Tom L. Morgan, 4306 No. 26

The Lapidary Journal

THE STAR OF INDIA
(Actual size and color)
Largest and finest star sapphire in existence

OCTOBER, 1947

A National Magazine for

GEM CUTTERS + COLLECTORS + JEWELRY CRAFTSMEN

Hollywood, California

VOLUME 1 35c Per Copy NUMBER 3

JADE

GEM QUALITY STONE

from

THE ARCTIC CIRCLE

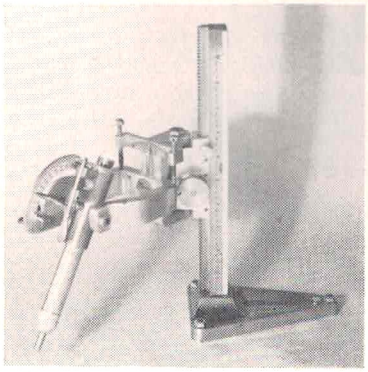
A truly fine stone of high quality
carefully selected
for the discriminating jeweler

ONE DOLLAR AND A HALF PER SQUARE INCH

HOUSE OF JADE
2429 Hollister Avenue
SANTA BARBARA CALIFORNIA

Introducing the

Master
"A HEAD OF ALL CUTS"



FACETING HEAD

Declared by many Professional and Amateur cutters to be the greatest advance in a Facet Head in the last Century. Special custom made, non-corrosive construction (where practical). Finger tip control (fast and positive). Compound angle feature (exclusive master). Permits the cutting of hearts, marquis, pendeloque with the same ease as cutting round brilliants. Slotted tripod base, head can be moved away from lap to grind and polish girdles. Hardened needle point pivots, insuring a lifetime of wear. Adjustable gib in mast to compensate for wear. Collet type chuck, elongated hole in protractor to compensate for adjustable stop. Calibrated column to enable the cutting of a number of stones of the same size. Head can be used on 8", 10" and 12" laps. 64 index standard equipment, 40 and 48 available on request. The master head available in Right or Left hand models. Right hand shown in picture. A precision tool for precision work. Price $98.50 F.O.B. factory.

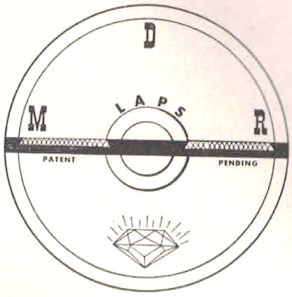
California purchasers add sales tax

OPENINGS FOR DEALERS

M. D. R. Manufacturing Company

5710¼ South Western Avenue
Los Angeles 37, California
Phone AX-2-9818

M.D.R. LAPS FOR FACETING



Precision cutting and polishing laps for all stones. Made of cast iron with an insert of tin, type metal, tin and type, lead or pitch. This type of lap assures you a true polishing surface.

Catalog	Price	Catalog	Price
No. 27—Tin	$14.20	No. 30—Type	$7.95
No. 28—Tin & Type	$10.95	No. 31—Pitch	$7.95
No. 29—Lead	$7.95	No. 33—Lucite	$4.20

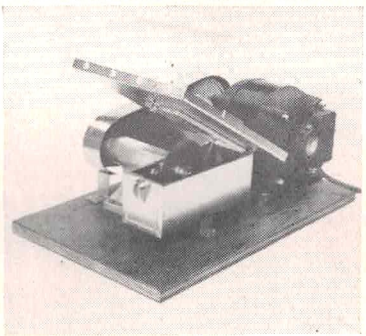
No. 32—Diamond, impregnated copper or bronze, 400 grit one side, 800 grit other side, price **$22.50.**

Something new—grind and polish on same lap.

No. 34—Combination copper and tin, 1⅜" of copper impregnated with 800 diamond, with 1⅞" insert of tin, **$25.20.**

Above prices are for 8" laps—½" arbor. 9", 10", 12" prices on request. If your dealer cannot supply you write direct to factory. All prices F.O.B. Los Angeles, subject to change without notice.

DIAMOND TRIM SAW



M.D.R. 4" Diamond Trim Saw No. 101

Aluminum alloy arbor, steel table, tank, guard and square head. All steel surfaces nickel plated. Precision ball bearing spindle.
Tank dimensions . . . . . 3"x3"x8"
Table dimensions . . . . . 8"x11"
Arbor size . . . . . ½"

Picture shows ease by which blade can be changed or tank removed for cleaning.

Tank and table can be removed in a few minutes and a jeweler's taper point installed for a polishing arbor for silver polishing or CARVING.

Price (less blade and motor) **$39.50 F.O.B. Factory.** Calif. purchasers add sales tax.

The Lapidary Journal

A NATIONAL MAGAZINE
for
THE GEM CUTTER, COLLECTOR AND JEWELRY CRAFTSMAN

THIRD ISSUE

PUBLISHED QUARTERLY — APRIL — JULY — OCTOBER — JANUARY

Volume One | OCTOBER, 1947 | Number Three

TABLE OF CONTENTS

COVER—THE STAR OF INDIA

Largest star sapphire in the world. Reproduced for the first time in its actual size and color. Photo courtesy of American Museum of Natural History. See story on Page 120.

Published by Lapidary Journal, Inc., 1129 N. Poinsettia Place, Los Angeles 46, California
Address Correspondence to Lapidary Journal, P.O. Box 1228, Hollywood 28, California.

COPIES OF THE LAST TWO ISSUES STILL AVAILABLE AT 35c EACH. ALL AVAILABLE BACK COPIES WILL BE 50c EACH AFTER JANUARY 1, 1948.

Manuscripts on lapidary, gem and jewelry subjects, as contributions, are solicited, but correspondence should precede submission. Contents are copyrighted and written permission must be secured from the editor to reproduce any of its contents.

Subscription Rates: $1.00 Per Year.
(4 Issues)
In the United States and Its Possessions.
Foreign Postage: 25 Cents Extra.
Single Copies: 35 Cents.

Display Advertising Rates
Furnished on Request.

LELANDE QUICK ..... *Editor*
HARRY R. RINGWALD ..... *Bus. Manager*
ALETAH QUICK, ... *Circulation Manager*

◆ Carving Gem Stones

By HARRY R. RINGWALD
Past President of the Los Angeles Lapidary Society
Business Manager of the LAPIDARY JOURNAL
1129 North Poinsettia Place, Hollywood 46, California

MANY amateur lapidaries will recall the great thrill you had when you polished your first cabochon or faceted stone. You looked forward to the time when your workmanship improved to such a high degree of perfection that you could produce beautiful gems without difficulty. When you reached this point you thought you would be satisfied. After many years of working cabochons and faceted stones, from all parts of the world, I was not content to stop there. All the time I knew there was something beyond this, something different which would help satisfy my greatest ambition and possibly start others, who had acquired the skill of polishing stones, on the road to a more difficult and rarer branch of the great lapidary art.

My thoughts turned to carving. I had seen and read much about those beautiful, exquisite carvings by the Chinese in Jade, Agate, Quartz Crystal, Lapis, Amethyst, etc. The thought of producing objects of art like these I believed utterly impossible as far as my skill was concerned but I said to myself, "I believe I can carve some simple objects. At least I am going to try but how is it done and how am I going to do it?" There was very little to be found on the subject in books. I thought of this for over a year before I had enough courage and confidence to attempt it. Many nights in bed I planned what I was going to carve and how to proceed to do it. The subject was on my mind so much that I began to imagine I would really show the great Chinese masters something!

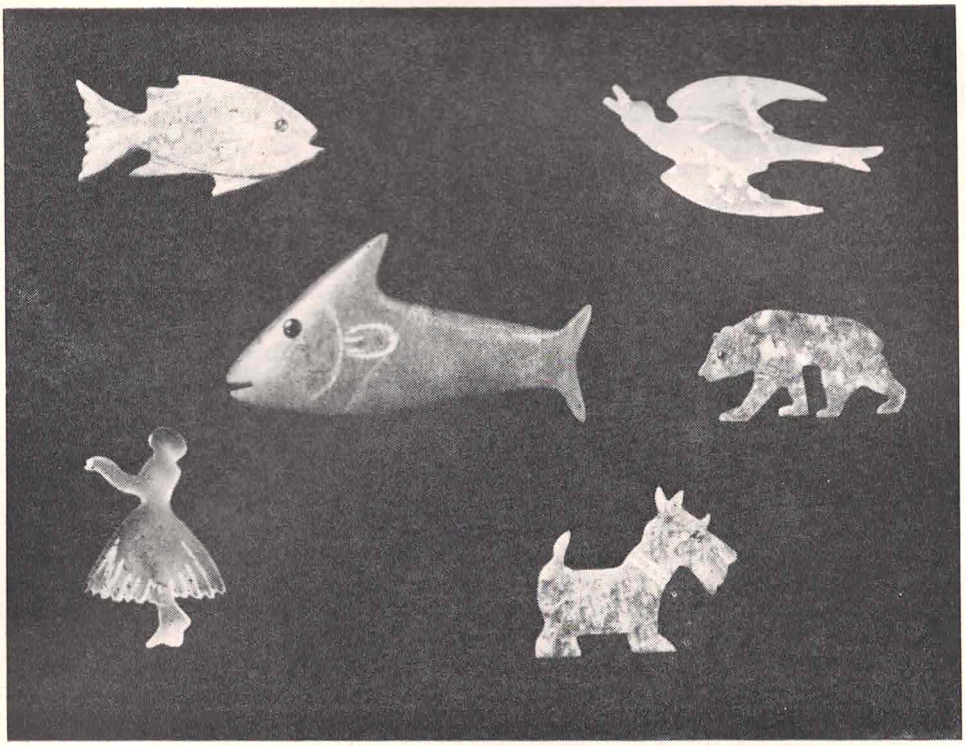
The Chinese possess all the methods known to our modern cutters. The only difference is in the method of wheel power. Their technique is to hold the stone against the revolving wheel and their tools include the circular disc-saw, wire-saw, diamond-pointer borer, tubular drill, lap wheel, cup wheel, steel grinding wheel and numerous steel points in various shapes and sizes. To all of these except the diamond borer they apply the abrasives mixed with water just as we do in many operations today.

It is not the intent of this article to lay down rules or to tell you how you should do carving. There may be better and easier ways of accomplishing the work than the trial methods used by myself. I want to tell how I produced small figures with the hope it may be of some help to my fellow lapidaries who are interested.

It has been suggested that beginners use soft materials first and then after experience proceed to harder stones. I was so anxious to make rapid progress that I passed up this suggestion and started in on cutting quartz materials. My first carving was a Wyoming jade fish about 2¼″ in length, which was copied from a print of an ancient Egyptian amulet. For the eye I used an Arizona garnet. The other figures are from 1¼″ to 2¼″ in length and are illustrated on Page 105.

Some of the figures were copied from prints and others from costume jewelry. In the ten-cent stores I found some plastic moulded figures which I used for patterns. Some were copied in relief or partly in relief, and others with flat surfaces.

I gathered a number of small tools. I got a Craftsman's Moto Tool which could be mounted in a stand in a vertical position as I used the method of holding the stone in the hand and applying it against the wheel. Then I procured a wire saw frame (5″), a number of carborundum sticks 4″ long (used like a file) in various shapes—angular, round, cone, square, etc.—for hand work. I also had an assortment of Norton Crystolon mounted points, a couple dozen ⅞″ carborundum saw-discs, a 1″ diamond saw (for moto tool use), a box of round birch toothpicks for polishing (also used in the moto tool), a nail file around which could be wrapped small pieces of carborundum paper for hand use, several ¾″ x ⅛″ grinding wheels in various grits,



Fish—Myrickite, Nevada. Ruby eye—Burma.

Dancer—Moss Agate Montana

Egyptian fish amulet. Wyoming Jade. Garnet eye—Arizona.

Bird—Horse Canyon Agate—Calif. Emerald eye—Colombia, S.A.

Bear—Texas Agate. Jet eye—Germany.

Dog—Wyoming Jade. Tourmaline eye—Brazil.

felt discs and cone shaped buffs, an aluminum pencil for marking the design on the stone, cerium and tin oxide polishing powders and an assortment of dental drill points for drilling the eye sockets.

Most of the gem material used was from 1/8" to 3/16" in thickness, because I realized the thicker the material the longer it would take to do the work. I selected good material without cracks. At the beginning the surface of the stone was smooth but not polished for it is difficult to trace a pattern on a polished surface. The time spent on the carved figures ranged from 20 to 40 hours for each. After working on a piece for several hours the tracing of the pattern will begin to wear off and it must be retraced many times as the work proceeds. I pasted a print on a stone but this soon wore off and the pattern was lost. After carefully selecting the material I traced the pattern on the stone with an aluminum pencil. Then with the 6" diamond cut-off saw I trimmed off all the surplus material, being very careful to cut near the traced lines but not into them. These cuts were in straight lines (Figs. 1-2-3). The next step with the 6" cut-off saw was to saw into the openings near the curved lines in a comb-like fashion (Figs. 4-5-6). The teeth of this comblike cut were then removed by sawing directly into their points. Not being uniform in thickness the very thin ones broke off while the saw would go the full length on the thicker sections. By slightly shifting the stone I was able to wear down all the comb teeth. The jagged edge was further evened by carefully moving the stone back and forth across the saw blade. Wherever the saw can be used it is much faster and safer for removing material than the small grinding wheels. In the sawing operation it was necessary to use a block support, cut at an angle, for the stone to rest upon in order that the cuts would reach the same depth on the underside of the stone as on the top. By trial one can determine the proper angle for the support. The next step (See Figs. 7-8-9) was to use the moto

tool with the one-inch diamond saw and also, at times, the 7/8" carborundum saw-discs, to further cut into the small openings. The carborundum saw-discs wear down fast but are effective on quartz. They are delicate and must be handled with care.

Thus far all sawing operations were in straight lines. Then came the inner curved lines of the figure which were worked with the wire saw. The wire was nicked by placing it on the vise block and striking it with the edge of a file to hold the abrasive. The abrasive was mixed with olive oil and applied to the wire with a small brush. All recesses which could not be reached with the straight line saws were cut out with the wire saw. If the stone cannot be entered from the outside, it is necessary to drill a hole and then unfasten one end of the wire on the saw frame, insert it through the hole and refasten. This wire sawing operation is very slow but it will do the work and it is surprising how easy it is to turn the corners. A 6" 220 grit grinding wheel was used to remove the remaining surplus material. The 3/4" x 1/8" grinding wheels were used to true up and smooth out the edges of the stone. Some of the places which could not be reached with the grinding wheels were worked with the carborundum sticks, used like a file. Other parts were ground with mounted points operated with the moto tool. The final sanding of the edges was done with 400A carborundum paper held with the fingers. All operations up to this point consisted in shaping the edges of the stone to get a good outline.

