

## PRESENTING THE LAPIDARY HOBBY

Lapidary is the word generally used to describe the art of shaping and polishing gemstones and generally also used pertaining to the person doing lapidary work.

The art and practice of lapidary dates back to the earliest hominid who picked up a pretty stone, improved it by rubbing it against another rock and presented it proudly to his/her mate, children, chieftain, etc. The practice of lapidary reached high levels of perfection in the Middle East and China thousands of years ago and throughout the world since. Today virtually anyone can shape and polish a stone with the effective diamond plated tools now available.

The list of activities and products under the heading of lapidary is long, limited only by ones imagination. The list of lapidary tools is also long and constantly growing as enterprising lapidaries modify wood or metal working tools to their own unique needs, or devise a totally new tool. A partial list of tools and projects follows.

The pictures illustrate a few unique machines used by a couple local lapidaries for smooth gem projects (not faceting). Most of them are available from catalogs, or can be made by modifying existing machines from other trades. Even better, used lapidary equipment at lower cost can be found through local rock club members.

Lapidary art is permanent. If you have the urge to create, do it in hard durable stone.

**First presented to the MID-MICHIGAN ROCK CLUB  
on 8Feb11  
by Bill and Barb Tite**

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**SUMMARY: STONE IS A VERY HARD AND DURABLE MATERIAL. IT IS PERMANENT ART.**

# LAPIDARY DEFINITIONS

## Funk & Wagnalls 1969

adj.

1. PERTAINING TO STONES OR THE ART OF WORKING IN PRECIOUS STONES.
2. INSCRIBED UPON OR CUT IN STONE.

n., pl. -daries

ONE WHO CUTS, ENGRAVES AND SETS PRECIOUS STONES.  
A CONNOISSEUR IN LAPIDARY WORK OR GEMS; LAPIDIST,  
LAPIDARIAN.

## Webster Giant Illustrated 1942

LAPIDARIST: n. ONE WELL VERSED IN THE KNOWLEDGE OF GEMS AND PRECIOUS STONES; A GEM CONNOISSEUR; ONE SKILLED IN CUTTING AND MOUNTING GEMS.

LAPICIDE n. A STONECUTTER.

I USE THE TERM LAPIDARY INCLUSIVELY FOR ANYTHING PERTAINING TO SHAPING AND POLISHING (LAPPING) GEMSTONE MATERIAL. I DO NOT INCLUDE COMMERCIAL STONE CUTTERS WHO MAKE TOMBSTONES, STORE FRONTS, COUNTER TOPS OR SCULPTURES OF MT RUSHMORE

## TYPICAL LAPIDARY PROJECTS

### 1. POLISHED GEMS

- A. ROUND, OVAL, PREFORM, SMOOTH STONES
- B. FACETED STONES
- C. BEADS
- D. SPHERES
- E. MOSAIC/INLAY
- F. DOUBLETS/TRIPLETS
- G. BAROQUE STONES. TUMBLED OR HAND POLISHED
- H. GEM TREES

### 2. SCULPTING

- A. ANIMALS/PEOPLE/CAMEOS
- B. FREE FORM, WINDOWS
- C. PICTURES – 2D, 3D, NATURAL

### 3. STONE TOOLS, APPLIANCES

- A. KNIVES, GUNS
- B. LAMPS
- C. DISPLAY PIECES
- D. DISHES, BOWLS, CUPS, COASTERS
- E. OBELISKS, SCEPTERS, ETC.
- F. CLOCKS, WIND CHIMES

ABOUT ANYTHING LIVING OR DEAD THAT CAN BE REPRODUCED,  
SOMEONE HAS MADE IT IN STONE.

Note: Lapping stone produces dirt as my machines readily show. Some lapidaries clean their machine like new after every use. Your choice.

