The Opal Express

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

Volume #36 Issue #03
March 2003

In This Issue:

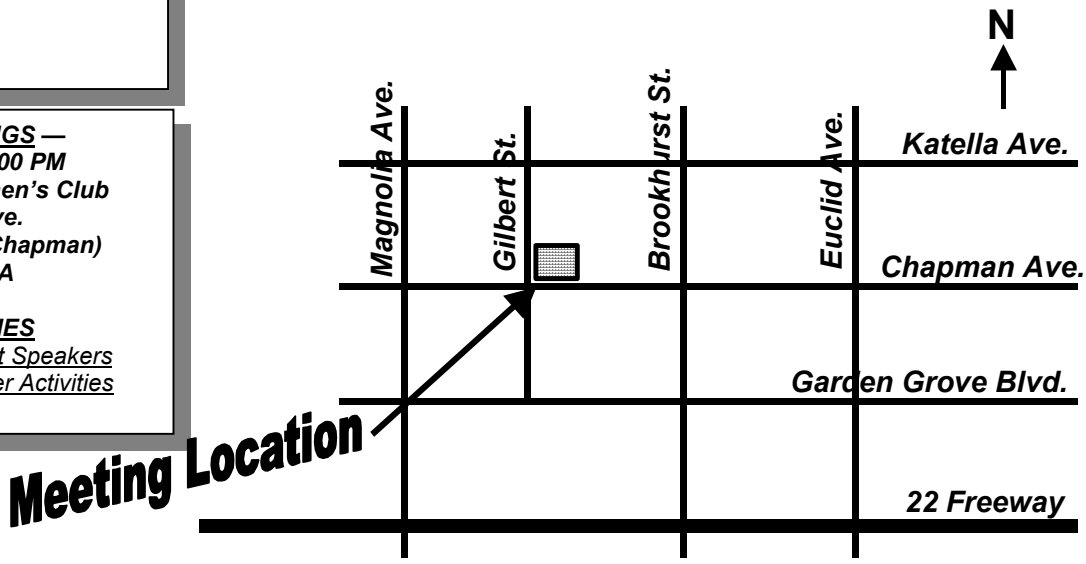
TO:

Important Dates:
Board Meeting: Mar. 3

General Meeting: Mar. 13

— 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*



The American Opal Society
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Article Deadline is the 20th of the month prior to each issue

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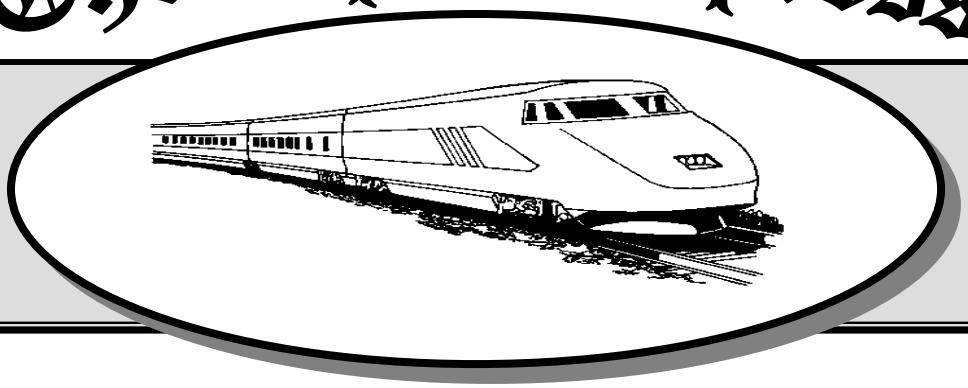
PLEASE CHECK YOUR ADDRESS LABEL. If your label shows **the** current month/year your dues are DUE NOW. If the date is older, your dues are overdue.

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

Pete Goetz

I would like to thank those folks that feel I have the necessary skills to serve the AOS in the capacity of President for the next two years. We have taken some great strides forward under the stewardship of the outgoing leadership team. My goal will be to continue this march forward with help of are membership.

Being new, I do not much to say at this time. I'll talk to you later!

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March Snippets

by Barb Whyre

Walgett Shire had a roving elephant back in the early 1930s. It appeared on Dunumbral Run, the outstation which incorporated Wallangilla Tank where opal was first found in 1900, and the site of Wallangulla, early Lightning Ridge, 1907. The Society has a snap of the unexpected visitor scratching himself on a tall post near the sheds. A disbelieving Barney Nolan looks on. Pink elephants yes, but this????

The youngster had wandered away from a circus performing at Collarenebri. Paddy Nolan, Barney's father, employee on Dunumbral for many years, snapped the photo.

Traveling circus and theatre troupes were usual country entertainment in the early years. They sometimes stayed longer when there was an opal rush!

++

A Mint's Worth Of Gold

Prospectors around the world have searched for gold in some strange places, but until recently, no one thought to look in downtown Ottawa. Someone finally did and they found hundreds of millions of dollars worth in the Ottawa River —*just outside the mint.* For 60 to 70 years, a combination of old technology and no environmental controls left a small patch of river bed — 30x15 meters — laced with *waste* gold and other precious metals from the coin stamping process of the Canadian Mint. A small consortium of mining companies headed by JAG Mines of Montreal expect to recover about $450 million (approx. one million ounces) worth of gold in the small area after processing about 50,000 tons of sludge and sediment.

From The Rock Blast 9/97 via The Rock Bag 5/99.

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Goldstone

In 1550, after years of effort and failure, chemists in Northern Italy happened to make a beautiful sparkling material with golden stars. They named it "Goldstone." It 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 there called it "adventuring stone" since it is impossible to foretell the success of the mixture for many weeks. Due to a lack of modem production methods, a batch of material could be unsuccessful because of the uncertainty of the heating and cooling process.

Recently a blue goldstone has been developed from the same process, called "Blue Magic." 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."

