America. Until recently, his was the opal most familiar to Americans.

Harsh conditions prevail at most opal mines. Some of the residents have constructed luxurious homes underground, especially at Coober Pedy, to make life more comfortable in these isolated sites. Tourism is now a secondary economic factor at Coober Pedy. Its residents enjoy urban amenities in a number of buildings erected above ground.

Andamooka remains a typical dusty "wild west" desert town. It was the world's largest producer of light-colored opal until the mid 1980s. Tunneling was the desired method of production during its most active period. Its famous vitreous transparent crystal opal is rivaled in beauty only by the more unstable variety found in Virgin Valley, Nevada.

The crystal opal produced in Oregon and Idaho, though of gem quality, is not comparable. The opal mined at Andamooka is considered by some to be the most stable in the world, because of its very low water content. Unique Andamooka opal matrix is often "smoked" or "sugar treated" to resemble black opal. The porous matrix absorbs sufficient carbon released by the processes to both darken its body tone and enhance its play of color.

Fred Ward describes this type of opal as having "a black peppery appearance with a speckled play of color." This particular characteristic, along with its lighter weight, distinguishes this opal from black opal.

White Cliffs is the only place where the marvelous and very rare psuedomorphic "pineapple" opal has been found. The pineapple opal formed when a mineral crystal of a specie, now believed to have been ikalite rather than glauberite, was first replaced by calcite and then by opal. Despite their rarity, most pineapple opals have been destroyed by gem cutters, who were able to profit more from the opals cut from the pseudomorphs than from having the single pineapple opal specimen.

In his book The Story Of Gems, Herbert P. Whitlock, a former curator of Minerals and Gems of the American Museum of Natural History likens the light opal produced at White Cliffs to that found in Hungary, but with "broader flashes of color" and in "masses capable of furnishing larger stones." This text is in direct contrast to the statement by Dr. Joel Arem in Color Encyclopedia Of Gemstones that "the opal is usually small, with veinlets of precious opal within common opal."

Lightning Ridge, a "free-wheeling" town of about fifteen

thousand people, now stands as the major source of the world's finest black opal. Here, the black opal is recovered from seams often more than forty feet below the surface. Heavy equipment is lowered through shafts, assembled below ground, and then used to work the seams in a fraction of the time it took to mine a claim with hand digging. The material is raised to the surface and washed in "co-op" agitators. This method permits faster and more economical sorting and allows easier identification of promising opal material.

Lightning Ridge maintains its own cutting center to retain control of the gems and maximize profits. Buyers deal with individual owners, who sell most of the best gems to customers from Japan and Asia. Sadly, less than eight percent of the finest opal reaches the United States.

Northwest of Lightning Ridge stand the ironstone formations of Queensland, the source of the brilliant boulder opals. These rock formations extend from and include the areas of Yowah, Quilpie and Opalton. A small area around Yowah yields the unique and very rare opal in matrix known as Yowah nuts. These expensive specimens are usually available to collectors only at gem shows and through auctions.

The Yowah nuts were once hollow ironstone concretions about the size of a walnut, and sometimes these contained brilliant opal cores. Some lie on or near the surface of the surrounding sandstone, but miners often use scraping equipment to expose the concretions. They may retain the name Yowah nuts only if a sizeable recognizable portion of the shell remains. If only a small portion of the shell is present, then they are properly called boulder opal. Complete removal of the shell changes the classification to solid opal. At Quilpie and Opalton, sandstone opal, which forms unattached to matrix and seams of boulder opal, lie within the surrounding sandstone.

When the opal is distributed throughout the ironstone matrix in a form not suitable for recovery, the material is often used for unusual decorator objects. It wasn't until the 1960s that heavy equipment and saws capable of handling the tough ironstone made extensive commercial development in the fields feasible. In the last few years, boulder opal has become well known and appreciated by gem enthusiasts all over the world. Its toughness, the brilliant colors, and a freeform style make it especially appealing to designers of unique fine jewelry. Opal mining in Australia is probably the least regulated major industry in the world. For the most part, it is a rough and tumble, cash and carry, cards close to your vest, buyer beware, and a "you'd better know your opals" business!

While Australia overshadows all other countries in the production of most varieties of opal, Mexico produces fire opal that exhibits a special "it" quality almost always referred to as Mexican fire opal. This gem can show a play of color, but it is the body that color makes it so distinctive. The state of Queretaro is the major source today of Mexican opal.

