South West Association of Turners 2015 Handbook

Turn 24 With SWAT

Evaluations

The Evaluation Forms are located at the back of this handbook. It is suggested attendees print a copy of Symposium Evaluation and enough Demonstrator Evaluation form to cover the rotation you expect to attend. The Demonstrator Evaluation form has enough space to critique two demonstrators. The notation Return to Preface at the bottom in the Evaluation Forms returns to this page.

Maps

Three Maps are included in the Handbook: *Downtown Waco*, *Upper and Lower Level Convention Center*.**The notation Return to Preface at the bottom in the Evaluation Forms returns to this page**

Hands-On

Hands-On Turning, Pen Turning and Sharpening is located (as last year) on the Lower Level of the Waco Convention Center just inside the front entrance.

Demonstrator Index

The Demonstrator Index links to all rotation handouts. In order that the Index only occupy one page, information is minimal.

The notation Return to Preface at the bottom in the Demonstration Index returns to this page.

Similarly, the notation Return to Index at the bottom of *All* handouts returns to the Demonstration Index page.

Welcome one and all to the SouthWest Association of Turners 24th Annual Symposium!

On behalf of the 27 member clubs Board of Directors, Executive Council, 57 Committee Chairs and hundreds of SWAT Volunteers I would like to thank you for your attendance and continuing support of our Symposium for the past 24 years. I am hoping this will be the best Symposium so far with each one bettering the previous year. I am already looking forward to the special 25th anniversary in 2016!

After visiting our ever growing list of vendors to pick up that new tool that will make you the best Woodturner ever (remember we are only one tool away from greatness) you should wonder down to our Hands-On Sharpening area and put a proper edge on the new tool. After which you can stroll the short 20 feet over to the Hands-On Turning area and try out that new edge. If not what you want repeat until it's right. As always there is also the Hands-On Pen turning area for you Pen Turners and those new to turning that would like to see what it is like to go from wood to finished project all in a short time. This year we will also have a room dedicated just to Pen Turning in all of its unique aspects. Please visit all of the Hands-On areas whether you are new to woodturning or an old pro; it is sure to enrich your turning experience.

As always there will be the 2-for-1 Drawing (*formerly known as raffles*) combining both beautiful Art pieces, tools, wood, jigs and this year a new Vic Marc VL300 along with two Jet 1221VS lathes. **All 2-for-1 Tickets will be red;** we will draw the art pieces, part 1 of the 2-for-1, on Saturday evening during the Banquet and part 2 will happen after lunch on Sunday for the final event of the symposium. **The Instant Gallery drawing (Blue Tickets)** will also happen on Saturday at the banquet and will feature the top 10 art pieces donated by our members and demonstrators along with exceptional opportunities at places like Arrowmont and Canyon Studios. We have added the 2-for-1 Tickets to the on-line registration so there is no excuse for having too few tickets this year. Buy lots and buy often I say.

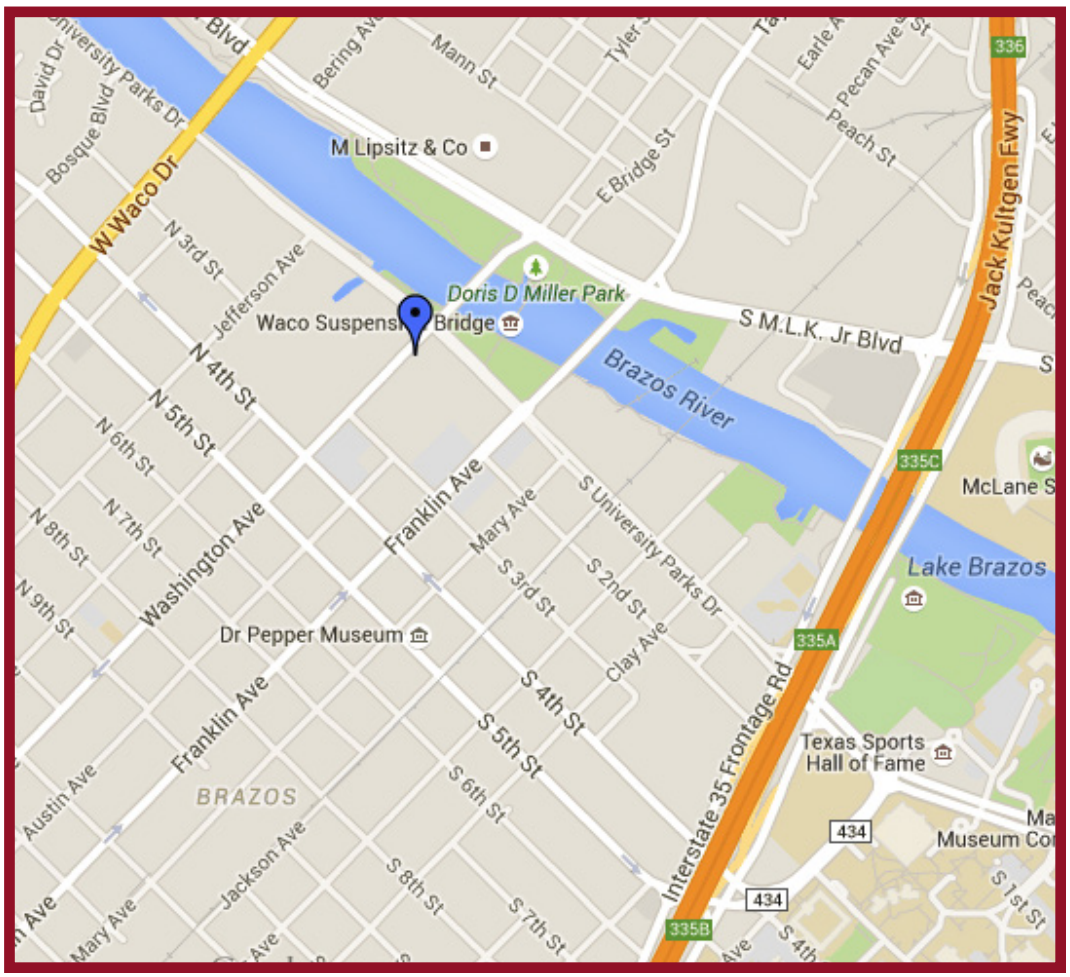
Our Instant Gallery is one of the biggest (if not the biggest) of all the US turning symposiums taking up a whole room unto itself. Beautiful art work from all over the country most of which will astound you with wonder of "how they did it." While in there don't forget to look over the separate Beads of Courage exhibit of boxes that will be donated to participating hospital to be given to kids struggling through treatments for extremely serious life threatening diseases. Visit our website for more information and a link to the Beads of Courage website.

Where else could you find: 54 turning classes (Rotations as we call them), electronically delivered Handbook, great lunch, the biggest Instant Art Gallery of all the symposiums, Special Interest Groups (SIG), more (Tool, Art and Wood) prizes, 3 lathe give away, over 45 vendors in 80+ booths, Internationally known turners such as Dick Gerard, Joe Herrmann, Kurt Hertzog, Ed Kelle, Malcolm Tibbetts, Derek Weidman, Jimmy Clewes (Wood World of TX), Stewart Batty (Woodworkers Emporium and alternate), Molly Winton (Wood World of TX) along with 15 regional demonstrators. All for $140?!! But we couldn't do it without your participation and the hundreds of volunteers that work tirelessly to bring the SWAT Symposium to you every year at such an affordable price. Thank you one and all, I hope you enjoy SWAT as much as I do, but if for some reason you are unhappy ,please let us know. We can't fix it if we don't know it's broken.

"What have you done for SWAT today?"
Ken Morton

President SouthWest Association of Turners
SWATurners.org
ken@woodshouter.com
210.833.7148

Waco Convention Center



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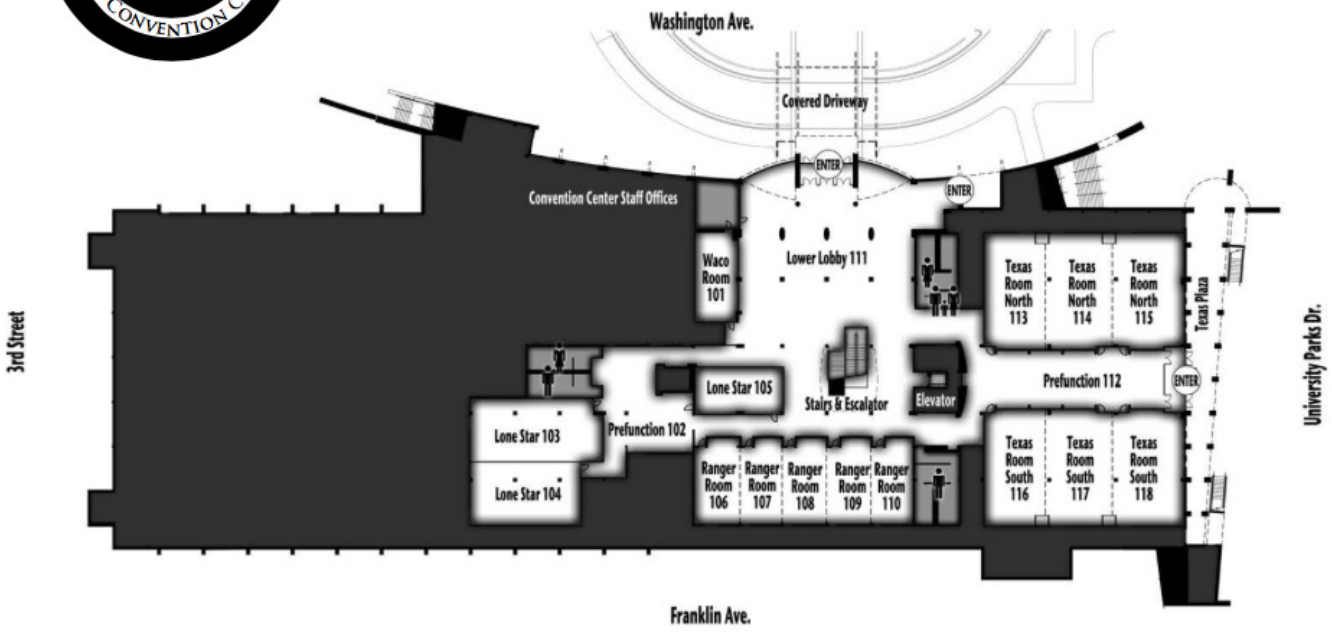
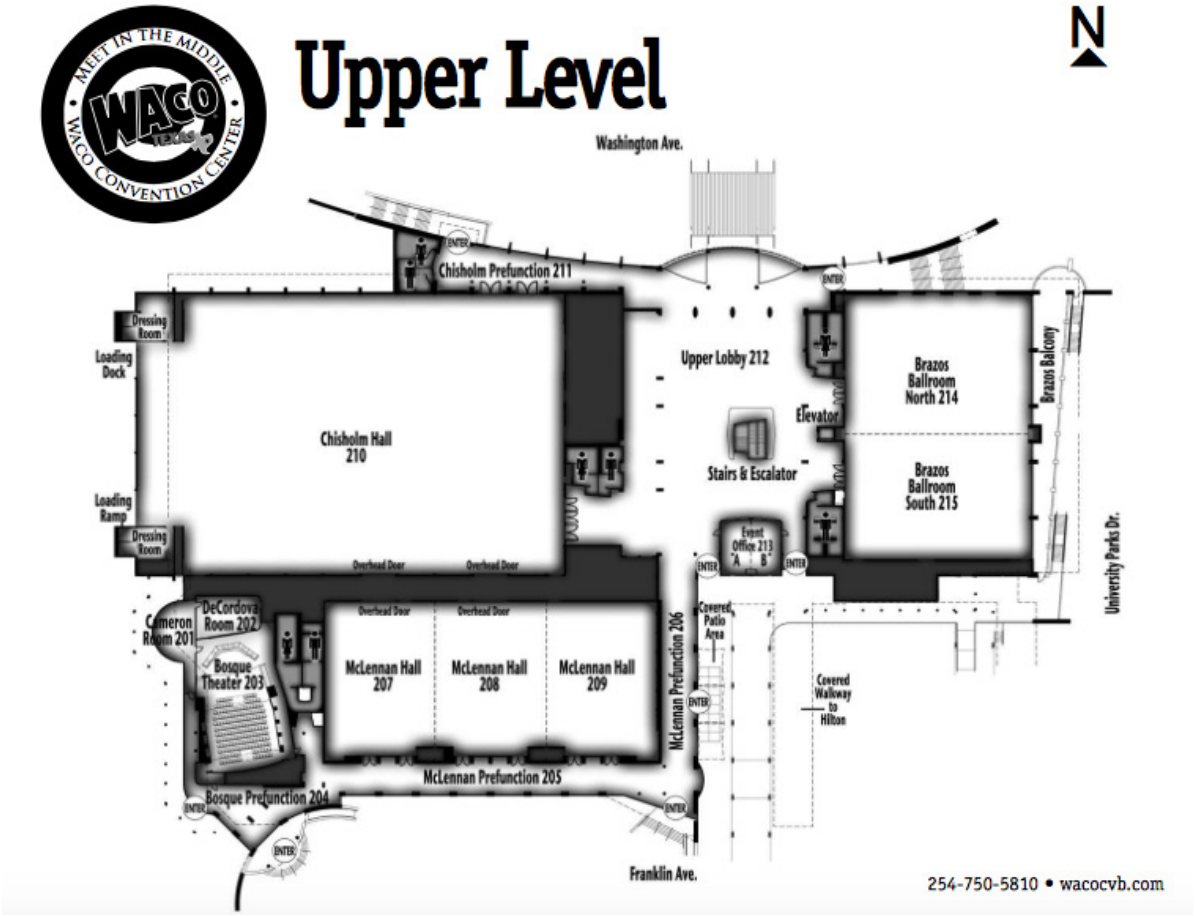
Lower Level



Upper Level



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ROOM	TEXAS NORTH	BRAZOS NORTH	TEXAS SOUTH	BRAZOS SOUTH	BOSQUE THEATER	RANGER
SPONSOR	HUNT COUNTY	CTWA	GCWA	WNT	HILL COUNTRY	DAW
FRIDAY, AUGUST 21, 2015						
9:00-10:00	OPENING CEREMONIES, CHISHOLM HALL					
10:30-12:00	Ed Kelle Digital Photography for the Wood Turner	Kurt Hertzog Pen Makings Tips and Tricks	Joe Herrmann Small Round and Square Bowls	Craig Timmerman Turning A Sphere The Old World Method	Janice Levi Jewelry Made Easy	Lyle Jameison Hollow Form Turning
12:00-1:30	LUNCH					
1:30-3:00	Dick Gerard Sphere-ology! Making Wooden Balls	Derek Weidman Drawing on the Lathe	Paul Coppinger Scab Bowls	MalcolmTibbetts Intro to Segmented Turning	Kirk DeHeer Surface Enhancements	Ken Morton Sharpening Interactive
3:00-4:00	BREAK					
4:00-5:30	Ed Kelle Explorations in Color and Texture	Kurt Hertzog Design and Turn Delicate Wooden Ornament	Jim Burt Heart Bowls, Heart Boxes and More	Jim Tanksley Turning Large Bowls	Larry Roberts Natural Edge Vessels	Glynn Cox Piercing on the Cheap!!
6:00-7:30	**Special Interest Dinner—Chisholm Hall- Tickets Must Be Purchased by Noon Friday at the Registration Check In**					
*****SPECIAL INTEREST GROUPS****						
7:30-9:00	Displaying and Photographing Your Work	Segmenting	Surface Enhancement	Pen Turning	Form and Design	
Moderator	Doug Baldwin	Michael Reggio	Janice Levi	Curtis Seebeck Don Ward	Alan Trout	

SATURDAY, AUGUST 22, 2015						
ROOM	**TEXAS NORTH**	**BRAZOS NORTH**	**TEXAS SOUTH 116/117**	**BRAZOS SOUTH**	**TEXAS SOUTH 118**	**RANGER**
SPONSOR	**HUNT COUNTY**	**CTWA**	**GCWA**	**WNT**	**HILL COUNTRY**	**DAW**
8:00-9:30	Dick Gerard Decorating Wooden Spheres	Derek Weidman Multi-Axis Turning	Joe Herrmann Spindle Turning Breadknife Handle	Kevin Felderhoff Transforming a Crotch to a Flying Winged Vase	Doug Baldwin Photography for Wood Turners	Delbert Dowdy Endgrain Box With Insert
9:30-10:30	BREAK					
10:30-12:00	Ed Kelle Explorations in Color and Texture	Kurt Hertzog Design and Turn Delicate Wooden Ornament	Dennis Ford Turning Small Hollow Forms	Malcolm Tibbetts Feature Rings for Segmented Turning	Janice Levi Jewelry Made Easy	Jim Burt Heart Bowls, Heart Boxes and More
12:00-1:30	Women in Turning Gathering	LUNCH				
1:30-3:00	Dick Gerard Sphere-ology! Making Wooden Balls	Derek Weidman Drawing on the Lathe	Joe Herrmann Small Round and Square Bowls	Jim Tanksley Turning Large Bowls	Glynn Cox Piercing on the Cheap!!!	John Holderman The Skew
3:00-4:00	BREAK					
4:00-5:30	Ed Kelle Digital Photography for the Wood Turner	Kurt Hertzog Taking Pens to the Next Level	Craig Timmerman Turning A Sphere The Old World Method	Malcolm Tibbetts Segmented Sculpture	Critique Derek Weidman Dick Gerard Joe Herrmann Ken Morton	Lyle Jamieson Hollow Form Turning
6:00-8:00	CASH BAR					
6:30-7:30	BANQUET DINNER					
7:30-9:00	2-FOR-1 DRAWING					

SUNDAY, AUGUST 23, 2015						
ROOM	**TEXAS NORTH**	**BRAZOS NORTH**	**TEXAS SOUTH 116/117**	**BRAZOS SOUTH**	**TEXAS SOUTH 118**	**RANGER**
SPONSOR	**HUNT COUNTY**	**CTWA**	**GCWA**	**WNT**	**HILL COUNTRY**	**DAW**
8:00 - 9:30	Dick Gerard Decorating Wooden Spheres	Derek Weidman Multi-Axis Turning	Joe Herrmann Spindle Turning Breadknife Handle	Malcolm Tibbetts Feature Rings for Segmented Turning	Doug Baldwin Photoshop for Wood Turners	John Holderman The Skew
9:30 - 10:30	BREAK					
10:30 - 12:00	Dennis Ford Turning Small Hollow Forms	Larry Roberts Natural Edge Vessels	Paul Coppinger Scab Bowls	Kevin Felderhoff Transforming a Crotch to a Flying Winged Vase	Kirk DeHeer Surface Enhancements	Delbert Dowdy Endgrain Box With Insert
12:00 - 1:30	LUNCH AND TOOL DRAWING					

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Doug Baldwin

DougBaldwinPhoto.com

Photography for Woodturners:

Light and Shadow

Objective Criteria for Successful Photographs

1. Overall Exposure
2. Highlight Detail
3. Shadow Detail
4. Edge Separation
5. Color Balance
6. Lighting for Shape
7. Area of Focus
8. Background
9. Photo is Part of a Portfolio of Work

1. Overall Exposure-

The overall light and dark balance of the photo.

Correct Exposure

2. Highlight Detail-

Sufficient or resolvable detail in the lightest parts of the art piece in the photograph.

3. Shadow Detail-

Sufficient or resolvable detail in the darkest parts of the art piece in the photograph.

4. Edge Separation-
The edges of the art pie
ce must clearly sepa- rate from the back-
ground.The piece must not blend in along its edges.

5. Color Balance-
The photograph must be properly color balanced to display the items correctly. No color shifts should be evident.

6. Lighting for Shape-
The lighting must support the dimen- sionality of the piece being photo- graphed. The object being photo- graphed should have highlights and shadows to maintain the shape of the item.
Overall Color Too Warm
Correct Color

7.Area of Focus-
The most important part of the item being photographed must be in sharp focus. Sufficient depth-of-field must be maintained for all relevant parts of the item being photo- graphed.

8. Background-

The background should support the item being photographed and not detract or call unnecessary attention to the background. Avoid the use of strong colors or textures in the background.

9. Portfolio of Work-

Each photo should be a part of a cohesive portfolio. Similarly styled photos support the artist's vision of their creative endeavors.

Creating the Photograph

1. Camera Choice
2. Lens Choice
4. ISO Setting
5. White Balance
6. Quality or File Size Setting
7. Shutter Speed
8. Aperture or f-stop
9. Picture style
10. Lighting

To view more photos or see the upcoming class schedule visit my website.

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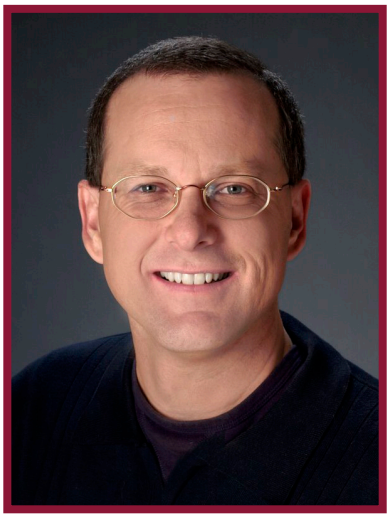


Doug Baldwin *Photoshop for Wood Turners:*

A Multi-Step Workflow Using Photoshop CS5

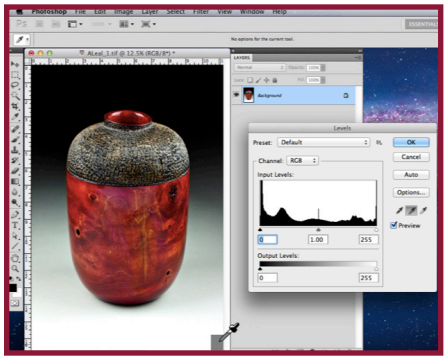
DougBaldwinPhoto.com

Open photo file in Photoshop CS1 to 6.

Go to File > Save As, set the file type to TIF and Save. TIF is an uncompressed file format.
JPG is not recommended for master file storage as it compresses the file and can reduce the quality of the file after repeated opening and closing of the file. JPG files are appropriate for online and email usage when converted from TIFs.

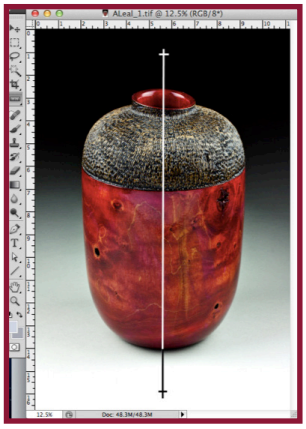
Color Correct the Photo

When shooting the photo, include a small corner of an 18% gray card in the photo.
In Photoshop go to Image > Adjustments > Levels. Click on the Gray Point dropper on the right side.
Using the Dropper, click on the 18% Gray card in the photo.The photo has been color corrected to neutral.

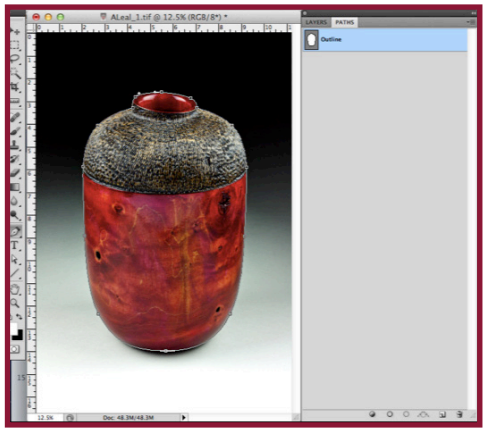


Straighten the Photo

Using the Ruler Tool, draw a line through the object in the photo to indicate the desired straightened position, either North/South or East/West.
Go to Image > Image Rotation >Arbitrary. Photoshop will indicate the amount of rotation necessary, click OK.

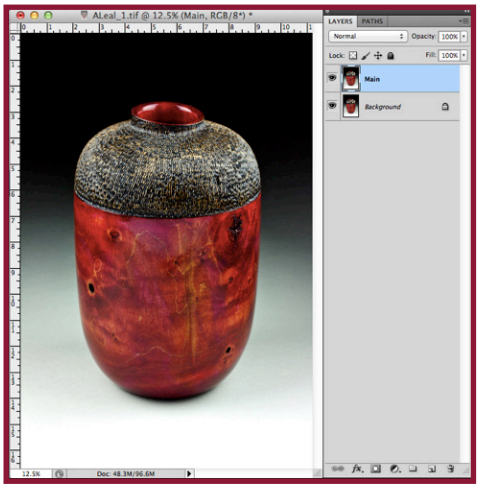


Outline the Wood Object



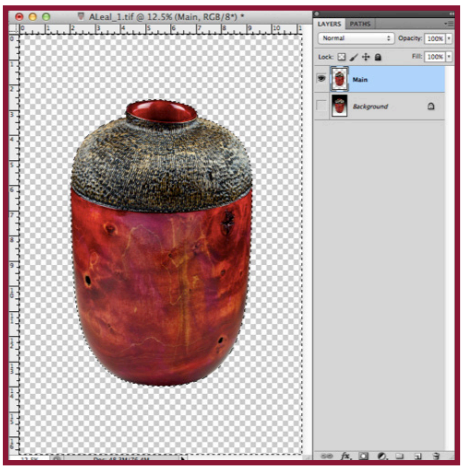
Go to Window > Paths to activate the Paths Palette. Check mark should now be next to Path in list and Palette should be visible.
In Palette, click on the small set of lines and downward arrow at the top right for sub- menu. Click on New Path. Name path “Outline”.
Using Pen Tool in Tools Palette, click and drag to create control points and outline object with path.The path should reside a few pixels inside the object.When the path is converted to a Selection and the background is removed, the Selection will shave a few pixels off the object.This is more desirable than having the selection outside the object and having small portions of the original background remain after the background deletion.