Most goldstone is shipped in bulk to major stone cutting and polishing centers. Germany is the most important cutting center, but much cutting is done in Austria, Holland and Japan. Goldstone will not discolor, fade, or lose its beauty.

From The Opal 2/96 via Rock Rollers 9/99.

SOME ASPECTS OF PRECIOUS OPAL SYNTHESIS

By S.V. Filin, A.I. Puzynin, V.N. Samoilov
Scientific Center for Applied Research, Dubna, JINR, Russia

Abstract

In this paper the authors describe the developmental research and basic steps involved in their synthesis of all-silica opal at the Center for Applied Research in Dubna, Russia. The structure and essential features of this attractive, relatively non-porous synthetic opal are illustrated, and cut and polished examples of this synthetic opal are illustrated.

INTRODUCTION

Precious opal has been known from ancient times. It is a valuable raw material for use in jewellery[1]. On the world market, the price of the precious opal continuously increases with time. The old European opal mines are now depleted, and the main supplier of the precious opal to world markets is Australia. To meet the rising demand for precious opal, in many countries attempts have been made to synthesize opal. However, the synthesis of opal is very complicated.

Precious opal was synthesized for the first time in early 1970's by Pierre Gilson of France[2]. Since 1993 the authors of this paper have been working to create synthetic opal of jewellery quality. Now some interesting results have been achieved in this field, and these advances are reported below.

THE SYNTHESIS OF OPAL

As researched and developed by the authors, the synthesis of opal is a multi-step process that can be divided into several individual stages.

Stage 1

In the first stage, using our modification of the Steber method[3], the synthesis of monodisperse particles of silica in alcoholic sols is carried out. The particles are formed by the hydrolysis of tetraethyl ester of orthosilicic acid, $Si(OC_2H_5)_4$, or TEOS, in ethanol. The catalyst for this reaction is ammonia. In this solution the hydrolysis of TEOS occurs by the following reaction:

$$Si(OC_2H_5)_4 + 4H_2O \rightarrow Si(OH)_4 + 4C_2H_5OH$$

Simultaneously, the polymerisation of orthosilicic acid occurs by the reaction:

$$nSi(OH)_4 \rightarrow (SiO_2)_n + 2nH_2O$$

In this process, small nuclei (with a diameter about 10 nm) are formed first from the liquid phase. Then the growth of the silica particles takes place. By adding further amounts of TEOS, the particles of silica grow up to the diameter desired-that is to about 300 nm size (see figure 1).

Stage 2

In the second stage, 'raw' precursor of opal is precipitated either by spontaneous sedimentation, or by centrifuging.

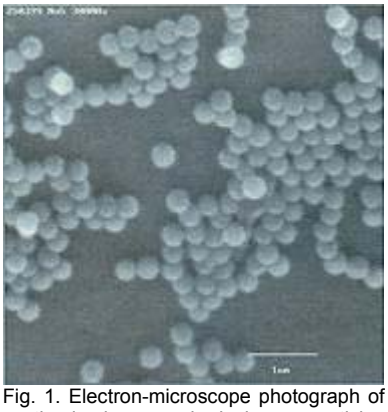

Fig. 1. Electron-microscope photograph of synthesized spherical particles monodisperse silica.

In precious opal, the particles of silica are arranged in very dense structures, or 'blocks', that form 'photon crystals'. Diffraction of light at these 'blocks' produces the vivid display of spectral colours of the opal. The bigger the blocks, the brighter and more variable will be the opal's *play-of-colour*, and consequently, the higher is its price.

It has been observed that the `blocks' of smallest dimension occur in precursor opal precipitated by centrifuging. It is for this reason, that at this time spontaneous sedimentation is used in our technique of synthesis. Nevertheless, this method (sedimentation) only provides satisfactory results for highly diluted sols, because in very concentrated sols the silica particles cannot be arranged immediately into an organized structure (see figure 2); cannot find their proper site; and, from above, further sedimenting particles are crowded[4] . As the existence of this zone of the dense precipitation is an obstacle for the formation of big monocrystalline 'blocks', the only way to prevent this phenomenon is to decrease the concentration of the particles in the sol. However, this produces both an increase of the sedimentation time, and an increase in the dimensions (height) of the sedimentation vessels that are required to be used in the process. So it is necessary to find a reasonable compromise between the time and quality of the sedimentation process that results. At this stage of our work, our chosen sedimentation time is about seven months.

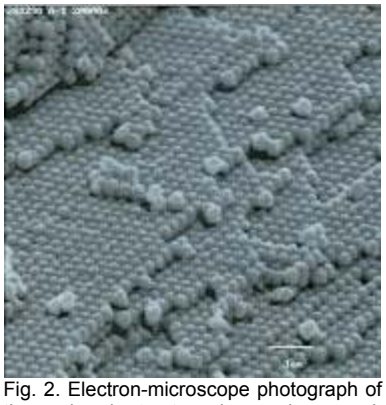

Fig. 2. Electron-microscope photograph of the ordered structure in precious opal, showing its light diffracting 'photon crystals'.

Stage 3

In the third stage of the synthesis, the precursor opal (see figure 3) has to be dried in order to remove liquid from its pores. At this stage the precursor opal is viscous, does not have a very compact structure, and it is impossible to dry under normal conditions without damaging it. Even if the process of drying is carried out very slowly (over more than three months), the capillary forces and the forces of surface tension in pores between particles leads to the formation of internal stresses-which sooner or later generate a network of 'breaks' (crazing) over the total volume of the opal. Consequently, it is impossible to prepare samples of opal with dimension greater than 1 cm using this method.

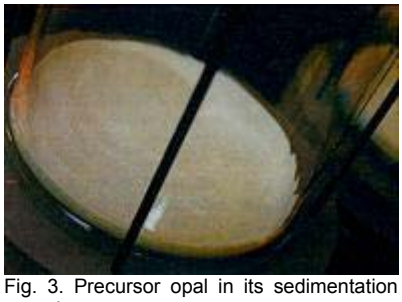

Fig. 3. Precursor opal in its sedimentation vessel.