Fire opal is found in the cavities of volcanic lava flows in Central and South America, as well as in Idaho, Oregon, and Nevada in the United States. Hand dug pits in Mexico still dominate the method of production there. It is a relativity inexpensive gemstone, and one that can have special faults. Opal formed in volcanic environments often crazes and cracks more frequently than that found in sedimentary deposits. The opal can also fade. Rhyolite spheres called "thunder eggs" sometimes contain such opal. It is interesting to note that much of the Mexican opal will craze within a period of less than an hour, although sometimes many months pass before crazing occurs.

Two new varieties have been recovered in Mexico recently. Opal deposited in rhyolite matrix, cut to retain some of its red, tan, pink, and cream-colored matrix, can superficially resemble Australian boulder opal. The new Leopard opal made its appearance at the gem and mineral show in Tucson in 1996. It is recovered from vesicular basalt formations, where the vesicules were filled with light-colored opal. The play of color spots do remind one of a leopard skin.

A lovely blue translucent common opal called Andean or Peruvian opal is found in the Andes mountains near San Patricio, Peru. Copper may be the essential trace element that causes its soft distinctive color. It has been used by native South Americans for more than a thousand years. Recent commercial production is making more of this inexpensive material available to carvers and jewelry designers at mineral, gem, and jewelry shows. Sometimes, this aqua blue opal can dry out and lose its clarity.

There are many other lesser known sources of opal. Honduras produces a light-colored opal in a dark reddish to black matrix. Prase opal, colored by nickel, is found in Poland. Much of the Indonesian opal material resembles the water or jelly opal found in Mexico.

No two opals are ever identical. Opal is generally a soft and fragile gemstone that requires proper care to preserve its great beauty. Before purchasing any expensive gemstone, become familiar with all the proper methods of setting and caring for such a gem. This is especially true of the unique and very beautiful opal.

The purpose of the New Mexico Faceters Guild (NMFG) is to bring together persons who are interested in faceting or faceted stones. We promote the art and science of faceting and provide a means of education and improvement in faceting skills. Finally, we provide a means of communication between those persons involved or interested in faceting as a hobby.

Meeting Dates: Second Thursday of odd numbered months
Time: 7:00 PM
Place: New Mexico Museum of Natural History
1801 Mountain Road NW ,Albuquerque, NM USA

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Cow Who Laid Diamond Eggs

ANI[FRIDAY, JANUARY 30, 2004 07:06:22 PM]

LIMBDI (Gujarat): It's not quite the goose that laid the golden egg, but an Indian diamond merchant's prized cow is dropping bejeweled dung .

Gohil with his cow

Mohabat Sinh Gohil accidently dropped a bag containing more than 1,700 small diamonds, worth almost $900, in a pile of hay while talking to a friend, when a hungry cow gobbled it up.

"I had gone somewhere with the packet of diamonds. It fell from my hands and one of the four cows who were around that time swallowed my diamonds. I caught hold of all of them and when came to know the right cow, I started collecting its dung," said Gohil.

Now, Gohil is feeding the animal a rich diet of grass, grain, fruit and laxatives and has so far recovered 300 diamonds.

Gohil collects the cow's dung everyday to retrieve his lost diamonds.

"I am sure that slowly I will be able to recover all my diamonds. I am feeding a good diet to the cow. I have also

consulted the doctor. But I know it will take some time," said Gohil.

Diamonds are dear to Gohil but he cannot get the cow operated upon as Hindu religious beliefs do not permit it.

From the Times of India,
http://timesofindia.indiatimes.com/articleshow/455350.cms .

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Opal Mosaic Triplets

If you have some small opal chips with nice fire, too small to make a cab, make them into opal mosaic triplicates.

Grind the opal chips about 1/16-inch thick. Trim and smooth the edges, making sure to remove all the matrix. The backing may be obsidian or any dark material. ** Prepare the background by sanding flat on one side. DO NOT POLISH. Do the same with a piece of clear quartz 3/32-inch thick.

On the sticky side of a piece of masking tape, mark the size and pattern you want to make. Then place the opal chips, best side down, so they will stick and cover the design, leaving a fine space between each piece. Let the edges of the opal chips overlay the design where necessary.

Next, mix epoxy cement with a little lamp black and rub it on the opal and between the spaces with a toothpick. Rub additional epoxy on the backing piece, press the two together, and leave overnight.

After the piece has set, peel off the tape and sand the surface lightly. Wash both opal surface and quartz surface to be bonded with alcohol. Mix clear epoxy and rub it on both the opal and quartz in a thin film. Press together. Let set for 24 hours. Shape and cab the piece, making sure when you cut your cab that the bezel will cover the edges of the opal.