Duplicate Background Layer

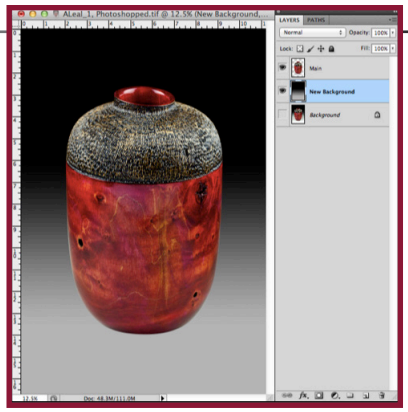


Go to Window > Layer to activate the Layers Palette. Check mark should now be next to Layers in list and Palette should be visible.
In Palette, click on the small set of lines and downward arrow at the top right for sub-menu. Click on Duplicate Layer...
Name new duplicate “Main” in dialog box. Click OK. Duplicate layer shows in Palette above Background layer and is active layer (blue high-lighting).

Convert Outline, Delete Background

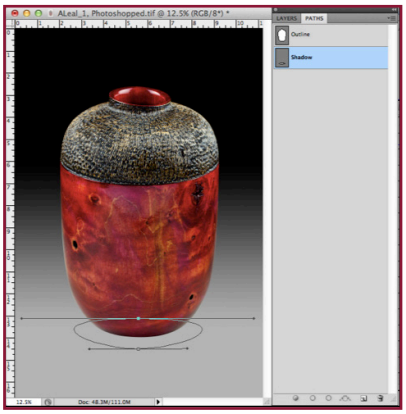


With Path active (highlighted in blue), go to sub- menu, then to Make Selection. Set Feather Radius to 0 pixels, Click OK. The object is outlined with a Selection (aka “Marching Ants”).
Click on Layers Palette.With Main Layer active, go to top menu > Select > Inverse. Hit Delete key. Background is now removed from around wood object. Click off eyeball next to Background layer to see object floating against transparent background.
Shut off selection by going to Select > Deselect.



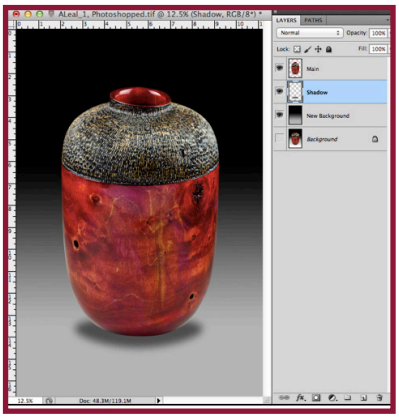
Create New Blank Layer

Click on Background layer to make it active (highlighted in blue).
Go to sub-menu and select New Layer. Name new layer “New Background”. Click OK.
New blank layer is active.
Select Gradient Tool in Tools Palette.
Click and drag with Gradient Tool to create new background. Gradient is created from Foreground and Background colors at bottom of Tool Palette and includes a smooth gradient between the two colors.



Create New Shadow Path

Click on sub-menu in Layers Palette. Go to New Layer. Name new layer “Shadow”.
Click on Paths Palette. Go to sub-menu and create new Path, named Shadow.
Create Path with Pen Tool to approximate a new shadow.



Create New Shadow

Go to sub-menu > Make Selection. Feather Radius of 50 pixels. Click OK.
Double-click on Foreground color at bottom of Tools Palette. Select color darker than foreground.
Go to top menu Edit > Fill.., and Select Use > Foreground Color.
Save file.

To view more photos or see the upcoming class schedule visit my website.

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JimBurt

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Heart Bowls, Heart Boxes and More

Origin of the Idea

Early in my wood turning career, a friend asked me to turn a heart shaped box. Her request was immediately dismissed as impossible. Later I read Stephen Hogbin's book *Woodturning: The Purpose of the Object* (Van Nostrand Reinhold Company, 1980) in which he described cutting woodturnings and reassembling the parts. His work inspired in me a way to make a heart shaped box. I also learned that the concept of impossible applied more to my self-imposed limitations than to any reality.

Basic Idea

Basically, a heart bowl is turned in two pieces. The bottom is roughly cone shaped. The top has a dual semi-circular cross section. Both pieces have a uniform wall thickness throughout. The top and bottom are glued together and cut in half along their common axis to create two bowls with heart shaped cross sections. If desired, the two bowls can be connected by a hinge to create a heart box.

Figure 1: The bottom (left) and top (right) turnings needed to make a heart bowl.

Design the Heart Bowl and Prepare the Blank

The cross section of a heart bowl can be drawn with a straight edge and compass as shown in Figure 2. The outside diameter of the bowl is 4R+2W. The height is slightly less than 4R+2W. All dimensions required to turn a bowl can be measured directly from Figure 2. The templates shown in Figures 3 and 4 are made with the same compass settings used to draw Figure 2.

A blank is normally about a quarter inch wider and two inches longer than 4R+2W. The extra length allows one inch on each end for tenons and working room. The extra diameter allows for misalignment errors. Cut the blank in two at the appropriate place.

Figure 2 highlights three requirements to turning a pleasing heart. First, the inside and outside diameters of the top and bottom must be equal at the cut line. Secondly, the curvatures of the top and bottom must be equal at the cut line. Finally, the mating surfaces of the top and bottom must be flat.

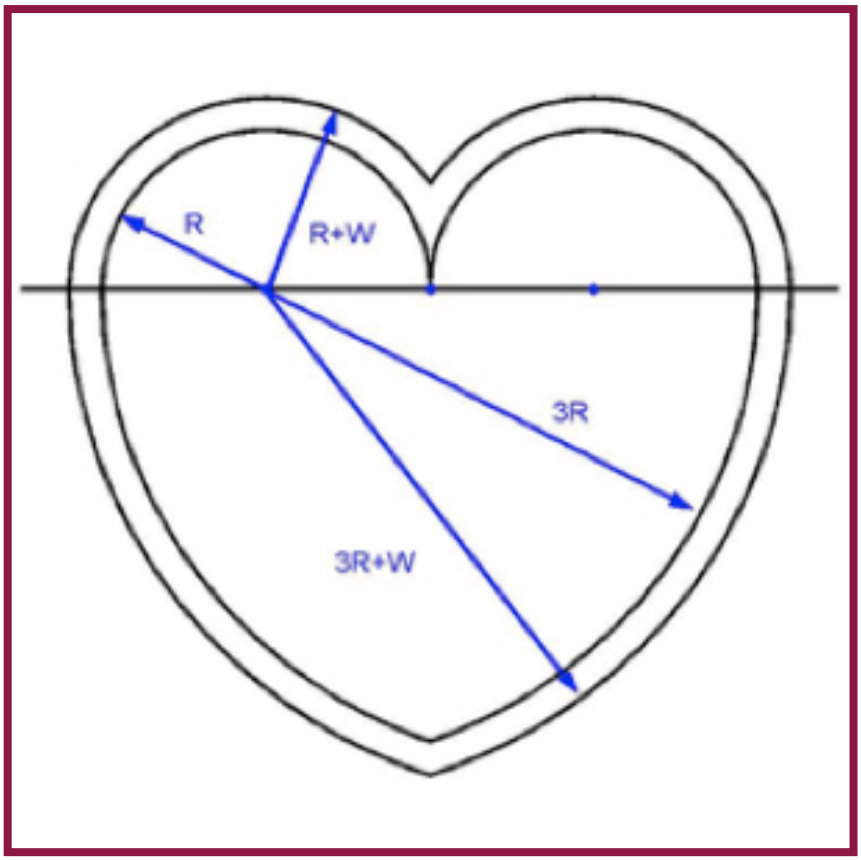


Figure 2: The horizontal cut line separates the top and bottom of the bowl. R is the radius of the semicircle forming the interior of the top. W is the bowl's wall thickness.

Turning the top

Mount the blank for the top and turn it true. Mark the inside and outside diameters on the face of the blank.

Turn the top's interior under the guidance of a template as indicated on the left side of Figure 3. A depth gauge is also useful for judging the maximum depth. The template is intentionally undersized so it can be inserted well before the final size is reached. Turn the top until the gap between the template and top are uniform.

With the top still mounted on the lathe, carefully turn the top's exterior to a uniform wall thickness. Use calipers to judge the wall thickness. Turn as much of the exterior as your calipers will allow. Flatten the top's face by holding sandpaper backed by a flat board against the face. Cut the top off the lathe.

Reverse mount the top. Continue turning the exterior moving the template over the surface to judge the curve. The template is shown on the right side of Figure 3. If desired, drill a hole to define the depth of the center.

Accurately measure the inside diameter of the top. Record the diameter or set your calipers or dividers to the inside diameter for future use.

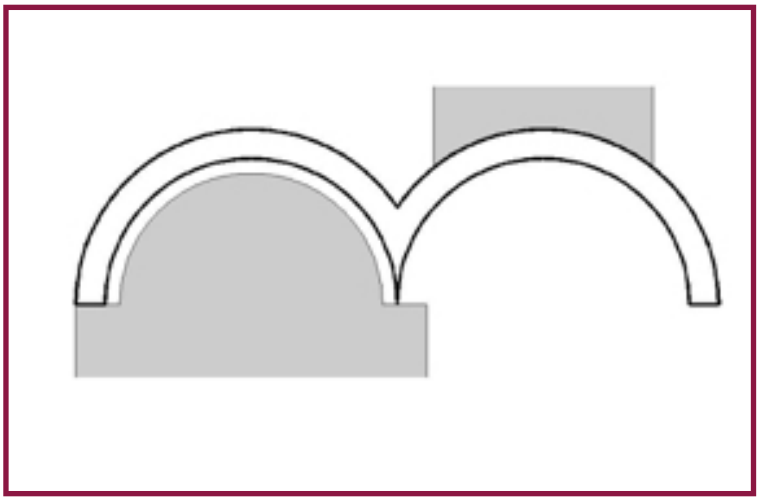


Figure 3: The shaded areas represent templates that ensure the top is turned accurately.

Turning the bottom

Mount the blank for the bottom and turn it true. Mark the inside and outside diameters on the face of the blank. Drill a hole the depth of the interior. Rough turn the inside of the bottom to a depth of about one inch. Flatten the top's face by holding sandpaper backed by a flat board against the face. Recall, the inside diameters of the top and bottom must be equal at the cut line. Carefully widen a narrow section at the rim of the bottom until it matches the inside diameter of the top. This is the only critical measurement, so take your time and work carefully. If you cut too much, face off the area and try again.

Turn the bottom's interior under the guidance of a template as shown on the left side of Figure 4. Fold the template so that it will fit inside the rough turned opening. Hold the tab on the face to ensure the template is at the proper angle. Without removing wood from the rim, turn the interior until the template touches all along the surface. This ensures the top and bottom will join smoothly. Rough turn more of the interior, fold out more of the template and continue turning. If the template can't reach the bottom, fold the tab back and slide the template along the curve, removing material as necessary until you reach the center.

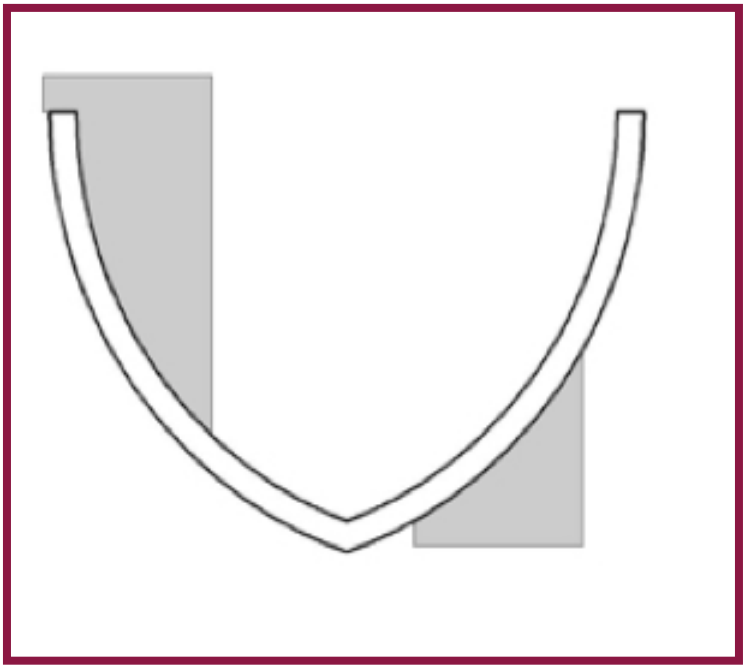


Figure 4: The shaded areas represent templates that ensures the bottom is turned accurately.

Turn the upper part of the bottom's exterior using calipers to the give the same wall thickness as the top. Turn as far as you can then ensure the face of the bottom is flat. Cut the bottom off the lathe.

Reverse mount the bottom and turn the bottom to its final shape. Use both the template on the right side of Figure 4 and the length of the bottom from Figure 2 to guide you.

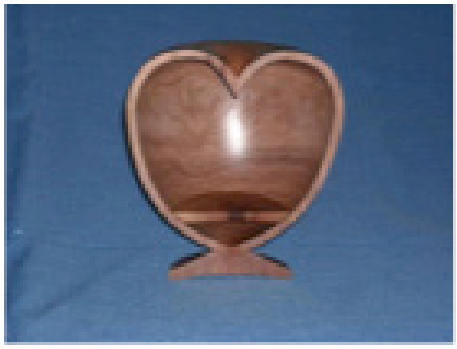
Post-Turning Procedures

Mount a scrap of wood on the lathe and turn a small conical depression to accept the bottom end of the turning. Glue the top to the bottom ensuring the grain patterns align. Use the lathe as a clamp with the live enter pressing on the top of the turning. Carefully smooth the joint between the top and bottom with sandpaper. Mark a center line all around the turning.

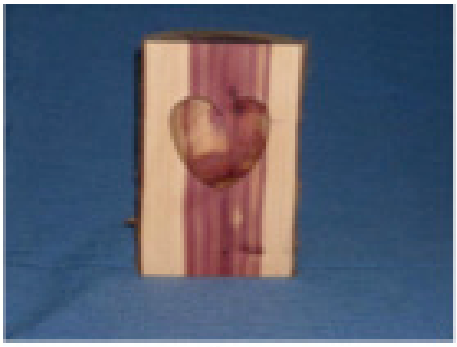
Remove the turning from the lathe and cut it along the center line. These turnings are awkward to hold and cut. I hold the turning on a bench hook and cut with a narrow, sharp flushcut saw. Attach a full sheet of sandpaper to a flat surface and sand away the saw marks. If you are making bowls, round the sanded surfaces. If you are making boxes, the sanded surfaces are best left flat. Use a scraper, sand paper and/or gouge to clean up the glue and smooth the region near the cut line.

Turning Other Objects

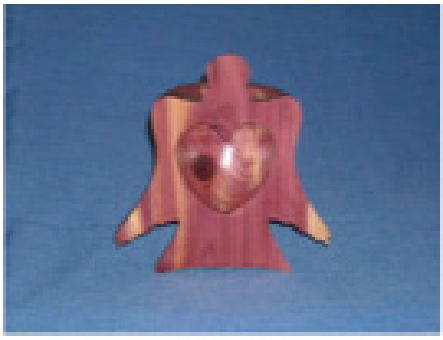
The heart shaped bowl had an exterior profile that matched in interior heart profile. Eliminating this constraint allows the creation of other objects. The Display shown below is made in the same manner as the bowl but with a supporting base turned on the bottom. The shelf is turned, halved and glued in place to hold a cherished item. Instead of a shelf, a tea cup hook could be attached at the top to hang an item. The Log is made by turning only the interiors before gluing the top and bottom. The Angel is made by turning the interior heart, gluing the top to the bottom and spindle turning the profile of an angel. Other profiles are possible, limited only by your imagination.



Display



Log



Angel

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Paul Coppinger

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Scab Bowls

Introduction

Woodturners love to turn burlwood because of its beautiful grain. Unfortunately burls can be very expensive. An alternative is utilizing tree scabs which occur when a tree loses a limb and then grows a scab over the wound to seal and protect.

Figure 1 Oak Scab

Tree scabs may be used to turn very unique bowls.

Figure 2 Finished Pecan Scab Bowl

Some scabs can be solid or may have partial remains of the missing limb.

Figure 3 Scab with solid inner surface

Figure 4 Scab with partial limb visible on inner surface

This determines the technique used to mount the scab. If the inner surface is solid, either a worm screw (screw drive) or a face place can be used to mount the scab to the lathe. (See Steps 1 & 2 below.)

If the inner surface has voids from a partial limb, then a face plate is necessary. If the voids are larger than the face plate, then attach a large diameter waste block to the face plate. (See Steps 1 & 2 below.)

Figure 5 Scab with Worm Screw and Spacers

Figure 6 Scab with Face Plate utilizing large diameter Waste Block

The flat inner surface will be the top of the bowl and the “hump” will be the back of the bowl. After mounting on the lathe, the “hump” will be turned and shaped first, and then the scab will be turned around to actually shape the top of the bowl. Before beginning to turn, decide the technique to be used to mount the backside. A tenon may be turned on the backside so chuck jaws can compress when ready to turn and mount. Usually, the tenon diameter should be just slightly larger than the minimum jaw diameter for maximum strength. If the grain of the tenon is not end grain, increasing the diameter of the tenon will minimize the possibility of the tenon splitting off. Remember that tenons require a very square or slightly undercut inside corner.

A recession or hole may be cut so that when ready to turn and mount the scab, chuck jaws can reach into, expand and hold. The hole should be slightly larger than the minimum outside diameter of the jaws. The depth of the hole should be 1/8 inch minimum and the wall should be square or slightly undercut to the bottom of the hole.(See *Figure* 7 next page)

Figure 7 Backside Recession

Procedure

1. Use a nail or any sharp-pointed object to find an approximate balance point on the inner surface. Compare the balance point with the general shape of the backside to attempt to center the backside "hump" to the spindle axis. Adjust as necessary.

2. Worm screw: Drill hole approximately ½ inch deep. The drill diameter should equal the shank diameter of the worm screw. For Oneway screw drives, use 3/8 inch.

   Face Plate: Position the face plate like the worm drive hole above. Next use woodscrews to attach the waste block to the scab being sure that the length of the screw will not affect the backside shape. Use at least 3 woodscrews to prevent "rocking" since the inner surface is seldom flat.

3. Mount to lathe, turn down speed to minimum, wear impact face shield, step to side of scab and turn on lathe. Loose dirt and/or bark may fly off. Increase lathe speed until vibrations become excessive then slow down slightly.
4. Begin shaping backside using a 45-45-45 or 3-45 pull cut. (Adjust tool rest to ~ 45 degrees to the lathe, lower bowl gouge handle to ~ 45 degrees and rotate flute to ~ 45 degrees….3-45s.) All these are starting points to a pull cut from the "hump" to the edge. Shape backside to desired form.

5. Either shape tenon or form recession.

6. Sand entire backside and apply any embellishments.

7. Turn and mount using the tenon or recession. (Oneway Talon® and Stonghold® chucks tend to loosen in the expansion mode so stop and readjust jaws to insure a tight fit in the recession.)

8. Hollow bowl to desired shape.

9. Sand top of bowl.

The next time you are cutting down a tree or processing a log or just happen to be walking through the woods with your chainsaw and see a scab, take a moment to cut it off … then go back to your shop and turn your first scab bowl.

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Figure 9 Scab Bowl Completed

Glynn Cox *Piercing on the Cheap*

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Piercing is the action of removing unwanted material to obtain a desirable artistic effect. I don't mean body piercing, although that can certainly happen if you are not careful. Whether using super high speed air powered handpieces or slow speed electric motor devices it is possible to produce dramatic effects in thin wall (1/16 inch-3/32 inch) turnings.

This demo is about procuring and building the necessary components (tools) to make a pierced turning, and doing it for about $100 excluding an air compressor. I will concentrate on the ultra high speed air driven handpieces, as I find these are the fastest and most efficient tools for piercing. There are certainly other, more advanced, ways of building a system but this is a good entry level route.

I find that electric motor driven Dremmel, micro motor, or Foredom type flex shaft tools are not optimal for fine small piercing details. They do work well with thick wall, large cutout size piercings which the small air powered handpieces cannot accommodate effectively. Their large bulky size and their slow rotational speed rapidly tire the hands. These electric tools max out at 45,000 rpm where the air powered units turn 250,000 to 400,000 RPM.

The high speed air powered piercing system consists of:

Dental Handpiece
Air pressure regulator/filter/valve/hose assembly
Burs
Air compressor

Most everyone has spent time in a dentist's chair and despise the sound and vibrations of the dentist drill. Get over it! It really is not that bad when you are holding the tool.

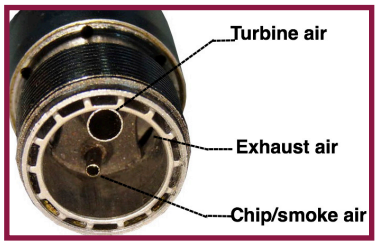
A quick *'dental handpiece'* search on eBay finds a myriad of units and prices. For woodturning piercing we need to concentrate on a few features:

- Bend angle of handpiece (contra angle)
  My preference is a handpiece with a 45 degree angle between the center line of the handle and the center line of the cutter. This to me provides the most comfortable grip (except possibly the straight handpiece discussed later). Handpieces with head angles from 60 to 90 degrees are difficult to use.
- Ceramic bearings
  Ceramic bearings do not require lubrication which is a nuisance and the oil could get on your turning.
- Chuck release
  The chuck wrench version arguably holds the bur tighter than the push-button but is slightly more expensive.
- LED lighting
  LED lighting is a great new addition and is worth every extra cent.

- Air port configuration
  Two or four air supply ports is not a big deal but I prefer the 2 hole system as it is simpler to provide chip/smoke air. More on that later.

An eBay search for '*dental handpiece 45⁰*' will find several units in the $20 price range. Add LED to the search and the price goes up and selection comes down. The LED light is powered by a miniature air powered electric generator inside the handpiece. These with ceramic bearings start about $60 from a "reputable" Chinese seller. Be sure and check the specifications for ceramic bearings. The relatively low dollar handpieces you find here are all Chinese products, even many that say made in Japan. You do get what you pay for, but you are piercing wood, not operating in someone's mouth or body.
Other hobby handpieces are available but rarely on the used market. Where the dental tools have a bend

45⁰ handpiece WITH LED

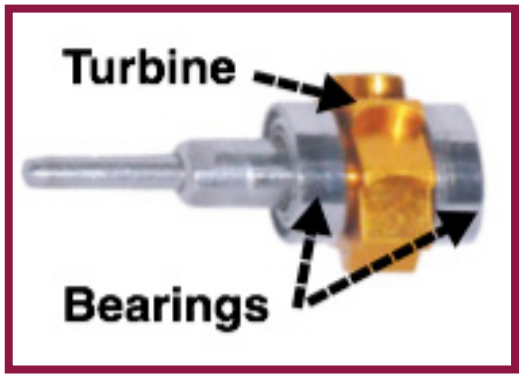


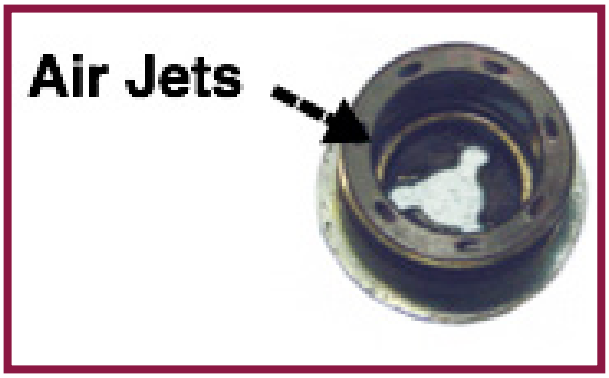
handpiece END

between the handle and the head these units are generally straight, like a pencil. These are great tools, very powerful, and very expensive. Hobby handpieces like the Power Carver and the NSK Presto are priced $350+. To replace a turbine in one of these will cost considerably more than the whole "cheap" system I am describing. I have not found any Chinese reproductions of these pencil type units. Do not confuse the low speed straight dental lab handpieces with the high speed ones I am describing here. They will not produce the results you want.

The shape of the handpiece is a personal preference. I have a problem holding the low angle units in a proper position to make a vertical cut. The straight units are good but again you have to watch carefully to approach the work at a 90 degree angle. The 45 degree angle I prefer is, for me, a natural angle to hold a pencil and presents the bur perpendicular to the work.