In order to solve this problem, the authors employ a method of supercritical drying in an autoclave to obtain defect-free samples of practically any dimension within a time span of 10-12 hours[5]. In this process, precursor opal, produced by sedimentation, is placed in an autoclave containing ethanol. The autoclave is then heated and, when the critical temperature for ethanol T_k=516 K, P_k=6.4 MPa) is reached, all of the liquid within the autoclave - and in the pores of the raw opal - transforms into vapour without boiling. The vapour is then exhausted from the autoclave at a constant temperature that is higher than the critical temperature of ethanol. The regime of the supercritical drying that is used in our synthesis is shown in figure 4.

By using this method of drying, internal weaknesses do not occur in the synthetic opal. Also, during supercritical drying, samples become significantly stronger- since at higher temperatures of about 300°C, additional siloxane bonds are formed between the neighbouring silica particles, by the reaction:

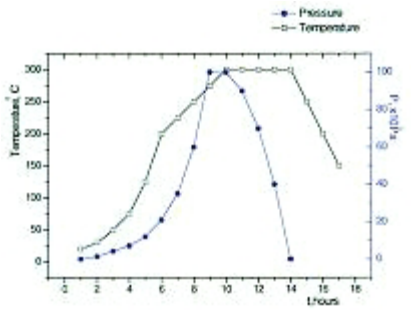

Fig. 4. Regime of the supercritical drying used in the synthesis of our opal.

$$\equiv\text{-Si-OH} \ldots \text{HO-Si}\equiv \rightarrow \equiv\text{Si-O-Si}\equiv + H_20$$

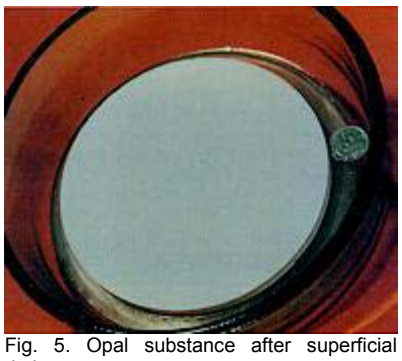
Fig. 5. Opal substance after superficial drying.

A defect-free sample of the dried precursor opal, obtained by this method of supercritical drying, is shown in figure 5. It has a diameter of 12.5 cm and a width of 5.5 mm. *Subsequently, this substance (dried precursor opal) must be strengthened by thermal treatment in a furnace. After this treatment, the opal substance becomes a fragile, non-transparent material that has an open porosity about 35 per cent.*

Stage 4

For the production of synthetic opal, it is then necessary to fill pores in the opal substance with a silica gel. In this stage proper consideration must be given to the difference in the indices of refraction that occur between the gel and the monodisperse particles in the forming opal (see figure 6). In response to this challenge, the authors have experimentally proved that in opal this difference can be substantially higher than 0.02[6] , without causing some decrease in the *play-of-colour* of the opal. Further experiments were carried out, with the aim of obtaining the best diffraction colours from the opal, and, simultaneously, attaining the necessary hardness of natural opal - which is 5½ - 6½ on Mohs scale.

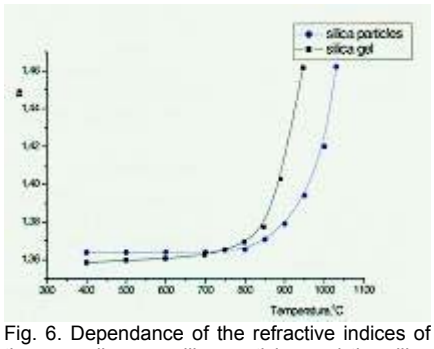

Fig. 6. Dependance of the refractive indices of the monodisperse silica particles and the silica gel on applied sintering temperature.

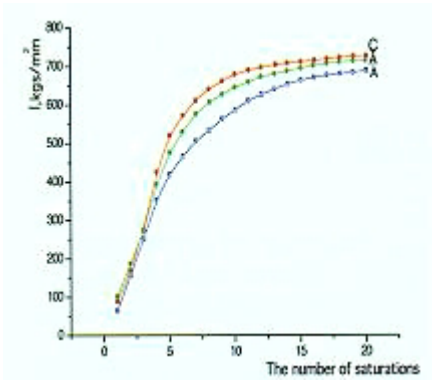

Fig. 7. Dependence of the microhardness of the opal substance on the number of saturations with the silica gels (temperatures of the sintering of the opal substance and the gel: A - 600°C, 400°C; B - 800°C, 800°C; C - 1000°C, 400°C)jb huih .

After the supercritical drying of stage 3, the samples of precursor opal were then sintered in a furnace at temperatures of 600, 800 and 1000° C. After saturation of these samples with silica sols, polymerisation of sol into gel and subsequent drying of the gels, these samples were sintered at 400 and 800°C. In figure 7, the dependence of hardness of the opal on the number of saturations with the silica gel is shown. It was discovered that the synthetic opal, produced at these sintering temperatures, had a really good *play-of-colour* despite the big difference in refractive index between the precursor opal and silica gel filling its pores. At the present time, both the opal and its filling silica gels are sintered at the temperature 825° C.

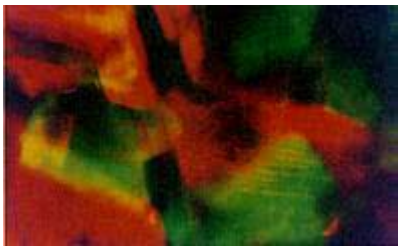
Fig. 8. Photograph of the *play-of-colour* of Russian black synthetic opal (x100)

Another very important task, solved by the authors, was the development of a 'soaking' technology based on high-pressure (600-700 atmospheres) saturation of precursor opal with the gels. As a result synthetic opals with 'closed' (very little) porosity are now produced.