** Ed. Note: Old broken 78 phonograph records are good because they are grooved and the epoxy will stick well to them.

From The Agatizer 8/89 via the Rock Collector 1/03

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Lightning Ridge Opal Festival
July 29 to August 1, 2004

The famous outback-mining town of Lightning Ridge will celebrate its culture and character with its annual Festival on Thursday, 29 July to Sunday, 1 August 2004.

Located on the edge of Australia's famous outback, Lightning Ridge is internationally renowned for producing the world's best black opal and the country's national gemstone.

You can see some of the world's best opal and jewellery at the Opal Trade Show and pick up great bargains at the Opal & Gem Expo with a great range of products including:

- Opals, gems, jewellery, and beads;
- Tools, machinery and lapidary supplies; and
- Arts, craft, souvenirs, fashion and novelty items.

Fossickers can try their hand at finding their own gems with the Miners Challenge.

For details call Angela Myers at 0407 455 413 (Australia), or e-mail her at ajm4@bigpond.com .

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Shop and Field Trip Hints

Firescale Inhibitor

Firescale is cupric oxide formed during soldering when the copper in sterling silver combines with oxygen in the atmosphere. To make firescale inhibitor, use boric acid (granular) and denatured alcohol. Add boric acid to alcohol until it stops dissolving and makes a tin paste. Place mixture into a large-mouth glass jar with a tight cap. To apply to work, shake and stir mixture. Then dip work into mixture with tongs or tweezers. After coating the work with the mixture, move work to soldering screen. Be careful not to remove any of the mixture from the work. Use your torch to ignite the alcohol in the mixture. After burning for a few seconds, the flame will go out and the work will be coated with dry boric acid. This will seal the work from oxygen and thus prevent firescale.

From The Pegmatite 6/2001, original source unknown.

Finding Lost Stones

Did you drop a small stone on the carpet? Can't find it? Place a nylon stocking over the vacuum hose. The stone will adhere to the nylon without going up the hose. If you drop a stone on a hard floor, get down on your knees with a flashlight and shine the light across the floor, rather than down. The beam should pick up a sparkle or shine.

From Chats & Chips via The Pegmatite 6/2002.

Lapidary Treatment of Opalized Woods

Opalized wood is usually very brittle and it is more heat sensitive than most other types of petrified wood. As with any other type of cutting rock, examine it carefully to get the best possible coloring, grain, and "pictures". Pictures and/or scenic effects are not very common in opalized woods. Any rockhound coming into possession of such a piece is very fortunate and should take very special care to get the best possible orientation for a picture or scene, whether it is cut cross-grain or lengthwise.

Opalized wood saws very easily, but since it is more brittle than other woods, greater care must be taken in clamping it in the saw vise. Too much pressure will cause it to crack or a piece may break off while sawing and damage the saw blade.

This article was first printed in the 1960's, so instructions call for silicon carbide wheels. Mr. Reese said to remove saw marks on a drum sander (expandable drum) with 120-grain grit or on a horizontal lap. That advice is still good, but most of us now have diamond wheels that do not become uneven and cause chipping or crack the specimen. Do not use any pressure when grinding or sanding. Any heat build-up can crack opalized wood.

In making a cab, trim it with a trim saw (no pliers) then form and shape with your diamond wheels, using gentle pressure only.

From The Rockhound Gazette via The Pegmatite 6/2001.

Polishing Dinosaur Bone

Dinosaur bone is handled much like agate: sanded to 600 grit on silicone carbide and polished on hard felt with tin oxide. The stone is then finished with black rouge on a muslin buff. The

muslin buff can clean out the tin oxide that remains between the bone cells, and the black rouge applies a stain to the tin oxide that remains behind.
From Pick 'N' Shovel via The Agatizer 11/2000.

Making Goldstone

In 1550, after years of effort and failure, chemists in a Northern Italian monastery happened to make a beautiful sparkling material with golden stars. They named it "goldstone".

Goldstone is essentially glass with inclusions of crystallized copper filings. The production has been a secret for centuries. Many have tried but no one has been able to duplicate it. The Monks called it "adventuring stone" since it is impossible to foretell the success of the mixture for many weeks. Due to a lack of modern production methods, a batch of material could be unsuccessful because of the uncertainty of the heating and cooling process.