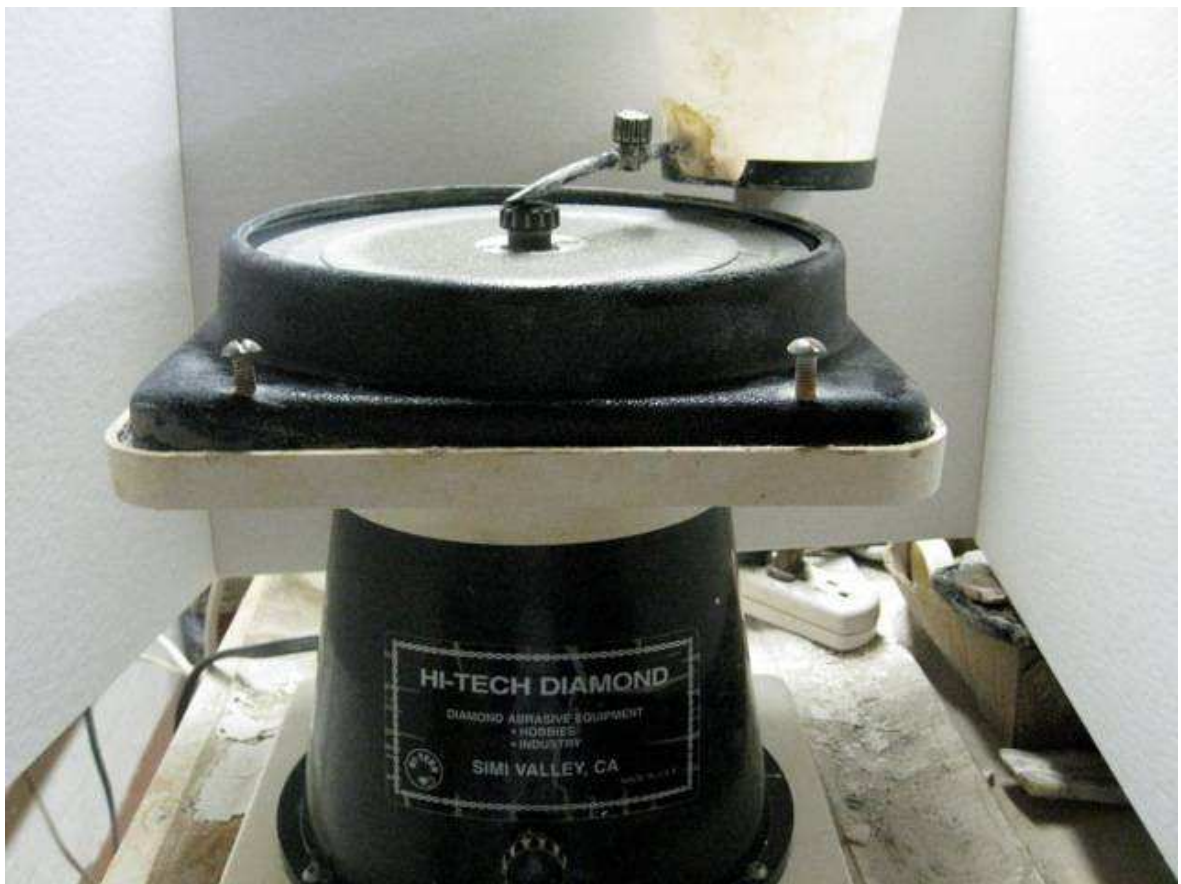
## THE HORIZONTAL LAP

### ALL U-NEED-MACHINE

The basic lapidary tool, aka All-U-Need machine. Diamond discs are available with various grit and a felt buff.

### TUMBLER COMMENT

Tumblers (not shown here – see later pages.) are often a beginning Rockhound/Lapidary's first machine and sometimes his/her last machine. Frequent failure and frustration make tumblers my last choice for beginners.



## DOPPING STATION

### 1. DOP STICK - HANDLE ON THE STONE

- A. Dopping a stone is a way to hold and control the stone during the lapping. Old fashioned sealing wax is heated and applied to any convenient stick and to the stone.

### 2. EASY RELEASE - FREEZER

- A. When the cab is finished it's freed from the dop by freezing. The difference in COE (coefficient of expansion) is so different between the stone and the wax that the wax shears free.