All of the handpieces have one thing in common, the air turbine. These are like a miniature hydroelectric turbine (see photo below). The regulated and filtered air is directed onto the turbine blades through extremely small slots in a disc similar to the scroll plenum of the hydro turbine. Again, these slots are extremely small and the smallest piece of contamination can clog them and reduce the turbine's speed and torque.





handpiece TURBINE AND SCROLL

A compressed air source is required. The handpieces only require about 2 CFM of air volume at 45 PSI. A compressor rated at 3 CFM at 60 PSI will work, but larger is better. The higher the volume the less cycling will occur. If you don't already have an air compressor, an inexpensive "pancake" unit will work fine. A moisture separator on the compressor is very desirable.

In order to provide proper filtered and regulated air several companies offer assemblies that are priced from $120 up. You can build one for less than $50. Here's how.

Before the air is provided to the handpiece it MUST be filtered and regulated again. Most small compressor systems have a regulator on them but few have proper filtering adequate for the turbine in the handpiece. You do not want to have any water or oil in the air stream, particularly with ceramic bearings. Other brands of filters and regulators, than the one specified here, are available either as combined or separate units. The filter needs to have a 25 micron or better filter element and be installed before the regulator. Most of the filters with a white poly element are 25 micron or better. The filter should be a coalescing type to remove excess water and oil from the air stream. The regulator MUST be a true "pressure regulator", not a "flow regulator". I see a lot of small flow valves designed for spray guns advertised as pressure regulators. A pressure regulator utilizes a spring loaded diaphragm to control a pilot valve and thus the pressure. A flow valve is only a variable orifice that controls the amount of air flowing, not the pressure and will destroy your handpiece . You can blow with your mouth through a flow regulator, not a pressure regulator. The handpiece requires 25 to 30 PSI pressure at the handpiece. Depending on the air line and fitting losses this would be about 35 PSI with the toggle valve turned off or 32 PSI with the valve turned on. This provides the desired maximum 30 PSI at the handpiece. This pressure is critical and should not be exceeded. Exceeding this pressure will burn out the LED and destroy the bearings.

It is a good idea to fabricate a onetime test gauge to measure the pressure at the handpiece. This can be accomplished by mounting a pressure gauge to a tee fitting and placing it between the end of the air tube and the handpiece connector. This will allow you to determine the exact pressure loss in your system and select the proper regulator pressure.

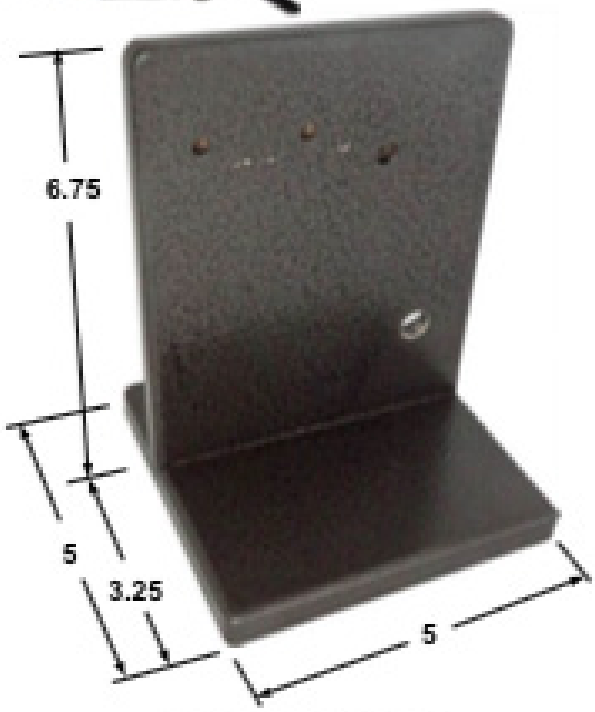
Acquire through purchase, trade, build, or scrounge the following components:

Regulator and filter assembly	eBay search '1/4 regulator filter -oiler'	
Air line disconnect	Harbor Freight to match your air line	
Toggle valve (2 way)	Various	search eBay
1/8 NPT or 10-32 to 1/4 inch tube fitting	Various (see below)	search eBay
1/8 NPT or 10-32 to 1/8 inch barb fitting	Various (see below)	search eBay
1/4 NPT to 1/4 tube elbow	Various	search eBay
1/4 inch OD nylon or PVC tubing	Multiple	hardware store
1/2 inch Teflon tape	Harbor Freight	1/2 inch x 250 inch
Support assembly	Fabricate	1/2 inch thick wood
Two hole hose assembly	eBay	search '*2H handpiece hose*'
0-60 PSI pressure gauge (optional)	eBay	search '*60 pressure gauge*'

Fabricate a support assembly from ½ inch thick wood of your choice (see detail below). I used some Baltic Birch plywood I had laying around. Paint it if you like. I personally like to have all my tools look nice so I painted the support with Rustoleum Bronze Hammertone paint. Mount and assemble the components as shown in the illustration below.

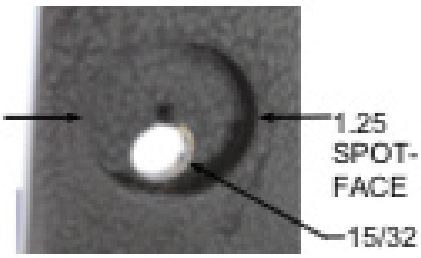
The illustration below shows the assembly of the filter-regulator-valve.

COMPLETED REGULATOR-FILTER ASSEMBLY



BASE ASSEMBLY

VALVE



VALVE MOUNTING HOLES

Use Teflon plumbing tape on all of the pipe threads. Be extra careful not to get any of the tape onto the face of the fittings as it can come loose and get into the turbine slots. Two clockwise wraps of tape around the threads is proper. The rigid tubing fittings are push type which only require you push the tube into the fitting and pull it back to engage the lock. If you need to remove the tube just compress the locking ring and pull the tube out.

The toggle valve is a great way to easily turn the air supply on and off but you can also use a ball valve. There are a lot of toggle valves on EBay. You will need a 2 way valve and also fittings to match the valve's port size. These toggle valves come with either a 1/8 inch NPT or 10-32 threaded ports. The style of toggle valve selected will determine its mounting configuration and type of fittings on your assembly.

Most regulator/filter assemblies come with a 0 to 160 PSI or a 0 to 1 kPa pressure gauge. I highly recommend changing this to a 0 to 60 PSI gauge. You will be working in the mid 30 PSI range and the resolution on the 60 PSI gauge is much better than on the 160 PSI gauge. They are inexpensive at under $10 each.

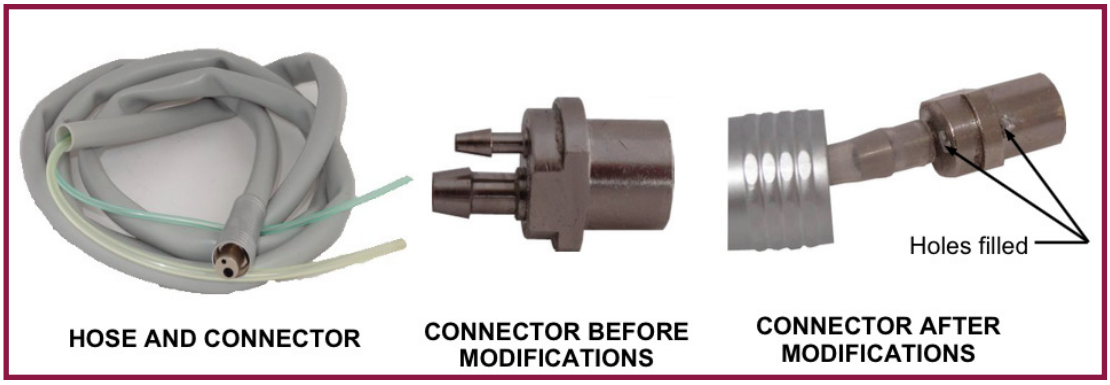
As a bonus, this regulator assembly works great with air brushes since there is no in-line oiler.

You may also add a quick disconnect coupler to easily change from your piercing tool to an air brush. Search Ebay for '*paint ball quick disconnect*'. Some pipe thread to tube adapter fittings will be required for this.

One other piece of equipment is required to provide compressed air to the handpiece. A dentist would use hose assemblies made of multiple tubes with a vinyl cover that provides air and water to the handpiece (see photo below). For our purpose only air to power the turbine is required, and optionally some air to blow away smoke and chips. Two hole connectors, with or without hoses are available on eBay for around $8 to $12. With the 2 hole system I have found that it is best to discard the large hose and use one 3mm ID x 5mm OD or 1/8 inch ID x 3/16 inch OD tube to provide air to the handpiece. This tube may be stripped from the hose or procured separately. Silicone tubing is very flexible but more readily available vinyl (Tygon), though stiffer, is also okay. This configuration puts much less stress on your hand because of the light weight and flexibility of the tubing.

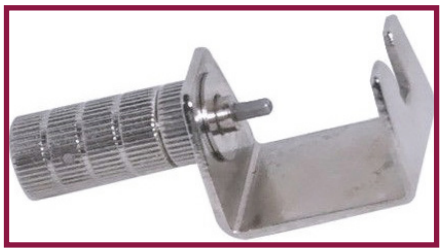
If desired, a modification to the 2 hole hose connector will provide a small amount of air for chip and smoke removal. The air is expelled through a small hole adjacent to the bur chuck. This modification requires drilling a very small hole between the two air ports. Determine the depth of the two holes (ports) and the length of the mating tubes on the handpiece to find an area between the end of the tubes and the bottom of the holes. It may be necessary to deepen the holes to allow clearance for the cross drill. Drill a number 76 hole through the side of the fitting adjacent to the small port and in line with the centers of both ports. Using this hole as a guide drill a number 80 hole through the web between the two ports. I drill a number 76 guide hole through the outside because it is very difficult to drill a number 80 hole that deep. Remove the small hose barb by heating it with a soldering iron and pulling it out of the connector.

Once this is done it is necessary to close the number 76 hole and the small barb fitting. This can be carefully done with epoxy or solder. See photos below. A hole larger than the number 80 will produce too much air bleed. There are other methods of providing this chip removal air but I have found that this is the easiest.



The cutters used in any small rotary tools are called burs and come in a variety of sizes and styles. There are flat, round, pointed, and egg shapes in carbide or diamond depending on the application. The ones I generally use for piercing are number FG699L and FG169L. The “FG” stands for Friction Grip to differentiate them from the slow speed burs that have a locking tab on the end of the shank. This designation is usually shortened to 699L or 169L. The “L” denotes Long, meaning the cutting length of the bur is longer than the standard bur length. The slightly larger diameter FG700L, FG701L or FG170L are also used. All of the burs have 1.6mm (1/16”) diameter shanks. I prefer the 699L bur for faster stock removal with less pressure. It is called a fissure crosscut as it has chip breaking grooves radially around the cutter. The 169L does not have these grooves and makes a smoother cut which is good for cleanup. These burs are available on eBay for around $1.59 each or $1.20 each for 100. You will break them occasionally but they last a long time as they are carbide. See bur photos below. Talk to your dentist, or the nurse, they will most likely save their slightly used burs for you. They will probably not be the 699L but will be some to play with for engraving, texturing, or cleanup of pierced holes.

The wrench style handpiece comes with a special tool to tighten and release the chuck. The wrench fits around the square nut at the face of the chuck and the spring loaded pen inserts into the back of the chuck. Insert the bur until the end of the cylindrical shaft just protrudes from the chuck and then tighten the knurled nut securely. The push button style handpiece only requires the push of a button to insert and remove the bur.



Chuck Wrench

Now that you have the whole thing assembled it is almost time to start piercing. Turn the toggle valve ***OFF*** and set the pressure regulator for 35 PSI. Before you connect the handpiece you need to turn on the valve and blow out any foreign particles from the system.

Finally, connect the hose, insert your desired bur, adjust the regulator for 35 PSI, turn on the valve and start piercing.

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Kirk DeHeer ***Surface Enhancement***

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Today's demonstration focuses on several methods of surface enhancement. First I will address the use of several metallic enhancements, and then I will speak to using dye markers. Each method may give your work an exciting and unique appearance.

Metallic Enhancements

The metallic enhancement products that I am demonstrating today are produced by a company called Modern Masters. The enhancement process is a three step procedure: application of the primer, application of a paint imbued with metal particles and the application of one of several aging solutions. While a number of colors and hues are available, I will speak to bronze, copper and iron.
Safety: Gloves should be worn to prevent prolonged contact during application. Eye protection is recommended. Recommended Waste Disposal Method: This material is **not** considered hazardous waste under Federal Hazardous Waste Regulations (40CFR 261).

Applying the Primer

Metal Effects Primer is a unique water-based acrylic primer. Unlike other primers, it is specially formulated to block Metal Effects Patina Aging Solutions and Activators from reaching the metal, wood, or reactive substrate. This helps prevent the formation of rust or other oxidation from forming under the paint film. Metal Effects Primer also blocks alkali salts, tannins, acid salts, and other unwanted contaminates from bleeding through to the Metal Effects Paint film and causing adverse reactions and unwanted color changes in the oxidized finish.

1. Make sure the work surface to be primed has been sanded to 320 grit, is completely dry, and does not have any surface contaminants such as oil, wax, or dust.
2. Thoroughly mix primer before applying.
3. Metal Effects Primer can be applied using a brush, roller, sponge, or spray gun. I recommend using a sponge to prevent leaving brush strokes in the dried surface.
4. Once the first coat has dried for at least a 1/2" hour, apply the second coat of primer. Let the primer cure for at least 12 hours before applying Metal Effects Reactive Metal Paints.

Applying the Metallic Paint

These metallic paints are pigmented topcoats. They are water base, stable, non-flammable, opaque, flowable liquids with flash points above 200°F. The painting processes with these metallic paints is very similar among the colors, but read and follow directions with each color to achieve the quality of finish desired.

The iron paint contains actual iron particles which will settle during storage. Thoroughly mix the iron paint by shaking the jar or using a stir stick. While these paints can be applied using a brush, roller, sponge, or spray gun. I recommend using a sponge to prevent having brush strokes in the dried surface.

Apply a minimum of **two** coats of iron paint allowing each coat to fully dry. **Do not apply Iron Rust Activator until the iron paint is fully dry.**

Applying Rust Activator

What is so interesting about this process is ability to create a worn rusted effect on a work piece using the rust ,activator. After the paint has dried, apply rust activator by lightly misting the painted surface. After 5 minutes reapply a light mist of Rust activator. The rust surface will start to form 30-40 minutes after applying. Cold and humid conditions will slow the oxidation time.

The copper and the bronze paint are applied the same, and each uses the same blue or green patina aging solution to activate the beauty and appearance desired. As the iron paint contains iron particles, the bronze and copper paints each contain bronze or copper particles. Thoroughly mix the bronze or copper paint by shaking the jar or using a stir stick. While these paints can be applied using a brush, roller, sponge, or spray gun. I, again, recommend using a sponge to prevent having brush strokes in the dried surface. Use same steps as with the iron paint. Apply at least two coats. allowing the paint to dry thoroughly.

Apply a coat of bronze or copper paint and allow to fully dry. Apply a second coat of the same paint, and while the bronze or copper is still wet apply the Patina Aging Solutions (Blue or Green) by lightly misting the painted surface. After 5 minutes, reapply a light mist of Patina Solution. The patinated surface will start to oxidize 30-40 minutes after applying. Cold and humid conditions will slow the oxidation time.

Applying Copper Paint

Misting Bronze Paint with Patina Aging

Below (L) copper and (R) bronze enhance bowls

Dye Markers

Blending multiple dyes on wood surface makes grain patterns pop. Using refillable dye markers gives me the advantage of fine control of my dye application and the markers I use, the Molotow Pump Markers, may be cleaned with alcohol and reused again and again.

Preparing the Workpiece

1. Make sure the work surface to be colored has been sanded to 320 grit, is completely dry, and does not have any surface contaminants such as oil, wax, or dust.
2. Seal the turning using a thinned sanding sealer with a ratio of 70% sanding sealer and 30% lacquer thinner.
3. Sand back the work surface with 600 grit sandpaper.

Coloring the Workpiece

1. Color the workpiece with the darkest color you plan on using. In this case we will be using black as our base color. Giving the workpiece a dark base will intensify the figure and color in the finished piece.
2. Once the dye has dried, sand back the dye using 600 grit sand paper.
3. I recommend moving the workpiece still in the chuck to a workbench so it's easier to color on.
4. Using the marker, color directly over the figure on the workpiece using a dark color (red, blue, green, purple); we will be using blue.
5. Fill in the non-figured space with a lighter color such as green.

Blending the Colors

1. The color on the workpiece needs to be blended to remove the harsh lines of color and smooth everything out.
2. Blend the colors together by wiping denatured alcohol or yellow dye in a circular motion.
3. If you have dye bleed to any unwanted areas, put the workpiece on the lathe and sand out any imperfections.

Setting the Colors

A nice glossy finish can be achieved using a spray lacquer. Spray multiple light coats and let dry overnight. Once dry, spray lacquer can be polished and buffed if desired.

Note: Do not use a wipe-on finish because the solvents in most finishes will cut the dye and leave an undesirable result.

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Delbert Dowdy

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Endgrain Box with Insert

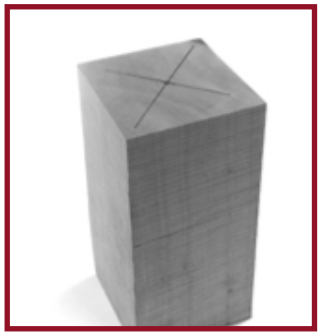
Choice of woods
You can use almost any hardwood. Woods that show very little grain pattern such a fruit woods (cherry, pear) and Exotics make very nice boxes. Woods that show grain such as oak and ash are a little more difficult to cut but with care can make very nice boxes also.

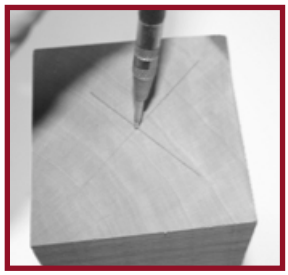
Tools
We will use a variety of turning tools. A chuck is essential to making the box. Tools include spindle gouges, scrapers, cut off tool, and a skew.

Size of Wood
A good size for a box is between 2 and 4 inches in diameter. Boxes smaller than 2 inches become miniatures. Large than 4 inch diameter are a problem to hold in most chucks.

Length of Wood
A good starting length of the wood is 2 to 3 times the diameter of the wood. Longer boxes can be made but they produce a set of problems in hollowing the bottom part of the box.

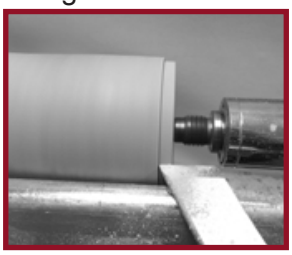
Wet or Dry Wood
You can start with wet or dry wood but wet wood will need to have the insides of the top and bottom removed and then dried. Like wet-wood bowls, the wood will warp as it dries. This is a particular problem as a top that fits when wet will surely not fit when the wood dries.

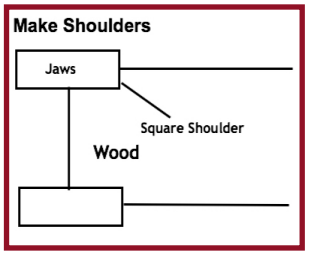




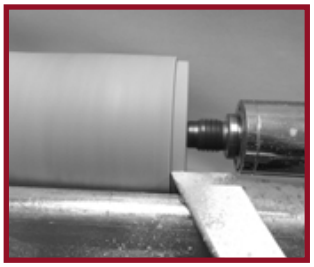
Between Centers
Before mounting between centers, I like to mark the center of each side and use a punch to put an indention in the wood for the points of the centers.

Cylinder
Turn the wood into a cylinder using your favorite tool for doing so. Square up the ends of the cylinder using your favorite tool. A parting tool works well for most people. Also you can use a gouge or a skew.





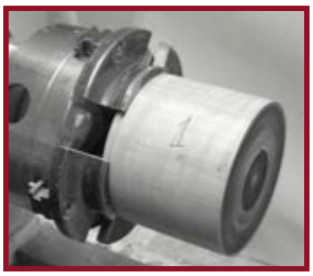
Make Shoulders



Use a skew or some other tool to place shoulders on each end of the cylinder. Make sure the shoulder is square to the cylinder. The shoulder need not be deep but should be short enough so that the end of the cylinder will not bottom out in the chuck. If your chuck jaws are dovetailed, you might cut a dovetail on the shoulder.

Golden Mean

The proportions of the top and bottom are important. Many people just “eye” the proportions and divide the Cylinder into the top and bottom. The best proportions are according to the Golden Mean which was discovered by the Greeks thousands of years ago. We find the proportion of 1 to 1.6 all through out nature. The human mind finds the dimensions generally pleasing. Dimensions of 1.6 to 1 up to 2 to 1 will work well. Always make the smaller piece the top. So mark your piece and part the wood into 2 pieces.



Place Top in Chuck

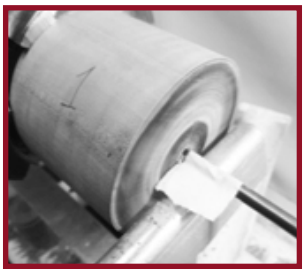
Now place the top in the chuck making sure the lip of the shoulder fits squarely on the jaws of the chuck and that the wood turns without any wobble.

Size of Inside

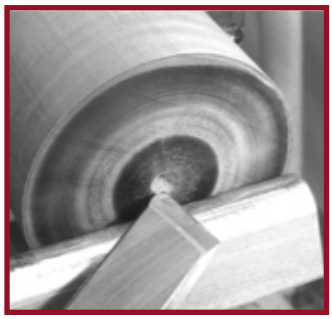
Determine how deep you want the recess in the top to be. Leave room at the top for adding details. The recess does not have to be particularly deep but deep enough to reduce the weight of the top. What diameter of material to remove depends on the final shape of the piece. Keep in mind if the exterior sides will be straight, concave, or convex. The lip on the top should not be too thick or thin. The lip on the top will fit over the bottom piece.

Turn top inside

You can now remove the bulk of the material on the inside of the top by several different methods. Turning tools can be used or forstner bits. If using turning tools such as gouges or scrapers, it is useful to remove the center first. I use a long drill bit with a wooden handle I made. Measure on the outside, the depth you want and place some tape on the bit.

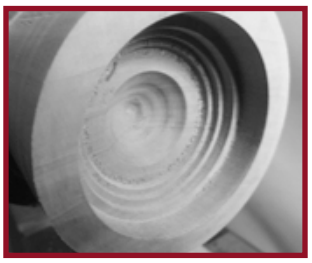


To center the bit, use a skew chisel on its side on the rest to create a center cone. With the cone in place, you can push the drill bit in to the proper depth.

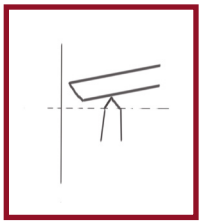


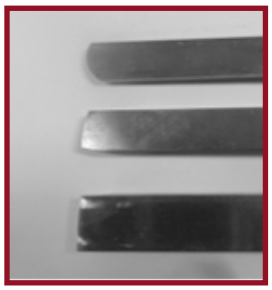
I then use a combination of gouges and square end scrapers to remove material. When using the scraper, take out a little at a time creating a stair step like pattern. Here I have taken out the center with a gouge to the depth of the drill bit.

With the square end scraper, slowly remove material until you get a flat bottom.



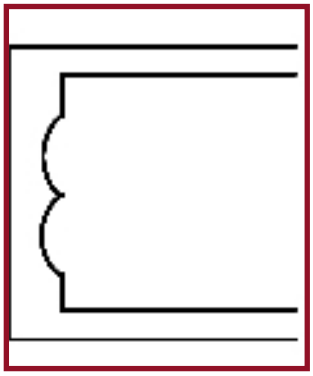
When using the scraper, have it cutting a little above center and angled down slightly which will help to reduce catches. The square end scraper is bad about catching and needs to be controlled with one hand on the rest and the other hand and arm resting on top of the handle to reduce the tendency for the handle move upward in a catch.





Modifying the scraper will help get into corners. Notice that two modifications are popular. One is straight of the left side with the front angling away and slight rounded. The angle allow you to move the handle to the right so the left side of the scraper is not rubbing on the sides and still can get into the outside of the bottom. The curvature reduces catches as less of the scraper contacts the bottom at one time. Another modification is to angle the left side of the blade and also angle and curve the front of the blade.

When cutting, slowly approach the bottom to begin the cut. It is not necessary that the "bottom" of the top be straight across.



Dome Inside of Top

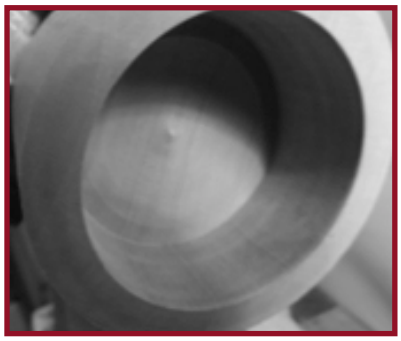
Using a curved scraper can create some interest in the top with the curves. The center point need not be removed, which creates interest and also makes your job easier.