A blue goldstone, called "Blue Magic", has been developed from the same process. There is also a green goldstone made with a slightly different process but with the same sparkling effect. The latest variation is a black "Midnight Stone". Goldstone will not discolor, fare, or lose its beauty.
From The Agatizer 11/2000 original source lost., from the Tektite, 2/02
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Coloring Agate Slices - Historical German Method

By Hale Sweeny

Back in 1913, Dr. O. Dreher, who worked at Idar in agate cutting, published a small paper on how agate slices were colored by them. This was astounding, as the methods were considered a trade secret at that center. Most of the early papers in English were based on translations of that paper.

I am presenting it for historical and general interest to the lapidary community. I beg you not to try his methods, as they are without the safeguards we would employ today, and use crude and unrefined chemicals. It is being printed solely for historical interest (and as there were so few postings from the members, today).

Preface

There will surely be much disapproval, from the gem-cutting industry, through the publication of this paper. While some of the techniques given here may not be generally known, it is understood that the general principles are not a secret to those outside the industry. Further, one can not learn in the coloring of agates and other stones merely by reading a paper; practice plays an important part in gaining results.

An apprentice in the agate-cutting industry is often taught only the cutting and polishing, while the "secrets" of coloring as practiced by his master will be guarded from the student. The young cutter busies himself with experiments in new methods, and often introduces an improved technique. Therefore, I believe it would be of value to the industry in general if the apprentice cutter was fully informed on the standard means of coloring and beat treatment of ornamental stones.

This brief pamphlet is not intended as a complete text on stone coloring. It will only give some principles on which the beginner can go. The use of many local expressions I consider desirable. Valuable instructions were given me by my father, likewise by August Dreher and Gustave Zang; my thanks to them at this point.

Introduction

The coloring of agates depends on the introduction of a coloring matter into their pores. Some layers of agate are less porous and therefore these will not absorb pigments but remain wholly uncolored or only partially colored. The cutter calls the less porous layers in the agate 'hard'. The layers or bands readily colored are termed 'soft'. The skilled artisan can often judge the ability of an agate to absorb pigments, prior to the treatment. The art of coloring agates and similar stones has been known to us for only a relatively short time. Long ago the Romans had learned the secret of black colors but they kept this secret for centuries. Finally in 1819 this old Roman technique was discovered by accident.

Lessons From Nature

Along about 1813 some German cutters observed agates in the field, presumably colored by the action of sunlight. Agates which projected from the earth were often colored a carnelian or sard (reddish), while the remainder of the stone beneath would be entirely colorless. This led to the practice of "burning" colorless agates to produce the reddish colors.

Not all colorless agates will become reddish when given the heat treatment of "burning." It is thought that the agates which fail to respond are those lacking in iron compounds, present as an impurity. This was finally solved by soaking the agate in a soluble iron salt and then "burning" by oven treatment. In 1845 the method of blue coloring was discovered and in 1853 green colorings were introduced, all the result of experiment by the lapidarist.

Different Methods

The manner in which the coloring pigment is introduced into the agate varies according to the color desired. In all cases where a permanent color is attained, the coloring matter is not introduced in a dissolved form directly, but by the use of various chemical reactions; these take place within the agate.

In general there are two methods of coloring an agate. In one case the soluble metallic salt is permitted to soak into the pores of the agate. This soluble salt in turn is changed to a colored insoluble oxide by heating. In the other method, two solutions or 'baths' are used in succession, the second bath causing a colored precipitate of an insoluble metallic salt to be deposited within the agate.

The following will serve to illustrate how some of the colors can be obtained in an agate:

- Red: Soaking stone in iron nitrate solution and then by burning", an iron oxide is produced.
- Bluish Green: Soaking in solution of chromic acid or ammonium bichromate, and heating to produce a chrome oxide.
- Apple Green: Soak in nickel nitrate and "burn" to produce a nickel oxide.
- Brown: Soak in a sugar solution and heat strongly to carbonize sugar to caramel.
- Blue: Soak in bath of yellow prussiate of potassium and then in a solution of iron sulfate to precipitate "Berlin blue."
- Blue: Soak in solution of red prussiate of potassium and then in solution of iron sulfate to precipitate "Turn-bull blue" in agate.
- Black: Soak in sugar solution and then in sulfuric acid, to change sugar to carbon.
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For completeness it may be mentioned that aniline dyes have been used to some extent in the artificial coloring of agates. The aniline colors, however, are not as permanent as the metallic oxides and precipitates described above. Aniline tends to fade when exposed to strong light.

Extraction

Before the agate is colored it must be cleaned of all oil and impurities which may be adhering to or soaked into the stone. In the cutting of agates, oil or kerosene is used to lubricate the saws, and this must be first "extracted." The petroleum substances can be removed by boiling in a strong solution of sodium bicarbonate, or solvents like gasoline or some non-inflammable commercial cleaning fluid can be used "cold."