For cutting semi-relief surfaces I used the 1" diamond saw and small carborundum saw-discs, cutting into the surface of the material at various depths according to the design desired. These cuts were made very close to each other (comb-like) and removed as previously described. Then the small grinding wheels and mounted points were used and also the carborundum sticks. The entire surface was then sanded with various grades of carborundum paper held with the fingers. The figures with the flat surfaces were then mounted on a block with sealing wax and sanded and polished in the usual manner of working cabochons. The edges of the stones and the faces of those carved in relief were highly polished with a round birch toothpick. The toothpick was inserted in the chuck of the moto tool and cerium oxide was applied with a small brush. The edges were polished by holding the stone in a horizontal position while the top surface was polished by holding the stone in a vertical position against the toothpick. In this operation the moto tool was in a vertical position. By using blocks and padding, the moto tool, while mounted in the stand, can be laid on its side and operated in a horizontal position whenever the operation requires it. After a little use the toothpick will weaken or break and it is necessary to keep replacing them. In drilling the eye sockets I used the dental drill points in the moto tool with 320 Boron Carbide. The lever on the moto tool permitted me to raise and lower the drill point constantly to feed new grit to the point of contact. Modeling clay was used to make a well around the hole to keep the grit mixture in place and it was mixed with water. The modeling clay was much easier to handle than sealing wax. About 1/16" socket depth was sufficient for holding the eye. It would have been easier to use small glass beads for the eyes but as that would cheapen the carvings I made them out of Ruby, Emerald, Jet, Tourmaline and Garnet.

The eye that gave me the most difficulty was the one made of Jet for the little California brown bear cut from Texas agate. I almost gave up in despair but after eight hours I was finally successful in getting the tiny black eye in the socket. This little eye was smaller than a pin head and it had to be nice and shiny when in place. I figured it would not be possible for me to polish it after the material had been reduced to the proper size so I cut a sliver of jet about one inch long and the thickness of a round toothpick, rounded it and then polished one end. I tried it in the hole and saw it was much too big, so I cut it down some more and still it did not fit; I continued trimming it until it seemed about the size of an atom. Then I cut it off and my real troubles began. The confounded eye disappeared and a long search produced no results. I made another which also popped out of sight. This was followed by four or five more and all of them vanished. Then I had a great idea. Amateur lapidaries are always getting ideas that no one ever thought of before. I got

a cardboard box about 18 x 16 x 8" deep. I placed my tools in this and the little carved figure and then I cut another eye, holding the material in the box while cutting it off. There it was in the box, it couldn't get away now, but when I went to pick it up with tweezers it shot clear out of the box and has not been seen since. I quit looking for the eyes; it seemed useless. By this time I was pulling my hair, with tears in my eyes almost because I could not overcome this seemingly simple operation after all the difficult work had been done on the bear. I had started on the eye right after breakfast and now it was just about time for my supper. "I am not going to let this thing get the best of me," I said to myself, "this little bear is going to have an eye if it takes me a week to make it." I then cut another sliver of jet, polished one end first, then cut it down until it fit, held the material in the box and cut it off. The eye slipped out of the twezers a couple of times but did not get out of the box this time, and I finally was successful in putting the eye in the bear. A very small drop of Excellsall liquid glass cement held the tiny mite in place.

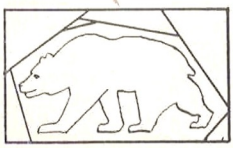


FIG. 1

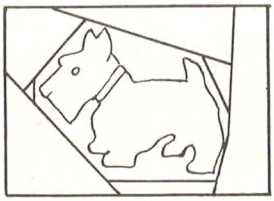


FIG. 2

FIG. 3

FIG. 4

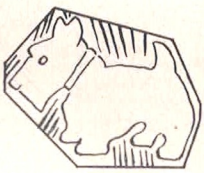


FIG. 5

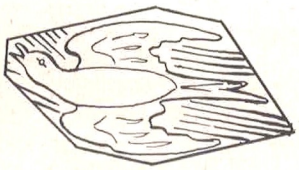


FIG. 6

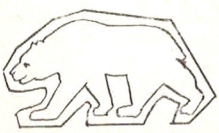


FIG. 7

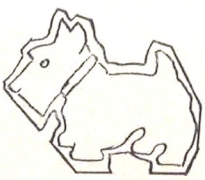


FIG. 8

FIG. 9

FIG. 10

FIG. 11

FIG. 12

Carving steps described in this article

Undoubtedly I could have made my carvings in much less time if I had not taken such pains in trying to get an exact reproduction of the patterns, with graceful lines and proper proportions. As in my dreams, these little figures were to be jewels and saving time was no object. Although one is working from a copied pattern, it requires a great deal of care to produce a fine object. As in all carving and engraving, material once removed cannot be replaced. To get a high polish on all the edges, recesses and curves also requires considerable time.

I do not regret the many hours put in on these small figures although in the same time I could have produced a hundred cabochons. It seems there are too many cabochons. I have several hundred myself, but prize these small carvings above them all. If you have become very weary of cutting cabochons and want to try something that will tax your ingenuity and be more rewarding why not try carving? To me it is the height of the lapidary art. There is no place to go from there. I believe all those who have acquired skill in working cabochons and faceted stones should take this final step.

Of all the beautiful sparkling gems there is none that can compare with a beautiful carved pattern or lifelike figure in gem material and adorned with precious stones. In my estimation the beauty and value of the ruby and emerald is greatly enhanced when this master touch is applied. Any lapidary can do carving, but how successful he will be depends upon his artistic ability, his patience and the degree of perfection he desires and attains. One should not dwell too much on the work of old masters or the Chinese who are the greatest carvers of all time. Their native good taste, exquisite ideas of beautiful and intricate design, their mastery of executing the most delicate and dainty patterns, their unlimited patience and great skill in working hard materials simply amazes us when we view their work. But it is possible for any lapidary to turn out creditable carving if he really wants to and I would like to hear of any experiences you have if you attempt it.

◆ The Faceting of Soft Transparent Stones

By GRIFFIN GRANT WAITE
38 St. Germain Avenue, Toronto 12, Canada

The JOURNAL is fortunate in having Mr. Waite offer this dissertation on the working of soft stones as it is probably the most authoritative and useful article ever published on the subject. The author is widely recognized as a competent investigator of polishing phenomena and has a long record as an avid experimenter with faceting problems.

Facet cutting of the softer minerals is something that most amateurs do not seem to have attempted. Sporadic attempts, using ordinary methods and equipment, inevitably seem doomed to frustration and disappointment. Perhaps the first requirement for ultimate success is a particularly mulish disposition.

My first serious attempt to cut a stone softer than apatite arose while cutting the calcite for a dichroscope. The dichroscope worked and is still in use, but the polish was not something for pride. The next encounter with the general problem came about when building a gem refractometer. This was before the war and the principal element in the instrument was an optically true hemisphere of glass. Suitable glass for this instrument was at the time only available from Jena. The glass purchased was known as SFS-1. It had a high lead content, a refractive index of 1.9229, and it was extremely soft. After an investigation of the methods used by lens makers, and considerable trial and error, the job was successfully completed. The finish cutting was a generating operation using the finest optical emery. The polishing was also a generating operation using the usual small, self-actuated whirling lap. The lap was faced with optical pitch, carefully grooved with a knife, and fed with a thin suspension of rouge in water. I remember that I even installed a sapphire cup jewel in the back of the lap for the pressure point to bear in. Several years later, when seriously tackling the problem of the facet cutting of soft gems, the above mentioned experience with the lead glass hemisphere yielded a number of clues that were of great benefit.

The standard technique with most lapidaries for polishing gems softer than corundum is to use a lap of tin, pewter, brass, or bronze with an aqueous suspension of tin oxide, titanium oxide, alumina, or chromium oxide as the polishing agent. That works fine with most gems down to apatite in hardness. While feldspar polishes readily with this technique, large tables on quartz gems are sometimes very difficult to free of grain marks. By using a slower speed for the lap spindle, and the most suitable direction of motion relative to the crystal structure of the gem being polished, even fluorite can be polished successfully by this method.

This is marginal territory for standard techniques however. It is purely with the hope that other amateurs can be induced to become interested that this article has been written. The writer believes that, with the cooperation of other active experimenters, a set of techniques will in time evolve and become standard practice for the soft gems. The following notes and observations represent merely the results of gropings after information by one individual.

Many of the observations may appear disconnected and perhaps irrelevant. Every new material presents a new set of problems. First attempts are chosen by reference to previous experience on what are assumed to be related minerals. Related minerals means the same hardness, same crystal structure, same tendency to cleavage or parting.

The Table

Rightly or wrongly the writer starts by "putting on" the table. If the gem is part of a large crystal fragment sawing is required. The softer minerals are often very cleavable and will not stand the abuse of the usual diamond saw and it is far too thick and wasteful of material.

A small diamond saw made from .010 to .006 inch thick of phosphor bronze and 2½" to 4" diameter is the answer. Drive it at several thousand R.P.M. through a light "string" belt run rather slack. The softer the stone the slacker the belt. Kerosene is a suitable lubricant and a true running round saw is essential for tender stones. The stone is held in the fingers; sawing is extremely fast, and by applying plenty of kerosene with a brush no damaging heat need be generated.

If a little flattening of the table is required, use No. 900 optical emery and water on a non-ferrous metal lap, (brass for example). If a lot of flattening is required, use No. 900 optical emery and plenty of time. In my opinion, No. 600 carbo grit is unfit to prefinish any gem stone of *any* hardness. In confirmation of this the mushroom lens industry during the war found it expedient to return to the use of optical emery.

The reason for specifying a non-ferrous lap for cutting is to avoid the uneven cutting that results from the rusty regions on a cast iron lap retaining the loose grains while unrusted regions let them slide off. Even the use of rust inhibitors will not always prevent trouble.

Many amateurs dop a stone in order to cut and polish the table. Very little practice is required to learn to do this by merely holding the stone between the finger and thumb or, in the case of small stones, on the end of one finger. A little bit of stickum on the finger helps to avoid dropping the stone. There are good reasons for this method, particularly in the case of tender stones. Dopping is risky, as too sudden or too uneven heating or cooling will crack many gem stones. If one can do the table without dopping that is a risk avoided.

Roughing out a stone on a wheel previous to dopping is optional. The writer seldom does this, in the belief that good gem material is often wasted by roughing out. However, it is freely admitted there are two sides to this question.

Dopping

A cold cement that would set in 10 minutes and yet be removable with solvent in another 10 minutes would be the ideal material for dopping tender stones. But I haven't found it.

Shellac, sealing wax and chasers' cement are rather standard for the usual gem stones. They are far too risky for tender stones. So far I have found Kerr's Perfection Impression Compound Tracing Stick No. 1 (obtainable from dental supply houses) a great improvement over the usual cements. It softens and becomes very tacky at quite a low temperature, although still uncomfortable to the fingers at that temperature. It adheres well to the other cements so that only a thin layer need be applied over the usual cement. Aside from facet cutting it is very useful when working valuable opals.

A stone not unduly sensitive to heat may be dopped by slowly warming it and the dop stick to the softening temperature of the Kerr's compound. This may be done by waving through the heated columns of gases rising from an alcohol lamp. Start at about two feet above the flame and very gradually lower the plane of motion to six inches as a minimum. The trick is to do it slowly enough. If you hear a click and find your stone in two pieces you were rushing things too much.

For some stones (barite for example) the foregoing technique is too risky. It is better to spend 20 minutes and dop them under water. To do this, heat a small dish of water over a slow heat source. I use a porcelain evaporating dish on an electric hot plate set low. Put water at room temperature, stone at room temperature and dop stick into the dish and let them warm up gradually until the stick of Kerr's wax in one hand will stick under water to the stone steadied with tweezers in the other hand. Lift the dish off the heat source and manipulate the stone to its correct position on the dop stick. Let the water cool slightly before removing the dopped stone from the water. A metal dop stick stores heat and helps keep the stone from chilling too rapidly after removal from the warm water.

Cutting

Unless the stone is very large and is known not to be of fibrous or bladed structure, it is best to stick to No. 900 emery for all cutting operations. Grains of carborundum, even as fine as 400, have a devilish aptitude for forming wedges and splitting minerals such as kunzite, apophyllite, cyanite, tremolite, and vivianite, to mention just a few. So

pass up carborundum and use 600 emery even if you have a lot of material to remove. The direction of the cleavage or of the fibers in the mineral *must* be closely watched. When you stroke a cat the wrong way undesirable consequences often ensue. Therefore be sure that you grind and polish your mineral so that the fibers lie down, if it is that kind of animal. A rotating lap has all possible directions of motion in that one plane. See that you choose the correct direction for each facet.

This is a lot easier said than done. Ability to move your stand rod to and fro from the center of the lap gives additional choices of direction and a 90 degree dop stick completes the job. Different equipment entails different methods of meeting this requirement. It is, however, a requirement that is almost obligatory if you are going to cut Cyanite or vivianite.

The facets of many soft stones, and the small facets of even fairly hard stones, often can be polished without previous grinding. Use the polishing technique and cut and polish simultaneously. Wulfenite, vanadinite and crocoite are three examples that will yield readily to this method.

Polishing

When the cutting has been done properly and you have the proper lap, speed direction and polishing agent, polishing is speedy and trouble free. This is true of all minerals I believe. I must hasten to add that I do not always find this combination, yet I believe it exists.

Experience favors the rule that the softer the stone the slower the R.P.M. of the lap. I have found that only by lowering the lap speed to a mere crawl could I get some materials to polish. My spindle is driven by an A.C. variable speed motor of very wide range in speed. It is even reversible through zero speed.

I haven't found the ideal lap but I get by on soft stones with three laps. Two are end grain wood and the third is a wax lap. The only woods that I have first hand knowledge about that will not check, crack, and eventually go to pieces with the cycles of wetting and drying are poplar and teak. Both are about 8½″ diameter and 3″ thick. They have stood up for years of use now. The polishing agent used with these wood laps is always cerium oxide. I have found nothing better but I haven't tried many other things as the cerium has been so satisfactory.