## 6 INCH TRIM SAW

### 1. WHAT'S INSIDE

A. The trim saw is the second machine the beginner might want.

### 2. FASTER SHAPING

A. In order to make cabs of a specific shape and size it is much faster to cut the shape out of a slab rather than grinding away larger amounts of unwanted material.

The trim saw can also make slabs (slices) from small stones. Clamping a "fence" along side the blade produces a controlled thickness and a smoother surface.



## 6 INCH VERTICAL LAP -1

### 1. VERTICAL LAPPING SURFACE - DIFFERENT TECHNIQUE

A. The next machine might be a bench grinder equipped with diamond coated wheels and a water system. It is unwise to shape stone dry due to the dust and heat generated plus damage to the expensive diamond wheels.

B. Silicon carbide wheels also work with softer stone but are slower and short lived.

### 2. SKIP THE DOP

A. Larger cabs can be shaped without the dopstick.

As with all machine work, good lighting is important.



## 6 INCH VERTICAL LAP - 2

### EACH WHEEL IS DIFFERENT FOR DIFFERENT PURPOSES

- A. Multiple vertical laps have the advantage of less need to stop and change wheels between operations. There are dozens of different grits as well as sizes and type of wheels for specific results.
- B. 6 inch diamond wheels 1" wide
- C. 8 inch diamond wheels 2" wide
- D. 6 & 8 inch soft wheels 2" wide
- E. 6 & 8 inch expanding rubber wheels using belts 3" wide
- F. Special shaped wheels for hearts, etc.



## 8 INCH VERTICAL LAP WITH DISC

### MAKE YOUR OWN LAPPING STATION

- A. Arbors with water systems are available from lapidary supply companies. They are often modified by the user to "improve" their function.
- B. They are basically an arbor with two sealed bearings and a cone (multi speed) pulley in between. A motor is mounted behind. The arbor is enclosed by the water system and spray shield.



## VERTICAL FLAT LAP

### FLAP LAP IS STILL NEEDED

Flat lap mounted vertically. This can do all the things the horizontal lap does (not as conveniently) and also can be fixtured to do square or beveled edges.



## MOTOR/GRINDER

### COMPACT DESIGN -- NO BELT

- A. Special double shafted motor mounted vertical wheels are also available with water system added. It lacks a variable speed.
- B. A common bench grinder could be fitted with diamond wheels but the speed might be too high and the bearings may not be protected sufficiently for the stone grit it will be exposed to. I have never tried one. The compact design without belts can be an advantage (portable?)



## EXTRA LAPS

### 1. USED LAPIDARY EQUIPMENT GOOD ENOUGH

A. Lortone is the traditional lower cost lapidary equipment supplier. Their machines develop vibrations with wear but as long as they turn the wheels they continue to work. In my experience it seems like every arbor ever sold is still working. I see little need to buy high \$ new equipment.

### 2. CONTINUOUS FLOW THROUGH WATER SYSTEM

A. My water system uses the home water supply with redundant valves to avoid flooding. The used water is drained into 5 gal. buckets which must be dumped occasionally. This avoids contamination. Many new machines use recirculating pumps. Obviously one must keep these machines clean between useage.



## LAPS AND BUFFER

### 1. WHEEL TO WHEEL PROCESS

A. The multiple arbors set up with different grits saves a few minutes of wheel changing and reduces the risk of cross contamination from coarse grit sludge after changing to a finer grit wheel. I seldom (obviously) clean my machines but have had no cross contamination.

### 2. AVOID CONTAMINATION

A. The semi circular enclosure between the two arbors is my leather horizontal buff which must be kept clean and shielded from any contamination. The two wheel buffs at the end are also kept covered with ordinary plastic bowl covers with an elastic edge band.



## HORIZONTAL BUFFER

### TRADITIONAL FAVORITE

- A. The low speed horizontal lap uses a slightly domed leather over foam surface and uses a slurry of tin or cerium oxide polish applied with a brush.
- B. This system is the ultimate super polish buff according to some lapidaries.