The agate may carry a small amount of iron and it is desired to remove this prior to "burning" for green colors, otherwise a dull or muddy green may be obtained. To remove iron compounds the stone is placed in warm nitric acid for two or three days and then placed in warm water for several days. The purpose of the nitric acid is to render any iron present soluble, so the water soaking may remove same. The warm water bath should be changed a number of times.

Important Colors - Red

The knowledge of obtaining carnelian and sard (reddish) colors in agate by "dry burning" was first discovered in 1813, but the "bath" method of obtaining the red shades came later, and at uncertain date.

(ASIDE: At this point, Dr. Dreher describes how they made a solution of iron nitrate by using about half a pound of iron nails and about a quart of nitric acid. Today we can buy refined iron nitrate salt and dissolve this in water, for use as described below.)

Red

To produce red colors the agate is soaked in a strong solution of iron nitrate. According to the directions of the old German agate cutters, this solution should be as thin as Munich beer. The aqueous solution of iron nitrate should be kept warm and the agate submerged for from one to four weeks according to the thickness of the stone. Stones three millimeters thick: for about a week; six millimeters: about three weeks and ten millimeter stones: about four weeks. Stones thicker than ten millimeters will seldom color throughout. (A millimeter is 1/25 of an inch.) This means that seldom will the color penetrate into an agate deeper than about five millimeters, or about 1/5 of an inch. Let it be understood at this point that all coloring is done after the stone or slab is completely cut and polished, otherwise grinding would expose the uncolored material below.

Drying Agate

After the agate has been soaked in the above solution for the desired time, it should first be carefully dried in a warm oven for from two to ten days. This is to remove as much free moisture as possible prior to the "burning" to avoid possible fracturing.

Burning

The agate is removed from the oven and while still warm is placed in a crucible. The agates can be best packed in some substance like fibrous asbestos or powdered magnesium oxide, and the crucible covered (an iron crucible will do nicely). The heat in the oven is raised very slowly, until the crucible has reached a red heat. It is then allowed to cool very slowly. This is best carried out by reducing the flame or heat gradually. The agate must not be removed from the crucible until the contents are completely cooled. It is possible that some stones may not have the desired color. In this case the soaking in the iron nitrate solution and the oven "burning" can be repeated one or more times as desired.

Green

Green colors can be produced in a number of ways. Two "baths" in common employ saturated or strong solutions of chromic acid or potassium bichromate. The solution of chromic acid seems to be preferred, though the bichromate salt is cheaper. The stone is placed in the chromic acid solution for from eight to fourteen days, according to the thickness and the "hardness" of the agate. Stones or slabs over ten millimeters in thickness should remain in the bath for a longer time six to eight weeks. The stones are then removed from the bath and placed in a warm closed container with lumps of ammonium carbonate, for at least two weeks. The purpose here is to have the ammonia gas penetrate the agate and cause a bright green precipitate of a chromate salt. (Liquid ammonia solution would possibly bleach out some of the soluble chromic acid or bichromate). After the agate is removed from the ammonia gas chamber it is dried and then gradually strongly heated in a crucible and oven as described under red coloring.

As water evaporates from the warm solution additional water can be added. The agate is removed from the sugar solution and without washing is placed in sulfuric acid. Green colors often do not come up to expectations. A muddy green or bluish-green may be noted. Experiments will often solve the problem in various kinds of agate. Of the best methods so far as I know them, I dare not say anything, since they should yet remain secret.

Black - Carbon

Black coloring was first known to the Idar cutters in 1819, and was discovered in an accidental manner. The agate is first soaked in a solution of ordinary sugar, 375 grams to one liter of water, or about as thick as flowing honey. The earlier cutters employed diluted honey, hence this solution is often called the honey bath. While the agate is in the sugar solution the vessels should be kept warm, as this seems to promote penetration. The stone is kept submerged for from one week to three weeks, according to thickness, "hardness," and depth of color desired. As water evaporates from the warm solution additional water can be added. The agate is removed from the sugar solution and without washing is placed in sulfuric acid. The acid is slowly warmed and then brought to a boiling or near the boiling point for about fifteen minutes. The vessel should be covered and care should be exercised to avoid the hot acid from spattering in the eyes, skin or clothing. A large vessel is best and a hot plate where the heat can be controlled is excellent. The agate is permitted to cool with the acid for a few hours.