GEMMOLOGICAL PROPERTIES

The characteristic gemmological properties of this Russian all-silica synthetic opal are given in Table 1.

CONCLUSIONS

All of the properties of the opals synthesized by the authors - that is their absence of characteristic micro and macro-defects (see figures 8 and 9), their 'closed' porosity, their chemical composition (silica and water up to 8 per cent), and their hardness (about 6 on Mohs scale) - are identical to those of natural precious opals. The total time of the synthesis is nowadays 10 months, compared to that of Gilson (12 months or more), and Chatham on www.chatham.com (~18 months).

In addition, our rough synthetic opal can be easily cut and polished for use in jewellery (see figure 10).


Fig. 9. Rough white synthetic opal of 52 gm weight.

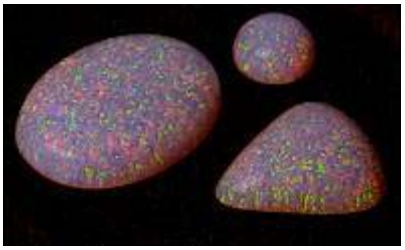
Fig. 10. Russian synthetic opal cabochons produced by the German opal cutting firms of Weiss, and Litzenberger. The cabochons weigh 10.2 ct, 1.6 ct and 4.8 ct.

Acknowledgement

The editor wishes to thank the Sydney based opal researcher Anthony Smallwood for organising the English language translation of the original Russian and language paper that formed the basis of this paper. Dr Peter Simon, Faculty of Chemical Technology, Slovak Technical University, Bratislava is thanked for providing this most accurate translation.

References:

Smith, G. (1984) Precious stones (in Russian). Moscow.

PROPERTY		Light (White) synthetic opal	Black synthetic opal
Chemical composition		Silica and water (up to 8%)	Silica, water (up to 8%), and carbon (less 1%)
Hardness		5.9-6.0	5.9-6.0
Fracture		Conchoidal	Conchoidal
Cleavage		None	None
Specific Gravity		1.96-2.03 (depends on water content)	1.96-2.03 (depends on water content)
Refractive Index		1.41-1.43	1.41-1.43
Diaphaneity		Transparent to semi-transparent	Translucent to opaque
Lustre		Vitreous (glassy)	Vitreous (glassy)
Fluorescence	***- LWUV***	None	None
	- SWUV	None	None

Table 1. Identifying properties of Russian 'all-silica' synthetic opal.

Gilson, P. (1979) Precious stones from the laboratory. Journal of Gemmology. 16(7), 494-498.

Stober, W *et al*. (1968) Controlled growth of monodisperse silica spheres in the micron size range. Journal of Colloid and Interface Science. 26, 62-69.

Kasatkin, A.G. (1973) Fundamentals of chemical technology (in Russian). p.750. Chimija: Moscow.

Puzymn, A.I. and Film, S.V. (1999) Employment of the Crysta method of supercritical drying in the process of the synthesis of precious opal (in Russian). Fizika kristallizacii (The physics of crystallization), pp.89-96, TGU: Tver.

Caskin, Aj. and Darragh, Rj. (1970) Opaline materials and method of preparation. US Patent 3,497,367

Puzynin, A.I., Samoiloy, N.Y and Film, S.Y (1999) The method of the production of extremely pure quartz glass (in Russian). Fizika kristallizacii (The physics of crystallization), pp.72-75, TGU: Tver.

Prassas, M. et al. (1983) Glastechn. Ber. 56, 542.

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- The Editor

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Opal Cutting Tips

Collected from the Lapidary Digest

Small Stones

Many cutters have difficulty with small stones. However, some professional cutters and traders make a good living out of them, selling the stones for earrings and other small settings. Chinese cutters routinely turn out stones down to 2mm round - accurately calibrated by eye. Nothing is wasted! Good opal is expensive and hard to come by. Even the smallest stones should be cut!

The supply of smaller material is generally more plentiful and cheaper than larger pieces. As a result cut stones and set pieces are more affordable to the public, and can generate good profit margins.

Professional cutters routinely cut small stones, but have their own preferred way of mounting and cutting them. For dop sticks you will often see very small nails used, even match sticks, with epoxy glues. However some cutters like to use the same sized dop sticks that their hands are used to for bigger stones, but sand the ends of the dop sticks down to a small point (spinning them against the grinding wheel), then taper dopping wax down further to mount and fit the small stone. Magnification is invariably used.

Tips and Tricks: The following tips and tricks have been provided to help cutters come to grips with small stones. These ideas have come from contributions to the "Lapidary Digest".

From Earl

It takes a light touch during the roughing stages, and a well worn sanding belt before polish.

In my experience it is easier to get smooth cabs using worn silicon carbide 400 & 600 grit belts than it is using diamond. Of course there are hundreds of folks that will disagree, but that's one of the joys of this hobby: what works fine for me may cause a disaster in your workroom.

Earl English

From Kreigh Tomaszewski

For smaller stones I find it easier to hold the stick very close to the stone, and by moving my thumb towards the tail of the stick (nail) I get the leverage to make a smooth rotation of the stone across the wheel. Moving the rotation point closer to the stone makes it easier to make the tight smooth curves needed for small stones. I just found the longer sticks made it harder because they hit my other fingers sooner when rotating.

I also agree with the suggestions about lightening up a little, starting on a finer wheel than normal, and using worn sanding disks.

Beyond the issue of dop stick diameter, small cabs also need shorter dop sticks. I usually use a #6 or #8 finishing nail. Sand the head flat, blunt the point on the grinder, and use super-glue to affix the stone to the head. I set the stone upside down, put a drop of glue on the back, and hold it down with the nail until it sets. Some recommend a small scrap of newspaper between the nail and stone.