The drawback of a wooden lap is the nap. End grain wood has a nap like the pile on a rug, although it is extremely short. This nap results in a rounding of the facet edges. Occasionally you can see commercially cut stones, often amethysts, having a high gloss and rounded edges that are telltale indications of the wood lap. In an attempt to control this my laps were faced off with a razor-sharp tool and the surface lightly impregnated with beeswax in xylol. The wax holds the pile and results in quite an improvement. By adding a few drops of aerosol solution to the ceria and water the repugnance of wax for water is somewhat mitigated.

Aside from their use with softer stones, these wooden laps are standard practice for polishing the tables only of large stones. They form the most dependable method of polishing large tables on amethyst, citrine, and smoky quartz. Rounding of the edges is no problem, as all the other facets are cut and polished after the table is done.

My failure of an attempt to polish a good sized brown barite gem led to the development of the wax lap. The wax used was a mixture of beeswax, carnauba, rosin and paraffin made up and on hand for "lost wax" process casting. It proved to be too hard but by warming the lap previous to use the barite was successfully polished.

An ordinary 9″ metal lap was placed on a hot plate and warmed up to the melting point of the wax. Wax was rubbed on until there was a good thirty-second of an inch of liquid wax on the surface. Next a well worn piece of open texture cloth, free from lint, was stretched over the waxed surface and the whole thing allowed to cool. After cooling the wax was carefully scraped down to the surface of the cloth and the lap was ready for use. I found that it polished an aquamarine beautifully, although more slowly than on a tin lap. I have found no tendency to scratch soft stones when using this wax lap. I have used only ceria and water with a little aerosol as a polishing agent on this lap.

(Continued on Page 114)

(Continued from Page 112)

Frankly the wax lap is too new a tool to be able to evaluate all its possibilities. I hope some readers of this article will make wax laps and contribute their findings to the general fund of knowledge. My next experiment with the wax lap will be to combine beeswax with ceria and use the mixture to make a new lap. The cloth, I feel, performs the essential functions of preventing the stone cutting grooves in the surface of the wax.

In conclusion, consider the case of these latent orchids of the mineral world; these forgotten Cinderellas, thought unfit to adorn a velvet receptacle. Give them a chance. Where among the harder gems can you find the orange red colors of wulfenite, vanadinite, and crocoite; the blue and green of cyanite, and vivianite; the red of proustite; the color range of a suite of fluorites; the dispersion of sphene, sphalerite or benitoite; the limpidity of beryllonite, hyalite, petalite or apophyllite?

◆ Agate and Silver Table Ware

By J. W. ANDERSON
3614 Ednor Road, Baltimore 18, Md.

Last fall I thought it would be a nice idea to make my wife a Christmas present of six sterling silver butter knives with agate handles. I planned to make only the handles and have a professional silversmith do the silver work but when I learned that it would cost a small fortune I decided to do the whole thing myself. I never had any intention of doing silver work before this and I knew nothing about it. I had no personal instruction and the only knowledge I obtained was from William Baxter's book JEWELRY, GEM CUTTING AND METALCRAFT. After studying the book thoroughly I connected a hand made torch with the gas in my basement and used an old blower from a discarded vacuum cleaner. I fastened this under my work bench and devised a convenient switch for the electric current.

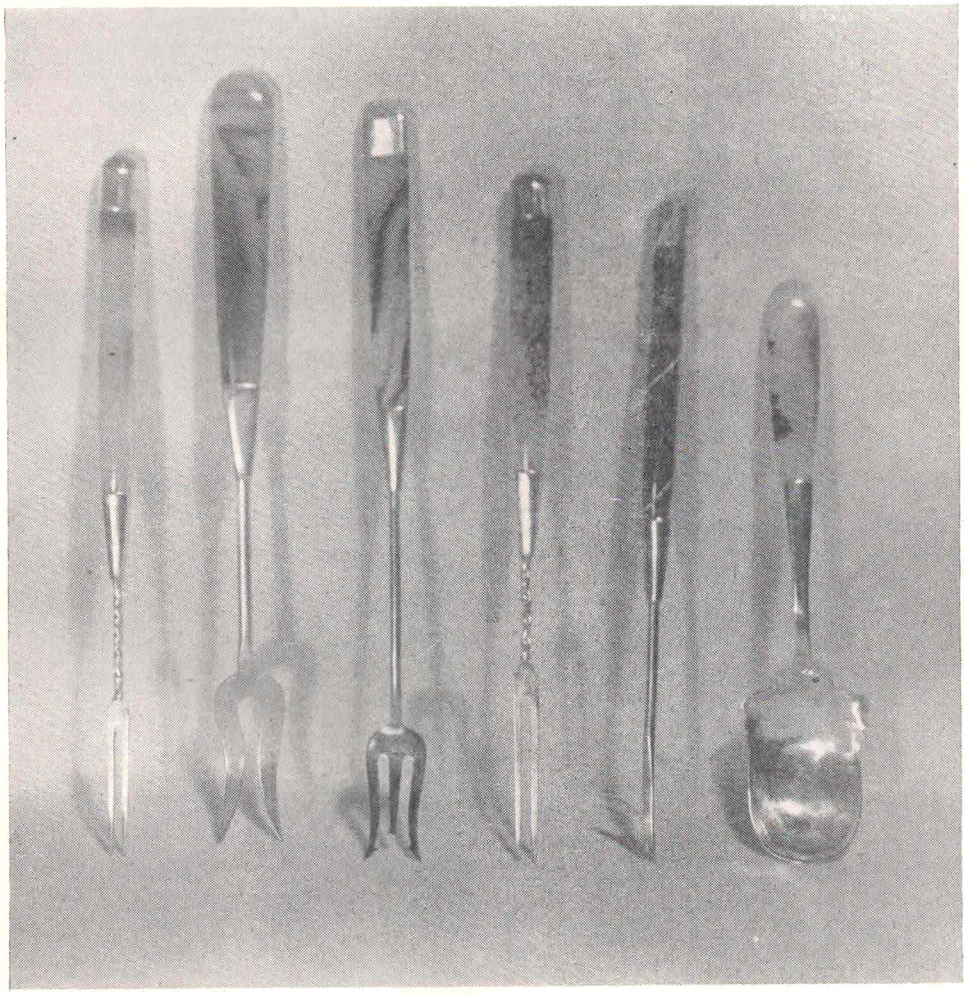
After purchasing two sheets of silver, 3″ by 6″, gauge 16 and 22, I cut six pieces the size and shape in Figure 1 from the 22 gauge material. With hard silver solder I shaped them into silver cones (see figure 2) into which I could insert the agate handles. I then cut pieces about 3″ long from the 16 gauge sheet but about 3/8″ narrower than the finished knife blades would be. These strips were slightly wider at one end than the other. About a quarter square inch was then sawed from the corners of the narrow end of the strips. (See figure 3). The short neck should be nearer the top of the knife blade than the bottom so that the handle will be nearer the top of the blade. A piece of 16 gauge silver should then be soldered to each side of the neck as indicated in figure 3 by dotted lines. This gives greater strength to the blade at the narrow point. After doing this I filled the neck until it fit the cone for the handle or about 1/16″. The cone was soldered to the blade with hard solder and the blade was hammered on an anvil until it was wide enough, with care being taken to keep the back of the blade a little thicker than the cutting edge. An outline was then marked on the blade with a pattern and it was snipped and filed. Instead of filing out the hammer marks I ground out the marks on the side of a No. 220 grinding wheel running in water. The silver was finished with a fine file, No. 220 grit cloth and tin oxide on a felt buffer followed by a soft cotton buffer with jeweler's rouge. All file marks should be removed before polishing.

The agate handle should be sawed from a slab no more than 3/8″ thick, free from fractures or detracting marks. The handle should be two and one-half times as wide as it is thick and kept flat with rounded edges. In tapering the end to fit the silver cone keep the shape the same as the rest of the handle. A perfect job of sanding and polishing must be done on the agate or the effect will be ruined. In setting the handle I found an excellent cement in Rapid Stone used by dentists. It is a powder and it should be thinned with water to the consistency of heavy cream. Before setting the agate handle make several notches in it with the sharp corner of a grinding wheel or a diamond saw as in figure 4. Be sure no air bubble is in the silver below the cement. It helps to scratch the silver deeply on the inside of the cone before soldering. All silver polishing should be done before setting the handle. Bevel the edge of the silver before setting the handle so that if a perfect fit is not obtained the silver can be burnished before the cement sets. The cement sets in about an hour but the knife should not be used for several days. Once it sets it is permanent. I tried to remove a handle and found it impossible.

Before polishing the silver and setting the handle the silver should of course be pickled after the soldering work is completed. This is done in a warm solution of one part sulphuric acid to ten parts of water. A copper dish is used and the articles are removed from the pickle with copper tongs as iron tongs will discolor the solution. Full directions on pickling, sawing, soldering and polishing may be found in Mr. Baxter's book which also gives complete information about the tools and materials needed.

It is interesting of course to make some of your own tools. Good wooden mallets can be turned on a power drill and instead of an expensive block and dies one can use a large hardwood block with assorted sizes of depressions and common round-headed bolts ground smooth and polished for dies. One should experiment with shapes by drawing patterns. Select the one of choice and paste it on the silver sheet and saw around it. Use a few drops of turpentine on the work to prevent gumming.

If the handle is round it adds greatly to set a stone in the tip of the handle in a contrasting color such as a translucent red or blue. A lightweight silver tube should be made and driven over the tip of the handle with a wooden or rawhide mallet. Drive it on the handle until just enough of the tube is left for setting the stone which is then set as in a ring. I think these sets improve round handles but they destroy the simplicity of outline in flat handles and are somewhat garish. In this type of work one cannot see his mistakes until the item is finished so that artistry is improved with experience. Balance and proportion is a matter of self education. The work involves no particularly difficult problems. It is the simplest form of hard soldering and when care is exercised the results are very beautiful and rewarding.



Examples of table ware made by the author from Montana agate and silver.

(Photos courtesy of W. T. Baxter)

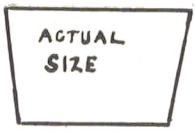


FIG. 1

FIG. 2

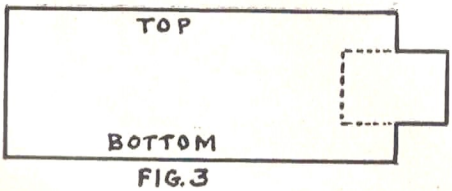


FIG. 3

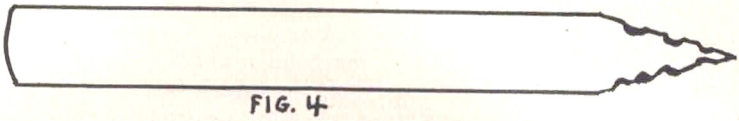


FIG. 4

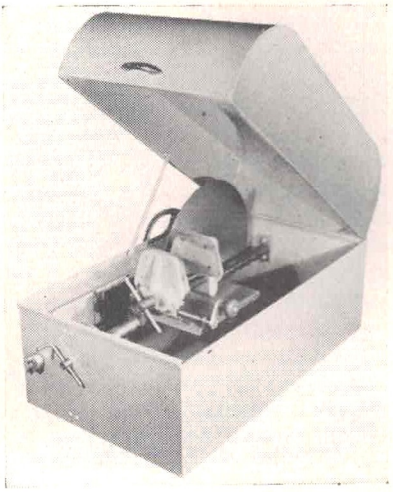
A silver rope may be put on round handles of the harpoon pickle fork type which is very effective. Twisted silver wire can be soldered to the cap and harpoon at an angle of 45 degres, allowing about 1½" for winding around the handle. Drive and cement the cap firmly on the end of the handle and then turn the handle in the socket until the wire rope fits tightly. Heating and softening the wire makes this procedure easier. A good shank for a small pickle fork may be made from a narrow strip of 16 gauge silver about 1½ times as wide as it is thick. Be sure it is uniform in width. After annealing it fasten one end in a vise and twist it with pliers and keep pulling it. As the ends will be oblong in shape the one that enters the cone should have a small separate piece of silver soldered over the end, coming down on each side not more than 1/16". This can be filed to fit the small end of the cone and is more satisfactory than plugging the holes with silver. In order to make a good joint silver must always contact silver.

I shall be happy to answer any questions readers may have if they will enclose a stamped and self addressed envelope for reply and of course I would like to hear from anyone who has been doing similar work.

The author examining an assortment of his fine craftsmanship.

"ALTA" Lapidary Equipment

ALTA DIAMOND SAW UNIT



This new saw unit is ideally suited for slabbing large rock specimens, as many as ten ¼" thick slabs can be cut in one setting, cross feed is actually 4".

Longitudinal feed is 11", thus rocks as large as 6"x8" by 13" long can be handled in this machine. Three step pulleys are provided on the lead screw for changing the rate of feed to cover any size and hardness of stone. A small totally enclosed gear box gives the necessary speed reduction to the lead screw. Saw arbor is aluminum casting with pressed in quill bearings, and Alemite fittings are provided for easy oiling. Maximum capacity is a 16" diameter saw with ¾" diameter arbor hole. Overall dimensions are 18"x32"x19" high. Totally enclosed heavy sheet metal construction. 6" diameter pulley is furnished on saw arbor.

Total weight 95 lbs. Price (less motor and blade) is $127.50 F.O.B., Pasadena, Calif. Shipping weight 115 lbs. We are now in production on a new "weight feed" saw, identical in size as above saw, which will sell for $91.50 F.O.B., Pasadena.

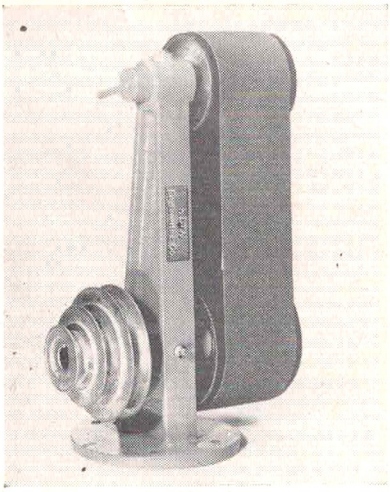
ALTA SANDER & POLISHING UNIT

A real purpose unit ideally suited for sanding and polishing. To adjust belt tension or changing belts simply turn cam lever on top of casting and lock set screw, a real time-saving factor. Most important advantage is that pressure on cabochon is distributed over a larger area, thus preventing overheating of stone at point of contact.