After the sulfuric acid treatment, a stone may tend to "sweat," due to a small amount of acid remaining in the pores of the agate. This can be eliminated by soaking the agate in warm water for several hours of longer.

Blue

Blue coloring was first used at Idar in 1845. Two shades of blue can be had, by the use of yellow prussiate of potassium or by the use of the red prussiate of potassium (ferrocyanides of

potassium). Dissolve 250 grams of one of (WARNING - poisonous) in one liter of water. The agate is soaked in this solution for from one week to two weeks. This bath should be kept warm, not too hot and should not be boiled. The agate is then soaked in a solution of iron vitriol (iron sulfate) for from four to eight days according to the depth of color desired. No "burning" is needed in this method.

A darker blue color will be had if the iron sulfate solution is acidified with a few drops of sulfuric and nitric acid. While the agate is in the iron sulfate solution it can be examined from time to time, and removed when the desired color is noted. The solutions used in agate coloring can be used repeatedly, by adding water to replace evaporation and small amounts of the salts as the liquid becomes weakened.

Cautions

Some of the chemicals employed in agate coloring are poisonous or corrosive and should be used with due caution. In the use of the prussiate of potassium solutions, small amounts of cyanide gas may be generated and care should be used in the inhalation of these fumes. This can be best used in a chemical laboratory under a hood, or outdoors where the fumes can not reach a possibly dangerous concentration. Much of the agate dyeing in Germany is done in the homes of the cutters; the kitchen of the Idar, Germany, agate cutter is often lined with various vessels where stones are receiving their beauty baths.

From the LAPIDARY DIGEST - Administered by Hale Sweeny (hale2@mindspring.com), Lap Digest Issue No. 130 - 3/31/95

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Finishing Cabs

Here is a great thread from The Lapidary List, posted October 21-26, 2002. It has some great info on how to finish a cab back, something opal cutters may be interested in.

From: Jim Perkins jperkins@ohio.net

Hi All, I really never gave it a lot of thought but, I think you folks have hit on a very interesting topic. I know a man in Ohio who produced custom shaped cabs commercially for years. He told me he roughed them out and tossed them in a vibrating tumbler to finish and polish them up. His work was beautiful by anyone's standards and he got a good price for his work also. I've been thinking of playing around with tumble finishing cabs but haven't as yet. Just a couple here and there. Most I do start to finish on the Genie. I have always done calibrated standard sizes but am starting to work more free form and original designs as that is much more fun after 40 years. I don't think just any free form is good but if done carefully and well executed can be very impressive. I'm also getting interested in some carving techniques in cabbing to give them more dimensional bas-relief. I was just wondering if I'm slow to pick up on these ideas? Are the rest of you already doing these techniques? I find this very interesting. Best Regards, Jim Perkins

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From: Jim jsmall47@earthlink.net

Jim-

The single biggest problem with doing tumble finishing of cabs is the hardness issue. It works fine for homogenous materials like hard agate and hard jasper, but any material with differential hardnesses flunks the process. (even hard stone gets a strange feature - most tumble finished cabs have a dimple in the middle of the back) I suppose if you did everything except the final polish by wheel you might get away with it, but I never tried that route. Carved cabs can be tumble finished, but there you will lose some of the fine detail; depends on how much you want in that direction on whether or not tumbling will work. Some of the most expensive roughs are soft (5 or less) material. These can be carved or cabbed by hand/wheel, and routinely polished all over. I tend to keep tumbling for tumbled stones though I have repolished coral and malachite beads using the dry method in one of my vibrating tumblers.

Jim Small Small Wonders

From: RoCkHeAd2u@aol.com

Hello all Most of my free form cabs come from small slabs or slabs with natural cracks. When any material has natural cracks, I just use a tool for breaking tile and crack the slabs along the existing crack. In this way I know I don't have to try to cut something and be watching out for this crack. If this small piece has good color or pattern, I try to shape the free form close to whatever the shape of the piece. (This works nice with Montana and its cracks.) This could be a triangle, rectangle, square, kite, (rhombus) and even some form of oval. The sides of those that are squarish shaped do not have to be straight. There is usually some amount of curve in all of my cabs. (I don't try to have an inside cure very often.) Since I am thinking of bezel setting, I round off the pointy corners some. I might not need to if it were going into a prong setting but sharp corners for cab bezels are not always easy. For the dome, I just round off each side towards the top. A triangle "cab" would have a dome that slopes in three directions. A squarish "cab" would have a dome that sloped in four directions. The highest point of the dome in my free form cabs is not necessarily in the middle of the cab. The highest point might be along one side of the cab. If it looks OK and right for this stone then it is OK and right.