## MOTOR BUFFER

### 1. QUICK AND DIRTY COMPROMISE

- A. The vertical buffing wheels are faster and more convenient using a stick or bar of wax based polish. The black wheel at right is for buffing silver. It's not good to do both stone and metal on the same buff due to the difficulty in removing the black stain from the gemstones.
- B. The wheels are cheap Chinese muslin. Better than nothing, maybe.



## REALLY OLD BUFFER

### 1. OLDER THAN DIRT-STILL MY FAVORITE

- A. The original buff. I've used this set for nearly 50 years and it is still my favorite. The left wheel used to be 6" diameter like the right wheel. It is a soft cotton wheel, no longer available. Note: the rags are to catch the stones that get away.
- B. Stone polishing is an art. There are many types of buffs and polishes, each different and favored by someone for their particular job.



## HARD FELT BUFFER

Noisy but effective. Another antique buffer that someone assembled long ago. I have mounted a hard felt wheel at right which is the ultimate for Petoskey stone. The left wheel is a simpler leather flat buff.



## 10 INCH TRIM SAW - #1

NO UNDERCUT -- 90 DEGREES

The 10" trim saw shown is unique in that the table is at the level of the axle center line. This allows the blade edge to enter at 90 degrees to the table surface. This allows cutting up to a line without undercutting, as occurs with a standard trim saw.



## 8 INCH SAW

### 1. TRIM/SLAB SAW

A. The typical trim saw design has the axle or shaft below the table. This provides an unobstructed table on both sides of the blade (but the blade undercuts your slab at the table surface.) The unobstructed table allows hand slabbing of small stones, 3".

### 2. VERSATILE BUT MESSY OIL SPRAY

A. Trim saws must have a liquid coolant just as large diamond saws. Dry concrete and tile cutting blades are inadvisable for lapidary work due to the toxic dust created. Lapidary saws with water or mineral seal oil avoids all dust and prolongs blade life.



## 10 INCH TRIM SAW - #2

### 1. NO UNDERCUT -- 90 DEGREES/OPEN TABLE

- A. Another table level shaft design. A saw which was equipped with a traveling vise with automatic feed.

### 2. A VERSATILE TRIM/SLAB SAW

- A. Without the vise this makes another good trim saw as well as ability to hand cut small slabs, 4"-5".



## 18 INCH & 30 INCH SLAB SAWS

## 1. AUTOMATIC SLAB SAWS

- A. Lapidary hobby slab saws run from 10" to 36 " per blade diameter.
- B. Commercial saws can be much larger.
- C. They are always automatic feed and fully enclosed to contain the obnoxious oil spray they create.

## 2. CAN RUN BOTH AT ONCE BUT DON'T LEAVE THE ROOM

A bench drill press is visible in the background, useful with diamond core drills.



## 30 INCH SLAB SAW

### 1. ROCK VISE - POWER FEED

A. A detail view of a large slab saw with power feed and a vise that will hold a large stone. It must however have one dimension that is less than half the diameter of the blade less another inch or so for the shaft and flanges.

### 2. LIMITED VISE GRIPPING POWER = LOOSE STONE = DISASTER

A. Usually less than half of a round stone can be slabbed due to limited grip by the vise.



## 14-INCH CHOP SAW & LAPS

1. MULTI. MULTI PURPOSE ARBORS & GRAVITY FEED SAW
2. CHOP SAW UNIQUE CAPABILITIES - LESS ACCURATE
3. NINE DIFFERENT WAYS TO EQUIP AN ARBOR

Another compact set of lapidary wheels and a special purpose diamond chop saw. (Tim & Cheryl's) There are several different wheels including a silicon carbide belt wheel which has a wider surface and works well on softer stones.

Tim Middleton built this all - you - want system on one bench. The only limit is one's imagination.



## DRILL PRESS

1. HOLE SAW
2. NOT WITHOUT PROBLEMS

A standard, cheap, bench drill press works fine with core drills and a pan of water.



## TAURUS RING SAW

### THE ULTIMATE TRIM SAW FOR INSIDE CURVES

A more sophisticated trim saw is the Taurus diamond coated ring saw. It cuts in all directions but requires much patience with hard stones to avoid breaking the blade. This is used only on very special or difficult cutout pieces. The blade life is short.