Flat specimens can be sanded and polished by holding them against rubber covered pulleys. The frame is a heavy aluminum casting precision bored for perfect alignment of upper and lower shafts. A 4" diameter die cast pulley with 3 steps provides a wide range of speeds. Sanding and polishing belts are endless 2½" wide by 27" long. Various grits available for sanding.

Overall dimensions, 7¼" wide by 12½" high, weight 9 lbs. Price (less belts) $19.50, 3 belts 120, 220, 320 grit $1.00. 1 woven polishing belt $1.95. Prices F.O.B. Pasadena. Shipping weight 15 lbs.

DIFFERENT



California Purchasers Add Sales Tax

ALTA ENGINEERING CO.

915 East Washington St., Pasadena 6, California

The Star Stones

By LELANDE QUICK

Authorities advise that a conservative estimate of the gem collectors in America would be 200,000 persons. This is an estimate of the gem collectors only; the people who make a collection of gem stones as other people collect buttons, stamps, coins, etc. It does not include the lapidaries, nearly all of whom collect stones other than the ones they cut themselves. But all these people desire to own at some time a star stone; a cabochon that shows the star ray effect known as asterism. The corundum family includes the sapphires and the rubies and they are often asteriated. Probably no stones are lovelier.

Our cover this month is unique in that for the first time anywhere the largest and finest star sapphire in the world is produced in its exact size and exact color from an actual photograph. It is not a drawing. This photograph was taken for us under the direction of Dr. Frederick Pough of the American Museum of Natural History in New York to whom we and all gem collectors everywhere are indebted. For it becomes a feat to take an actual photograph of a star stone that will show the star plainly and not show at the same time too much other reflection. We believe the Museum photographer has achieved as fine a picture as will ever be presented. And of course no photograph can do justice to such a magnificent gem as THE STAR OF INDIA. No photograph ever conveyed the majesty of a California redwood tree; you must stand beneath one to properly feel the awe of the largest and oldest living thing on earth. And you must actually gaze at THE STAR OF INDIA to conceive its great beauty.

The actual size of THE STAR OF INDIA is 1¾″ long by 1 9/16″ wide and 1½″ deep. The gem was given to the American Museum of Natural History by J. P. Morgan about 1902. Both the top and the bottom are polished and the star shows from either side. The star is well formed and defined and the stone itself shows the characteristic hexagonal banding pattern. It is fairly uniform in color and it is free of cracks and flaws. It weighs 563.35 carats. No value has ever been placed on the stone and the original price paid by Dr. Kunz, who purchased it for Mr. Morgan, was never revealed. However, it is entirely safe to say that if the stone was ever offered for sale that at least a dozen buyers throughout the world would gladly offer a fortune for its possession and that it is one of the most valuable gems in existence for it is said to be the finest and largest star stone in the world. While the stone is large and clean it is not the deep rich blue color of the expensive star gems.

The origin of THE STAR OF INDIA is not definitely known but it is doubtless from Ceylon. A photograph on the museum's original catalog card shows it in a setting with four diamonds around it and there are notes about it having been cut by Nockold, the "sapphire king" of London, and once having belonged to an Earl but the record of the name is now illegible. Dr. Pough writes the JOURNAL that "we have always regretted that Kunz was so close-mouthed about it. In one of his books he said that it had a 300 year history but failed to give the basis for his statement. Tiffany was queried a few months ago but they replied that they had no data in their files."

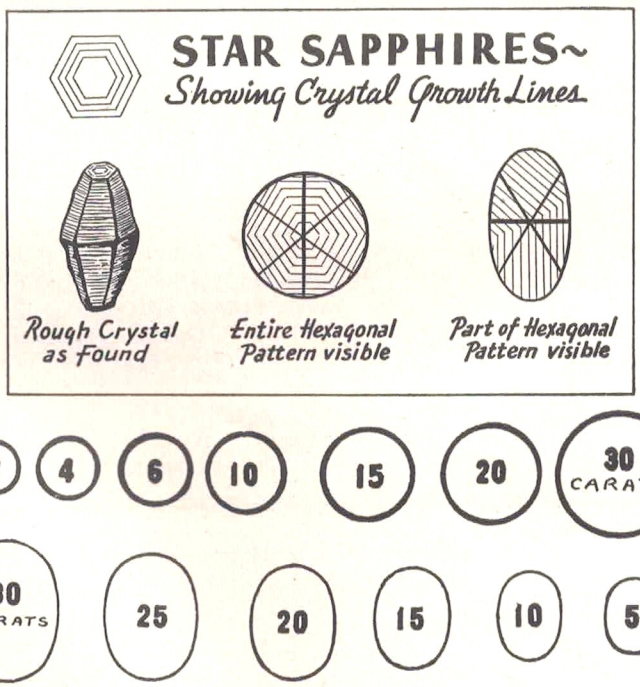
The same museum also possesses what is regarded as the finest star ruby in existence. It is the De Long ruby, weighing 100 carats and it has a very beautiful star. The stone is clean and of good color. A gift of Mrs. Edith Haggin De Long about 1936, it came from Ceylon and is probably the best stone in the museum's collection.

Just as no stamp collection is considered moderately good unless it contains a fair representation of the Columbian issue, no gem collection can be considered representative unless it contains a star stone. For the untrained and unappreciative person examining a collection is more apt to be impressed by asterism than any

phenomena displayed by any of the gems. Good star stones can be purchased for collections from almost any of the gem dealers. They are not usually available at your local mineral and lapidary suppliers because there is not sufficient demand for them to carry such an expensive inventory. However, many of the wholesalers in the larger cities have them and several of our regular advertisers have good stocks of them if you wish to direct inquiries to them.

Here in America we secure fine star garnets from Montana and they are fairly common in experienced lapidaries' collections. Of course nearly every lapidary possesses some star quartz and when blue mirrors became the vogue several years ago the amateurs hit upon the idea of making doublets of star quarz backed with blue mirror to make some of the most entrancing "star sapphires" in existence. These are referred to in the trade as 'starolites' but should not be confused with staurolites, an entirely different gem. Nor should they be confused with 'starlites,' a name Kunz tried unsuccessfully to promote for the blue zircon. Star quartz can be bought from almost any dealer and following this article is an excellent one by James C. Arnold on how to make these star quartz doublets. Contrary to popular belief the exact cause of the star has not been definitely determined but Mr. Arnold offers a plausible explanation. It is said to be an optical effect related to the hexagonal formation of the gem. No star actually exists within the stone and nothing within the stone corresponds to the star lines.

The parallel lines sometimes seen in star sapphires are crystal growth lines forming an hexagonal pattern (see diagram). In some finished stones parts of these lines are visible but they do not cause the star although they are indirectly related to it. Star corundum without some internal markings or flaws is pracically unknown. The best way to view a star stone is by any single direct light stronger than the surrounding light; preferably by sunlight. The star will shift when the light strikes it at an angle so that the flatter the cabochon the greater the motility of the star. An opaque stone reflects more light than a transparent one and the backs of sapphires are usually left unpolished to offer greater reflection. The stars may have any number of legs or rays from four to twelve but sapphires and quartz usually have six while garnets usually have four.



Approximate sizes of various carat weights of star sapphires.
Diagrams courtesy of Wm. V. Schmidt Co., Inc., N.Y.C.

While no star emerald is known Halford Watkins reported seeing one in an Indian temple but it has never been tested gemologically. Another famous star sapphire is the 316 carat STAR OF ARTABAN in the U.S. National Museum.

If any reader earnestly desires a star stone and cannot locate a source of supply the JOURNAL will advise where they can be procured from reliable sources.

◆ Preparation of Star Quartz

By JAMES C. ARNOLD
2514 W. 76th St., Los Angeles 43
President of Hollywood Lapidary Society
Past President of Los Angeles Mineralogical Society
Past Vice-President of Los Angeles Lapidary Society

We found our material in an abandoned silica mine high up in the mountains of the San Diego county "back country" near a little place called Nuevo. Our group from the Hollywood Lapidary Society had arranged by mail for entrance to the property and each digger paid a fee for the privilege of retaining all he could gather in a day. There were 32 diggers in about 20 cars. We drove in over unimproved roads that were very narrow and steep at times but the country was beautiful from the heights and the weather was really California "climate."

The mine shows the typical pegmatite veins characteristic of San Diego county and it has stringers of black tourmaline crystals and some rose quartz in place. Most of our good material was found as isolated pieces in the old mine dumps. Some of it was rose tinted but most of it was the usual milky type. The best material had that "silky" look that shows genuine and very beautiful asterism.

While no one knows the cause of asterism I venture the thought that it was caused by the slight movement of the silica gel during the time it was setting to form the cryptocrystalline structure in which it is now found. Contraction of the cooling mass in the veins without external movement might cause this particular form of striae which catches reflected light to form the wonderfully attractive hexagonal star seen in gems prepared from the material.

Each of the rockhunters in our amateur societies has his own method of preparing these outstanding gems for display but I have found the following process most satisfactory and practical:

1—Examine the rough crystals by transmited light (let the light shine THROUGH) while in a reasonably dark room and try to imagine a perfectly clear portion as seen through three dimensions.

2—Cut out the chosen area with a diamond saw and be sure to remove ALL of the flaws, the feathers and the checked spots.

3—Grind a reasonably round sphere and smooth it until ALL of the surface has approximately the same finish. It may be polished or just a matte finish but it should have no unground spots on it to catch the light differently from the rest of the sphere.

4—Prepare a light source by driving a needle through the bottom of a round gallon can. Place a 100 watt clear light bulb beneath the can and have the can cover it by being upright with the hole at the top. The can gets hot and should be used quickly and the light turned off intermittently.

5—Have a small dish containing about a half cup of any of the following: naptha, kerosene, cleaning solvent or nitro-benzene. Nitro-benzene is the best as it is closest to the refractive index of the quartz but it is very smelly and the odor lingers on hands, utensils and in the room.

6—Dip the prepared sphere into the liquid and hold the sphere over the hole in the can after turning on the light. The light beam must be very small and sharp and one must use the equipment in the dark for best results. Turn the sphere about and keep dipping it into the fluid to keep it WET. If the material is asteriated the "legs" of the star will be seen. Do not hold the sphere too close to the hole in the can but about six inches away until you see a star.

7—Keep turning the sphere in the light until each of the "legs" is the same distance apart as you rotate it with the center of the star as the axis. If the legs are curved you have not found the true axis. Each of the legs MUST be straight and the same distance apart. When you have established the axis,

mark the exact center of the axis with a pencil. An X is more easily seen.

8—Wash the sphere and saw it exactly in half at right angles to the axis. Polish by regular lapidary procedure by using No. 220 paper followed by No. 320 paper and cerium oxide on a wet suede leather buff. Be sure to polish the back with an optical finish as the light has to pass through this surface twice.

9—Obtain some blue mirror-glass not more than 1/16" thick and cut a piece about 1/8" larger than the hemisphere. This may be square if you prefer.

10—Obtain a half ounce of Canada balsam from a drugstore. Have a gas flame and a piece of smooth iron or steel about 2" x 4" by 1/2" thick. The metal plate should be heated to about 300 degrees Centigrade. When it is hot, dip a match stick in the balsam and transfer as much as will adhere to the hot plate. Remove from the plate and test the balsam frequently by "pulling a thread" as you would in making candy. When the thread breaks as you bend it the balsam is "cooked." This usually takes about 20 minutes. The plate with the balsam on it will catch fire from the flame when it is very hot so that it should be removed from the flame when it starts to smoke. Do not use yellow balsam for then it has been cooked too long or has been too hot. If it is yellow it is best to restart as yellow balsam will give a stone a poor star.

11—When the balsam is "cooked" and hot, slide the star quartz on the plate and let it heat. Turn the little mirror face down on the plate at the same time and heat to the same temperature. With tweezers or pliers slide the mirror from the plate and turn it right side up and transfer the star quartz to the top of it. There should be a layer of hot, clear balsam between the quartz and the mirror. Set the stone carefully on the edge of your work block in such a manner that the delicate mirror back does not stick to the block.

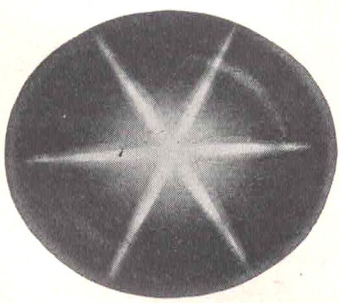
12—The work should cool sufficiently in 20 minutes. When it can be handled, stick a piece of adhesive tape on the back of the mirror so that handling, grinding and setting will not scratch the back surface.

13—Grind the glass mirror edge to the size of the quartz and the proper angle for mounting in the bezel. This is done by holding it in the fingers and not by dopping.

14—The setting is very important and should be well planned. Design a mounting so that it has leaves or flower petals or some easily closed extension of the bezel to hold the stone or trouble will be experienced. If the bezel is of solid construction subsequent hammering will dislodge the stone from the mirror and the work will have to be redone.

This is a lot of work for one stone so that it is wise to make about 10 spheres at a time. Some of the material will show no star and should be discarded. Then flaws will be seen during the testing for the star and more will be discarded. I usually get 5 or 6 fine stones out of a batch of 10. Sometimes I remove flaws from the sides of stones and reshape them in ovals. When I had difficulty in obtaining thin blue mirrors I took thick ones and ground them down and polished them. This was added work but I always felt amply rewarded for my care and precision when I was able to gaze at my gems with great satisfaction.

While I have had great pleasure in working fine Australian opal during the past several years I have always had more favorable comments about my "stars" than I have about the opals. All of the material I have worked has been obtained in California. It is also found in Brazil and almost all rose quartz is asteriated but that material usually is badly fractured.



HIGH
PA
Lap
- ANNO

Model L. Combination Unit

A COMPLETE LAPIDARY CABOCHON MACHINE IN ONE SIMPLE UNIT READY TO PLUG IN AND GO TO WORK.