To remove the 'dop' stick, grasp the stone and dop stick between finger and thumb firmly, and rap the free end of the nail hard on a large metal object. I use the edge of my grinder. You want to be holding the stone and nail when done. I've only had a few chips where the glue pulled out a chip of stone.

Mark your slab with a template so you know the size cab you want and trim around it, but don't touch the line. Make sure your line was to size by using a pointed scriber (I use an sharpened length of aluminum TV ground wire).

Rough grind (or fine if softer rock) the edges left from trimming up to, but not quite touching, your scribed shape. You

should have a square edge (90 degree angle) and a smooth outline shape that is just a hair too big. Use a fine wheel and carefully make a very small bevel (45 degree) around the bottom until the bottom is just a hair smaller than the template hole.

Now we start trimming the top edge to bring it to shape in steps. Imagine using a super sharp knife-edge to trim off the rock from just above the bevel at the base to just inside the scribed line on the top. We want a hairline thin band between the top of the bottom bevel and the bottom of the top trim. Grind this around; it should still be just a hair larger than the template.

Repeat many times, each time lifting the base a little and moving towards the center at the same time with each 'cut' on your grinding wheel. If you do it right you will end up with a whole bunch of rings (when viewed looking down on the top of the cab), each the same shape (and centered in) as the template (and the stone is still just a hair too big to slip thru it). Now you have the shape roughed out and need to be off your coarse wheel.

So far we've been working around the stone. Now, on the fine wheel, we're going to work from the base to over the top. Each time we roll we start at a different point around the base (1/4 to 1/3 the way around), using a light touch so we trim the edges and not the small flat faces of the rings. Over and over, around and around. Each rotation across the wheel goes from the ring just above the base bevel smoothly until it is just over the middle of the top. Repeat until you have the shape smooth and the stone just barely be forced thru the template (but don't push it quite that hard) - the rest of the edge will disappear in sanding and polishing, and the stone will exactly fit your template. Do the same rotation sequence from base to top middle for each sanding grit. Polish likewise.

With small stones, especially round ones, and a little practice, you can align the dop stick roughly with the axis of the grinding wheel and 'roll it' to get the edge trims, tilting the base of the dop stick away from the wheel a little more with each level. It is a little harder with ovals to do this and keep the shape right.

If you do this right there is no way to produce a flat spot. If you do, you have not made a smooth motion through the entire length of whatever cut you were making or pressed too hard thru part of the stroke.

And if you want real fun, try cutting 2x3mm opal cabs for replacement side stones on rings. I'll give you a hint, a micrometer helps. The amount the first ring needs to be larger than the template (desired size) at the beginning can be calculated - its the amount that will be removed by the rotation grinding, sanding, and polishing... 80 grit is approximately 7.5 thousandths of an inch in diameter. 120 grit is approximately 5 thousandths of an inch in diameter and needs to remove between 20 and 30 thousandths of an inch of surface (you have two sides) to eliminate the scratches and pits of 80 grit. 220 grit is approximately 2.5 thousandths of an inch in diameter and needs to remove between 10 and 15 thousandths of an inch of surface (you have two sides) to eliminate the scratches and pits of 120 grit.

600 grit is approximately 1 thousandths of an inch in diameter and needs to remove between 3 and 5 thousandths of an inch of surface (you have two sides) to eliminate the scratches and pits of 220 grit. Aluminum Oxide 305 pre-polish is approximately .2 thousandths of an inch in diameter and needs to remove between .4 and .8 thousandths of an inch of surface (you have two sides) to eliminate the scratches and pits of 600 grit.

Polish is approximately .001 thousandths of an inch in diameter or smaller and needs to remove between .1 and .2 thousandths of an inch of surface (you have two sides) to eliminate the scratches and pits of 80 grit.

Kreigh Tomaszewski
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Webpage at: http://Tomaszewski.net or
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From Craig Nielson

I would add that for very small objects, I start out on a 280 diamond wheel. The really coarse grits just seem to grind it down TOO fast, and give me flats, and other boo-boos before I know it!!! Be sure to use a soft hand in grinding and sanding, and check it often.

Another trick for small dops is to get some brass rod from your local welding shop to use as dops. They come in various diameters. By taking a piece of channel iron and cutting a slot in it at 90 deg. to the side just wide enough for a hacksaw blade you have a nice little miter box. By stacking in the rods you can cut a bunch at one time.

If you are cutting a bunch of small rounds that are of the size of the rods that you have, all the better. By using superglue and a piece of matchbook cover or postcard for a spacer just cut to the brass and you have your outer shape and size.

Craig Nielson

From Dick Friesen

This thread reminds me of the time a lady brought me a petit point ring with a stone missing for repair. I explained that I might have to use stabilized turquoise to match the color and that the time required to cut such a small stone was higher than you would expect from the size of the stone, but she was willing to pay the price I quoted so I took the job.

I thought matching the color was going to be my biggest problem so when the first piece of rough was a perfect match I should have suspected I was in trouble (Murphy's Law). It started with the trim saw; I had to hold the second piece with tweezers to keep it from dropping between the blade and the table, where the first one went.

The stone needed to be just a little under 1mm by 3mm and I could not figure any way short of carving a special piece of aluminum to get a dop stick for it and I thought making the dop stick would take longer than cutting the stone.

After several attempts to dop it I just grabbed my Foredom, a Cratex wheel, and my #5 Optivisor and carved it holding it in my fingers.

The lady got her ring and I got a LOT more respect for the artisans that cut those stones. If anyone knows how the Zunis cut those stones on the reservations I would like to hear about it.

Dick Friesen

From Hans Durstling

No one has yet mentioned the fact that the wax itself can be shaped into a small dop. This is how I've seen it done in Idar. Simply gather up a gob of hot wax on the dop stick in the usual way, then with wet thumb and forefinger twirl the soft wax out into a cone shape. Let it harden enough to maintain its shape, touch it to the hot small stone, adjust.