I have not done any special carving effects on cabs. At the present, this does not seem to be a way I am drawn.

Larry in Portland.

From: GARY TUCKER <deerdance22@yahoo.com>

Hey Everyone, This is a interesting topic, cab or free form. Myself, I am fairly new to the cutting polishing world and for the longest time I did not have any templates to use as guides for making cabs. A lot of my stuff took on a freestyle approach and ended up turning out nice. Being of a artistic background has probably helped me in seeing some 'face ' in the stone that can be brought out in free form or cab. I enjoy free form because I can allow some of my own expression come out in the stone's shape. I am in the ROLE program with our local club that is teaching us good cabbing techniques and it really helps me along with getting the most out of my material. I just want to also say that this site has helped me out immensely, with the ideas and suggestions I read. I pass on some of these ideas to our local club via our newsletter with acknowledgments to this site. Thanks again

Gary T. cabbingNIH

From: "Ed Benjamin" <edben@prodigy.net>

Jim writes, > I have always done calibrated standard sizes but am starting to work more > free form and original designs as that is much more fun after 40 years.

Hi there, Jim and the rest. Glad to "see" you up and around, Jim. So you're finally going "free-form". I guess I beat you to it by a few years. I spend so much time as Editor of our club newsletter, Arrowhead News, that there's not much time left over for lapidary, collecting, or other parts of the hobby. My first efforts at bola making, years ago, gave me "wearable" bolas, but didn't earn me much "credit" from club members. Over the years my efforts have improved, but I make no claim to any sort of membership in the ranks of the good lapidaries.

I guess I never "warmed up" to making standard "cabs". Just had no appeal to me. Too Victorian - or something like that. Or maybe it's just that I've never been talented enough to "hew to the line" and come up with anything resembling a standard size!

I like my bolas BIG, but I can't even claim any sort of championship in that direction, other than that the "average man" always asks if it isn't uncomfortable.

I like bolas from self-collected materials, for the most part, so that when I wear the bola I'm mentally taken back to the joys of the vacation-collecting trip when I had the pleasure of picking up the stone for the first time. Sure, some of my favorite stones are other than self-collected. And the stones themselves usually "dictate" the final form of the finished bola. For example, one of my near favorites is a piece of relatively soft jasper from the shore of Lake Michigan. As the bola neared completion, a weak fracture gave way -- and the shapeless stone became an instant "State of Michigan" (Lower Peninsula only)! Naturally, that's the way it stayed. Got to give God the credit. I sure didn't do it by myself! My all-time favorite bola is of Ohio Flint. It gets more wonderful comments from the public than all the rest of my bolas combined (Maybe because I wear it most of the time).

With your many talents, Jim, I'd sure like to see some of your free form inspired works. We'll have to make it happen! Ed Benjamin (Editor Ed)

From: TAM <tam2819@cox.net> Subject: Re: cabs

Jim, Another path you may take is to form the cab and then using your faceting head, bezel the edges. Teresa

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May Gem & Mineral Shows

1-2 — ANAHEIM, CA: 45th annual show, "Rockin' in the Wild West"; Searchers; Brookhurst Community Center, 2271 W. Crescent Ave.; Sat. 10-5, Sun. 10-4:30; free admission; live demonstrations, exhibits, dealers offering minerals, gemstones, jewelry, hobby supplies and books, Rock 'n' Kids program, jewelry making for kids, Discovery Room, silent auction, grab bags, Wheel of Fortune, hourly door prizes; contact Karen Fox, P.O. Box 3492, Anaheim, CA 92803, (714) 832-3580; e-mail:the_rox_fox@yahoo.com; Web site: www.gemandmineral.com/searchers.html.

1-2 — BAKERSFIELD, CA: 46th show, "People Are Nuggets, Too"; Kern County Mineral Society; Kern County Fairgrounds, Ming Ave. and S. P St.; Sat. 10-5, Sun. 10-5; free admission; contact Buster Ordiway, 15220 Sunnybank Rd., Bakersfield, CA 93312, (661) 589-3834.

1-2 — BISHOP, CA: 1st annual show; Eastern Sierra Gem & Mineral Club; Tri County Fairgrounds, Sierra St. and Fair Dr.; Sat. 9-5, Sun. 10-4; contact Jeff Lines, (760) 935-4576; rockmun@hotmail.com

1-2 — BOZEMAN, MT: 22nd annual show; Bozeman Gem & Mineral Club; Gallatin County Fair Grounds; Tamarack and Black St.; Sat. 10-6, Sun. 10-5; adults $3, children under 12 free; gems, jewelry, minerals, fossils, artifacts, demonstrations; contact Dan Carter, 3550 Yellowbell Rd., Bozeman, MT 59715, (406) 586-4552.