SAWING - GRINDING - SANDING - POLISHING - ALL WITH EASE AND COMFORT

CHECK THESE POINTS

* No lost time changing wheels.
* Complete — Nothing else to buy.
* Large diameter wheels.
* Strong and serviceable — This is not a toy.
* Ball bearing precision construction.
* Ample working space — No crowding — Working space for two people.
* Quick adjusting motor mount to change speeds.
* 12"-14" gravity feed Slabbing Saw that may be disconnected when not in use.
* Drain plugs in grinding wheel splash pans and saw box.
* Carriage on Slabbing Saw slides on ¾ C.R.S. with a 2¼" lateral movement.
* Carriage and vise cast of close grained gray iron.

THE MODEL L.

Combination Unit consists of the following as pictured:—

* 2 — 10" x 1½" Carborundum grinding wheels for rough and finish grinding.
* 1 — 10" x 1½" hard wool buffing wheel for buffing.
* 2 — 8" x 3" balanced aluminum drum sanders for sanding.
* 1 — 12" Diamond blade by Carborundum.
* All-Steel table mounted on **rubber casters.** Table is 64" long by 28" wide, made of reinforced steel.
* 2 — Mounted splash pans for grinding wheels with drain plugs.
* 1 — Mounted splash pan for buffing wheel with removable slip cover. (Slip cover not shown in photo.)
* 1 — ¾ H.P. Heavy Duty Motor with plug-in cord and motor starting switch.

Remember:—this combination unit is sold Complete with wheels and Heavy Duty Motor. Approximate shipping weight when crated 550 lbs.
Model L Combination Unit complete F.O.B. South Pasadena, California—$295.00. A $10.00 charge is made for crating. California purchasers add 2½% sales tax.

HIGHLAND PARK LAPID

Designers and Manufacturers o

1009 MISSION STREET, SOUTH PASADEN

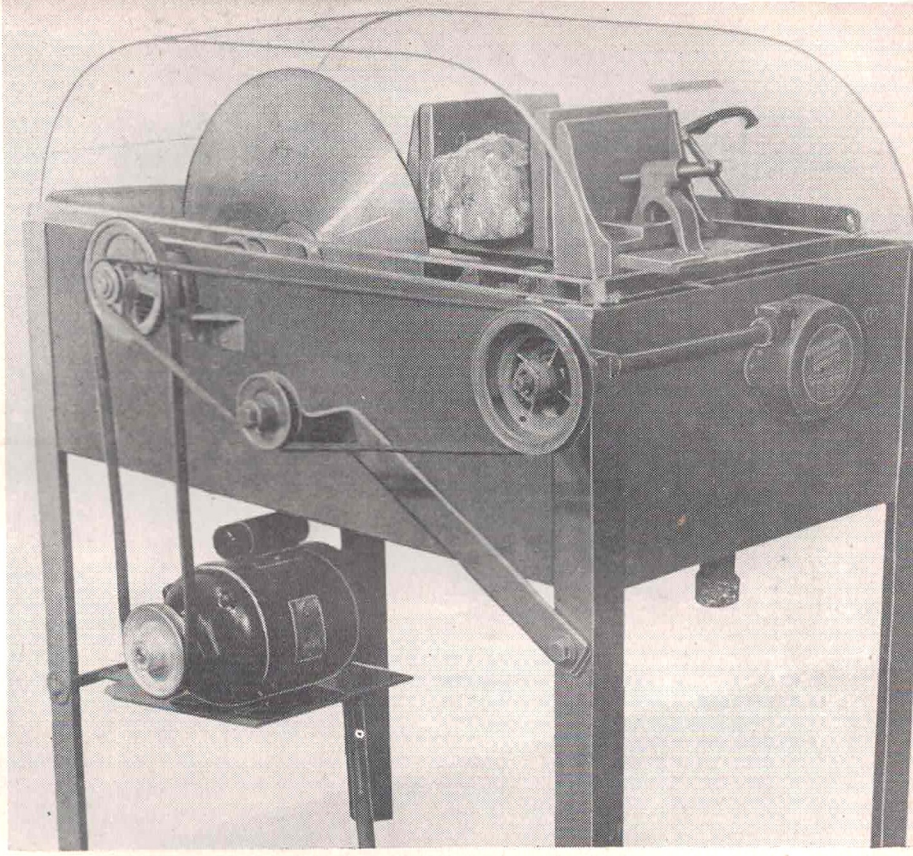
The

LAND

ARK

idary

UNCES -



MODEL J-3 16″ SAW

The Model J-3 16″ Slab Saw is a piece of equipment you will be proud to own. Satisfied customers have reported sawing over 10,000 square inches per blade with these units.

* **Saw Box** — all steel construction. Box is 34″ long x 24″ wide x 44″ high.
* **Carriage** — is cast of close grained gray iron and slides on ¾″ drill rod. Split-Nut on carriage, operated by a flip of a handle, gives a quick return of carriage in one easy motion. Carriage has a 2½ lateral movement.
* **Vise** — is cast-iron with jaws faced with hard wood. Vise opens up to 6¾″.
* **Arbor** — is ball bearing equipped and is well protected against grit.
* **Power Feed** — on Model J-3 and J-2 has four speeds for variation in rock hardness.
* **Model J-3** — (as pictured above) with 16″ blade by Carborundum, belt and motor mount—$195.00.
* **Model J-2** — (metal hood in place of Lucite hood) 16″ blade by Carborundum, belt and motor mount — $165.00.
* **Model J-1** — (gravity-feed) 16″ blade by Carborundum, belt and motor mount — $135.00.

Shipping weight — 280 lbs. crated.

½ H.P. Motors with motor starting switch are available with these saws for $45.00 additional each.

Available for **immediate** shipment. Write for free literature.

California purchasers add 2½% sales tax.

DARY SUPPLY COMPANY

of precision lapidary equipment.

NA, CALIFORNIA. PHONE PYRAMID 1-2022

◆ Opal Prospecting in Australia and How to Prepare an Opal

By LOUIS HALENAR

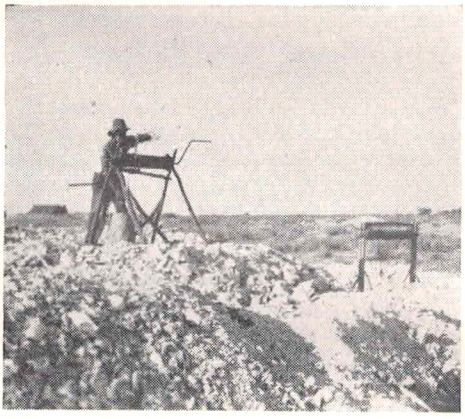
1592 University Ave., New York City 53

People are always interested in the Australian opal fields but very few Americans have been there. Reading about the opal fields fired my imagination to the point where I felt I had to go and see them myself. I have returned recently from a prospecting trip to the fields at Coober Pedy (aboriginal for White Man's Caves) and Andamooka. Most of the opal being mined at present, with the exception of black opal, comes from these locations. At one time there was more than a thousand miners working the fields and their marks are still present today in abandoned shafts seen for miles around the range. The fields are not being very actively mined at present and only a few miners gouge through the old shafts.

Coober Pedy is a dry, barren country where people live in caves excavated from the side of the sandstone range for there are no houses built of timber. The caves are quite comfortable in the 125 degree summer heat and warm enough in winter.

I arrived at Coober Pedy by truck, having made the 150 mile journey from Kingoonya which is south of the fields. The journey took nine hours because of the bad road and overheated engine and kangaroos and emus were plentiful along the way.

Upon arrival I decided to try a field about eight miles west of Coober Pedy. There were about thirty miners there. I joined forces with an old timer and we both worked one claim. Most of the miners were geting opal. There is no definite level at which opal can be found but it is usually at least 18 inches below the surface and seldom more than 30 feet down. The opal bearing ground is a seam of gypsum with iron oxide and sandstone. We sank five shafts and each time we hit a level but it was a seam of potch, or colorless opal, although we did find some opalized clams with fire. We abandoned this claim for another with no better results although the indications were that opal was present and the work should be continued. But the hot season was upon us and dysentery broke out in the camp with about 75% of the miners being affected. A miner's meeting was called to try and check it. The cause was undetermined but it was probably the water and insects or the unsanitary conditions of the camp. It became so hot that most of the miners returned to Coober Pedy or the coastal cities. I decided to go on to Andamooka and I gave my half of the claim to my mate. He later gave it another chance and it produced opal.



Lifting opal from the mine

Andamooka is also in South Australia, about 140 miles north of Port Augusta. It is on the west shore of Lake Torrens, a dry salt lake. The field is very large and produces some of the finest opal I have ever seen. The conditions are much better than at Coober Pedy although water was becoming scarce when I was there. Andamooka has small dwellings built of native boulders. Mining proceeds on a larger scale and more than 100 miners were there at the time. Opal is mined in the same

manner as at Andamooka but it is a little more difficult because of the large boulders of quartzite rock that must be removed from the shafts. The quartzite contains layers of thin but very beautiful opal. I did a bit of gouging in several fields around the district including The Saddle, German Gully, Gun's Gully, Stevens Creek and the Boundary Rider fields. I collected some fine opal but no great quantities. My passport time was running out but I gathered a lot of experience and I have fond memories of many friendships formed with prospectors and bushmen and the opal buyers who came to the fields.

Both districts have their Boot Hill Cemeteries, with eight graves at Coober Pedy and two at Andamooka. The buyers regularly visit the fields and make their individual bargains with the miners, giving them from $3.00 to $100 an ounce for the opal, depending upon the quality. A flying doctor will come to Coober Pedy in an emergency and the government has established a water tank there. The only requirement for opal hunting is a strong back, ability to stand 100 degree temperatures daily, freedom from allergy because of the salt bush (which acts like our ivy and oak), good eyesight to see the small poisonous mulga snakes that like to hide in the shafts, and five shillings for a prospector's license.

How To Cut An Opal Doublet

Doublets are made from small sections of thin opal that cannot be cut into full cabochons. Cutting doublets from these small sections serves two purposes. It makes inferior opal look like black opal because of the backing and it improves the fire.

In making a doublet the first step is to rough out a small thin piece of opal on a No. 220 carborundum wheel free of bumps. The best color is chosen for the BACK of the opal and not the top. After grinding to shape the section is lapped flat with FF grit. The next step is to grind a cabochon, preferably from jet black obsidian so that the flat bottom of the cabochon is the same size as the opal section. After polishing both sides of the opal conventionally and the flat surface of the obsidian cabochon the

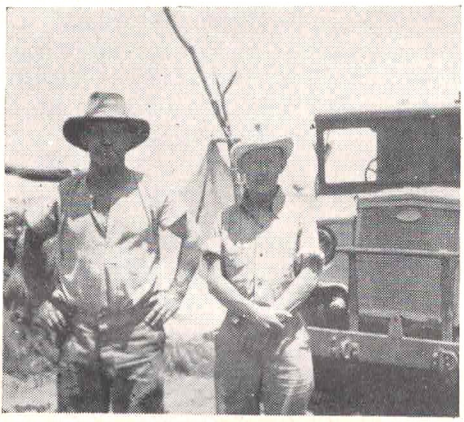
Continued on Page 130

Next issue of the Journal will be a Special Jade Number.

Continued from page 129

opal should be glued (with the best fire down) to the flat side of the cabochon. I find flake shellac most satisfactory for the purpose as it can withstand sanding without overheating.

Warm the obsidian back over an alcohol lamp and then place a small flake of shellac on the warm surface. Then warm the obsidian again until the shellac melts and spread it over the surface, being careful not to use too much. Press both sections together and warm once more, keeping the opal away from the direct flame. Remove from the flame and lay the doublet on a flat surface. Press both sections together, preferably with a rubber eraser and use a sliding action. This will insure an even distribution of the shellac so that the sections will fit tightly. The shellac is quick-drying and the doublet may be worked on as soon as it cools.



The author (on right) with his partner at the opal diggings.

The doublet should now be dopped with the opal section up and the stone shaped as desired on a No. 220 carborundum wheel. If you now desire to have the top of the doublet slightly rounded you have a delicate operation before you. Work slowly and reduce the opal until the fire reaches the best effect. The more opaque the opal section is the thinner it will have to be in order to show fire to the best advantage. If the section is translucent do not grind it very much. Sanding should be done with a very light pressure on a well worn cloth. Blend in the opal around the girdle but do not undercut it. I first polish with tripoli on a leather buff,

keeping the stone moving fast and using almost no pressure. I then get a super-polish with tin- or cerium-oxide on another leather buff. The stone is then removed carefully and re-dopped to do the back after which it is removed and cleaned of all wax with carbon tetrachloride or nail polish remover (acetone). If the opal is opaque it is best cut in a flat section and eliminate the sanding. Substitute this process with polishing directly on a wooden wheel with tripoli, followed by cerium oxide on a leather buff.

◆ Diamond Grinding Wheels for the Lapidary

By C. K. WORTHEN
195 Pierce St., Birmingham, Mich.

Over twelve years ago the writer was placed in the position of Engineer of Diamond Products by a large manufacturer of grinding wheels, diamond wheels and other abrasive products. At that time the manufacture of diamond wheels in the United States was in its infancy and practically all diamond wheels were manufactured for the grinding of cemented carbide tools. There were two types of bonds used for bonding, or holding the diamond particles; a resinoid type and a metal type.

As manufacturing facilities for diamond wheels were increased we naturally looked for new applications of them. Such applications as glass, ceramic and stone grinding and sawing eventually led to the use of diamond wheels for the grinding of quartz wafers, or piezos, used for the control of radio frequencies. As quartz cutting was closely allied with mineral and gem stone grinding, development of diamond wheels for the use of the lapidary was started. There was a precedent for this as the impregnated type of diamond cut-off wheels was coming into use for sawing, replacing almost entirely the use of the abrasive mud saw. Diamond cutters had used thin copper discs charged with diamond dust for sawing diamonds as well as charged cast iron laps for grinding and polishing the facets on diamonds.

In addition to the resinoid and metal bonds, a vitrified type of bond had been developed also for use in the manufacture of diamond wheels. Development tests in both laboratory and field proved very conclusively that the only bond suitable for lapidary work from the standpoint of economy was the metal bond. Wheels using the metal type of bond were manufactured by mixing the diamond powder with powdered metal, forming them in a cold press and sintering in a hydrogen furnace. This method of manufacture assured an even distribution of diamond throughout the diamond content portion of the wheel to any depth desired. The grit size of the diamond to be used for lapidary work was important; too coarse diamond particles would cause chipping of the gem stone being ground; too fine a grit size would retard the speed of cutting. It was determined that either number 150 or number 180 grit diamond was satisfactory for grinding any materials varying in hardness from turquoise to agate and petrified wood. Later tests also proved that the same grit size was suitable for grinding the synthetics, such as sapphire, ruby and spinel. Even diamonds could be ground rapidly and economically, using the same wheel. In fact, many manufacturers of diamond lathe tools adopted these wheels for diamond grinding.