Such a wax cone tip can be molded to any size, with cautious heating the stone can be leveled out and centered (can't do that with crazy glue!) and the stone doesn't need to be flat bottomed.

However to do small flat bottomed cabs in multiples and in predictable sizes I'll often use a number 4 flat head slotted brass wood screw held in a pin vise. Screw heads straight from the package may not be perfectly flat and may need to be touched up on a fine file. Using crazy glue, glue up quite a number at a time, and then insert one screw after another into the pin vise. It's quite quick. If you grind into the screw head the metal may burr up and pop the stone off, so the screw head should be lightly beveled. The slot in the screw head aids access of acetone to dissolve the crazy glue later.

Hans Durstling sinico@nbnet.nb.ca

(Hans Durstling does stone cutting -cab and facet- freelance writing and custom goldsmithing in Moncton New Brunswick Canada; he is an opal addict and this is a picture of "Millennium Bug no. 1," a recent piece with three opals in silver and 14kt gold. The two smaller opals, in the "bug" were dopped as described above".)

Polishing the Back:

A question which often arises (particularly with fiddly small stones) is whether the back of a stone should be polished, for commercial reasons. The short answer is it depends.

It seems to be a habit of cutters on the South Australian opal fields, and Chinese factories, to polish the back of light opal stones. This does have value in giving the stones a clean "manufactured" or "finished" look.

Boulder opal is often polished on the back, for several reasons. Many people think the brown ironstone looks better polished and makes the stones look more attractive, thus making them easier to sell; also many boulder pieces are used in pendants where the back is visible (in fact, a polished or finely sanded well formed back would be advisable for most open backed pendant pieces of all opal types).

However professional cutters of dark base Lightning Ridge material in New South Wales often leave the backs unpolished, just well formed and sanded smooth, and volumes are sold this way to field buyers. Often the potch backs of stones from nobby origins can contain sand or pits which are best not highlighted by a high polish. In any event, a fiery attractive stone will sell well regardless of whether the back is polished. There could be some marginal advantage in terms of "finish" for polishing the backs of lesser stones.

Polishing the backs of lighter base, crystal or translucent stones actually diminishes the brightness and therefore value (as the stones are being sold loose) of these stones, by allowing more light in from behind. There is some advantage in leaving these unpolished on the back!

All that said, the polish should always extend from the top down to a point where any part of the stone in an open (e.g. claw) setting would be visible. Where a large amount of the stone is visible from behind a setting (e.g. pendant or brooch) there could be some value in polishing the back.

Tools for Opal Carving

From Dan

The best flex shaft tools I've ever found for sanding and polishing stages are the Nova Miniature Points from Diamond Pacific (800-253-2954). Basically these points are like Cratex, but with diamond grit instead of silicon carbide. They are BLOODY expensive, about USD $7.25 each. However, they last quite well, cut fast, and give excellent results. Their grit sizes are: 60, 140, 280, 600, 1,200, 3,000, 8,000, 14,000, and 50,000. The points come in flame and bullet shapes, both small and large. I buy the large flames and bullets in every mesh. It costs a fortune but it's worth it because of the time that you save.

For polishing larger areas of a larger carving (not opal), try the Diamond Pacific Nova wheels in the 2 3/8 inch diameter. They come with bushings that take the internal diameter down to 1/4 of an inch. Put a 1/4 20 bolt and a fender washer through the bushing - ta da! Mounts in your #44 hand piece. Again, these wheels are expensive, USD $50.00 each or set of 4 grits for $180.00, but they will polish slabs and large areas of a carving faster than you can say impending recession.

Hi-Tech diamond (805-522-6211) has a similar line of points, and they also have a line of mini-disks. Their process is to embed diamond grit in epoxy and spread it in a thin layer on a disk or felt bob. They are *much* cheaper than the Nova points. I keep a good supply of these on hand even though they are vastly inferior to the Nova points. The Hi-Tech diamond mini-disks are pretty good and inexpensive solution for polishing large areas of a carving.

Another product I like from Hi-Tech diamond is their pretty extensive line of diamond compound in a syringe. They take diamond grit and mix it with a toothpaste like material. You squirt very small amounts of it on a felt bob and start polishing. You cannot use this stuff with opal since it must be worked dry and will heat the opal too much. However, it is handy stuff to have around for other materials since there are many shapes of felt bobs/disks/pads/etc that you can put it on. I think I paid about $10.00 for a 5 gram tube at a recent show.

Treating Cracks in Opal:

From Ivan

I have had some success with the method to be described. Not all opal is treatable.

I bought a small hand-operated pressure/vacuum pump from Cole-Parmer, Model 79301-10. It has a gauge, which shows either vacuum or pressure. It also has a switch to change from vacuum to pressure. A semi-rigid hose was attached to the pump and to a heavy glass jar with a metal lid using things from the local hardware store. An airtight metal container will also work. The other thing needed is also from the hardware store. It is a clear glue curable with ultraviolet light. The glue was designed to provide invisible mends for glassware. Glass and opal have similar refractive indices. The one I have used is Duro Clear Glass Adhesive #CGA1 81190.

The process must be carried out in dim light. Opals which have been taken to prepolish stage and dried are coated with the glue and placed in the chamber. I draw about as much vacuum as the pump can provide and leave the vacuum on overnight. Then the vacuum is released slowly. Pressure is then applied. The pressure is held on for about twelve hours. Pressure is released from the chamber. The opals are cleaned of excess glue on the surface. Either isopropyl alcohol or acetone can be used. I prefer the alcohol because it seems less aggressive. The stones are then exposed to ultraviolet light. Here in Arizona that's easy to do with sunlight. After the glue is cured, the opals can then be given the final polish.

Ivan Saddler

Ivanrs@aol.com

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$50 Million Sapphire For Sale

By Barbara Green

December 13, 2002 - Beverly Hills, CA

It's larger than a hen's egg, encircled with 35 brilliant cut diamonds, and now available to those who have the means.