Parallel Insides

It is important that the insides walls of the top are parallel to each other or you will have problems fitting the top on the bottom.

Final Inspection

Before you do the final sanding and inspection, it is time to check for any tear out inside the top. Tear out of the end grain is very common. If you have tear out, you can try turning it away by sharpening your tool and very gently removing a little bit at a time.



Softening the End Grain

If this does not seen to work, then you need to soften the fibers of the wood. There are several things you can use, but do not use water. You can apply paste wax, mineral spirits, sanding sealer, or oil. Make sure that what you apply is compatible to the final finish you wish to put inside the top. Let the softening agent soak in for a few minutes and try again removing small shavings.

Sand/Finish

Sand the inside of the top up to 400 grit and finish. Make sure the finish has dried before you fit the top to the bottom as some finishes might cause the wood to swell.

Chuck Bottom

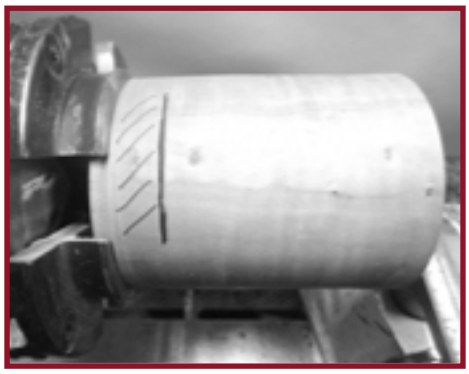
Remove the top and now place the bottom piece in the chuck.

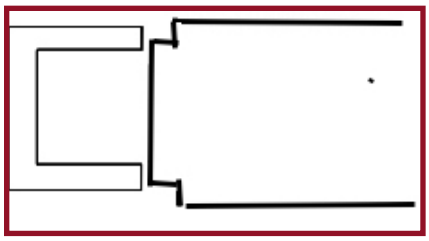
In determining the depth of the inside of the bottom, you will want to leave 1/2 in to 3/4 inch in the chuck when you turn the bottom off.

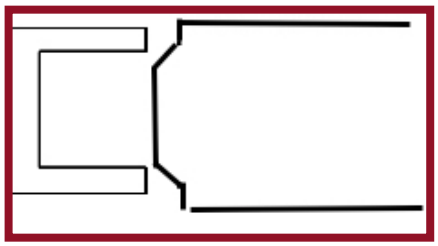
This wood in the chuck will be used to reverse chuck the bottom piece so you can turn the bottom of the piece.

It is always a good idea to be able to remove most of the material from the bottom and top and let them set for 24 hrs if possible to let the wood do any warping that might occur. Even if you think the wood is dry, it may surprise you as the wood can change a little. If you are ready to finish the inside, you must first determine the size of the lip on the bottom that the top will

fit over. You will want to over size the lip so the top does not quite fit. Once you have determined that size, you can now know how much material you can take out of the bottom piece. Remove material for the lip, being sure to leave it oversize but within a 1/32 or more.
One way to determine if you are getting close is to cut a slope on the top of the lip and see if it fits inside the top. When it barely fits inside the top, you can leave the lip alone until you finish the inside of the bottom piece.







Forstner Bits

You can remove material from the bottom piece in the same way as the top piece but to show a different technique, I will use a set of Forstner bits. If you do not have a set of bits that include sizes up to 3 inches, you could use a smaller bit and use the straight scraper to remove the rest of the material. To get the bits to center on the wood, create a cone with your scraper as before. The point on the bits will keep the bit centered for the rest of the cutting. I turn the lathe speed down and use a smaller bit, usually less than 3/4 inch diameter. To know how deep to drill, we will mark the depth with tape on the outside of the bottom piece as before. Remember that the point of the bit can leave a hole up to 1/4 inch long that will need to be removed later. Now mount the Forstner bit in a Jacob's chuck in the tail stock.
Only drill an inch or so in depth, removing the shavings as you go. If you drill too much, the water in the wood may heat and swell the wood, trapping the drill bit. Now I replace the small bit with a little larger bit until the final diameter is reached. The sides of the hole should be fairly smooth.

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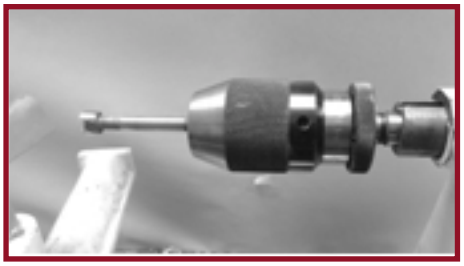
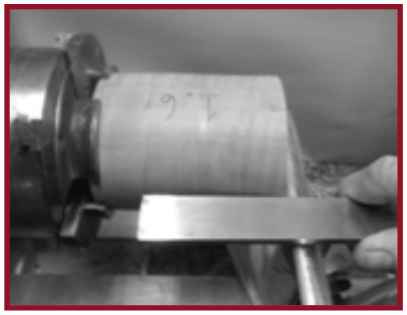




Level Bottom

Leveling the bottom enough to remove the point of the bit is the most difficult operation in making a box. In almost all cases, you will have your scraper hanging over the tool rest so far into the box that a small catch is hard to control.
This is where a thick scraper with a long handle comes in handy. You might want to practice on a piece of scrap before trying the final box. It is most important to have the scraping edge above center and angled down slightly. You need to sharpen your tool and, if it has an large abrasive burr, you might want to go over the top with a diamond hone to remove the burr. It will still cut well if you sharpened first before removing the burr. You must approach the bottom slowly and carefully as you will not be able in most cases to see the tool as it touches the bottom. Move your tool side to side, being careful not to move the tool to the right side of the spinning piece. This will cause a sudden and nasty jerking of the tool that could cause damage to the piece. Take your time and remove the shavings often. You may need to soften the bottom end fibers as before to get a clean cut. Using a spray finish can help to get to the bottom. Letting it sit for a few minutes before cutting may help. At the bottom there is a little nib in the center that is hard to deal with. One technique is to move your scraper to the center of the bottom just below the nib and gently move the scraper up to remove it. Another easy method is to use a small sanding pad with an extension, if necessary.
Turn the speed down low on the lathe and spin the pad in a drill. It can make fast work of the nib and also sand the bottom as well.

Ways to sand

To the sand the walls of the bottom piece can be tricky if it is deep. You do not want to put your fingers very deep in the bottom. That is the way accidents happen. If you do put your finger inside, be sure to move the sandpaper in and out continuously. If you leave it in one spot, you will get sanding rings that will be hard to get out. Another method is to get a dowel that is 1/2in. to 1in. in diameter and about a foot long. Cut a slot down the center as long as the width of sandpaper you are using. Now put one end of the sandpaper in the slot and wrap the sandpaper around the dowel. You will have to wrap the paper in the direction so that when inside the vessel, the turning vessel will keep the paper wound on the dowel. If you wind it the other way, it will unwind quickly.

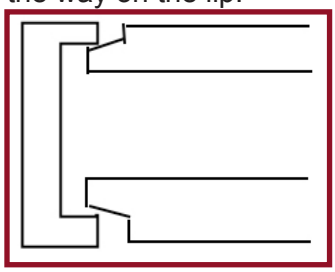
Now with one or two hands move the dowel in and out while turning the dowel in the direction to keep the paper on the dowel and using all the sandpaper surface around the dowel. When that paper around the dowel, that is being used is worn, just tear off that small amount to expose fresh paper and start sanding again.

Finish Inside

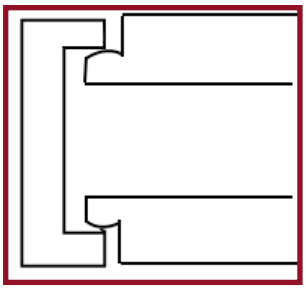
Apply your finish to the inside while on the lathe so you can use the turn- ing action to distribute and dry the finish.

Top Lip

Now, it is time to form the lip on the bottom piece. Make sure that it is larger than the opening in the top. This is the time to slow down and get this right. We are going to try to produce a fit called a suction fit so that the top gives a little resis- tance when you remove it and make a small sound. We want to produce a rounded profile on the out portion of the lip. Continue to remove small amounts on the front slope until the top will fit about 1/2 of the way on the lip.



A skew turned on side acting as a scraper works very well for this task. Take your time. Make small cuts, turn off the lathe, and check the fit often. Once you are 1/2 the way on, it is time to round the lower portion of the lip. You may want to angle the shoulder a little to make sure the top fits well. Adjust the cut until it goes on but is still hard to get off. We will make it easier to get off later after we have turned the top.

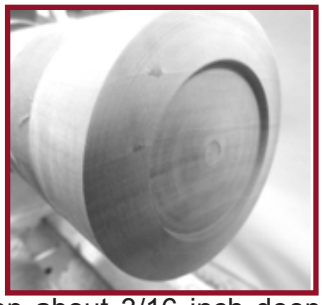


Types of Fit

If the box is one that will hold items such that one might need to remove the top with one hand, you do not want the tight fit, but a loose fit. One does not want a fit such that someone might lift the box with one hand only to have the bottom fall off and spill its contents.

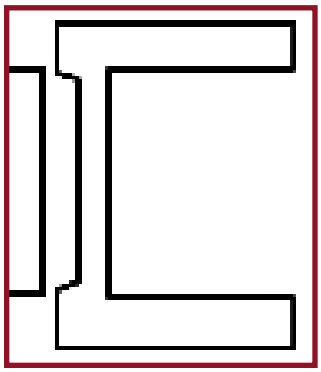
If it is over cut

We want the tight fit so that we can now place the top back on the bottom while still in the chuck to finish the lid and the out side of the box. If the lip was over cut, there are some ways to make a tighter fit. One is to slightly wet the lip with water to swell the fibers. Another method is to place paper towels between the top and bottom and another is to tape the top and bottom together. You will probably want to use the water or towels along with the tape. The tape will need to be removed to turn the sides of the box but if you are gentle in your turning, the towel or water should hold it on. You can add more than one paper towel if need be.



Adding Insert

Now is the time to add an insert of different wood or some other round material. You will need to either flatten the top or put a dome shape on the top. Choose the insert wood and determine what is largest diameter of material you have. The cut in the top must be smaller than the diameter of the insert. Do not try to get the cut in the top exactly equal to the largest diameter of insert but at least a 1/2in. smaller in case of bad cuts. Make a cut in the top about 3/16 inch deep with a flat bottom. The important thing here is that the sides of the cut be angled slightly outward. That angle is the secret of making the insert look as if it fits perfectly. We will cut the insert in just a bit.



Turning and Fitting the Insert

You can place the insert material in a second chuck or glue it on a waste block on a face plate if you do not wish to remove the bottom of the box from the chuck. If you have the insert material in a chuck, make sure enough protrudes from the chuck to safely turn without getting your tools in the chuck jaws. Turn a flat surface on the insert and turn it round but larger than the opening in the top of the box. Now to get the insert to fit well, we will need to turn an angle on the insert in the same direction as the angle in the top but the insert angle must be steeper than the top. Once again approach this task slowly. Remove the top from the box and try to fit it on the insert. The insert should almost touch the bottom but not quite and there should be no space around the edges. If it touches the bottom, there might be space around the edges so remove some of the insert and try fitting again. When you have it right, remove the insert material and glue in the top. Wood glue or CA will work well if it is medium or thick CA. Try not to let it ooze up around the edges of the insert. Let the glue dry enough to turn the insert.

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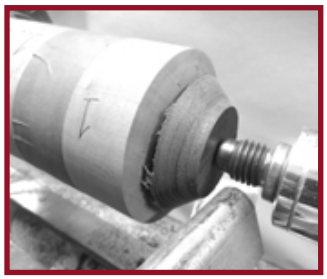
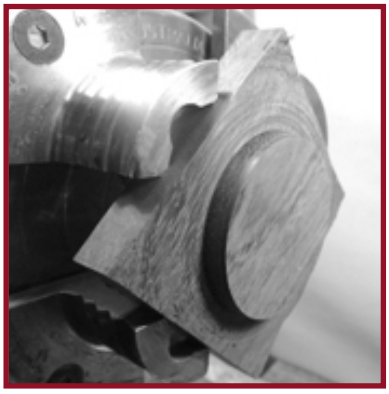




Finish the Insert

Either place the bottom of the box in the chuck again or put the chuck with the bottom back on the lathe. Place the top with the insert back on the bottom and try to get the whole box to run without wobble. Place a live tail center on the insert as long as you can. Remove the bulk of the insert and then gently turn the rest of the insert to match the top profile. Be careful not to remove too much of the top and insert or you might reveal a gap around the insert.
Sand and finish the top and insert at this point.

Finish Box Outside

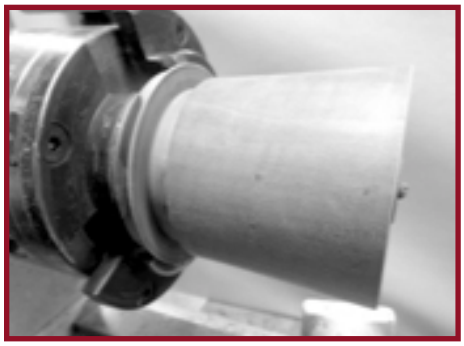
Finish cutting the outside of the whole box. Sand and finish the outside of the box now.

Final Top Fit

Now is the time to get the fit of the top just as you want it. If you have a tight fitting lid, try using some 220 sandpaper to gently remove material until you get the fit you want. Adding finish at this point on the lip may change the fit so be careful.

Cut waste for bottom
You are getting close now. Find the spot you want to be the bottom of the box making sure to leave some wood in the chuck for a jam chuck and not cutting into the inside of the box. Part off the box trying to leave a concave surface on the bottom. You may want to saw off the last little bit so the bottom does not go flying and dent the box.

Cut and Finish bottom
Turn a jam chuck to get a very tight fit but not so tight that you split the lip on the bottom forcing it on the jam chuck.



Gently turn the bottom of the box smooth and add some detail to the bottom so people know it was turned. I like to add some rings. An odd number of rings looks best. I like three rings.

Sand and finish the bottom. Replace the top and enjoy your new box.

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Flying Winged Vase:

Transforming a Crotch

Learn how to turn a **Flying Winged Vase** that will be an heirloom treasure to enjoy for many years. Kevin's demonstration emphasizes turning with a gouge and hollowing. When planning a project, Kevin will seek the natural beauty of the wood. The orientation of the crotch is important. One needs to strive to bring out the beauty inside the piece and one position may prove better than another. He begins his demonstration with a discussion of basic woodturning.

Steps

1. Identify the wood and envision the correct cut to enhance the beauty of the Winged Flying Crotch.

2. Mount a board on the branches to support the tail stock.

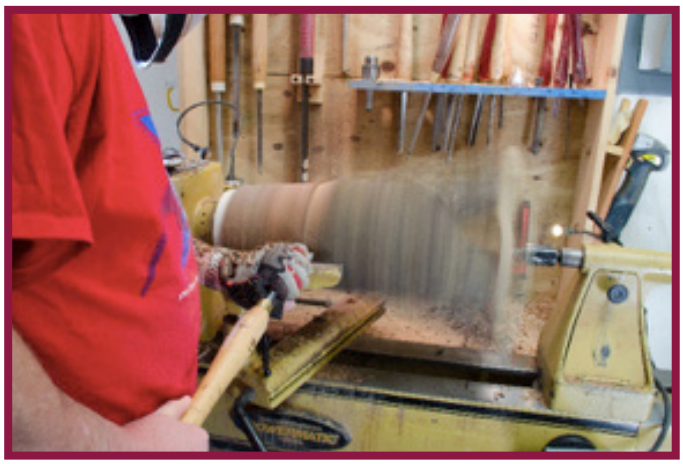
3. Mount the Crotch to the lathe with a spur center and live center on the tail stock.
Aligning the crotch on the lathe so the wings and body of the vase line up evenly. bring out the best characteristics of the wood.
This will maintain integrity of the shape of the vase.

Flying Winged Vase:

4. Squaring the bottom of the vase for the mounting of the face plate.

5.. Mounting the face plate to bottom of the vase

6. Rounding up the middle of the vase and shaping the underside of the wings of the crotch..

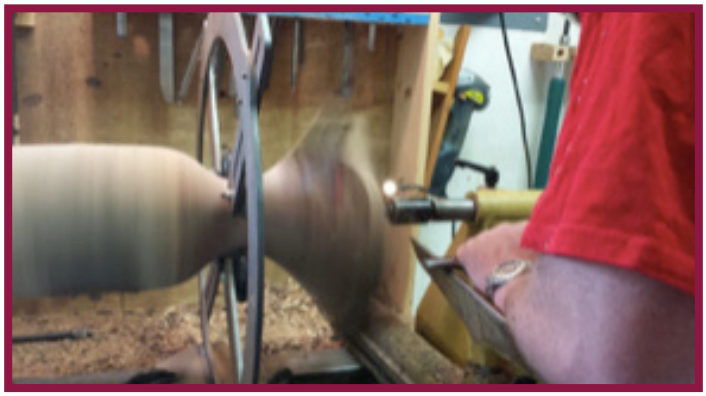


7. After the base, middle and under side of the wings are rounded and shaped, the neck and wings are turned to size. **Push Cut..**

8. View of wood to appreciate the challenge and integrity of the wings.

9. Steady rest is mounted and start shaping the top side of the wings of the crotch.

10. View of turning top side of wings of crotch.



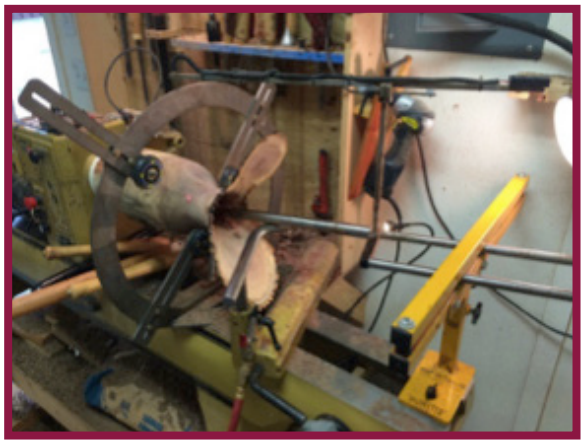
11. View of turning passes on the wing turned similar to a cowboy hat on the brim whereas you take small cuts and work from the outside of each wing to protect the fragility of the wing due to it not being supported.

12. Starting from the outside, a push or pull cut can be made to round and shape the neck of the vase. The cut should be stopped short of the top edge so that the bark is not torn off. Make a push cut from outside to centeras you cut down through the bark. This will give a clean, sharp edge. The use of pressure is important in cutting natural edge pieces because the gouge is not in continuous contact with the wood and cuts air. There are two pressures you need to consider: **a.)** down pressure on the tool rest to maintain stability and **b.)** inward pressure needs to be consistent so the gouge is not plunged into the void between wood contacts. The gouge cannot be sharp enough. The gouge should be sharpened once for the inside, once for the outside, and before final cuts. Cut only about a third of the way down to achieve the desired wall thickness. Then move to the next portion and do not go back to the top or the result will be a broken vase. As the cuts go deeper into the vase, the tool rest should be angled into the vase to provide support to the gouge and reduce vibration. The lathe should always be turned off before the tool rest is repositioned. Always spin the piece after the tool rest is repositioned to ensure the piece will clear all around the edges.

13. Drill out an access and drill to a depth where you think the bottom of the vase will be.

14. Setting up Hollowing System and adjust the laser measuring the wall thickness and hollow the top half of the neck and top of the body of the vase. Laser aids in determining the wall thickness and reduces the amount of stopping and starting due to measuring.

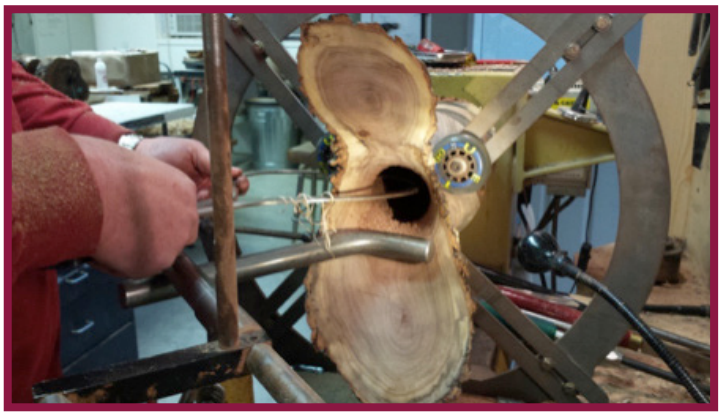
15. Hollow the Top Half of the vase.



16. Remove steady rest and insert a jam chuck to support the wings of the vase while finishing shaping the bottom half of the vase.

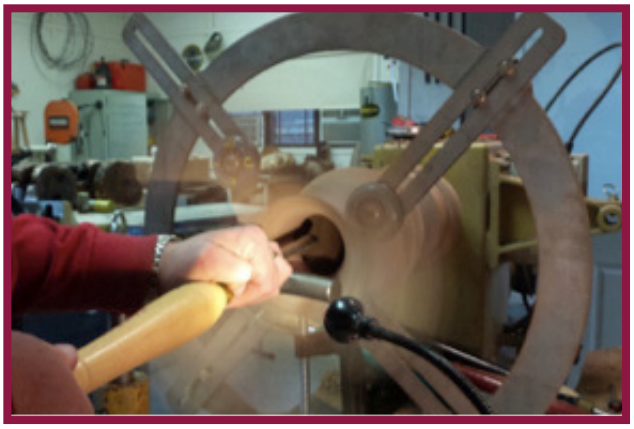
17. Shaping the outside bottom of the vase.

18. Put the steady rest back in place and set up the Hollowing system again to hollow out the bottom half of the vase. You can see the laser on this picture.



19. Measure wall thickness to about 1/4 inc to 5/16 inch.

20. Scraping the inner walls to smooth them out using a scrapper



21. Turning the tendon on the base for holding onto it for final sanding.

- **Safety: Wearing eye protection, preferably a face shield; not using rags near the lathe; rolling up long sleeves; using sharp tools.**

- Tools Used: Bowl gouge and Hollowing system

- Sharpening: Kevin uses a 180 grit 8-inch CBN wheel on a slow speed grinder. He uses a jig to grind which gives him a rapid and reproducible edge on his tool.

- Sanding: Sand on the lathe at slow speed using 80, 120, 180, 220 and 320. The rotation of the sander and the lathe are opposite

- Finish: Danish oil, 5 coats of Lacquer, Beall Buffing System allowing the oil and lacquer to dry about 4 days between each application.

- YouTube Video:
  https://www.youtube.com/watch?v=tLPbQkn9O0w

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Dennis Ford *Turning Small Hollow Forms*

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"Small" means different things to different people. For this demonstration a **"small hollow form"** is one that is turned with hand held tools. I make these in a single session and don't worry about a little distortion from drying.

Wood and Shape selection.

Planning the shape and selecting the wood go together. If you have a desired shape, you can select a piece of wood that will work. You can also choose a shape based on a particular piece of wood. Either way it is good to have a planned shape before turning on the lathe (the plan may change while turning). I often hear "start turning and see what happens", but that does not work for me.
Virtually any wood that will stay together on the lathe can be made into a hollow form. Some will be more enjoyable than others. Dry osage-orange will take some time to hollow since it is so hard. Wet willow is so soft that it is difficult to get a clean cut. Either one can be used if you really want to. A piece with voids can yield excellent results, just be cautious to stay out of the "line of fire" in case it blows up or sheds a loose chunk while spinning.
Grain orientation is an important part of the planning. End grain orientation can take less preparation; just mount a branch between centers and get started. Problems with cracks are likely with this method but it is possible to produce fine work. End grain orientation that does not include the pith has an excellent chance of being crack free but requires unusually large logs. Side grain orientation is my preferred method. Some distortion will occur but cracks are more easily controlled. Turning the form to a uniform thickness (thin is better) and slowing the drying rate usually does the job.

Making shavings

Mount between centers and round the blank checking for defects and features. Turn a tenon on what will become the bottom. Mount in chuck and begin shaping the outside with the tailstock in place.
Finish turning the upper section but do not remove too much wood around the foot at this time. This is a good time to sand the outside. Install a Jacobs chuck in the tailstock and drill a center hole to almost final depth. Use a fostner bit that is slightly smaller than the planned opening size. Remove the tailstock from the lathe
Begin hollowing with a straight tool cutting an inverted cone shape inside the vessel. Stop short of the bottom to maintain strength in that area. Stop frequently to clear the shavings.
Use a curved tool to hollow to final thickness starting at the top. Stop frequently to clear the shavings and to check the thickness. With some practice you will be able to visualize where the cutting tip is (if you are in a comfortable position). If your headstock slides, use that feature, otherwise standing on the back side of the lathe works pretty well. Some small voids in the wood make determining thickness easy. Large voids make hollowing easier but also allow everyone to see the inside surface. This can be an asset if the inside is clean and smooth. Take light cuts and keep the tip moving.

When finished hollowing measure the depth. Then finish shaping the bottom as much as possible. If there is enough room to part the vessel off, finish sanding before parting off. If the bottom is too close to the chuck, remove the vessel and turn a mandrel that fits inside the vessel opening. Do not attempt a really tight fit; a piece of cloth or paper towel will act as a cushion. With the piece between the mandrel and the tailstock, finish turning the bottom area except for the small tenon that the tailstock holds. This is a good time to sand and apply sanding sealer. The tenon on the bottom can be carved off later.