The concentration of diamond, or the amount of diamond in proportion to the amount of bond, was important in designing a wheel for the lapidary. Diamond dust is an expensive item, therefore too high a concentration would make the cost of such a wheel out of reach of the average amateur lapidary. On the other hand, too small an amount of diamond would result in less economy, due to faster wheel wear. A medium concentration was found to be most satisfactory.

After determining the bond, grit size and concentration, the type and size of the wheel to be offered as a standardized lapidary wheel was considered. For experimental use, the writer had purchased a B. & I. Grinder as it seemed there were probably more of these grinders than any one make in use at the time by amateur lapidaries. Learning that other horizontal types of machines such as the Gilde, Lapidary Equipment Company's "Complete Lapidary," the Orrcut and others could also use the same type and size of wheel, the writer decided on a cup type diamond wheel. A 5″ diameter cup wheel having a 1 1/16″ width of rim seemed completely suitable. Since this type of wheel had been a standard wheel for the Heald Grinder, moulds were available without extra cost. The 1 1/16″ width of rim seemed wide enough for any ordinary sized cabochon. Combining this size and shape with the correct grit size and concentration, with the correct grade of hardness of the metal bond, a number of wheels were manufactured for trial in the field. The rate of wear of the wheel would determine the depth of diamond required. Over a period of

The author at his lapidary bench

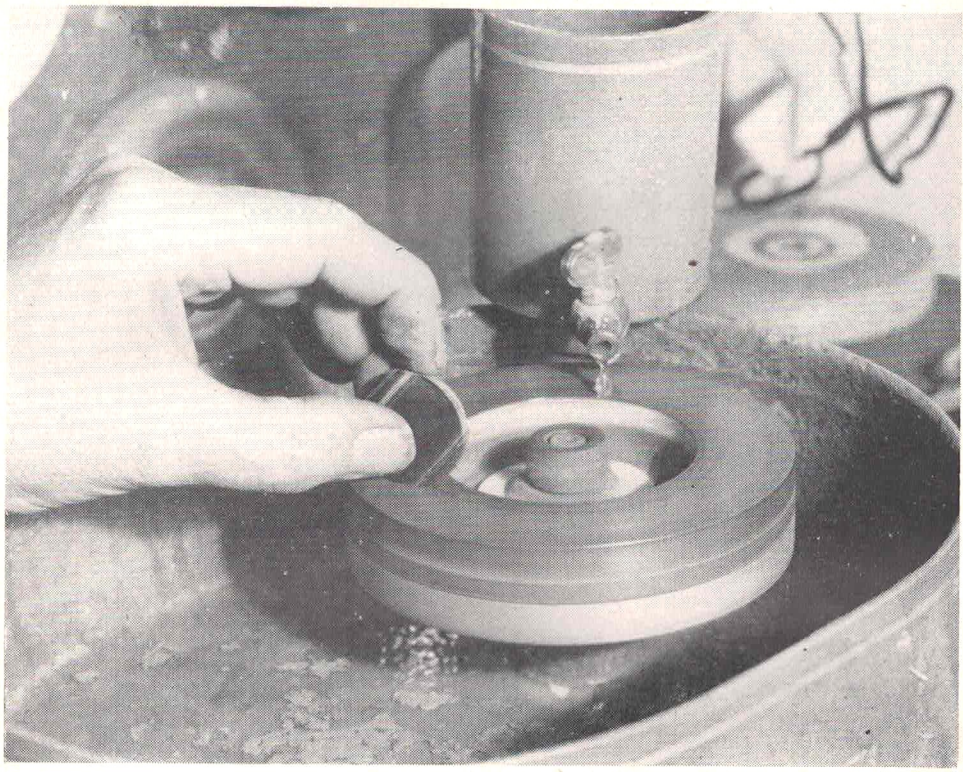
time the reports from both amateur and professional lapidaries were checked and tabulated and it was decided that 1/32″ was sufficient for the diamond depth. As both 150 and 180 grit wheels were tested (the 150 grit being preferred over the 180) we now had a standard lapidary grinding wheel. This was cup shape, 5″ in diameter, 1/16″ rim width, metal bonded with 150 grit size diamond in a medium concentration and having a diamond depth of 1/32″.

These standard wheels were then subjected to numerous tests under operating conditions and on all types of gemstone material. One professional lapidary reported his wheel still operating satisfactorily after grinding more than 12,000 cabochons, with very little indication of wear. Later reports from other users substantiated this information and we felt that we had a wheel of proven economy.

Let us consider other points of our standard lapidary grinding wheel, and let the reader determine for himself the merit of the product. Since no wheel has ever been reported worn out we can only judge the wheel life by actual wear measurements. Our data indicates that, dollar for dollar, the percentage is in favor of the diamond wheel five to one over the silicon carbide wheel. The wide rim replaces the cast iron plate and loose abrasive for grinding the flat or base of the cabochon. The stone, either held by hand or dopped, can be shaped to size, the bezel angle is ground next, and then the curvature of the top, or crown, of the stone is ground. The entire grinding of the stone is performed on the one wheel, faster than is possible on a silicon carbide grinding wheel of roughing grit size. The finish of the stone is superior to the finish obtained by using a fine grit silicon carbide wheel. The stone is now ready for sanding operations. Throughout the grinding operation, the stone has been perfectly *cold;* there has been no wheel shock due to bumpy or uneven grinding wheels. A water drip applied near the center of the wheel is the only coolant necessary. The diamond wheel will not tear or scrape the skin if the lapidary's fingers accidentally touch the wheel.

There is no wheel trueing problem with the diamond wheel as the wheel will never become bumpy. An abrasive stick furnished with the wheel should be passed across the face of the wheel at intervals to clean off any load accumulating from lack of coolant, particularly when softer types of stones are being ground. There is no dirt or sludge other than the material ground from the gemstone. Due to the fact that the gemstone is ground cold, heat cracking is entirely absent. The wheel can not be injured by the grinding of any gem material; even the application of a sharp corner of agate or some synthetic sapphire will result only in the grinding away of the sharp corner of the gemstone, leaving no mark or groove on the diamond wheel.

Wheel speed of the diamond wheel is not important. There is very little difference in speed of grinding, whether the wheel is rotating at 300 or 5,000 surface feet per minute. The writer prefers a wheel speed of about 500 surface feet per minute.



The author using a diamond grinding wheel

The diamond wheel for lapidary use was designed for cabochon grinding and is not suitable for cutting facets. It can be used to advantage, however, in roughing out a stone to be faceted to shape. Unfortunately, it is not possible to bond fine grit size diamond (600) with a metal bond manufactured by the powdered metal process.

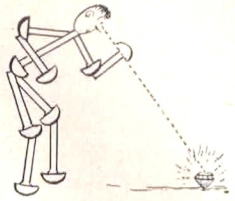
Diamond cut-off wheels are of two types: the impregnated type, where a small amount of diamond dust is charged or impregnated into the periphery of a copper or soft steel disc; and the sintered rim type, where the diamond dust is mixed with the metal powder and formed in a cold press into a ring, which is then sintered in a hydrogen furnace. The ring is then soldered around the periphery of a disc of saw steel. While the cut-off wheel of the sintered rim type is manufactured with the same type of bond as the metal bonded diamond lapidary wheel, the grit size of the diamond used is much coarser, usually being from number 46 to number 60 grit. As the sintered rim type of cut-off wheel contains several times the amount of diamond used in the impregnated type, the life of the wheel is much longer. The

sintered rim type is also much faster and smoother cutting. For wheel speed of the cut-off wheel of the sintered type, it is possible to rotate at speeds up to 10,000 surface feet per minute although from 3,000 to 5,000 surface feet per minute is recommended for best results. The writer has tested many different types of coolants on diamond cut-off wheels, and for his own personal use prefers a mixture of odorless kerosene and automobile lubricating oil.

Since the end of World War II, many second-hand diamond wheels used in industry have found their way into the hands of the lapidaries. Most of these wheels were designed for requirements very different from gem cutting. Resinoid or vitrified bonded diamond grinding wheels will grind stones BUT—wheels manufactured with these bonds are not as economical as the metal bond. The grit sizes used in industrial diamond wheels are, for the most part, not suitable for lapidary work. Many lapidaries have condemned diamond wheels for gem stone work, simply because they were using diamond wheels of specifications far removed from the correct lapidary diamond wheel. Lapidaries who have been disappointed with the industrial wheels should consider these facts.

As for the initial cost of diamond wheels to the lapidary I previously mentioned this was kept in mind when designing them. When this wheel was first offered for sale, the price was $45.00. Due to the great increase in the price of diamond bort, the price was increased to $54.00 and last June it was further increased to the present price of $60.40. The cost of any diamond wheel is based on the amount of diamond contained in the wheel. The same formula applies to diamond wheels used in any industry, whether they are for lapidary use, glass grinding or the grinding of carbide tools. As our friend Harry Howard remarked in his recent article in the LAPIDARY JOURNAL, "There are a few items which I hope to see offered soon for the help of the amateur—more moderately priced sintered diamond wheels for cutting (especially for faceting), more moderately priced resinoid bonded diamond wheels for polishing the harder materials, etc." I fear that the fulfillment of Mr. Howard's wish for a lower priced diamond wheel is not for the near future.

◆ Beginners Page



In attempting to tell beginners about the fundamentals of grinding I am reminded of my own profound ignorance about the matter when I first became interested in gem cutting. I had been mildly interested in the subject for some time but I had never seen a gem ground and I could find no books on the subject. My wife surprised me at Christmas by presenting me with several grinding wheels and a motor. She was as ignorant about the matter as I was and indeed the clerk in the store where she made her purchases was as ignorant as both of us for when she presented her problem he sold her small grinding wheels for sharpening knives, etc. They were unfit for gem grinding. But in my ignorance I set up the motor and the wheels and proceeded to take a rock as big as my fist to grind it to shape. Even with proper equipment it would have taken me many hours to get anywhere and then I couldn't stand the terrific noise and the dust. I didn't know that water had to be applied to the wheels.

As stupid as I was I soon realized that everything was wrong and I sought out a commercial lapidary who would tell me nothing of course except to snarl at me "what do you want me to do—teach you the business?" But in the meantime I did see his equipment and I saw that my own was entirely unsuitable. I then learned of a lapidary equipment dealer who sold supplies at his home. Seeking him out on a Sunday afternoon I became entranced with the stores of gem materials he had for sale and I observed how he had his own shop arranged. I bought a grinding head and wheels and had some one else set them up for me.

But I hadn't learned too much for I still had seen no one grind a gem. With a water supply and correct wheels I thought I had the answer. I still had no rocks sawed into slices and I again proceeded to grind down a big rock. Things proceeded much better of course but it seemed so slow. I felt I was pretty smart now and I figured that if the rock ground slowly that if I increased the pressure it would speed the work. It did —and it ruined the wheel which soon became as bumpy as a toad's back.

In the meantime I became acquainted with some kindred souls and we organized the first lapidary society in the country. Probably because I talked faster than anyone else they elected me as their president for it wasn't because of my knowledge. Here I was president of a lapidary organization and I not only had never ground a rock in my life but I had never seen any one else grind one. However I was not alone and in a very short time I not only observed others grind but I became fairly proficient myself.

Things are far different now. The tiniest community in America usually possesses someone who is cutting gems so that interested persons should seek them out and watch them grind a stone. For you can learn more in a half hour watching and doing in a shop than you can by reading any book on the subject. I pass on this information of my own ignorance only to encourage others who are unlearned in lapidary technique to investigate America's fastest growing hobby and art form. Gem grinding is NOT difficult.

Grinding consists of wearing away unwanted material to the point where it is useful. When you sharpen a knife you grind away the dull steel until it is keen and can cut. When you grind a cabochon you grind away the unwanted material until you attain the shape you desire. But the grindstone that sharpens your knife will not cut your agate because the grindstone is harder than the steel in the knife but not as hard as the agate and therefore the agate will usually grind away an ordinary whetstone instead of being ground by it.

Since most gem materials are hard (that's what makes them desirable in the first place) they need wheels of a greater hardness to wear them down. The diamond is the hardest substance but it is too expensive for use as a general abrasive. Today we have commercial

substances made into grinding wheels that are almost as hard as the diamond and hard enough to cut any gemstone except diamond itself. Before we had these substances lapidaries had to depend on natural abrasives such as emery, sandstone, corundum and flint. These are produced by the uncontrolled forces of nature. But in 1891 Dr. E. G. Acheson made silicon carbide in an electric furnace and this is now sold under the trade name of carborundum. This abrasive can be controlled and thus not only lapidary procedure but the problems of industrial grinding have been solved to a greater extent in 50 years than in the previous 5,000.

As pigs of carborundum come from the furnace they are crushed and sorted. If the crushed pieces will sift through a screen having eight holes to a linear inch it is called 8 Grain or 8 Grit size. This is very coarse and rough gem grinding usually begins on wheels of a fineness of 220 grit and proceeds to 320 grit or finer. After these grains are sorted they must be bound together into a wheel and this becomes a bonded wheel. As it revolves the tiny grains contained in it scratch the gem and wears away the softer material. Water must be forced to the grinding wheel as it generates heat and if the gem is permited to get too hot it will crack and be destroyed. In the next issue we will tell you how to proceed to grind a gem once you have carborundum wheels properly mounted with a coolant supply to wet the gems.

◆ Shop Helps

If you have found a useful short-cut in your shop send it in. We will give you credit. The most skillful craftsmen as well as the beginner should find this department useful.

Suggestion from J. W. Anderson, Baltimore, Md.

If you like to make your own tools good wooden mallets may be made by using ordinary gas pipe T connections. Grind, file and polish these and then with a pipe wrench screw 3″ long pieces of hard wood into the connections and another piece 10″ long for the handle. Then shape, sand paper and varnish. The T connection will give weight to the mallet and prevent the wood from splitting.