1-2 — KINGMAN, AZ: Show, "Gems of AZ"; Mohave County Gemstoner's Club; Senior Center, 1776 Airway; Sat. 9-5, Sun. 9-4; Free Admission; rocks, gems, crafts; contact David, Mohave County Gemstoner's Club, P.O. Box 3992, Kingman, AZ 86401, (928) 692-3797.

6-8 — FRANKLIN, NC: 3rd annual show, "Mother's Day Gemboree"; Franklin Chamber of Commerce; Community Facilities Bldg., Hwy. 23/441S; Thu. 10-6, Fri. 10-6, Sat. 10-6; adults $2, children 12 and under free; sales, special exhibits, equipment, supplies, demonstrations, jewelry, jewelry repairs, custom mounting, cutting; contact Franklin Area Chamber of Commerce, 425 Porter St., Franklin, NC 28734, (888) 510-4367; Web site: www.franklin-chamber.com.

8-9 — RENO, NV: 38th annual show, "Jackpot of Gems"; Reno Gem & Mineral Society; Reno Livestock Events Center, Exhibit Hall, 1350 N. Wells Ave.; Sat. 10-5, Sun. 10-4; adults $4, seniors and ages 12-18 $3, children 6-11 $2; contact Jennifer Rhodes, (775) 356-8820.

14-16 — COSTA MESA, CA: Spring show; Martin Zinn Expositions; Holiday Inn-Bristol Plaza, 3131 S. Bristol; Fri. 10-7, Sat. 10-7, Sun. 10-5; free admission; 75 domestic and foreign dealers; contact Martin Zinn Expositions, P.O. Box 999, Evergreen, CO 80437, (303) 674-2713; e-mail: MZ0955@aol.com; Web site: www.mzexpos.com.

15-16 — BILLINGS, MT: Show and sale; Billings Gem & Mineral Club; Holiday Inn Grand, MT Convention Center, 5500 Midland Rd., I-90 exit 446; Sat. 10-6, Sun. 10-5; adults $4, children under 12 free with adult; collector displays, dealers, educational exhibits, demonstrations, dinosaurs, field trip information, field trip information, fossil boxes, garnet table, grab bags, silent auction, wheel of fortune, special display by Nate Murphy; contact Phill Garnett, (406) 628-8121; e-mail: BJGarnett@aol.com.

15-16 — NEWBURY PARK, CA: 30th annual show, "Pageant of a Thousand Gems"; Conejo Gem & Mineral Club; Borchard Park Community Center, 190 Reino Rd.; Sat. 9-5, Sun. 10-5; free admission; contact Don Asher, (805) 482-2510.

15-16 — YUCAIPA, CA: 44th annual show; Yucaipa Gem & Mineral Society; Yucaipa Community Center, 34900 Oak Glen Rd.; Sat. 10-5, Sun. 10-5; free admission; contact Lee Peterson, (909) 794-0731; e-mail: res09ayd@verizon.net.

22-23 — ESCONDIDO, CA: Annual show; Palomar Gem & Mineral Club; Escondido National Guard Armory, 304 Park Ave.; Sat. 9-5, Sun. 9-5; adults $2, seniors (65+) $1, children under 12 free with adult; gem and mineral dealers, demonstrators, drawing; contact Annie Heffner, (760) 735-8067; e-mail: annieheffner@hotmail.com.

28-30 — MARIPOSA, CA: Show, "The Goldbug Gala Show"; CA State Parks Mining and Mineral Museum, Mariposa Gem & Mineral Club, CMM Museum Association; Mariposa Fairgrounds, Hwy. 49; Fri. 10-6, Sat. 10-6, Sun. 10-4; children under 17 free; adults $4/three days $10, seniors $3/three days $8; gem and mineral booths, educational activities, raffles, silent auctions; contact Dianne Mueller, P.O. Box 1192, Mariposa, CA 95338, (209) 742-7625; e-mail: mineralmuseum@sti.net; Web site: www.cfmsinc.org.

29-30 — LAKESIDE, AZ: 10th annual show; White Mountain Gem & Mineral Club; Blue Ridge Jr. High School; Sat. 9-5, Sun. 9-5; admission $1; dealers, exhibits, silent auction, Sam Sharp's Fantastic Collection of Fluorescent Minerals; contact Tonie MonDragon, (928) 537-8855.