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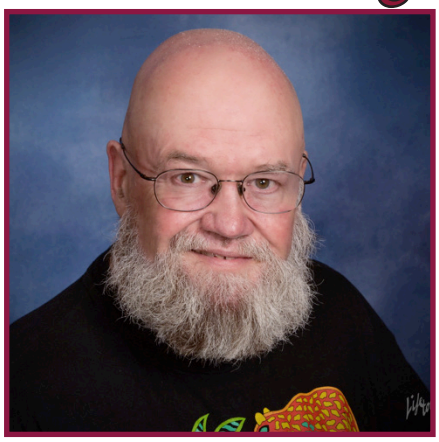

Dick Gerard

Decorating Spheres

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Now that you have made some spheres, whatever are you to do with them? Well, if they are highly figured and/or highly colored naturally, then I advise do nothing. Apply the finish of choice and let the wood do the talking.

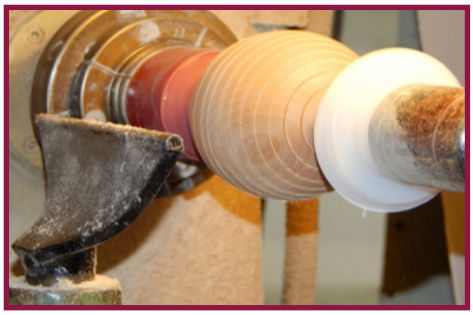
On the other hand, if the wood is not highly figured or colored, perhaps some surface enhancement or decoration is in order. For me, prime candidates for enhancement are plain maple, birch, ash, oak, holly, pear, cottonwood and the like. The sole exception I make is cherry. I just cannot bring myself to "enhance" cherry. Just my own personal idiosyncrasy.

So let's enhance some plain maple. In the following pictures we will show some spheres being embellished via sponge painting, texturing, carving, and creating what I call **…**

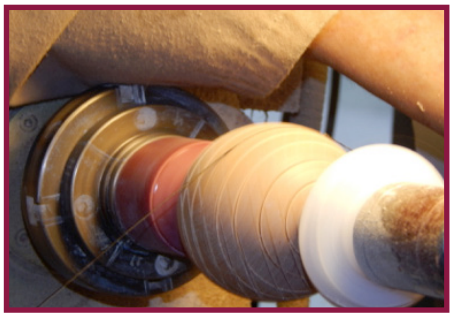
Harlequins

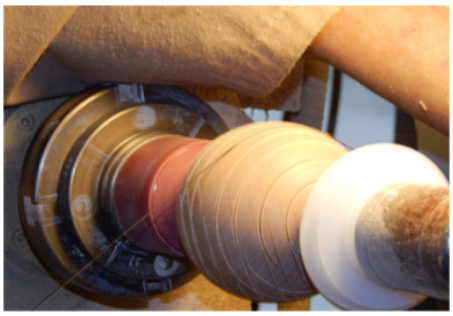
First, remount the sphere in cup chucks, making sure the orb is centered so that whatever you do, the decoration will flow evenly around the sphere. Of course, interrupted decorations do lend a certain dynamic to the piece.

Now, using the tool of your choice begin making grooves around the sphere spaced as evenly as possible. I have used 3 point tools, the long point of a skew, and even the point of a spear shaped tool.



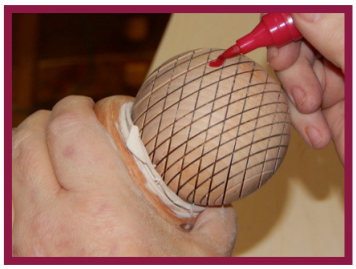
Now, before doing anything else, I suggest you use a wire burner to burn in those grooves. This will provide a barrier (and contrast) to any color that you might want to add later.





Now rotate the sphere in the cupchucks either 90 or 45 degrees … your choice. Rotating 90 degrees will yield more square shapes (or rectangles) while a 45 degree turn will yield diamond shapes.

Next, take the sphere off the lathe and add color of choice. For my use, I have constructed a vacuum holding (L) device using a vacuum pump, vacuum chuck, ball valve, reinforced plastic tubing, some plywood, and the Woodfast Pro Carver's Vice.
You can also use the Trent Bosch (R) carvers device.
Mount the vacuum chuck on the threaded spindle and apply vacuum. Using this method, you must construct a dedicated vacuum chuck (I use PVC) with a hole drilled in to accept a barbed hose connection.



Applying color to the demarked areas. I use India inks, Copic markers, Sharpies, paints, colored pencil … whatever works!

Some finished Harlequins.

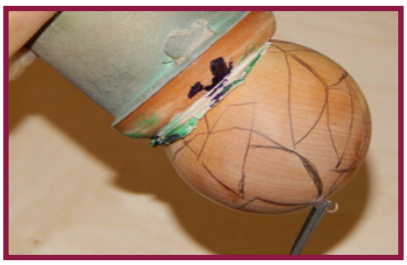
Free Form Design

I use my off the lathe, home made vacuum fixture to hold the sphere.

Here you can see the vacuum holder tilted to allow access.

Now let's create a …

Free Form Design



Draw a design of your choice. Here (L and C) I use a pencil to draw a free form design of flowing lines and curves. At right I use a power carver to incise the lines of the drawn on design.
After you have carved as much as you want, sand off any rough bits and apply color where ever you choose.

Texturing

With the sphere mounted on the lathe, use any tool you like to add texture. Examples are:

Sorby texturing and spiralling tools
The Decorating Elf
Pneumatic Needle Scaler

Texturing done. Now on to dying and finishing. Here are a two pictures showing the end results.
The first image is a sphere that was textured and then dyed black. After the dye dried, I used a wax stick impregnated with a gold color and rubbed it into the textured areas. After wiping away the excess, I used a spray can lacquer to apply the final finish.

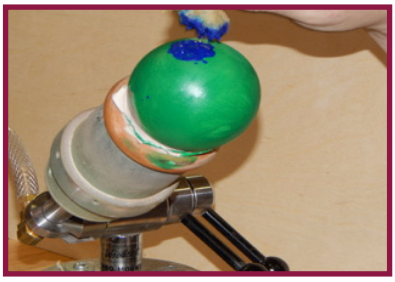
The second image is different only in that I used a purple dye.

Finish A Sphere With Out Leaving Marks

Here is a picture of my device to hold pieces that receive a sprayed on final finish.
Applying the final finish to a sphere without leaving marks was a real problem … at first. Then, from somewhere deep inside my trivia packed mind, I remembered something called a nail bed. So, with a piece of mdf, I laid out a grid in pencil using a ruler and square. I then predrilled the holes … hundreds of them! Next, I drove small finish nails through one side. Then I flooded the side with the heads with CA glue to seal the nails completely. This is the result.

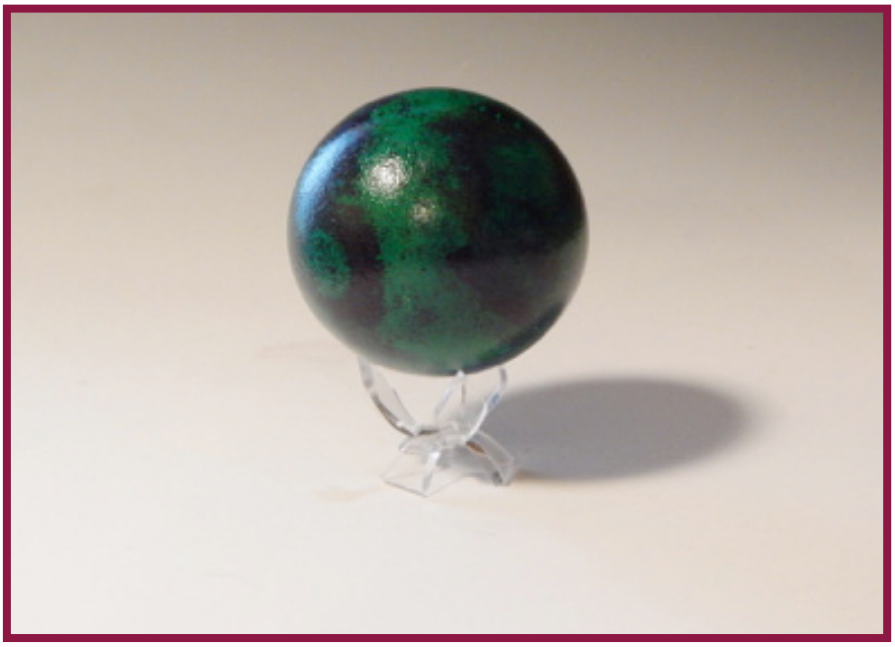
Sponge Painting

Sponge painting is a technique I first learned from Mike Hosaluk back in the 80's. Basically you will need some sea sponges (some people prefer synthetic) and acrylic paints in various colors. I like to use related triads of colors, such as green/blue/yellow or red/blue/purple or red/yellow/orange. Use a sponge to apply your first color (green).



Use a clean sponge to apply the second color. As you can see, I use my vacuum holding device here as well. Apply the second color while the first color is still tacky but not wet. If the surface appears glossy it is probably still too wet.

Use a hair dryer to speed things up.



Here is the completed sphere on an acrylic stand.

So that's it! *Voila! Fini!* Done!

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Dick Gerard *Sphere-ology!*

(or making wooden balls various ways)

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In this demonstration I will show attendees how I make wooden spheres using cup chucks, the Soren Berger Sphere caliper and one or two commercially available sphere jigs (time permitting). The demos will cover:

- Safety
- Selection and preparation of stock
- How to make cup chucks/sphere turning faceplates
- Tool selection and usage
- Making of the sphere from rough out to finish

Design: its just a sphere

Wood: sound hard wood, preferably dry

Tools:

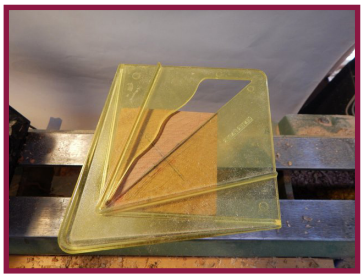
- face shield
- spindle roughing gouge
- spring calipers
- hand saw
- four-jaw chuck
- drive center
- center finder
- center punch or awl
- red and black pencil
- parting tool
- 3/8 inch spindle gouge or bowl gouge
- ½ inch or 5/8 inch bowl gouge
- sandpaper (yes sandpaper is a tool)

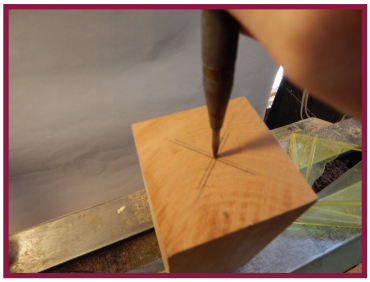
STOCK PREPARATION

The following steps and accompanying photos show steps common to the many methods of turning spheres. These will **NOT** be repeated for each method below.

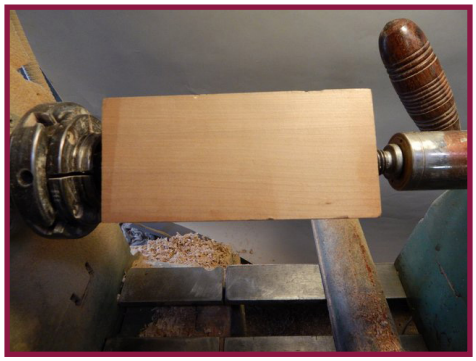
Select wood

Step 1: Locate and mark centers





Step 2: Mount wood between centers.



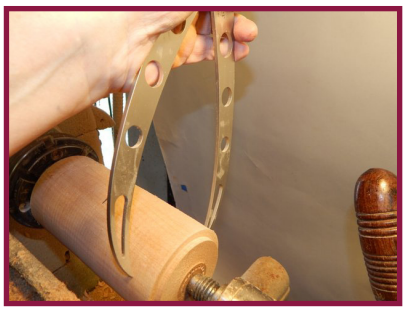
Step 3: Round wood to cylinder.

Step 4: Turn tenon to fit 4 jaw chuck (except for using cup chucks with the Richard Raffan/cup chuck method).

Step 5: Mount chuck and wood using tailstock for support.

Step 6: True up wood (if required … no picture here).

Step 7: Using calipers, measure diameter of stock.

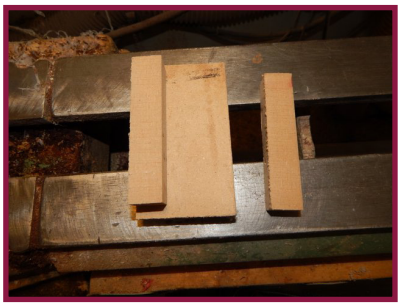


Step 8: Layout width along the stock.

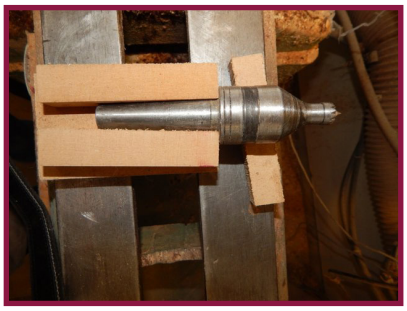
Sphere Option 1: USING CUPCHUCKS *(ala* RICHARD RAFFAN)

For this method of turning spheres, you will need to make cup chucks to hold the rough turned sphere. You can make your own cup chucks from scrap you probably already have. All you need is a jig to make a morse taper to fit your head stock. For the tailstock you will need a tap if your tailstock has a thread (usually ¾ x 10). Alternatively, you can simply drill out a snug hole to just fit over the revolving center.

A morse taper (MT) sizing jig can be made from 3 pieces of scrap.



Simply attach one piece to the base (glue or screw or both).



Place your MT example alongside the piece you just attached to the base piece. Making sure the MT is firmly against the alread attached leg, attach the remaining side piece using glue and screws or both.

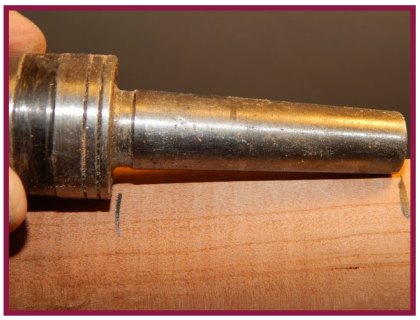
Here is an example of a wooden cup chuck with a #2MT to fit the headstock.

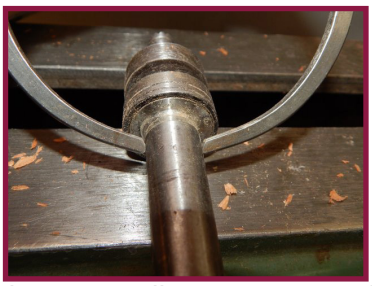
To make this head stock cup chuck, start with stock between centers. Round to a cylinder.

Use your calipers to measure the small diameter of your example.

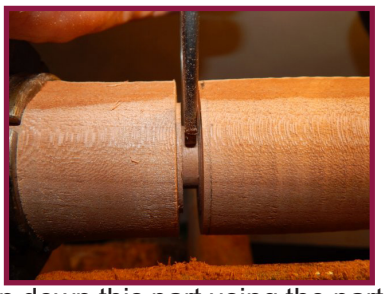
Using a parting tool, turn down until the calipers just barely fit. Leaving this part a bit large is just fine (for now).

Now, measure the distance from the small end of your drive center up to the largest diameter just behind the head. Transfer this measurement to your stock.

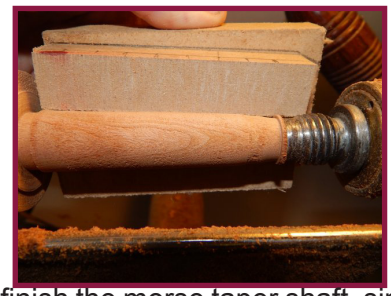




Using your calipers, measure the diameter of this largest part of the morse taper shaft.



Turn down this part using the parting tool and calipers.



To finish the morse taper shaft, simply start at the the large diameter end and gradually turn down to the small end. As you get close to what you think is the final diameter, stop the lathe and check using your MT jig that you just built.

If the shaft is still to large to fit the jig. When the sizing jig just fits, remove the stock from between centers.

Remove the drive center in the head stock. Insert the shaft of your just turned mt cup chuck. If it is a sloppy or loose fit, you will have to start over. However, using the sizing jig virtually guarantees a nice snug fit.

Assuming that the taper fits well, bring up the tail center and begin shaping the portion that will extend beyong the spindle. A good thickness for this portion is ½ to ¾ inches thick. The diameter will depend on the size of sphere you are making. Larger spheres require larger cups. Smaller spheres require smaller cups

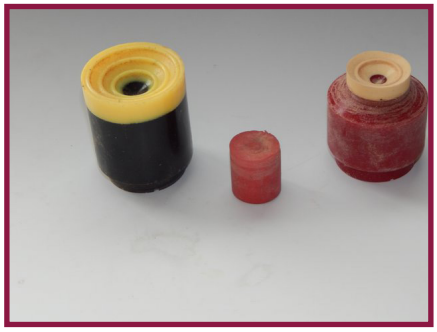
The Cup Chucks

Cup chucks may also be made to fit a four-jaw chuck. Cup chucks used in the tail stock may be threaded, but a bottle stopper mandrel may also be used in the head stock to hold cup chucks. These mandrels are 3/8 inch. Here are pictures of homemade cup chucks that fit into a four-jaw chuck along with the homemade drive.

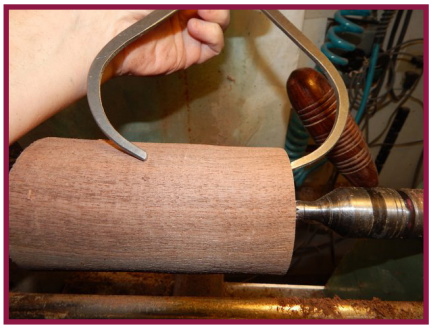
Here is the UHMW with the ¾ x 10 tap. Threading the blank allowed me to screw this securely to the revolving tail stock center.

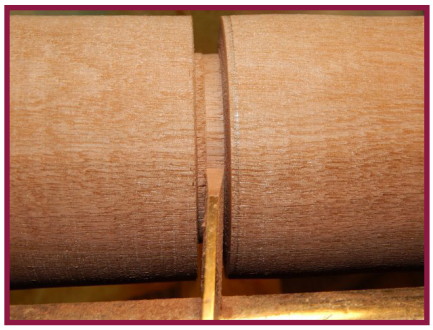
Here is the result of threading the UHMW cup chuck.

These tail stock chucks are available from Rubber Chucky (see source of supplies located at the back of my other handout, ***Decorating Spheres)***



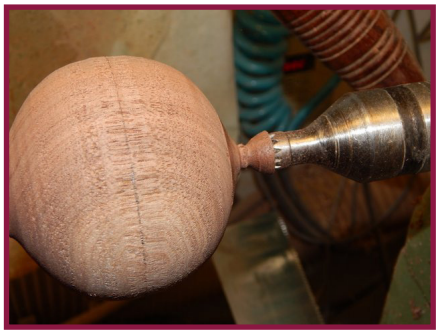
Now that you have a method to hold the roughed out sphere, let's do some more turning. Work through the first **six** steps listed on the second page of my handout.
I prefer to use a spindle roughing gouge for preparing the cylinder.
With the Richard Raffan method, we mark with calipers instead of the Soren Berger tool. Now turn a tenon on the tail stock end. Using calipers set to the diameter, layout and mark the length of the sphere. Then, using a parting tool, make a tenon on the headstock end.





Determine mid-line of stock. Mark this center line around the cylinder.
Using gouge, make rough sphere.

When the sphere roughed in, turn down the tail-stock tenon. Go only as far as you are comfortable with. Also, take into consideration the species of wood you are using. Oak and hard maple, and most exotics, can take a small tenon and still be ok. However, poplar and other similar density long grain woods require a larger tenon for strength.



With lathe **STOPPED**, use hand saw to remove all but 1/8 to ¼ inch of tenons.
Now we move the headstock end. Turn the tenon down as small as you are comfortable with, just like on the tail stock end. Then with the lathe stopped, use a hand saw to free the rough sphere from the remaining wood. Mount cup chucks to lathe. Place sphere between headstock and tail stock resting lightly in cup chucks/face-plates with tenons at 90^0 to axis.

Tighten tailstock to secure sphere. Use bowl gouge to remove tenons/ghost images. When ghosts are removed mark diameter with one line. Then rotate sphere 90 degrees. Remove ghosts. When ghosts are gone, mark diameter with 2 lines. Rotate sphere in cups until you have a new unmarked sphere. Remove ghosts and mark this diameter with 3 lines.

With ghost image removed, repeat the above process but using sandpaper not bowl gouge; repeat for each grit.

Done!

Sphere Option 2 TURNING A SPHERE USING CHEFWARE EZ RADIUS BALL JIG
After preparing and mounting stock, turn a tenon on the tail stock side. Make this tenon about ¾ inches long and about ½ inch in diameter. Close is okay.
Now using calipers set to the diameter of the stock, layout along the length of the cylinder and mark for the head stock tenon plus some clearance. Determine the mid line of sphere with small ruler.

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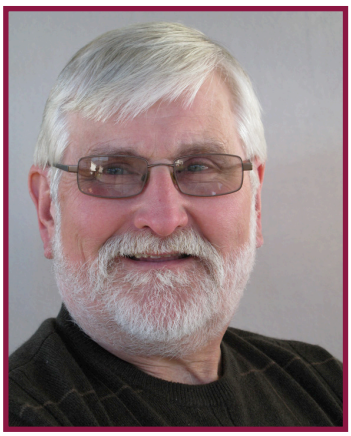

Joe Herrmann

Square Bowl:

Now Its Square

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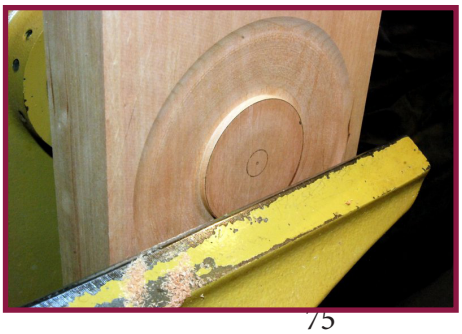
INTRODUCTION: After the 2012 Provo Symposium, I stayed after a few days and visited with my friend, Dick Anderson, in Idaho, and, as a part of that trip, I did a demo his club, the Magic Valley Woodturners. Just prior to the demo, we stopped by to visit their President, Ken Ames, at his house where we feasted on rhubarb pie and ice cream and looked at some of the turnings in his collection. I was particularly interested in a square bowl that Dick made since that was the topic of my demo for the club (See *Woodturning Design*, 35, February, 2012).

Some months later, my friend Bill Noce remarked that the bowl in Issue #35 wasn't really square--it was more rectangular--and he was right. That remark, coupled with the bowl that Dick made, got me to thinking about a variation on the original article and that is the topic here.

MOUNT THE BLANK: Just about any species of wood will work for this bowl, and I chose cherry for mine. I found some cherry with pitch pockets at a local hardwood dealer that I really liked, so I decided to use it for the project. I started out with a piece 1-5/8 inch thick x 6-1/4 inch square. Because the raw edges will have to be sanded after the turning is complete, you will end up with a bowl approximately 6 inch square--more or less. I used a screw chuck to mount my blank but a faceplate would also work.

I decided to mount the blank on a screw chuck for the initial turning and this required that I drill a 1/4 inch pilot hole for the screw. I also wanted this hole to serve as a depth marker, so I drilled it 1-1/4 inch deep in the center of the blank using a brad point drill bit--just be sure to include the point of the drill when setting the depth stop.

I just got the new Easy Wood Tools Chucking System® and have been using it a lot (See the review in *Woodturning Design,*45, October, 2013). You get the best hold with the least amount of marring on the tenon when the chuck jaws are almost fully closed. The jaws I used measured 2-3/8 inch fully closed so I decided to start my tenon/foot at 2-1/2 inch--be sure to measure your jaws and adjust accordingly. Measure your jaws to see what diameter foot you will need.



TURN THE BOTTOM: Once the blank was mounted on the screw chuck, I measured the required circle and cut the tenon approximately 1/8 inch deep with a parting tool. I wasted the excess wood away with a 1/2 inch bowl gouge. You will notice that I made sure to mark the bottom of the bowl with my live center as this will make remounting the bowl to finish off the bottom much easier later on. I made my foot about 1/8 inch high.

I wanted the outer tips of the bowl to be approximately 3/8 inch thick, so I drew a reference line on one end and started to eliminate waste wood to form a cove so I could start forming the ogee shape. (See *Fig. 4*) Keep working on the outside shape until you are satisfied, both with the form as well as the quality of the cut. (See *Fig. 5*)

I sanded the surface prior to reverse chucking the bowl, and found that most of the time I could get by with power sanding the surface with a hard disc if I was extremely careful--notice I said (most of the time); if you don't feel comfortable doing this, by all means hand sand the surface with the lathe stopped.