* * *

In its pamphlet "The Simple Secret," the Silversmith's Guild advises: "As to chemical cleaning . . . by this we mean placing the silver in water in an aluminum container, adding salt and soda, and boiling . . . this process does remove tarnish, but it also removes the aging tone or color of the metal . . . and it is well to follow it with polishing with a regular silver polish." Quoted from GUILDS, published by the American Gem Society. They add the following suggestion of their own: "It is the general consensus that there is a serious objection to the use of detergents in the case of those patterns containing oxidation. The continued use of such cleaning agents will in time completely eliminate the oxidation in the design. However it is acknowledged that the use of detergents on patterns where NO oxidation occurs will keep silver gleaming."

* * *

Suggestion of Alfred Kramm, Grass Valley, Calif.

He disagrees with our advice in the last issue to add a little glue to Plaster of Paris when in a hurry. He claims that 50 years ago in Germany he learned the trick of adding a little glue to plaster to make a stronger union but that it RETARDS the setting until all the moisture in the glue has evaporated.

* * *

We notice advice in one of the society bulletins to the effect that the safest way to remove a polished stone from the dop is to dip it into boiling water. That certainly would be the quickest way to crack an opal because heat causes expansion of the water content in it. The safest way to take a stone off a dop is to follow the advice given in the last issue of the JOURNAL—leave it in a pan of ice; when the ice melts the stone will be in the bottom of the pan unfractured.

◆ Answers to Inquiries

NOTE—This department should become one of the most important sections of the LAPIDARY JOURNAL in future issues. If you have problems write us about them. We will get the answer somewhere. And if you don't agree with an answer give us your idea. A lively and useful Q and A department should become an encyclopedia of gem information through the years. Will you help?

Inquiry of Mrs. Winifred B. Hafsos, Cupertino, Calif.

I have a fireplace made of Nevada wonderstone and have been trying to find a varnish or lacquer that will not discolor the rough stone. Please advise what to use.

Reply by Lapidary Journal

We know of no varnish or lacquer that will change the natural effect of wonderstone but if you want it smooth for easier dusting why not shellac and wax it? We think it a shame to do anything to it to make it look artificial.

* * *

Inquiry of Lee Warren, McMinnville, Oregon.

I do not get very fast work with cerium oxide on tiger eye. I run it on a leather buff about 10″ travelling about 1750 R.P.M. Am I turning too fast?

Reply by Lapidary Journal

Run your buff half that fast and use chrome oxide with little pressure.

* * *

Inquiry of Mrs. L. B. Coons, Meadowlands, Minn.

I need information on cleaning and polishing shells as a hobby for the making of lamps, flower holders, etc.

Reply by Lapidary Journal

We have no information of value. Can some reader help?

* * *

Inquiry of Edith Keeler, Marion, Ohio.

What makes silicon carbide wheels get washboardy and what do you do about it? My manual training teacher said "straighten it with a piece of broken wheel" but how does one do that when hands are not strong enough to hold the piece steadily? Why do some pieces of flint crack so badly when others do not?

Reply by Lapidary Journal

Mrs. Keeler's advice from her training teacher reminds us of our recipe for cooking elephant meat which begins "first, catch an elephant." How many beginners have a broken wheel about? Mrs. Keeler should buy a wheel dresser in any hardware store. Wheels get bumpy because of uneven pressure and changes in hardness of the materials being ground; usually because of too much pressure or not using the entire surface of the wheel by moving the stone back and forth across the wheel. Some stones crack because of too much heat caused by forcing the work or not getting enough water and of course bumpy wheels will ruin a lot of material. Dress the wheel and keep it running true and free of bumps for every time a bump hits the gem it is like a hammer pounding on it. All stones should be examined in front of a strong light to determine the existence of fractures before starting the work as many cracks show up only after the work has progressed.

J. Harry Howard of Greenville, S.C., disagrees with Mr. Mitchell's advice in the last JOURNAL that grinding Kunzite to a point will cleave it. He offers the following additional advice—"My teacher told me that grinding Kunzite to a point was dangerous but I believe the cleaving is caused by some of the material being so weak that it cannot be cut no matter how gently it is handled. There is no way to determine this except by trial. 'Harsh' sawing is bad. The saw must be perfectly round and the Kunzite fed carefully. Sawing should always be ACROSS the cleavage plane and this tends to split the stone or weaken it so that it splits later. Hold

and manipulate the stone so that the grinding is lengthwise of the crystal .Don't grind with a rough or a coarse wheel. My teacher thought the splitting was often caused by a grain of abrasive being driven like a wedge into the material on the cleavage plane. If this is so the finer the abrasive the less likelihood of such an accident. A sintered diamond wheel should be ideal for Kunzite because it is smoother, truer and less likely to have loose grains act as a wedge but I haven't tried it."

EDITOR'S NOTE—Mr. Howard doesn't say who his "teacher" was but from previous correspondence with him we have a strong hunch it was Grant Waite—who says about the same thing in his fine article in this issue.

Our apologies for butching an item in the last issue. We asked John Grieger of Pasadena to give us instructions for polishing synthetic spinel, which he did, but when we printed it we ran it as instructions for polishing synthetic corundum and failed to catch it in the proof reading. Two readers caught the error and now Harold Rouse, Yucaipa, Calif., gives us the instructions for really polishing the synthetic corundum. Rouse writes "after grinding to shape on a No. 220 wheel sand on a new No. 220 cloth. This will do little but take down some of the roughness. Take cold rolled copper 1/8" thick or a little more and use on a horizontal lap using tripoli and water as a polishing agent. Heavy pressure must be used at all times and keep the stone rotating to avoid flat spots. Another method involves the use of diamond powders. A copper or brass lap charged with 40 micron grit will smooth it after grinding. Then use a hard leather lap with No. 2 or No. 4 micron diamond well rubbed in and drip a little water on the lap to keep it slightly moist. This is faster than the first method but more costly."

◆ News of the Societies

DOUGLAS GEM AND MINERALS CLUB (Douglas, Ariz.) explored the outcroppings of amethyst near Patagonia, Ariz., recently. An earlier trip was made to turquoise mines near Gleeson.

* * *

LONG BEACH MINERALOGICAL SOCIETY (Long Beach, Calif.) presented an exhibition of petrified wood and gem stones from the Long Beach area at the Port-O-Trade exposition in Long Beach under the direction of F. W. Schmidt.

* * *

OKLAHOMA MINERAL AND GEM SOCIETY (Oklahoma City, Okla.), starting a little more than a year ago with 17 members, had a membership of 46 on its first anniversary.

* * *

NORTHERN OHIO GUILD (Cleveland) recently held an exhibition of the H. Paul Juergens collection of unusual gem stones presented under the direction of Mrs. George Beattie.

* * *

AKRON MINERALOGY SOCIETY (Akron, O.) has elected Dr. Paul Acquarone of the University of Akron as President. The Society made a field trip to Kelly Island in August.

* * *

YAVAPAI GEM AND MINERAL SOCIETY (Prescott, Ariz.) held a very successful gem and mineral show at the Arizona Power Company's showrooms on July 19th and 20th. Moulton B. Smith is president for the next year.

* * *

SAN JACINTO-HEMET ROCKHOUND CLUB (Hemet, Calif.) was recently organized and held its first field trip to Cahuilla Mountain for tourmaline.

* * *

MOJAVE GEM AND MINERAL SOCIETY (Barstow, Calif.) is going to conduct a gem cutting class in the fall on Monday and Wednesday evenings and non-members may attend.

GEM COLLECTORS' CLUB (Seattle) publishes a very attractive and informative bulletin called NUTS AND NODULES. The club is now undertaking a carving project and has an advanced jewelry group.

* * *

EVERGREEN ROCK CLUB (Seattle), now in its second year, started with 11 lapidaries and now has nearly 60. The organization is unique in one respect—it meets on Sunday evening. Meetings have been held in members' homes but the group is now so large it meets at the Washington State Chamber of Mines.

* * *

NAPA VALLEY ROCK AND GEM CLUB (Napa, Calif.) is a new society of gem and mineral collectors in that area. Frank Level was elected President and interested people in the valley should communicate with him.

* * *

SAN JOSE LAPIDARY SOCIETY, Inc. (San Jose, Calif.) heard a talk on the ceremonial use of precious stones in ancient China given by Dr. Thomas E. La Fargue. Russell Grube, founder of the Society, has been giving lectures on gems and gem cutting to the summer crafts classes at San Jose State College.

* * *

SAN PEDRO LAPIDARY SOCIETY (Calif.) witnessed a showing of natural color agate transparencies at its August meeting. The projection slides were made and shown by Albert Hake, President of Southwest Mineralogists, Inc., of Los Angeles, and prominent member of the Los Angeles Lapidary Society.

* * *

SAN DIEGO MINERALOGICAL SOCIETY (San Diego, Calif.) will present a showing of its great mineral collections in the State Building in Balboa Park on October 18th and 19th. At one time San Diego County was the third largest gem producing area in the world and many of the old mines are being reopened. It is doubtful if any city its size can match the collections of crystal minerals in private hands as San Diego—all of them mined within an hour's drive of the city. While the great museums all over the world contain fine tourmaline, kunzite, beryl, garnet and aquamarine specimens from the area, there was much fine material that remained behind with

early collectors and much of this will be on display in October. This should be a great treat for the cutter, collector and mineralogist.

* * *

ORANGE BELT MINERALOGICAL SOCIETY (San Bernardino County, Calif.) will present a gem and mineral show on November 8th and 9th. It will be held in the National Orange Show building at San Bernardino. One of the oldest and finest gem and mineral societies in the country, they can be counted upon to have a fine display. The society contains many lapidaries. It is interesting to note that no award of ribbons will be given.

* * *

HOLLYWOOD LAPIDARY SOCIETY (Calif.) was entertained recently by visiting members of the San Pedro Lapidary Society telling of their experiences in a co-operative shop. An added feature was a gem material auction to augment the society's treasury.

* * *

SOUTHWEST MINERALOGISTS, INC. (Los Angeles) recently heard a talk by Charles Standridge on the peridot and sardonyx. They also heard a lecture by Victor A. Arciniega on "The Origin of Minerals."

* * *

JUNIOR ROCKHOUNDS (Prescott, Ariz.), believed the only group of child mineral and gem collectors, recently celebrated their first anniversary with a display of their collections in the showroom of the Arizona Power Corp. at Prescott on September 6th and 7th. The organization is headed by John Butcher, President, age 10, and has about 35 members.

* * *

SOUTH COAST LAPIDARY SOCIETY (Corona Del Mar, Calif.), may be the name of a new group organized on July 27th by the editor and Howard Barnes. The meeting was held on the lawn of Mr. Barnes' home and lapidary equipment was shown by several manufacturers and demonstrated by them. There was also a fine display of finished gems by Mr. Barnes and silver work made by his wife, Kay. Forty-one persons signed up for membership at the initial meeting, at which Lelande Quick spoke on the history of the lapidary art

(Continued on Page 150)

The Lapidary Journal CLASSIFIED ADS

RATE — 5c PER WORD PER INSERTION
MINIMUM SPACE $1.50. ADS UNDER THIS CLASSIFICATION ARE PAYABLE IN ADVANCE. CLOSING DATE AT HOLLYWOOD, CALIF., FIRST DAY OF MONTH PRECEDING MONTH OF ISSUE. PUBLISHED QUARTERLY: APRIL — JULY — OCTOBER — JANUARY.

BE A MANUFACTURING JEWELER. Learn the profitable jewelry, gold and silversmithing trade at home. Simplified, illustrated course teaches jewelry designing, manufacturing and repairing, Gemsetting, etc. GEMCRAFTERS SCHOOL, Dept. Q. Kalispell, Montana.

ZIRCONS are back at Pre-war prices, 3 for $3.25 postpaid. These are all white stones, sizes are 4mm. to 6 mm. BISHOP'S AGATE SHOP, Maryhill, Washington.

AUSTRALIAN OPALS. Fine Cabinet Specimens, or Cutting Opal. Good trial assortment, $15.00. LISTS FREE. Correspondence Invited. NORMAN M. SEWARD "HIGHLANDS," 2 Studley Avenue, KEW, Victoria, Australia.

25 BEAUTIFUL, colorful Ozark's 2½" specimens including blue and brown chalcedonies. Rose and green jasp-agates, red jaspers, onyxes, banded and mottled flints, all for cutting and polishing. Also breccias, cherts, crinoids, brachiopods and drusy quartz crystal clusters. Sent postpaid for $2.00. JOHN JENNINGS, Eureka Springs, Arkansas.

MULTI-COLORED Opalized Agate in lovely patterns and color combinations. Fine cutting material, also Fluoresces Various Colors. Blue, Lemon, Pink. Sample order of one pound assorted for one dollar or five pounds four dollars. Apache Teardrops, Amethyst Crystals, Quartz Crystal Geodes, and Thunder Eggs. Chalcedony Geodes and Fluorescent Chalcedony Roses. Any of the above assorted, $1 per pound. Orders filled same day received. Special price to dealers on request. Correspondence invited. GUIDE SERVICE TO CHOICE GEM LOCATIONS AT A REASONABLE FEE. We positively guarantee abundant supply of quality material. Use your car or ours. OASIS GEM CO., P.O. Box No. 838, Wickenburg, Ariz.

GENUINE ZIRCONS, first quality, unset. 3 stones, total average 3-cts., special value $6.00. All colors. Or will trade Zircons for any old gold or broken jewelry you may have. Send order or write for free shipping container. B. LOWE, Dept. LJ, Holland Bldg., St. Louis, Mo.

DEATH VALLEY NODULES 50c Lb. Houser bed Geodes 40c Lb. Petrified Palm 75c Lb. Commercial sawing 10c sq. inch. Lapidary supplies. ERWIN TONNE, 517 Balboa St., Costa Mesa, Calif. (Phone Beacon 5580 W)

AUSTRALIAN WHITE OPAL, excellent fire, ovals 9x7mm., $3.00; 10x8mm., $4.00; 11x9mm., $5.00; 12x10mm., $6.00; rounds 5mm., $.75; 6mm., $1.00; 7mm., $1.50; 8mm., $2.00, Australian Green Opal, beautiful fire, 10x8mm. oval, $8.00 to $20.00; 12x10mm. oval, $10.00 to $35.00, plus 20% tax. Larger stone prices on request. Money back if not completely satisfied. ACE LAPIDARY CO., 92-32 Union Hall Street, Jamaica, N.Y.