Said to be the world's largest and most valuable sapphire, the Black Star of Queensland will be sold by Beverly Hills art and antiques curator Jack Armstrong on behalf of the Kazanjian Foundation. It weighs 733 carats and is reportedly valued at $50 million.

The immense and stunning stone comes from the Anakie sapphire fields in Central Queensland, Australia. On a picnic with her family, Mrs. Roy McKinley stubbed her toe on the mostly-submerged gem, thus originally discovering it; news reports from the 1930s say it was.

The Black Star arrived in America in the 1940s, acquired by the Kazanjian brothers, who were immigrants from Armenia and became highly successfully California-based precious stone jewelers. Their descendants now oversee the Kazanjian Foundation.

The stone was displayed at the Smithsonian Institution for 17 years.

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Strange Relics From The Depths Of The Earth

On February 13, 1961, three rock hounds - Mike Mikesell, Wallace Lane and Virginia Maxey - were collecting geodes about 12 miles east-south-east of Olancha, California. Geodes are spherical stones with hollow interiors lined with crystals. On this particular day, while searching in the Coso Mountains, they found one stone located near the top of a peak approximately 4,300 feet in elevation and about 340 feet above the dry bed of Owens Lake.

The Rockhounds took it to be a geode, but later found it was not, because it bore traces of fossil shells. The next day when Mikesell cut the stone in half, he nearly ruined a 10-inch diamond saw in the process, for it did not contain crystals, but rather something totally unexpected. Inside were the remains of some form of mechanical device. Beneath the outer layer of hardened clay, pebbles and fossil inclusions was a hexagonal-shaped layer of a substance resembling wood, softer than agate or jasper. This layer formed a casing around a three-quarter-inch cylinder made of solid white porcelain or ceramic, and in the center of the cylinder is a 2-millimeter shaft of bright brassy metal. This shaft, the rock hunters discovered, is magnetic, and after several years of exposure never showed oxidation. Also, surrounding the ceramic cylinder are rings of copper, much of them now corroded. Embedded too, in the rock, though separate from the cylinder, are two more man-made items - what look like a nail and a washer. The puzzled rock hunters sent their find to the Charles Fort Society, who specializes in investigating things out of the ordinary. The society made an X-ray examination of the cylindrical object enclosed in the fossil-encrusted rock, and found further evidence that it was indeed some form of mechanical apparatus. The X-ray revealed that the metallic shaft was corroded at one end, but on the other terminated in what appeared to be a spring or helix of metal. As a whole, the "Coso artifact" is now believed to be something more than a piece of machinery: the carefully shaped ceramic, metallic shaft and copper components hint at some form of electrical instrument. The closest modern apparatus that researchers have been able to equate it with is particularly the spring or helix terminal that does not correspond to any known spark plug today. The rock in which the electrical instrument was found was dated by a competent geologist at 500,000 years old.

From Osage Gems via Pick Hammer News 2/02

(I did a little research myself on the "Coso Geode" and found that most modern researchers believe it to be a 1920's Champion Spark Plug incased in clay, probably from a Model T Ford used at one of the nearby mines. See the website http://www.talkorigins.org/faqs/coso.html for the complete story. Sorry to burst any Ancient Astronaut bubbles! - The Editor)

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Cutting Boulder Opal

I'm just curious. Are there many people here using boulder opal? If so, what kinds of cuts do you prefer? How many are using the matrix type with color flashes, what about larger seams accented by matrix? What kinds of sizes are you using? Etc.
I just picked up some old boulder rough and I want to cut to meet the market need.
Thanks,
Derek Levin

From: Don Rogers

>If so, what kinds of cuts do you prefer?<

Derek, the nature of Boulder Opal is that the Opal decides the cut. Most Boulder is in very thin seams that are not necessarily flat. You end up with some interesting shapes and contours. I especially like the "splits" which give you a matched pair of whatever shape they end up.

>How many are using the matrix type with color flashes<

The Ironstone Matrix was my first love in opals. Depending on the opal, it can be an awesome piece or kind of 'Ho Hum'. One thing to remember with the matrix is that the darker the matrix, the better the chance of a good finished stone. This is because the lighter matrix is softer and more porous resulting in a very noticeable difference between the opal seam and the matrix when polished. Getting a good polish on the matrix is a trick in its own. You need to throw out all you knew about cutting and polishing opal. First, you need to plan on getting dirty. It is nasty stuff to cut as the Ironstone leaves everything coated with a rusty colored coating. So don't try to touch up one on your faceting machine that sets on the coffee table on your white carpet. If you have ever seen a rusty radiator in a car boil over and leave that rusty brown stain all over, well that is what you end up with when cutting matrix opal. Sometimes it is well worth the mess though.

My mentor in Australia who cuts matrix opal gave me the following "receipt" for cutting it and getting a good polish.

Rough cut it as any other stone. Start the sanding on 400 grit "DRY" Progress through 1200 grit still DRY Now go to an expandable drum with a resin belts and diamond paste starting at 6000 and going through 50,000. Little water in each step and limit the time in each step. Let the diamond do its work to eliminate the under cutting. You can end up with a very good polish and surface using this method. Just plan on getting dirty and "Please wear a mask".

Don

I personally use only a few select pieces to make jewelry but that being said, I look for stones that reach out and grab your attention. I like the so called "natural doublets" that come from following a seam and I like stones that the opal slashing through them either makes a picture or is striking. I then design a piece around the stone. Two good examples come to mind. I have one stone that's matrix itself is unremarkable, just simple gray stone. The opal though is fantastic and cuts through the dark gray stone in a V that makes it look like a dark mountain surrounded by a sunset. The stone is about 50 x 70. Another stone I have is in a dark wood colored matrix with swirls in the matrix that make it look like well-polished mahogany. Through this stone is laced thin purple fire that is so bright it looks like a lightening bolt. This too had its own setting designed for it. These are the kind of stones that I look for. - Alicia Miller

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March Gem & Mineral Shows

1-2--ARCADIA, CA: 44th annual show; Monrovia Rockhounds; The Arboretum, Ayers Hall, 301 N. Baldwin Ave.; Sat. 9-4:30, Sun. 9-4:30; admission to Arboretum grounds; 12 dealers selling jewelry, rough material, cut stones, specimens, lapidary equipment, other supplies and wire-wrapped jewelry, treasure wheel, grab bags, dinosaur dig, geode cracking, displays; contact Kris MacFarland, 3771 Bresee Ave., Baldwin Park, CA 91706-4119, (626) 337-8596.