TURN THE TOP SURFACE: Reverse chuck the bowl, making sure that the tenon is secure. (See *Fig. 6*) Just like the rectangular bowl from Issue #35, I decided to have a ring sitting proud of the surface as the focal point. This meant I would have to switch jaws on the chuck later and I determined that I would need a 4-1/4 inch ring to expand into--again, your jaws might have a different requirement. I know from experience that a 1/4 inch wide ring works best so I drew the two required lines on the top surface. (See *Fig. 7*)

Figure 4
I marked the thickness of my outer point at 3/8 inch and started to form the ogee.

Figure 5
I'm satisfied with the shape and the quality of the cut.

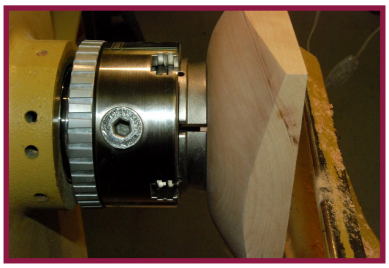


Figure 6
Reverse chuck the base so you can work on the top surface.

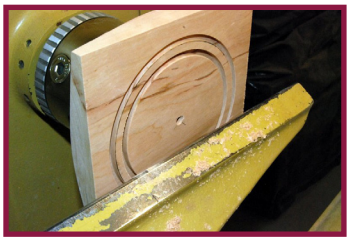


Figure 7
Define the ring with a parting tool.

Next I used a parting tool to make two cuts to isolate the ring making sure that the inside surface was about 1/8 inch lower than the outside. See Diagram (A) If you make the two cuts equal depth, there is a possibility that the ring could shear off under compression because there is no meat inch behind the jaws as in (A). However, when the inner cut is made lower,--as in (B)--there is more wood behind the jaws and the chance of failure is lower.

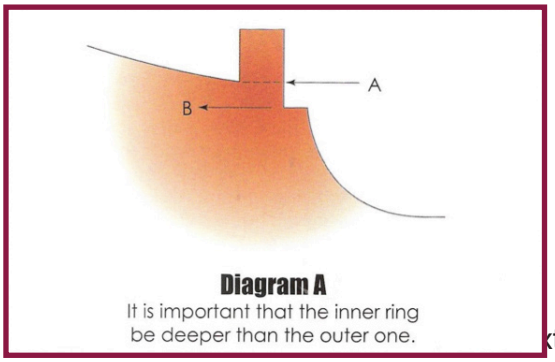


Diagram A
It is important that the inner ring be deeper than the outer one.

I used a 1/2 inch bowl gouge to connect the base of the ring with the outer corner, making sure I had a straight line. There was a bit of torn grain so I used a freshly sharpened 1 inch skew as a negative rake scraper to refine the cut. You can see in *Fig. 8* that I was quite successful.

I tackled the interior bowl next and used a 1/2 inch bowl gouge to remove the wood down to the required depth, making sure I had a smooth flowing curve. (*See Fig. 9*) Use your fingertips to check as they will prove to be more reliable than your eyes. You will notice [illegible]xt to the ring--at left a small (shelf) that will be used to mount the bowl when finishing off the bottom. Next, I completely power sanded the interior bowl.

Rounding over the ring is the next step and I used the same method as I did in the previous article in Issue #35. (See *Fig. 10*) Some time back I took a class with Ray Key and was introduced to a skew that he used to form small beads and other details; it works quite well and I use it a lot. *Fig. 11* shows the skew from the original article. Just be careful not the hit the shelf or the outside base of the ring with the point of the skew when rounding over the ring.

I've not had good luck trying to power sand the ring and the area outside the ring so I hand sand these areas. The ring can be sanded under power but it's best to sand the outer area by hand with the lathe off.

I like to texture the area adjacent to the ring because it is difficult to cut this area cleanly and it is difficult to sand. I use a texturing tool that I bought from Eli Avisera but the small Sorby texturing tool would also work well.

Figure 8

Try to form a straight line when you remove the waste material from the ring to the outer point.

Figure 9

Your fingertips will tell you if you have a smooth flowing curve for the interior bowl.

Figure 10

Form the ring--I used a skew as a scraper but a gouge would also work.

Figure 11

The Ray Key skew works great to form small details.

Figure 12

Start the texturing process by incising a line adjacent to the ring.

Figure 13

Form the pattern with the texturing tool.

Figure 14

Frame the pattern with the skew--I think three lines look best.

Figure 15

Clean up the foot and form a small cove.

Start by using the Key skew to form a groove adjacent to the ring. (See *Fig 12*) The groove doesn't have to be very deep but it should touch the ring at the base. Next, reduce the speed and, while holding the texturing tool at a slight angle, drag the tool out from the ring. (See *Fig. 13*) You may have to do this more than once to get an acceptable pattern. And finally, use the skew to highlight the textured area--I generally make three lines that are not an equidistant apart. (See *Fig. 14*) I've found that the texturing can be cleaned up with a Scotch Brite pad and will remove the *fuzz* quickly.

One thing I like about the Easy Wood Chuck System® is that it is so easy to change jaws. Like most of us, I'm somewhat lazy when it comes to changing jaws on my other chucks and usually try to make do with whatever set of jaws I have in place. This is not always the safest practice; however, I can change out the jaws on the Easy Wood chuck® in about 30 seconds so there is no excuse for not changing jaws.

After changing to the larger jaws, I reversed chucked the bowl and expanded into the ring I created on the top surface. The jaws will expand against the ring and will register on the shelf left earlier. I put my live center into the mark I left earlier and used it to make sure I was accurately registered so the bowl ran true. Be careful not to apply too much pressure when tightening the chuck--just make sure the bowl is snug.

I like to erase any evidence of how the vessel was originally chucked up, so I used the Key skew to cut away any bruising that might have been left by the chuck jaws and then turned a small cove on the outer edge of the foot. (See Fig. 15) I also used the skew to make a cut adjacent to the foot just as I did for the surface ring.

Notice that the area adjacent to the foot is not cut very clean--never fear, the texturing will eliminate it! I used the texturing tool to create a pattern and then used the skew to incise the framing lines just as I did for the top. Don't forget to remove the fuzz with the Scotch Brite pad.

I also cut a slight cove inside the foot to form a ring because a bowl sits better on a ring rather than a flat surface. I also formed a small (button) at the very center that I textured as well. I cut two lines into the interior cove so I could sign my work with a small wood burner and finally I highlighted the foot ring and the textured button with the skew. Unfortunately, something happened to the progression photos--I ended up with a double exposure and was unable to use them so *Fig. 16* shows the final result.

Even by cutting the blank square with a sharp carbide blade, there was still some areas of torn grain on the outside edges, especially on the end grain. I've found that a 5 inch random orbit sander fitted with 150 grit abrasive will remove it quickly. Just be careful; the sander is rather aggressive and you can sand off too much wood before you know it. I put the bowl in a vice and carefully sand the edge while continually checking to make sure the edge is kept straight.
FINISHING: I think simple is best for finishing and use the same procedure with all my turnings: First, I flood the piece with oil. I used to use boiled linseed oil cut 50/50 with paint thinner but lately I've been using Watco Danish Oil. I let the oil sit for about 5 minutes and then wipe the surface clean. I usually use a piece of paper towel if there are no textured areas; however, I've discovered that the paper towel shreds and can get trapped in the textured area. It's difficult to remove so I used a piece material from an old t-shirt instead.

After allowing the piece to dry at least overnight--preferably for several days--I brush on a heavy coat of brushing lacquer, (like Deft) let it set for about 5 minutes and wipe off any excess with the t-shirt material. After a couple of hours I rub out the lacquer with 4/0 steel wool. I've found that it is best to blow out the fine steel wool (dust) with an air compressor before proceeding with the next step.

Finally, I apply another coat of oil, let it sit for about 5 minutes and wipe off any excess oil with the t-shirt material. I usually only apply one coat of the oil, but you could apply more coats if you wanted a glossier surface. **Be sure to dispose of the oily rags properly!**

Figure 16
I like to have some detail here for those who look!

FINAL THOUGHTS: I hope you will try making one of these bowls. They are a quick project to make; they offer a lot of (table-top appeal) ; and make a great gift for any type of Holiday occasion!

Joe Herrmann

Square Bowl:

Now Its Square

TOOLS NEEDED:

Thickness planer
Table saw
Jointer
Ruler
Drill press w/ 1/4 inch brad point drill bit
Lathe w/ assorted chisels
4-jawed chuck with large and small jaws
Texturing tool
Hand drill (optional)
5 inch random orbit sander (optional)
Wood burner

MATERIALS NEEDED:

1-5/8 inch x 6-1/4 inch square cherry, or specie of choice
Power sanding discs (optional)
Assorted grits of abrasive paper
Finish of choice

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Joe Herrmann ***Tiger Stripe Rolling Pin***

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440-563-5785

MATERIALS NEEDED:
2-5/8 inch square x 23 inch tiger maple or specie of choice
3/4 inch x 3 inch x 8 inch walnut blank or specie of choice
2 ea. 1-1/4 inch pan head black screws
Assorted sanding discs
Assorted grits of abrasive paper
Preserve finishing oil
Watco Antique Oil
Deft Satin spray lacquer

SOURCES OF SUPPLY:
Tiger Maple: Dunlap Woodcrafts:
www.dunlapwoodcrafts.com
Preserve:
http://mastersblendfinish.com/find_us.php

TOOLS NEEDED:
Chop saw
Ruler and pencil
Awl
Inside calipers
Lathe with StebCenter and revolving cup center
Assorted turning chisels
Hand held electric drill with sanding mandrels
Thickness planer
Jointer
Table saw
Drill press with appropriate drill bits
Spindle sander
Laminate trimmer with 1/4” chamfer bit

INTRODUCTION: When I was doing art shows I somehow gravitated toward making kitchen items and did quite well making breadboxes, wine bottle stoppers, knife blocks, rolling pins and the like. I enjoyed making the rolling pins and wondered how many of the women who bought the pins actually used them? I bet I have made well over a hundred of these rolling pins and hope that you will find the project worthwhile enough to make one for your family.
The genesis for the rolling pin featured here came from an auction that was held at the VFW post in the little town where I now live. Most of the stuff being auctioned off was junk, but a rather well-worn, but attractive rolling pin came up on the block; unfortunately, it sold for over $80.00 which was far more than I was willing to pay. Once I saw that the rolling pin was going to be out of my price range, I quickly sketched it out but then had to do some research to determine the correct overall length and diameter; I hope you agree that the research was worthwhile.

LET’S GET STARTED: I purchased some killer tiger maple turning squares at the North Carolina Woodturning Symposium (See Sources) so I decided to use one of them for this project. This project requires a blank that measures 2-5/8 inch square x 23 inch long. While it is easier and better to start with a blank closer to the required dimensions, my blank measured 3 inch square and I just decided to go with it. Once the blank is cut to the correct length, connect the corners to locate the center and make a small dimple with an awl.

I like to use a large StebCenter in the headstock end and a revolving cup center in the tailstock, but use whatever you are comfortable with using.

BRING THE CYLINDER TO ROUND: There are a number of ways to bring the bla- ing a large spindle roughing gouge (SRG). (See Fig. 3) Be sure that the tool rest is e blank as this will help you to form easily a straight, true cylinder. When using any S v the ABC rule: Anchor, Bevel Cut. Be sure the tool is anchored on the tool rest with t t cut. Raise the handle until you see shavings coming off the cutting edge and then proceed to make your cut. Continue this process until the blank is round. Lately I've been adding a "D" to that axiom for "Direction"--always cut downhill with the grain so the fibers are supported during the cut. You can tell when the cylinder is completely round by the shape of the shavings coming off the gouge. As it approaches round, the shavings will become longer and will fill the gouge faster. (See Fig. 4)

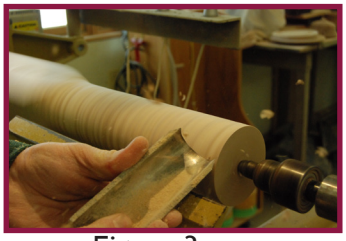

Figure 3

Figure 4

If I had started with a blank closer to the required outside dimension, I could stop now and begin forming the handle details. However, I must now bring the blank to the required overall dimension. I set my outside calipers to just a hair above 2-5/8 inch and used a sharp parting tool to score the cylinder approximately 1 inch apart. (See Fig. 5) Cutting so many grooves so close together isn't absolutely necessary but I find it to be easier to do it this way, especially for beginners. Once all the grooves are cut, begin to reduce the cylinder to that dimension. I use a peeling cut and concentrate on each little space individually until they are almost all down to the required dimension rather than simply going across the entire cylinder at once. (See Fig. 6) I have found that if you do it that way, you end up with a dip at each juncture. Once each individual section has been reduced, then you can traverse the entire cylinder. Be sure that the tool rest is parallel to the surface of the cylinder and pinch your gouge between your thumb and forefinger (See Fig. 4) so the tool glides parallel to the tool rest. This will help to assure a smooth, straight cylinder.

LAYOUT FOR THE HANDLE DETAILS: Begin by finding the center of the cylinder, lengthwise, and then measure 6-1/2 inch in either direction. (See Fig. 7) Set the calipers to 1-3/4 inch and repeat the process described above to bring the ends of the cylinder down to the proper dimension. (See Fig. 8 and Fig. 9) **NOTE:** In Fig. 8 you will notice that ***I DID NOT*** take the parting cuts to the very end of the handle--I stayed about 1/4 inch to 3/8 inch away from the final dimension. This will be explained later on.

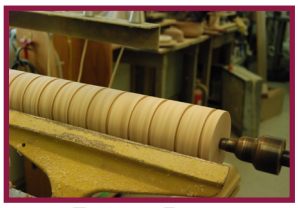

Figure 5

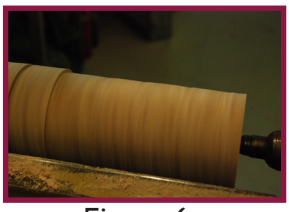

Figure 6

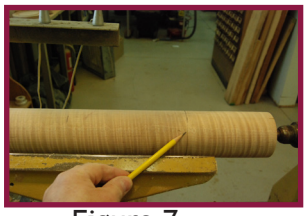

Figure 7

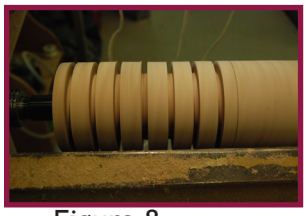

Figure 8

SAND THE CYLINDER: I find that it is easier to sand the main part of the cylinder next and power sanding is the most efficient way to do this. (See Fig. 10) I use a stiff backed mandrel and a PowerLoc disc to do this, starting with 150 grit and working my way up to 320 grit. Once finished, I hand sand the cylinder with 240 grit abrasive to remove any circular scratches left by the discs. (See Fig. 11) At this point, reestablish the layout lines laid out earlier. (See Fig. 12)

FORM THE HANDLE DETAILS: Refer to Diagram "A". Begin to layout the major dimensions for the handle next, measuring from the line reestablished in Fig. 12. Measure over 1 inch, 1-3/4 inch and 4-1/4 inch respectively. (See Fig. 13). Set the calipers for 7/8 inch and make a groove centered on the 1" mark. (Note that I cut two grooves to prevent the parting tool from binding in the cut.) Reset the calipers to 1-1/4 inch and cut a groove to the right of the 1-3/4 inch mark. For now, just score where the end of the handle will be located. (See Fig. 14)

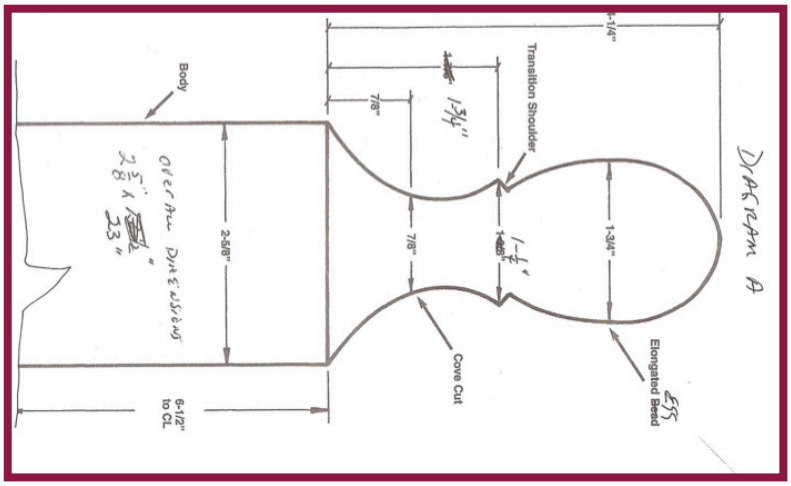


Figure 9

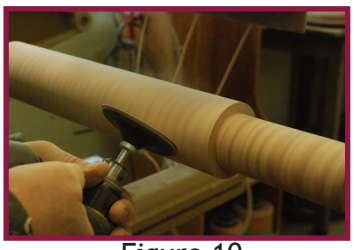
Figure 10

FORM THE HANDLE DETAILS: Refer to Diagram "A". Begin to layout the major dimensions for the handle next, measuring from the line reestablished in Fig. 12. Measure over 1", 1-3/4 inch and 4-1/4 inch respectively. (See Fig. 13). Set the calipers for 7/8 inch and make a groove centered on the 1 inch mark. (Note that I cut two grooves to prevent the parting tool from binding in the cut.) Reset the calipers to 1-1/4 inch and cut a groove to the right of the 1-3/4 inch mark. For now, just score where the end of the handle will be located. (See Fig. 14)


Figure 11

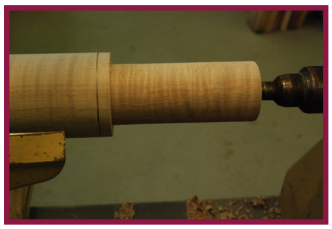
Figure 12

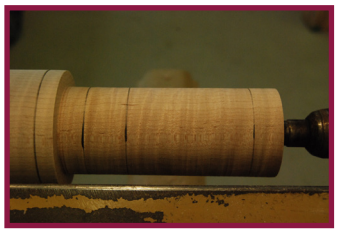
Figure 13

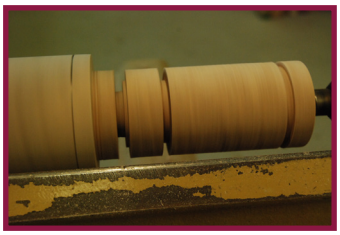
Figure 14

Begin by starting to form the handle cove and the left side of the "egg" detail. (See. Fig. 15) Once those are finished, start to turn the left hand side of the large cove detail, working back in stages to the original line being very careful not to get a catch which would let the gouge "run" to the left onto the sanded cylinder. (See Fig. 16) Notice that the final inside parting tool groove is being eliminated during this step. If we had cut this last groove immediately adjacent to the 13" mark, there wouldn't be enough material left to complete the cove. (See Fig. 8) Finally, form the right hand side of the "egg" detail. (See Fig. 17) I formed all these details with the "pointy" spindle gouge that I have detailed in previous articles but a standard ground gouge would also perform well. Notice in Fig. 17 that I have left an attachment point approximately 1/2 inch in diameter to provide enough strength to turn the other end. The attachment point will be reduced later once the other end has been turned and sanded.

SAND THE HANDLE DETAILS: I power sand as much as I can, even on spindle work. It is not only quicker and more efficient than sanding by hand but I think that the finish I get is far superior than that produced by hand sanding. I sanded the "egg" with the same hard backed disc used to sand the main cylinder. However, I sanded


Figure 15

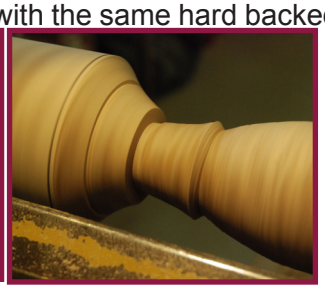
Figure 16


Figure 17


Figure 18

the cove with a "wave" disc (available from most retail woodturning outlets) using a soft, Velcro backed sanding pad because it's easier to get the pad into the cove detail. (See Fig. 18) Again, I sanded all the details starting with 150 grit abrasive and worked my way up to 320 grit. Be careful not to blur the sharp crisp edges with the abrasive. Also, be careful when sanding the transition point between the cove and the "egg" so you don't burn the corner with the hard backed disc. Finally, used the hard backed disc to chamfer the corner of the cylinder so the sharp edge cannot cut the pie dough. (See Fig. 19) Fig. 20 shows the completed, sanded detail.

When I was turning a lot of these rolling pins I discovered that I was having a difficult time getting the two shapes close to the same shape and I decided that it was because I was turning one end right handed and the other end left handed. One day I decided to reverse the blank in the lathe (See Fig. 21) and found that it worked much better. You can either try my method or form the other end with the blank in the initial orientation. The handle details on this end are formed using the same procedure outlined above. However, if you decide to keep the blank in the original orientation, the parting tool cut on the 1-3/4 inch mark will be made to the LEFT of the line this time around.

PARTING FREE: Once the details are formed and sanded, it's time to part the completed rolling pin free from the waste. Once you start, **DO NOT** turn off the lathe and restart it as the centrifugal force could snap the attachment points. It is important that the end of the "egg" remain round and not flat so be careful when reducing the attachment points to a little less than 1/4 inch in diameter. (See Fig. 22) Once the attachment points on each end have been reduced, remove the blank and cut the waste off at the band saw, being careful to leave a bit of waste on the ends. (See Fig. 23) Use a sharp utility knife to pare away the majority of the waste (See Fig. 24) and then use the soft backed pad to sand away any imperfections being careful not to sand a flat on the end. Finally, hand sand the end with the grain to refine the surface. (See Fig. 25)


Figure 19


Figure 20

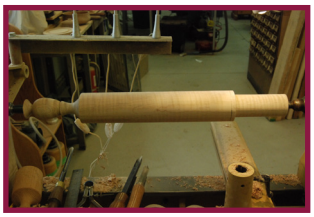
Figure 21


Figure 22


Figure 23


Figure 24

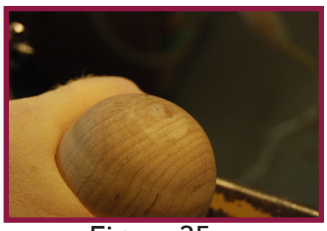
Figure 25


Figure 26

FINISHING: I prefer to use a food safe oil to finish my rolling pins. Unfortunately, vegetable oil will eventually become rancid and I've never liked the "wet" look that mineral oil imparts. Most walnut oils leave a yellowish tinge to the wood which, for darker woods, is acceptable; however, for lighter woods it isn't. Therefore, I use an oil called Preserve, a Master's Blend product that is available from a number of retail outlets. (See Sources). It is a water clear, nut meat oil that works well. (See Fig. 26)

I apply the oil by pouring a generous amount into my hand and then flood the surface of the wood with the oil. I allow it to set, usually overnight, and then repeat the process the next day. The following day I use paper towels to remove any oil that hasn't soaked in--usually there isn't any. I found a cardboard box (that comfortably holds about eight rolling pins) that I use to elevate the rolling pin so the oil can soak in--can you tell that it has seen plenty of use? (See Fig. 27)

MAKE THE HANGER: Now that the rolling pin is finished you can concentrate on making the hanger. I found that there is enough variation in the hand turned pins that each hanger needs to be made individually to mate with a specific rolling pin. You can make a generic holder but I think the individually made hangers just look better.

FINAL THOUGHTS: Preparing for this demo has brought back some rather fond memories. I've been associated with All American Crafts Publishing--the parent company for *Woodturning Design*--for well over twenty years and this demo is based on an article that is a repeat of the first article I did for *Creative Woodworks and Crafts Magazine* back in the early 90s. I've found better ways to turn the rolling pin and have added a hanger to the mix so, while the design is the basically same, the demo is new.

Any specie of wood can be used for this project but I generally concentrated on the close grained hardwoods such as the tiger maple and curly cherry. However, oak and ash also worked well for pins that were to be used as decorative pieces. Also, the laminated blanks, such as the one described in Issue #1 of *WTD*, was also a good seller.

And, finally, in the **interest of safety**: I've gotten emails from folks expressing some concern about how safe it is to cut the parting tool grooves with the calipers in place while the lathe running because the calipers can catch and be ripped from your hand. This is and has been pretty much standard practice, **BUT**, if you have the slightest bit of concern, stop the lathe to measure the diameter. If you **DO** measure while the lathe is running, keep in mind that you have to be careful not to force the calipers into the groove; they should just ride in the groove and slip over on their own. Also, be sure that the ends of the calipers are rounded over so they cannot catch.