FLUORESCENT MINERALS: Tested under short wave Mineralight. COLORADO Uranium Ore (Autunite-Uranocircite on pegmatite), $1.00 to $2.00. Brilliant yellow-orange fluorescent and phosphorescent Barite, 50c to $2.50. CANADA phosphorescent Gypsum Roses, 2 for $1.00. ARIZONA Scheelite, $1.00 upward. POSTAGE EXTRA. MARY-ANN KASEY, Box 230, Prescott, Arizona.

WONDERSTONE-ONYX-TRAVERTINE. Colorful Nevada minerals in large chunks for Book-ends, Lamp Bases, Table Tops, Desk Sets, Paper Weights or Novelties, 25c per pound. Rare new Ivory Onyx shows dendritic trees, waves, lines, will cut large Bracelet Sets, 50c per pound. Sea-green Travertine, very beautiful, $1.00 per pound. Specimens of Wonderstone, 15c per pound. Banded Rhyolite, silicified, or opalized, 25c per pound. Mixed Agates, Jasper, Petrified Wood, etc., special offer, 20 pounds for $5.00 or 40 pounds for $8.00. This offer good for thirty days only. A small amount of Tourmaline Crystals, specimen groups, $1.25 per pound. Specimen Turquoise mixed with Variscite, Azurite and Malachite, rare Aurichalcite, etc., prize package, $2.00 per pound. All prices F.O.B. Goldfield. Mineral specimens, 15c each. Smoky Topaz (obsidian), banded and several colors, also opaque black. This is not a common material. Most people have never seen these colors. $1.00 per pound special, 3 pounds $2.00. Satisfaction guaranteed. Order at once as stock is limited. Nevada Opals, 50c per ounce. Fluorescent minerals, assorted, 3 pounds $2.00, includes Hydrozincite Opal, etc. MRS. MARYPHILIS FOREMAN, Box 178, Goldfield, Nevada.

FOR SALE—What has been declared by experts as the most perfect and most beautiful Coral Cameo Brooch known to be in existence. For particulars call or write A. R. CODE, 415 N. First St., Alhambra, or phone ATlantic 4-6177.

Continued on next page

(Continued from Previous Page)

To all our friends—

Having sold The Colorado Gem Co. I am taking this means to thank all of you for the many ways you have helped us. I'll be glad to hear from you anytime. I will devote all my time to the development of Gem Village and collecting good materials for a few of my dealer friends.

Eddie and Doris Neuenschwander, the new owners are very fine people and will carry on the business under the same name and same high standard we have tried to maintain. They will devote all their time to the business and are able to handle it in much better shape than I have.

Best wishes to all, **FRANK MORSE,**
Bayfield, Colo.

◆ General Gem News

Grieger's of Pasadena has issued their new fall and winter catalog which is the most ambitious and useful catalog we have ever seen. They have EVERYTHING. It sells for 35 cents but is worth it as it practically contains a course on gem grinding.

* * *

Richard Pearl, well known writer of Colorado Springs, is bringing out his new book MINERAL COLLECTORS HANDBOOK this month. He is already at work on another book to be titled POPULAR GEMOLOGY, scheduled for printing before the end of the year.

* * *

We have the schedule of Gladys Hannaford's lecture journeyings. Mrs. Hannaford gives a lecture on diamonds (accompanied by pictures of the mines, etc.) that is a wonderful evening's entertainment—and she gives it free. She starts in Minnesota at the end of September and winds up in Florida next April. She will spend a week in Washington in January, three weeks in San Francisco and two in Los Angeles and vicinity in January and February. Program chairmen should make every attempt to schedule this program for a meeting. A postal request to the JOURNAL will get you information about the time of Mrs. Hannaford's visit to your area so that you can attempt to arrange a date with her.

* * *

An attempt is being made to organize a lapidary society in San Diego, Calif. Interested persons should communicate with Bob Clapp, 4585 Utah St.

* * *

ATTENTION CALIFORNIA COLLECTORS!! The San Diego County Fair recently offered $1700 in CASH prizes to gem and mineral exhibitors in four divisions but because of poor publicity only $700 was awarded to the few who exhibited. One man won $200 in CASH by entering two divisions. This kind of thing should bring out really fine collections next year. Watch for it. The JOURNAL will give complete details in time. Exhibitors were not limited to San Diego County residents.

The John Burroughs High School, 1920 Clark Street, Burbank, Calif., will start an adult class in Jewelry Making beginning Sept. 15. Beginners class Monday and Wednesday, advanced students Tuesday and Thursday from 6:30 to 9:30 P.M. Tuition is free. C. R. Gaitskell will be the instructor. For further information write to the Adult Education Office, 1920 Clark Street, Burbank, Calif.

* * *

Oscar Smith, who operates Smith's Agate Shop in Portland, recently purchased his partner's interest in the New Museum at Depoe Bay, Oregon and is now the sole owner. Tourists should not fail to see his wonderful display containing thousands of rare minerals and gem stones. Some of the specimens are world famous. One of particular interest is a massive quartz crystal slab about 4 feet by 2½ feet from Arkansas. In addition to the museum he has a jewelry store where beautiful cut stones and mounted gems may be purchased.

* * *

Persons living in Los Angeles and vicinity who want to learn gem cutting and jewelry repairing can do so by registering for classes at the Allen Lapidary Equipment Co., 3632 W. Slauson Ave., Los Angeles. Present classes meet on Monday and Wednesday evenings but plans are in the making for classes for four nights and two afternoons a week.

* * *

George Smith, well known lapidary of Fresno, Calif., has built what is claimed as the largest diamond saw in the state if not in the country. It is 48″ and he runs it at only 70 R.P.M.

* * *

There are but 700 expert diamond cutters and polishers left in Holland out of the 3500 who worked at the trade there before the war. A training school is being established to increase the number to 10,000.

* * *

R & B Artcraft Co. of Los Angeles is building a big addition to their store to take care of their fast developing business.

Gems From The Mail Bag

I want to tell you that I think you have a mighty fine magazine under way and I hope indeed that it will be successful and will have a most prosperous future. Just reading your magazine makes me want to get at it again. *Major General Julian S. Hatcher, Falls Church, Va.*

I regard your presentation in a class which will lend dignity to the art of gem cutting—the quality is significant. *Richard Charles King, Colorado Springs, Colo.*

Several books on gem cutting got me interested in stones but two of your LAPIDARY JOURNALS did the trick. I am a Viennese and know a beautiful thing when I see it. Your JOURNAL is a GEM; it is ART. You talked me into it; I want to learn gem cutting. *K. M. Eberts, Rockaway Park, N.Y.*

A magazine of JOURNAL quality can work wonders in strengthening and boosting the lapidary hobby and when you become a monthly there will be dancing in the streets. *Henry L. Luoma, Ahmeek, Mich.*

It is such a convenient size for reading in bed! *Edith Keeler, Marion, Ohio.*

It's too small and walks off. *Driver Smith, Vernal, Utah.*

There are three of us in our family and each one of us seemed to get more out of a different article. This shows you have a fine magazine for everyone. *Mrs. A. M. Brown, Yakima, Wash.*

Your second issue was gratifyingly good; if it is kept at that high level it deserves to be a success and I believe it will be. *Arthur Sanger, Chicago.*

It is a wonderful magazine and the color of the cover is out of this world. I especially like the ANSWERS TO INQUIRIES department and the SHOP HELPS. You are filling in the blank spaces where the need has been. *Mrs. J. B. Clarke, Tujunga, Calif.*

There is nothing but praise for the way you have started the ball rolling. It's now in class A so keep it going. May you and the JOURNAL live long and prosper. *William Pitts, California Academy of Natural Science, San Francisco.*

You sure hit the ball for a home run this time. Cooking on every page. *Nelson Whittemore, Santa Barbara, Calif.*

I think the LAPIDARY JOURNAL is very fine. The beautiful covers alone are worth the subscription price. *Lucille Sanger, Chicago.*

My house is a mess and not a lick of work has been done but the JOURNAL just arrived. I sat down and read it in spite of the work surrounding me and after that it was impossible to resist the impulse to write and express my appreciation and gratitude for this fine issue. *Laura King, Hollywood, Calif.*

The page dealing with making rings is wonderful. That's where I am and I sure will read that article several times, especially the soldering part. The magazine as a whole is a Masterpiece! *W. A. Poleson, Rathdrum, Idaho.*

I think lapidary is the investment hobby which stamps were a generation ago. Some will resent putting money value on a hobby but a potentially profitable hobby is no less enjoyable because it may have a chance of some day becoming a good investment. In radio the beginner is a "lid." Put in plenty of stuff for the lids. *Jack V. Wood, Santa Barbara, Calif.*

Got your July issue of the JOURNAL today and am quite taken with your magazine. *Grant Waite, Toronto, Canada.*

Received my two copies of the LAPIDARY JOURNAL and have not enjoyed such a kick since I cut my first cabochon. $6.00 a year would not be excessive for a publication of this character.—*H. E. Rogers, Wichita, Kansas.*

There has long been a need for an excellent magazine in this field and you seem to have sensed and included those factors which will make a well balanced, interesting and valuable magazine.—*Joseph D'Agostino, Plainfield, N. J.*

Next issue of the JOURNAL will be a special JADE number.

COMING EVENTS

At Long Beach, Calif.—October 12th, 10:30 to 5:30
Gem and Mineral Show—728 Elm Ave., Machinist Hall

* * *

At San Diego, Calif.—October 18th & 19th
Gem and Mineral Show—(Commercial Displays Also)
State Building, Balboa Park
10:00 to 10:00 on Saturday
10:00 to 6:00 on Sunday

* * *

At Philadelphia, Pa.—October 20th to 25th
Amateur Hobby, Science & Craft Show
700 Commercial Exhibitors
Convention Hall

* * *

At San Bernardino, Calif.—Nov. 8th & 9th
Gem and Mineral Show (Non-Commercial)
National Orange Show Building

* * *

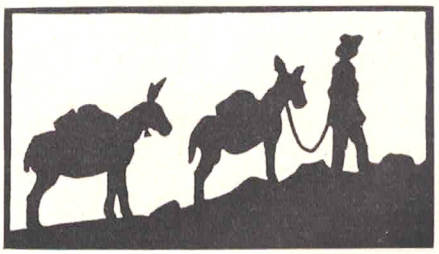
At Baltimore Md.—Nov. 24th to Jan. 4th
Hobby Show at Municipal Museum
Articles Shown on Page 117 will be displayed

(Continued from Page 144)

and gave advice regarding the organization of a group. The second meeting took place on August 18th, at which time Mr. Barnes was unanimously elected president, with Bob Neece of Laguna as Vice President, and Jean Smith, Secretary-Treasurer. Fifty-five persons attended the second meeting and all persons residing in the South Coast area of Laguna, Newport, Balboa, Corona Del Mar, Costa Mesa, etc., who are interested in minerals, gems or jewelry craft are welcome to join the group. Future meetings will be held on the third Monday evening, probably in the Baltz chapel.

* * *

LOS ANGELES LAPIDARY SOCIETY was host on September 14th at a picnic in Oak Grove Park, Pasadena, given to other Lapidary societies in the area. There was an attendance of more than 300 persons and many donated attendance prizes were given. THE FACETEERS, the society's faceting group, had an attendance of 41 at their August meeting. This group has made marvelous progress in faceting. It is their custom to take a "problem" by discussing a difficult cut or difficult material and then having each member present a finished gem at the next meeting of the material and cut previously discussed. Faceters in the Los Angeles area interested in the problems may attend the meetings held on the third Monday evening in the basement of the Museum in Exposition Park.



That's Me on the Right

SURE IT'S TIME TO THINK OF CHRISTMAS!

Here's a dollar special for little Joe or Big Bill's stocking or for *you!*

Don't bother with checks or money orders or letters. Just put a dollar bill in an envelope with your name and address and a note saying "Send me your dollar special, Chuck," and see what a good value you get.

Fifteen (15) Square Inches of Good Assorted Cabochon Material for $1

And look — ROUGHED OUT BOOK ENDS, FROM $3 to $10 A PAIR.
Polish them yourself. Fine Christmas presents.
1947's biggest cutting bargain—good Nevada Rhodonite at only 75c lb.
Only 10c a square inch in slabs.

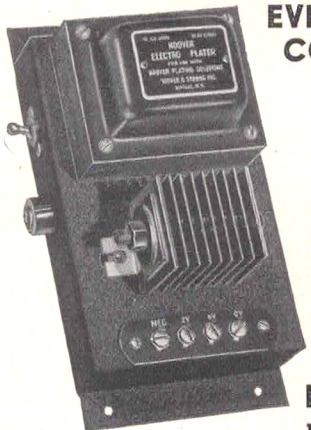
Write us about star quartz

SATISFACTION GUARANTEED ON EVERY PURCHASE

CHUCK JORDAN
453 E. Garvey Blvd., El Monte, Calif.
GOOD VALUES FOR MORE THAN SIX YEARS

HAVE YOU A FRIEND OR RELATIVE

who would be interested in the Journal? If you have, then send us $2.20 and we will send him the first three issues timed to reach him for his Christmas present, followed by the Jade issue about Christmas time. We will send him a Christmas card announcing your gift and the fact that he will also receive the next four issues. Orders must reach us no later than December 10th and be marked "Christmas Gift." That will be eight issues in all. Address Lapidary Journal, P.O. Box 1228, Hollywood 28, California.



110-120 Volt—50-60 Cycle

EVERY JEWELER NEEDS THIS COMPLETE ELECTRO-PLATING OUTFIT

(Plate with Gold, Silver, Rhodium, and Other Metals)

$24.50 Pre-war Value—**$19.50**

No experience needed. Simple instructions enable you to start plating immediately.

1 Hoover Electro Plater	$15.00
1 Qt. Pure Gold Plating Solution	5.00
1 Qt. Copper Plating Solution (Makes 1 gal.)	2.50
1 Qt. Electro Cleaner (Makes 1 gal.)	1.00
1 Qt. Electro Stripping Solution (Makes 1 gal.)	1.00
3 Anodes	
Complete Instructions	
Total Value	$24.50

Special Combination Offer $19.50

Send for free folder No. 253

Hoover & Strong, Inc.
121 Tupper St. Buffalo 1, N.Y.

Shipped express collect—check or money order. Sorry, no C.O.D.