1-2--VENTURA, CA: 41st annual show, "Artistry from Nature"; Ventura Gem & Mineral Society; Seaside Park, Ventura County Fairgrounds; Sat. 10-5, Sun. 10-4; free admission; gems, minerals, rocks, fossils, jewelry, exhibits, displays, demonstrations, prizes, video presentations, dealers, kids' activities; contact Jim or Nancy Brace-Thompson, (805) 659-3577; e-mail: jbraceth@juno.com.

7-9--OGDEN, UT: 52nd annual show, "Golden Spike Gem Show"; Golden Spike Gem and Mineral Society of Ogden; Union Station 25th and Wall Ave.; Fri. 9-6, Sat. 10-6, Sun. 10-5; adults $2, students $1.50, children under 12 free; Fri. is Kids' Day, contact Bonnie Glismann, 4326 S 200 W, Ogden, UT 84405; e-mail: bonniesbylines@juno.com.

8-9--BAKERSFIELD, CA: 1st annual show, "Rock & Mineral Rendezvous"; Helfrich's Rock Shop; Kern County Fair Grounds, 1142 South P St., at Belle Terrace; Sat. 9-7, Sun. 9-5; more than 100 booths with rocks, minerals, gems, fossils, lapidary equipment, silent auction both days, grab bags; vendors welcome; contact Lew Helfrich, 3006 N. Baker St., Bakersfield, CA 93305, (661) 323-2663; e-mail: lewsrocks@netzero.net.

8-9--SAN MARINO, CA: 45th annual show, "Gems, Minerals and Jewelry of the Southwest"; Pasadena Lapidary Society; San Marino Masonic Center, 3130 Huntington Dr.; Sat. 10-6, Sun. 10-5; free admission; dealers, demonstrations, displays; contact Marlene Kyte, (626) 794-0519; e-mail: marlenekyte@yahoo.com.

8-9--SPRECKELS, CA: Show, "Parade of Gems"; Monterey Bay Gem & Mineral Society of Salinas; Veterans Memorial Hall, 6th and Llanos streets; Sat. 10-6, Sun. 10-5; free admission; contact Peter Sherrill, 18070 Damian Way, Salinas, CA 93907, (831) 449-6242; e-mail: petkatmat@aol.com.

8-9--TURLOCK, CA: Show, "Show Time 2003"; The Mother Lode Mineral Society; Stanislaus County Fairgrounds, 900 N. Broadway; Sat. 10-5, Sun. 10-5; adults $3, children under 12 free with adult; contact Bud McMillin, (209) 527-8000.

14-16--VICTORVILLE, CA: 27th annual tailgate and field trip; Victor Valley Gem & Mineral Club; Sidewinder Mountains, I-15 exit Stoddard Wells Rd., east 11 miles, follow club signs; free event, Sat. field trip 9 a.m., 75 vendors will sell and trade; contact Bob Harper, (760) 947-6383.

15-16--HAWTHORNE, CA: Show; Northrop Grumman Gem & Mineral Club; NGRC Clubhouse, 12329 Crenshaw Blvd. (Entrance 16); Sat. 10-6, Sun. 10-4; free admission; lapidary displays, dealers, shop demonstrations, wire art and bead-knotting demonstrations, free hourly door prizes; contact Jimmy Lapham, (310) 784-0407; lapham@earthlink.net.

15-16--SAN JOSE, CA: Show, "Earth's Treasures"; Santa Clara Valley Gem & Mineral Society; Santa Clara County Fairgrounds, 344 Tully Rd.; Sat. 10-6, Sun. 10-5; adults $6, children under 12 free; contact Chuck Boblenz, 655 Santa Coleta Ct., Sunnyvale, CA 94085, (408) 734-2473; e-mail: cboblenz@aol.com.

15-16--SEATTLE, WA: 49th annual show; North Seattle Lapidary & Mineral Club; Lake City Community Center, 12531 28th Ave. NE; Sat. 10-6, Sun. 10-5; free admission; dealers, demonstrations, door prizes, grab bags, raffle, spin-a-wheel, silent auction, Sun. pancake breakfast; contact Bob Thompson, 15704 Greenwood Ave. N, Shoreline, WA 98133, (206) 362-2752; e-mail: thompson@seanet.com.

21-23--ALBUQUERQUE, NM: Show; "Treasures of the Earth"; Albuquerque Gem & Mineral Club; NM State Fairgrounds, School Arts Bldg.; Fri. 10-6, Sat. 10-5, Sun. 10-5; contact Paul Hlava, (505) 255-5478; e-mail: hpf1@qwest.net.

22-23--TORRANCE, CA: 54th annual show, "Nature's Treasures"; South Bay Lapidary & Mineral Society; Torrance Recreation Center, 3341 Torrance Blvd.; Sat. 10-6, Sun. 10-5; no dealers; contact Omer Goeden, (818) 353-9279 .

29-30--WALNUT CREEK, CA: Show, "Great Contra Costa Crystal Fair"; Pacific Crystal Guild; Civic Park Community Center, 1375 Civic Dr., at Broadway; Sat. 10-6, Sun. 10-6; contact Jerry Tomlinson, (415) 383-7837; e-mail: sfxtl@earthlink.net; Web site: www.crystalfair.com.