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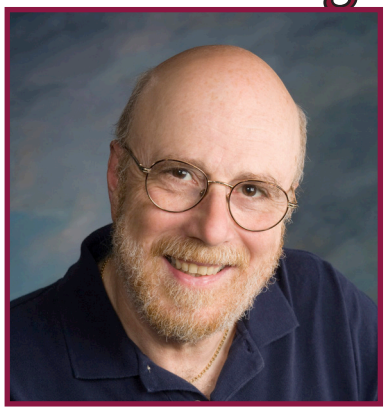
SWAT 2015

Turning 24



Kurt Hertzog

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Pen Tips

Initial Work Tips

Selecting Materials
Material Utilization
Marking Materials
Cutting/drilling Materials
Prepping Materials
Gluing tubes
Inserting
Facing

Tips and Tricks Topics

Tools (mandrels, mandrel abuse, pin chucks, cutting tools, sharpening, bushings, lack of bushings)
Perfection fit techniques (design and trim to fit, disassembly techniques, turning to dimension, press to fit, quality ink fills)
Kit adaptations (losing the center band, making special parts, lengthening/shortening)
Kitless pens
Stick pens
Nibs
End caps
Closed end pens
Single piece pens
Pyrography
Painting
Engraving
Inlaying

Materials Tips

Wood glue ups
Stabilized woods
Metals
Solid surface materials
Antler/bone
Casting

Finishing Tips

Sanding techniques (grits through 2000)
Micro mesh
Friction finishes
Ca finishes
Lacquers

Pen Discussion & Interaction Groups

Pen Makers Guild (http://penmakersguild.com/)
Yahoo Penturners Group (http://groups.yahoo.com/group/penturners/)
Yahoo Penmakers Guild (http://groups.yahoo.com/group/penmakersguild/)
International Association of Penmakers (http://www.penturners.org/forum/portal.asp)

Material Source lists

Arizona Silhouette (http://www.arizonasilhouette.com/)
Beall Tool (http://www.bealltool.com/)
Bear Tooth Woods (http://www.beartoothwoods.com/)
Berea Hardwoods (http://www.bereahardwoods.com/new/)
Bethlehem Olive Woods (http://www.bethlehemolivewood.net/)
BG Artforms (http://www.bgartforms.com/)
California Import / Export (http://calietools.com/)
Craft Supplies USA (http://www.woodturnerscatalog.com/)
HUT Products (http://hutproducts.com/)
Kallenshaan Woods (http://www.kallenshaanwoods.com/servlet/StoreFront)
Klingspor (http://www.woodworkingshop.com/)
Rockler (http://www.rockler.com/)
River Ridge Products (http://www.rrpwhite.com/)
Russ Fairfield (http://www.woodturnerruss.com/)
Turchetta Supplies (http://www.turchetta.com/goldennib/home.htm)
Woodturning Design Magazine (http://www.woodturningdesign.com/)
Woodcraft (http://www.woodcraft.com/)
Woodchuckers (http://www.woodchuckers.com/)
Woodturningz (http://www.woodturningz.com/SlimlinePenKits.aspx)

Additional references

Turning Pens And Pencils by Kip Christensen, Rex Burningham, and Dale Nish
The Pen Turner's Workbook: Making Pens from Simple to Stunning by Barry Gross
Pens from the Wood Lathe: Step-By-Step Instructions for the Wood Turner by Dick Sing

Notes:

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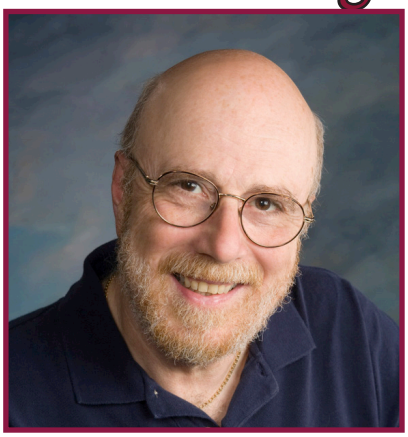

Kurt Hertzog *Ornaments*

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Design of Ornament Considerations

Method of display
- Hanging (ability of parent to support weight)
- Sitting
- Suspended
- Other

Balance Considerations
- Number of pieces
- Center of mass of design
- Finials – number, positions, materials
- Display method – weight, aesthetics
- Material – workability, multi-piece, mass

Materials
- Wood
- Glass
- Shell
- Plastic
- Cast
- Other

Methods of body creation
- Multi-piece
- Single piece
- Hollowed
- Solid
- Assembly
- Dissimilar materials
- Permanent

Other considerations
- One of a kind, reproducibility
- Fragilness
- Additional decoration/enhancements
- Hanging methods and tricks

Return to Index

John Holderman

Effective Use of the Skew

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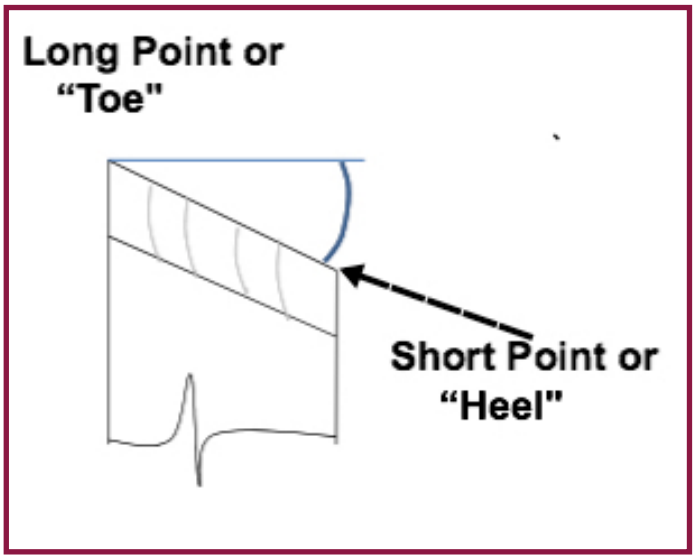
What is a skew and why is it different from other tools?

- Different types of skews
- Sharpening the various types of skews, discussed during demonstration Using a skew , discussed during demonstration
    - Various cuts with a skew
    - Beads and coves
    - Practicing techniques

A skew is so called because the cutting edge is “skewed” relative to the tool itself. The tool is flat, usually rectangular in shape when viewed down its length and is sharpened with a bevel on top and bottom of the tool.

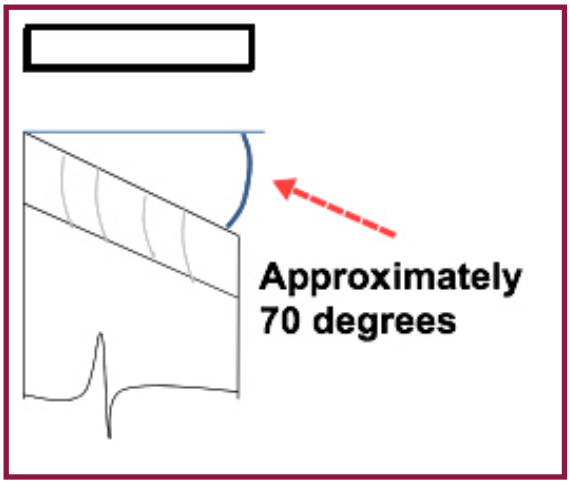
This is differs from other tools such as gouges which are round and from scrapers that are ground without a sharp cutting edge.

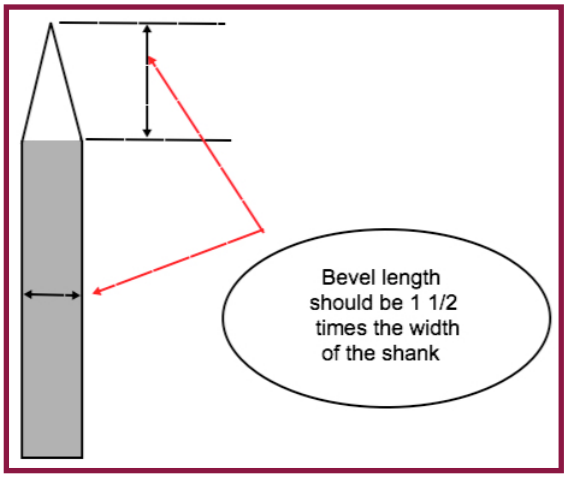


There are several types of skews on the market.

The Straight flat Skew:

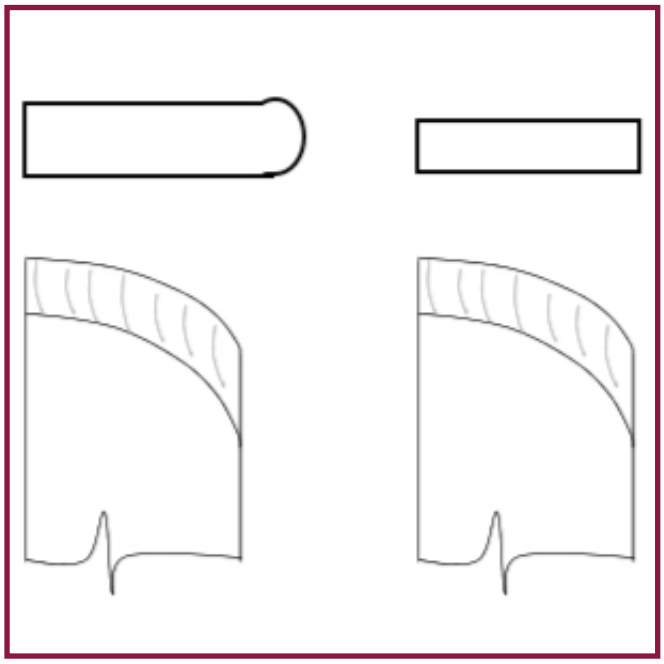
- Shank of the tool is rectangular, the angle of the skew is approximately 70 degrees
- The cutting edge is straight





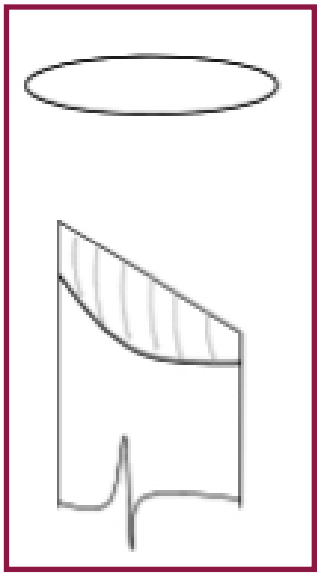
The Curved flat Skew:

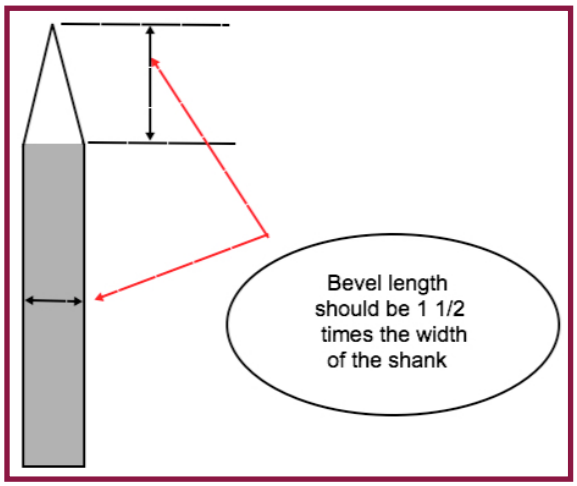
- Shank of the tool is rectangular, the angle of the skew is approximately 70 degrees
- The cutting edge can be ground with a short straight section then a longer curve or curved over the length of the cutting edge



The Straight Oval Skew:

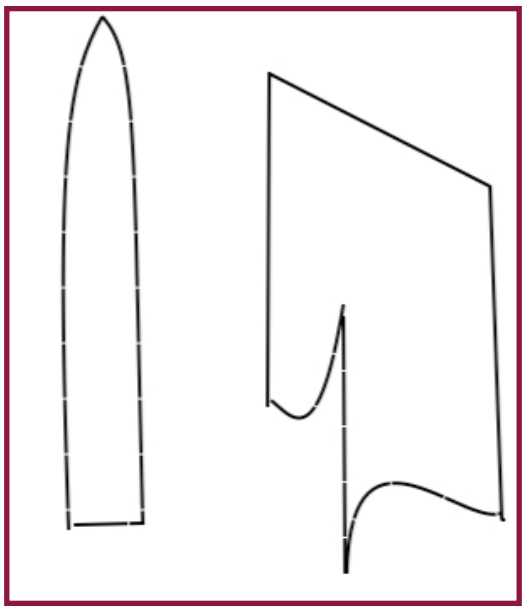
- Shank of the tool is Oval, the angle of the skew is approximately 70 degrees
- The cutting edge is straight





The Convex ground Flat Skew:

- Shank of the tool is Oval, the angle of the skew is approximately 70 degrees
- The cutting edge is straight



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Lyle Jamieson

Hollowing

www.lylejamieson.com
YouTube channel: http://www.youtube.com/user/JamiesonLyle
Facebook page: https://www.facebook.com/lyle.jamieson1

Are You With Me?

"...Your unit has been around a while now and there are lots of "new" ideas out there but you can quote me on saying don't mess with what works...and your unit works! Thanks Lyle!"
Wilford from Alabama 9/11/12

The above quote got me thinking, not so much about my hollowing system that he is referring to, but the process I have developed. Do you turn without catches? Do you start between centers? Do you start on the balance point? Do you turn fast? Do you have the drive center with the adjustable pin? Do you use faceplates? Do you ALWAYS take advantage of grain direction? Do you do the outside of hollow forms in stages? Do you do the inside of bowls in stages? Are you using sharp, I mean really sharp tools? Do you use sharp sandpaper? Do you turn without vibration? Do you use bevel support? Do you plan ahead or just wing it? Do you use the band saw safely (read-not at all)? Do you finish the finish? Do you friction drive reverse turn? Do you do the outside and inside of a bowl on the same axis? Do you exceed the safe limits of your tools?
I have learned techniques from the best turners in the world in the 90's by taking individual classes. In the last 10 years or so I have seen about every big name turner in the world do their thing first hand as I travel around the USA doing symposiums as a vendor and demonstrator. I have taken the best techniques and processes from all these experts and put them together into one process. There are many different methods but none that work as well as mine, not right or wrong. I always explain WHY I do what I do. The bottom line is I have a process that prevents problems, is safety minded, steers clear of obstacles and has the least amount of limitations possible.
My method is not mine but a compilation of the best way to do things molded together into an efficient process. Yet, I see my students using chucks or screw chucks or steady rests, or dull tools, or spindle roughing gouges, etc. etc. etc. So, if what I have developed works so well, why doesn't everyone that is exposed to it, use it 100 percent of the time? I think some just see a new method and say to themselves, "That's nice, but my way works for me, don't try to teach an old dog new tricks." Sometimes I think some have to justify the fact they have spent a lot of money on tools that don't work very well. It is a shame to have a multi-million dollar quarterback who sits on the bench, but we have to play with the guy that can get the ball down the field. My process is the easiest, easy on my body, easy on the wood, easy of the lathe, requires less sanding, easy on the tools. My process puts you in complete control, the control means you are working safe, with no fear and no catches, so you have more fun and with more fun the
creativity can get to levels you never could imagine.
What happens if you don't take the whole package? You only get part of the picture. The part of the process you decide to ignore will result sooner or later in an obstacle or limitation. Our tendency is to push the envelope as far as we can. We want to turn bigger, thinner, taller, faster, stronger, whatever. So the limitation will likely crop up sooner, rather than later. How do you resolve the obstacle? You need to put a band aide on the problem. You find a way around it. You find a fix. The band aide becomes an obstacle in itself and a domino effect starts to complicate things…unintended consequences.

My process prevents the obstacle from getting in the way of your accessibility or creativity rather than trying to fix the problem, after it exists. It only makes sense to eliminate the possibility of problems and not have to find a fix. So many of the conflicting portions of what many others demonstrate these days are due to the teacher showing you how to fix a problem. The instructor has good intentions usually and is not just trying to sell you more tools you don't need, but isn't it a better path to not have the problem in the first place? How do I get the whole process? This topic is not intended to be a sales effort on my part. You need the right tools for the job. And more important is to get some help to learn how to use the tools you already have. There are many pieces of the turning puzzle. You may have missed one or two pieces and finding them will make your turning time more fun and productive!

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Ed Kelle *Digital Photography for the Woodturner*

http://www.kellewoodturning.com

Our works are often judged upon the images we produce. Initial impressions count for a lot in today's rapid society. If you've been disappointed by the results coming from your camera, understand why this is the case and what you can do to present your artwork with the same high quality standards that you set during the creative process.

One of the most important parts of photography is exposure, and even with today's advanced technology, it can be the most troublesome part.

Shutter speed is expressed in how long the shutter is open for exposure, this is expressed in fractions of a second. The longer it is open, the more light hits the camera's sensor. A fast shutter speed 1/125 second can freeze action while a slow shutter speed of ¼ second lets more light enter and permits motion to blur. Aperture is the opening of the lens diaphragm. A setting of 2.8 permits large amounts of light to enter but creates a smaller depth of field. Depth of field is the range of distance that is in focus. A setting of f/22 permits much less light to enter but gives a larger depth of field.

Shutter speed settings
in fractions of a second

1/4 open longer time, more light entering, blurs motion
1/8
1/15
1/30
1/60
1/125
1/250 open shorter time, less light entering, stops motion

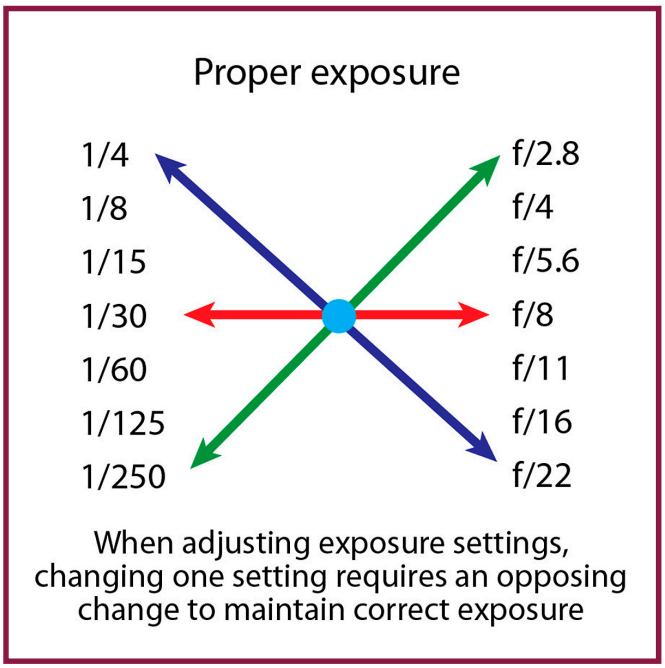
Aperture settings

f/2.8 larger opening, more light entering, small depth of field
f/4
f/5.6
f/8
f/11
f/16
f/22 smaller opening, less light entering, larger depth of field

A camera meters a scene and adjusts towards a "normal exposure" by averaging the light it senses. A Kodak gray card is set to be what your camera meters to in order provide the proper range of lights and darks in an image. By taking a meter reading off a gray card under your set lighting conditions then setting your camera to manual mode, this same exposure would be correct for any subject matter placed in the scene at that same spot. Any other mode than manual will cause the camera to recalculate exposure for the subject once the gray card is removed and replaced by your turning.

Once in manual mode, changing one setting would require the opposite correction of the other to maintain this same exposure value. My preference is to set the aperture to what I need, then adjust shutter speed as necessary.

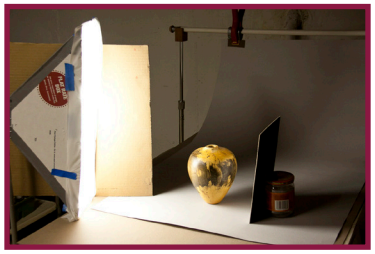
No matter what the source, light spreads out in a V shaped pattern and decreases in intensity over distance. Changing your lighting position will change the exposure. Moving a light closer intensifies the light while moving it farther away decreases intensity and spreads the light out farther.



Learn to control the light. Feathering the light means turning the light slightly away from the subject, so light will fall off the subject rather than being in the more intense center of the spread. Placing your subject farther from the background will allow light to fall away and darken the background without the need for a graduated background. If possible, turn off all other lighting when photographing. I even block sunlight coming in from win dows in oder to be in total control of all the light in my image.

Soft light is diffused light that creates soft shadows. The light tent here creates a nice uniform lighting for your works with soft shadows. A one light setup will still create shading on the opposite side.

Light can be bounced back onto this dark side by placing white foamcore or cardboard just out of camera view. This still provides the dimensionality of tone without too deep of shade.



A dark board would do just the opposite, it removes some light from the opposite side, this can be helpful with light toned objects. Remember that light reflects while dark absorbs.

I can control soft light better with a home made softbox, which permits me to have the background recede farther from my subject. Boards can be placed to block light from background or from causing lens flare in the camera. Do not place them right against any type of lights.

Hard light is directional light that creates a defined transition to shadows, this is often seen when using a bulb in a metallic reflector or with undiffused flash. A more harsh transition from light to dark is useful to bring out the texture in works.

Before photographing, examine your turning closely. Make sure it is free of dust. What is it's most important feature? Can you see that in camera? Adjusting the height of the tripod up or down slightly can make a world of difference in creating depth. Photograph in the vertical position if that is appropriate, cropping out from a horizontal format needlessly cuts way down on file size. Zoom in on your object for detail shots. Try changing lighting positions and see how the results differ. You might have to adjust exposure to compensate.

Even great lighting can not save an image that is out of focus. Always check focus under full light. I prefer to focus manually and take advantage of the live image function on my camera to zoom in and check focus. Using a tripod with remote trigger or self timer leads to crisper images. How is your depth of field? Is the entire image in focus? Larger f stop numbers create larger depths of field. If you adjust from f/8 to f/11, you need to compensate with a longer exposure time to maintain the same exposure, so ¼ second would need to change to ½ second exposure. Here is the value of using manual mode, you control everything. Digital cameras give us instant results of changes.

Always zoom in and check your image after photographing. Better to see the results now while you still are set up in case you need to adjust focus or lighting. You can also remove the card from your camera and download it to your computer for viewing while your camera remains in position on the tripod.

Have final goals in mind before you photograph. What will you be using this image for? If it is for a business card, consider how you would like to lay it out. Do you need extra background space for type to the side or below the image? Photographing with this in mind saves plenty of hassle later on.

Want to get a bit creative? Experimenting with putting your piece in an environment such as on a shelf with natural light from a window. Or maybe outdoors. You could also place your turning on top of a piece of glass to give some reflections. There are no limits to what is possible. Home decorating magazines and craft magazines provide plenty of sources for inspiration.

such as on a shelf with natural light from a window. Or maybe outdoors. You could also place your turning on top of a piece of glass to give some reflections. There are no limits to what is possible. Home decorating magazines and craft magazines provide plenty of sources for inspiration.

Number of Megapixels	Approximate 3:2 print ratio size		Screen resolution 72 dpi
	at 300 ppi	at 200 ppi	
2mp 1600 x1200 pixels	5.3" x 4"	8" x 6"	22.2" x 16.6"
4mp 2464 x 1632 pixels	8.2" x 5.4"	12.3" x 8.1"	34.2" x 22.6"
8mp 3456 x 2304 pixels	11.5" x 7.7"	17.2" x 11.5"	48" x 32"
12mp 4209 x 2800 pixels	14" x 9.3"	21" x 14"	54.8" x 38.8"
15mp 4752 x 3168 pixels	16.3" x 10.9"	24.5" x 16.3"	66" x 44"
21mp 5616 x 3744 pixels	18.7" x 12.4"	28" x 18.7"	78" x 52"

It is often said that photography is about problem solving, once you learn to control your camera, you understand how to create the image you have in your head. Don't be afraid to experiment with your controls. Take your time with your photography. The results will show the same level of care and thought that you put into creating your turning.

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Ed Kelle

Explorations in Color and Texture

http://www.kellewoodturning.com

Experimenting with Acrylics

Acrylic paints are a fun way to enhance your woodturnings. The advantages of using acrylics are that they are water based, non toxic, have a relatively short drying time, are odorless and have some flexibility to move with wood. Many of the techniques I demonstrate here were ones that I used previously with oil based paints and mediums in the past. As the painting industry has changed, there has been a movement towards acrylic paints for the reasons previously stated.

It can be very intimidating to view the many choices in the aisles of an art store. There are so many products and manufacturers to choose from with not as much information available in brochure form near the products. A company I like to use is Golden Paints, based in Connecticut. They have a wide range of products available and have many resources available for users, both online and in print versions. These help to explain what results you can expect from with various mediums available.

Of course, knowing exactly what you want and finding it in stock at the store are entirely different. But do not be afraid to mix manufacturers if what you want is not available. All acrylics will work together.

Preparation

Most important is that you have a good form to start with. An unsatisfactory form will still be evident no matter what you do on top of it. Take the time to perfect you base form.

Many of these techniques are messy, prepare your bench by covering it with either cardboard or inexpensive paper. Have a few brushes on hand, I mostly use white nylon brushes of various sizes. They will last many years if cleaned with soap and water. I even use them for doing glue ups on my woodworking projects. White plastic plates make great palettes, and contain things nicely. Plastic palette knives and spoons are used to mix and apply the paints.

While acrylics dry within a few hours, if you wish to cover an entire turning, this can not be done in one setting. It has to have a dry point to sit on while the rest of it cures. With this in mind, I normally work on a few pieces at a time. Some dry while I work on the others.

Types of acrylic paint-Regular or heavy body paints- The traditional style of tube, these have a thick consistency and can be built up in layers.