## DIAMOND BAND SAW

1. ANOTHER GOOD SAW FOR MODERATE CURVED CUTS
2. USED WHEN A STRAIGHT BLADE WON'T DO

A. The diamond band saw works like any band saw except it cuts glass and stone with a diamond coated band type blade. It cuts in one direction and can create modest curved cuts.



## CABBING MACHINE

### 1. COMBINES ROTATION AND ROCKING MOTIONS FOR ROUND CAB

- A. A home made cab making machine built by Bob Rosa's father to shape star sapphires or any small round cab. It creates a perfect hemispheric shape against a selected cup with grit added with a brush or drip system.
- B. More complicated machines are available with a cam follower to produce various sized oval cabs.



## EDGE GRINDER

### INVALUABLE FOR EDGES OF INSIDE CURVES

An edge grinding machine borrowed from the stained glass hobby is useful in stones as well. A variety of small shaped diamond cutters is available to finish inside curves and edges.



## CARVING AND DRILLING TOOL

### SPECIAL PURPOSE TOOL FOR SMALL COMPLEX PROJECTS

Another unique machine is a combination drill press and sculpting head. In the position shown it is a drill press where the table rises vertically to the drill chuck. The motor rotates 90 degrees making various carving bits accessible to a hand held sculpture project. The other end of the motor shaft accepts various polishing wheels.



## HANDHELD SHAPING TOOLS

1. SOMETIMES IT IS EASIER TO FINISH IT BY HAND
2. BETTER CONTROL
  - A. Hand held tools are useful when all else fails. Fine detail work and clean up is often easier and more accurate with diamond coated burs and files. a hand held Dremel type tool is also valuable.



## SPHERE MACHINE

IT MAKES ROUND BALLS FROM ALMOST ROUND BALLS

A sphere machine assures a perfect sphere every time which would be difficult by hand. This one, owned by Tim Middleton, requires hand applied grit while it is working. Some machines use three heads (and motors) and may include a continuous grit drip system. It requires a high degree of faith to trust these machines to do a perfect job without human attention.



## BEGINNER'S TUMBLER

### FORGET IT

The hobby stopper. The beginner's tumbler is often the first machine a wannabe lapidary works with. Unfortunately tumble polishing gemstones is not as simple as it seems. (Or as the instructions may indicate.)

I don't recommend beginning with a tumbler.



## INCLINE TUMBLER

### BETTER CHANCE OF SUCCESS WITH SMALL PIECES

A better tumbler to start with is the inclined open barrel type. The action is better controlled and progress is easily monitored. The rubber cap is easily removed exposing the contents. In the background are the traditional closed barrels.



## ONE GALLON TUMBLER

### MOST POPULAR

The real value of tumblers is for finishing preformed and selected stones with a high probability of a satisfying product. They are also valuable for production de-burring or burnishing of precious metal rings and jewelry items. A final burnishing of finished cabs can produce perfect polish. This tumbler is still limited to small batches of small pieces.



## VIBRATING TUMBLER

### A REAL PRODUCTION MACHINE

Vibrating tumblers have gained favor in some cases to polish fine pieces while removing minimum material and with less breakage. Shown is a Ray tech 75 that will finish hundreds of pieces at one time. Smaller 1 or 2 quart vibrating tumblers are better for hobbyists and are readily available.



## FORTY GALLON TUMBLER

GOOD FOR LARGER STONES

Of course if you have a lot of rocks to tumble and some are larger than 2-3" the old fashioned octagon barrel still works. This one will do about 50# of stones per load. Hand built one of a kind.



## GRINDING ROCKS REDUCES STRESS

### BETTER THAN WATCHING GRASS GROW

A big benefit of the lapidary hobby is stress relief. The gradual change in the shape and beauty of a stone patiently held against the tool of choice is very satisfying and leaves one tired but relaxed.



## ROCKHOUNDS MAKE GOOD FRIENDS

### THIS PICTURE SAYS IT BEST

The very best benefit of the lapidary hobby is the fabulous friendships that develop as rockhounds show each other their latest accomplishments.

Polishing stones is special. This art is forever.