Fluid body paints- flow much easier than tube based paint, a little can go a long way with these. They are pourable. Slightly more transparent.

Airbrush paints- flows the easiest for spraying. Available in transparent and opaque versions.

Techniques

Tissue paper technique- My goal is a patina like look on the surface of the form. Regular gel medium produces a creamy consistency with some transparency transparency. A spoon full of this is mixed with some GAC100 medium, an all around medium that will thin out the acrylic and also help stiffen the tissue. Crumple up small pieces of wrapping tissue paper, then using a bristle brush, add some of this mixture to the tissue and apply to the wood. Wrinkles and folds are what you want to create, this will add texture to capture the washes of paint which will be added later. Overlap as you work, create irregularity in the surface. Plan ahead to cover as much surface as you can while leaving an area for the piece to rest on while drying. I do not add color at this stage, so I can clearly see any areas which have not been covered. Once the entire surface is covered and dry, I will brush on my base coat of fluid acrylic using a white nylon brush. In this case carbon black, which is the blackest black you can get. I mix this with a bit of the GAC100 to make it flow easier and also stiffen the underlying tissue. Once again, think ahead to how it can sit while drying. If after the base coat, you see areas you are not happy with, you can always apply more tissue there and then re-coat with the black. Next comes the glaze coats. I am aiming towards a semi transparent layer of paint which will build up the the folds and creases. I use a mixture of tube based green with airbrush green and GAC100 or glazing medium. This is scrubbed into the base layer, it will go transparent in many places. Over the course of a few sessions, I will add various glaze layers until I am happy with the results.

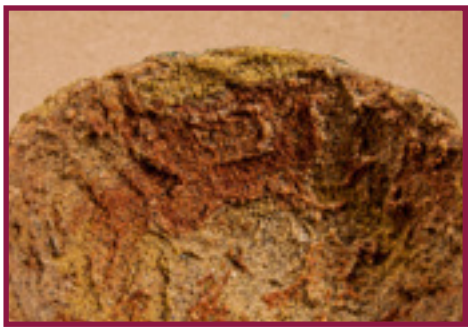
Sometimes I vary the color, or use a wash of black to tone back areas. My goal is a patina like look. The final step is to use a dry brush technique. This is the application of small amounts of paint to the very tips of the creases and folds, as if those areas were rubbed clean of any patina. I use a small flat white nylon brush and iridescent copper paint. Put only a small dab of paint on the palette, this is a time consuming step extra paint would only dry up. Lightly drag the tip of the brush from the paint, drawing some out, then drag the brush out on a clean area. You want a very minimum of paint on it. Apply with the brush held horizontal to the surface, only brushing against the high points. Be patient, the end results are worth the effort. At any stage in the process you can go back to reapply glazes or dry brush. I have worked pieces over and over until I was happy.

Rock technique-

The goal here is a rough surface. Using the Regular gel medium and a few drops of the GAC100, I add in aquarium rocks. Mixing as I go along, my final goal is a mixture that is not too wet and not too dry. Meaning I can still see the rocks and they are not swimming in a creamy substance. While the medium will dry and shrink a bit, I wish to retain the facets of the rock itself. Too much medium will fill in the areas between the rocks. If it is too creamy, add more rock slowly. I also mix in my base color of fluid acrylic now, a few drops of carbon black. Apply with a palette knife or spoon, and work towards a coating that hides the surface entirely. You will be working on smaller areas with this as it has a tendency to want to slide off curved surfaces. The areas you apply the mixture should be positioned horizontally to dry. This process that will take a few days. You can mix up a larger batch and store in in a container for a long while. I have had a mixture sitting for over 2 years now in a tupperware container with the mixture also covered with waxed paper to keep air from it. Once the base layer is complete, you can move onto any glazing layers as was previously explained and then finished off with a dry brush technique of a lighter tone of paint. This helps to define the texture more.

Sand technique-

Same method as the rock technique, on a smaller scale of material. This one is a bit easier to tell if the mixture is too wet or too dry. Mix the gel medium with the GAC100 and slowly add in sand and drops of fluid color. For additional variety, mix different batches of color and use them together on the surface as shown. Glazes and dry brush methods can be used if desired in the final process.



Molding paste techniques-

Hard molding paste is used to build up thick strong surfaces than can be carved. I mix the paste with my base colors and apply with a palette knife. When I have covered as much as I can, I will dab the knife against the paste to pick up peaks in it. If you wait a little while, the paste will stiffen a bit and it will hold the peaks a bit better. A variation of this is to use crumpled up saran wrap or a piece of plastic bag to dab at the mixture, this will create a smaller denser pattern. This mixture can be stored as well until the entire piece has been covered. This technique also takes a few days as drying times increase with the thicker medium. When finished, glazing and dry brush will give depth to the texture.

Glitter technique-

GAC100 mixed with fine glitter and brushed on surface with white nylon brush. Can be reapplied in layers for additional density. Keep mixture to a thin viscosity, not thick and clumpy. Works best against dark base colors. Support work while drying.

I have used many other mediums in my works, including tar gel, glass bead gel, interference paints, and iridescent mica flakes. In all cases with my works, I use test scraps of wood to find out what works best for me before applying this to any turnings. Do not be afraid to experiment and develop your own techniques, there is no limit to what can be done. Have fun!

Resources

goldenpaints.com	Paint manufacturer, good resources explaining products & uses
utrecht.com	art supply store
dickblick.com	art supply store

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Janice Levi

JEWELRY MADE EASY

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Turning the cross grain disk

No special jigs or chucks are required, but you will need to turn waste blocks of varying diameters to which the disk blanks will be attached. Each disk will need to be trued and the diameters can range from 1 inch to 1 ½ inch to 2 inch (2 ½-5 cm). The second set of waste blocks will be the same diameters but will be slightly concave in shape.

The larger wood blanks, 2-3 inch (5-8 cm) in diameter, should be about 3/8-1/2 inch (10-12 mm) thick to start. Use a compass to outline the circumference of the circle then remove most of the waste wood on a band saw.

Using double sided tape (I prefer SpecTape brand as it does not leave a gummy residue on the wood), adhere the disk to a flat-sided waste block, making sure that the waste block is smaller in diameter than the finished disk. Use the tape sparingly. You may have to cut the strips in half or even thirds in order to be able to easily remove the disk.

Before pressing the disk firmly into the tape, pull up the tail stock and line up the center mark from the compass with the live center. Do not allow the live center to puncture the turning disk. I place a barrel washer (or a pen bushing) between the point and the disk, then tighten the tail stock for as long as possible.

Use a bowl gouge and sheer cuts to begin shaping the rounded surface of the disk. Switch to a spindle gouge to turn the slightly rounded edge of the disk which will be about half way through the original thickness.

Remove the tail stock and barrel washer and use light cuts to smooth the top surface. Hand sand or lightly power sand, going through all the grits.

Now remove the disk, use a center finder to mark the center of the unturned side, and mount the turned side on a concave waste block with double sided tape. This can be a trial and error process to get the disk perfectly centered. Bring up the tail stock so that the live center can aid in the centering process, and lightly press the disk into the tape. Some adjusting may be necessary. I again use the barrel washer and apply very light pressure with the tail stock. Make light sheer cuts with the bowl gouge to achieve the final shape for the back of the disk. The outer edge should be no thicker than 1/8 inch (2mm). You are aiming for a thin, graceful disk, not a clunky chunk of wood. Remove the tail stock and make the final light cuts. Sand through the grits and remove the disk.

Apply the finish of your choice—spray lacquer, oils, or waxes and buffing.

Turning the end grain disk

Small diameter disks are turned differently. If using a pen blank, insert the blank into a chuck with small jaws as far as it will go to help avoid vibration. Turn only the very end of the blank round using a roughing gouge or spindle gouge. Then with the spindle gouge, slightly round over the end of the blank. Since the finished disk will be between 1/8 inch-3/16 inch (2-4mm) thick, this is a quick process. Using a thin parting tool, angle the parting cut so that the back side of the disk is also somewhat rounded. Do not completely part the disk off, but leave about 3/16 inch (3-4mm). Hand sand the front of the disk and as much of the back as possible, going through all the grits.

Round over the outside edge to remove any sharp edges. Finally, finish parting off the disk. A small tooth saw may also be used to part off the disk. Hand sand any roughness on the back of the disk and finish with your choice of finishes.

When turning a large number of disks, the process can become somewhat tedious. I usually make 5-6 at a time, toss them into a small container, then turn more the next day.

A sanding option

After turning the cross grain or the end grain disks, there is an area on the back side that must be sanded. This can be done by hand but an option that I prefer is to mount a small sanding disk in the drill press and sand the back side of the disks, going through all grits. I collect a number of disks in a small container then sand all of them at one time. Although I sometimes apply lacquer, oil or water based polyurethanes, it is often sufficient to simply use a three step buffing system on both the front and the back sides.

Turning end grain beads

Pen blanks or even smaller end grain blanks prepared on the band saw can also be used to turn beads. Insert the square edged blank into a chuck with small jaws so that only 2-3 inch (5-8cm) of wood is exposed. This will help prevent vibration. Insert a 1/16 inch (1-2mm) drill bit into a Jacob's chuck placed in the tail stock, and with the lathe running at about 600 rpm, drill the center hole of the bead slightly deeper than the completed diameter will be. Use a skew point to create a small recess in the blank so the drill bit will center up properly. (Note: larger holes can be drilled but the advantage of this process is to allow for the use of finer assembly methods.)

Using a spindle gouge, turn a cylinder to the desired diameter, leaving the bulk of the blank unturned. Depending on your comfort level, use a spindle or detail gouge or a skew to shape the right hand of the bead. Then shape the left hand portion of the bead, but do not cut all the way through. Sand the bead through all grits and apply friction polish or wax. Finally, use a skew, parting tool, or small toothed saw to part off the bead. A small nub may remain. Hand sand and dab the area with friction polish or wax.

Assembling the necklace

A few tools are necessary to make the assembly process easier. I would recommend that anyone interested in jewelry making should spend some time in a local craft store looking at the many possibilities. At a minimum you will need two sets of small needle nose or jewelry pliers (one with smooth jaws), round nose pliers (optional), small wire cutters, jump rings (not the spiral kind), pins with flat heads for attaching the beads, necklace chain, and neck clasp. I have found that the gun metal color of chain is most complementary to the wood; silver and gold often detract from the wood's beauty . A handy tool to have is a Dremel and Dremel drill press with bits smaller than 1/16 inch (1mm). Although the small holes in the disks can be hand drilled, the drill press makes the task easier.

Cut two lengths of chain, one 28 inch (70cm) and the other 24 inch (60cm). The longer chain will hold the disks and the shorter chain will hold the beads. Do not attach the neck clasp at this time. Use the Dremel to drill a hole about 1/8 inch (2-3mm) from the edge of the feature pendant. Next, drill the holes into all the smaller disks. Depending on the thickness and density of the wood, the hole may be closer than 1/8 inch (2-3 mm) from the edge.

Using the two pairs of jewelry pliers, separate the jump rings. Do not pull the ends straight apart, but rather, push one end of the ring away while pulling the other end toward you, creating a spiral shape. Slide the open ring through the hole of the feature pendant, then slide the ring into the center link of the longer chain. Use the two sets of pliers to close the ring. Attach all the remaining disks in the same way, mixing and matching size and color on each side of the feature pendant.

To attach the beads, insert a flat head pin into the bead and remove all but 3/8 inch (1cm) of the wire. Use round nose pliers to shape the wire into a small loop above the bead. Open a jump ring and insert the ring through the loop, then into a link in the necklace chain. Close the jump ring. Attach beads in various sizes and colors along the chain. To dress up the beads, an assortment of metal bead separators and holders are available at local craft stores.

When all disks and beads have been attached, use jump rings to connect the two upper links of chain to each end of the neck clasp.

The necklace is finished, but don't forget the earrings. Disks, beads or a combination of each can be attached to ear wires using jump rings and pins in the same way as to the necklace chain.

It's now time for your imagination to take over. Use your skew to cut small "V" grooves or a chatter tool to enhance the disks and beads. Pyrography and color can further embellish the end product. And with jewelry, the rule of the day is, "It can never be too gaudy!"

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Ken Morton *Sharpening Interactive*

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Because we all go through life learning as we go I like to call my demonstrations "Interactive", not only will you learn something, I am hoping I can as well from listening to your experience and points of view. It's when you think you know everything that you stop learning and the only one that hurts is yourself. For this reason it is better to go to the demonstration, so that we can all interact with each other, rather than try and just work from a handout. This handout is made to work with the demonstration and does not contain drawings are diagrams. If each person (including myself) picks up one new trick or piece of knowledge then I have met my goal for the demonstration.

When doing demos I work from an outline and will structure this handout to try and conform to my outline. Because of the interaction of the audience and time restraints we may not hit all topics and cover others more thoroughly than originally planned but I am always open to suggestions, emails, phone calls or just stopping by my shop if you are in the area, if you need more information. My contact information is listed above. Unfortunately I am one of those guys that still has to work 40 hours a week, but I will get back to you as soon as I can

Who am I?

I have been turning since 2007, been President of Hill Country Turners in Kerrville TX, am a member of Alamo Woodturners and currently President of SWAT. My turning experience has been from my own mistakes, SWAT rotations, Club presentations, attending professional classes, DVD's and books. For sharpening I pull mainly from my own experience, Mike Darlow (MD), Kurt DeHeer (KD) and Alan Lacer (AL) which you will hear me quote from during the demonstration. But not only did I watch and read all of the above I went out and tried them to see what works for me, which I encourage all of you to do. Don't take my word for it or Kurt's, Mike's, Alan… make your own decision based on what works best for you.

What could I possibly teach you?

My X amount of years versus the combined knowledge in this room, I'd probably loose! But there may be that one thing you haven't tried or heard about or thought about for a long time that will make the difference in how you perceive things. "Perception is Reality!" WRONG!!! When you start believing that phrase then you stop looking for the truth and learning new things. There is no worse epitaph than "That's the way I've always done it!" Always doubt what you are being told and ask questions until it makes sense for you. Learn something new every day. All you'll lose is a little time but what might you gain.

Safety

Always use eye and face protection when working with woodworking tools. In a lot of cases ear protection is in order as well. ***NEVER*** do anything you are not comfortable with. Keep the speed down until you have mastered what you are trying to do and comfortable with the motion or action. You only have one set of everything, keep them safe all the time!

Why do we sharpen?
Because it's dull? Shouldn't get that bad before you sharpen. You'll have to come to the class to hear the answer.

What is Sharp?
"If you can see the edge there is no edge." (AL) This means that when you look at it under a light if you can see a shiny spot along the edge then it isn't sharp. That shiny spot is a reflection of the light off a part of the edge that isn't sharp. When all the shiny spots are gone it's sharp. Different tools need different degrees of sharpness depending on their use. Finishing cuts need a sharper angle 25° to 35° vs. roughing or hogging cuts which will be in the 35 to 45 degree range. Cutting tight corner may call for a 50° to 60° angle. Scrapers are a different subject but they also hold true to the above. One important thing to remember is that, "the sharper the tool the more aggressive the tool!" If you are a beginner I suggest you start with a lower angle (45° +) until you have the feel of the tool.

How do we sharpen?
Freehand, jigs, platform, Wolverine, Tormek, Sorby… Any or all or open to the wood turner depending on how deep his pockets are. A lot of professional turners advocate freehand sharpening because of time and speed. But honestly how many of you are production turners on the clock. By freehand I mean only using the platform to steady your hand. Personally I am freehand challenged; you probably don't want to turn with anything I have sharpened freehand. I believe you can sharpen faster, more consistent and take off less steel with a jig than freehand. My preferred setup for gouges is a Tormek bar mounted on a slow speed grinder and a Wolverine setup for all other tools. I find this to be the most economical and fastest way to sharpen. We will concentrate on these two methods since they are the post prevalent in use.

Wheels
We won't go into great deal about wheels just to say that I advocate an 8 inch wheel mounted on a slow speed grinder (1725 rpm - the 3450 rpm is way too fast). Some like using 6 inch to make the hollow grind more pronounced for honing. If using a ceramic or aluminum oxide (AO) the preference would be ceramic with J or K hardness. Never mount a grey N hardness (the ones that comes with the Home Depot grinder) to sharpen wood turning tools, it is way too hard. Mike Darlow (MD) suggests an H hardness which is much softer and wears down faster. Of course my preference is CBN Wheels. Why you ask? Never have to balance or true the face. Never wear down, cut faster with less heat and no wheel dust. And best of all they won't blow up on you!!! Many schools have gone to them just because of the liability of the ceramic wheels blowing up. Besides the CBN will last a life time. My rig has 80 and 120 grit CBN wheels. You would probably want 46/80 or 60/120 for AO or 80/120 for ceramic. Use the lower grit for reshaping and the higher for finish and re-sharpening.

Setup
Always make sure that whatever setup you use, Wolverine, Tormek, Sorby… that you follow the directions and make the setup and measurements as accurate and square to the grinding wheels as possible. If you do this the attachments for the jigs will work the best and give you the most accurate angle. If the setup is off then the angle setting guide you use will could be off and cause your cutting angle to be greater or less than you want. The one thing that is very important no matter which method or jig you use is to have a rock solid easily adjustable platform! My recommendation for the cost conscious is a slow or variable speed grinder, 80/120 ceramic wheels and a Wolverine setup with the Vari-grind jig. This will sharpen everything you have. For those with a little more $ change to CBN wheels and add the Tormek setup.

Let's sharpen something!
A tool right off the rack is seldom sharpened correctly and definitely not to your own liking, immediately regrind before use. Clean up all sharp edges on tools so they will slide easily across the tool rest. When sharpening keep hand on top of tool above the platform or jig to keep from raising the tool off the rest. You will need to have the following in your arsenal of tools: A way to set the angle you want on the jig you want and way to measure that angle after you have sharpened the tool. I use the Raptor setting tools and will get into their use later. I have a compass depth gauge for checking the angle but you can use a lot of the gauges that come with the grinder or jig. A marker is needed to mark the tool with any specifics for the angle and grind so you can reproduce it quickly. A hone with my preferred being diamond. Slip stone for the inside of gouge flute. (AL sells a great one but it is $$, next best would be the one from Craft Supply.)
The edge profile can be created by going straight into the grinding wheel at 90° until the desired profile is reached after which you can sharpen to the new edge.

Scrapers 40-80° (60°)
Views on this angle very from 40-80 °, my suggestion is to use 60 because the cut is cleaner and the clearance to the wood is better (if you can't get the cutter to the wood it won't cut). I do all my scrappers and tips to this angle. Hone the top before you grind, all the sharpening demos I have seen (AL, KD & MD) adhere to this as well. Here are the steps I take:

1. **H**one the top of the scrapper.
2. **S**etup angle on platform (I use the Raptor but you'll have to be present to see how to use ☺)
3. **H**one the top again.
4. **R**aise the burr using a burnisher (best) or stone (not so best).

In between going back to the grinder you can repeat steps 3 and 4. Wouldn't do this more than 4 times and probably only 3 before returning to the grinder. Definitely return to the grinder before the final finishing cut for the cleanest finish. I do not recommend using the burr right off the grinder! This burr is very weak and rough and will not stand up to the high speed of the wood. Just rubbing it a few times with your thumb will usually get rid of it. The only good burr is one raised with a burnishing tool.
Specialty end scrappers, round, square, oval, tear drop, straight… are easily sharpened using a couple of different jigs with the platform.

Parting Tools 40°-55° (45°)
Obviously the parting tool needs to be sharp but it also has to maintain that sharpness over the cut which is both aggressive and forceful. Going with a 40 degree or less angle will be sending you back to the grinder more often so I settle on 45°. I do not advocate the use of a diamond shaped parting tool for one very good reason, if you don't have both sides equal and set right on the middle of the tool blade it won't work period. If the middle is wider than the cutting point it can't get to the wood. I use a flat 1/8 inch parting tool with the lower blade cut shorter than the top; this aids in support of the cutting edge. When returning to the grinder with this cut, you will sharpen only the bottom portion until it gets close to the middle and then regrind the top blade. The other option is to have both surfaces the same length, meeting close to the middle. If it is a flat parting tool it is not a problem if they don't meet in the middle.

Skew Chisel 25-45° (30°)
There are several different shapes of skews in manufacture these days; round (spindle master), square, oval and square with rounded edges. I suggest the later because of the way the skew is used on the tool rest. Square edged skews will catch on every nick on the tool rest when sliding across and do not roll easy when cutting beads or coves (yes I said cutting coves with a skew but that's another demo).
My preference is a traditional straight angle sharpened to 30° whereas many experienced turners like Alan Lacer prefer the radius skew. Again the biggest thing to remember with the angle is the sharper the blade the more aggressive the cut.

Skew Chisel 25° - 45° (30°) (Continued)
For a beginning turner my suggestion is a radius blade sharpened to 40°. I find 45° too for out making you twist the tool more to cut, but you may want to try it if 40 doesn't work for you. The angle from the toe to the heel should be 70°/20° regardless of the shape of the blade. The thing about the cutting angle of the skew is that it is actually to angles combined so in order to get a 30° angle you will need to set the platform at 15°. There are those who say sharpen to 1 ½" times the thickness of the skew, but I find it easier to just set the angle of the platform to the correct angle that works best for me. When honing the skew, make sure you hit all 4 sides. Strop the edge for razor sharpness. I use the platform to sharpen, but there is also the Wolverine and Tormek setup that will be covered in the demonstration. You'll just have to show up to see how.

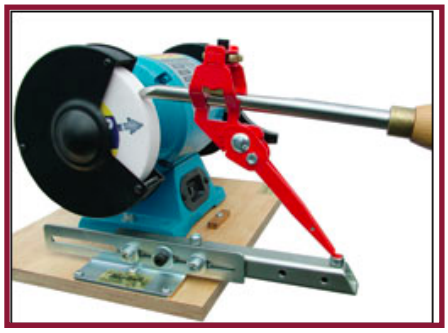
Gouges (what everyone has been waiting for)
There are several different gouge shapes to consider; roughing, spindle/detail and bowl. We will cover each but since the detail and bowl gouge are sharpened using the same jig they will be combined in the demonstration.

Roughing Gouge 45°-55° (45°)
This is pretty simple so we won't spend a lot of time on it. I use 45° because it's sharp enough to give a good cut but utility enough to stand up to punishment. Use either the platform or Wolverine setup to sharpen and hone the flute. You can hone the flute 3 or 4 times between regrinding.

Detail & Bowl Gouges Sharpening Commonality Setup
There are several jigs for sharpening but I think the best by far is the Tormek setup on a low speed (1725) grinder. If you don't have this setup then the next best is the Wolverine using the Vari-grind or True-grind jig. Either one of these setups will give you a sharp facet free tool to that is quickly repeatable.

Tormek's angle and grind setup is easily done using the A/B Template (TTS-100) at right. There are other means of setting this up but you need to be at the demonstration to see.

The Vari-grind/True-grind is just as easy to setup if you use the Raptor setup tool, previously used on the platform, to set the angle. In order for this to work correctly you need several things to happen: The Wolverine needs to be setup correctly and square to the grinder with height (6 1/4") being one of the important factors. The leg of the Vari-grind needs to be set to 23° and locked in, there is no need to move this ever again. Using the leg at 23° will give you the most consistent angle from nose around to wing which keeps the wing cut from being too sharp and aggressive. The closer the control leg to the jig (greater than 23°) the steeper the angle of the wing and more aggressive the tool. Use a ***2" overhang*** of the tool out of the jig.



Grinding

* **S**et profile first (if needed) by going straight on to the wheel at 90° with flute down.
* **G**rind wings first, right then left then blend the nose.
* **T**ry and get a facet free grind.
* **D**on't grip the tool handle (except for Tormek) it will make you lift the tool off the rest.
* **K**eep tool moving and use a light touch.
* **D**on't spend too much time on the nose you'll get a flat.
* **W**ings can be convex or straight but never concave. My preference is convex which gives you more control, straight will be more aggressive.
    * **T**he more wing the more wood.
    * **L**ong wings for exterior.
    * **S**hort for interior.
    * **T**his is controlled by how far you swing the tool to the left or right not how close the arm is to the grinder or the length of the tool overhang (2") out of the jig.

Grinds

There are really only two parts to the grind, the nose and the wings. How you put the wing length and angle together is what determines the grind. After grinding and in between returning to the grinder you can hone the flute. In order to round the heal move the tool extension out to 2 ½" and round the heel of the tool on the grinder.

Finger Nail (35°)

Irish (45°)

* Outside of bowl
* Medium wing 40-55°

Modified Irish or Ellsworth or "E" grind (45°)

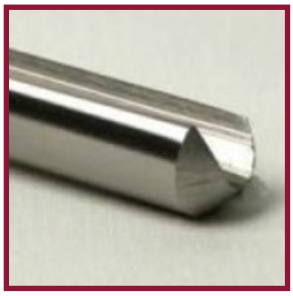
* Outside of bowl
* Long wing (takes a big bite) 40-50°

Spindle/Detail

* 30-35°

Traditional or Standard (60°)

* **I**nside of bowl
* **F**or tight curves at bottom of bowl
* **S**econdary bevel or rounded heel (using 2 ½ inch tool extension) will help alleviate compression marks.



Short wing 55°-60°

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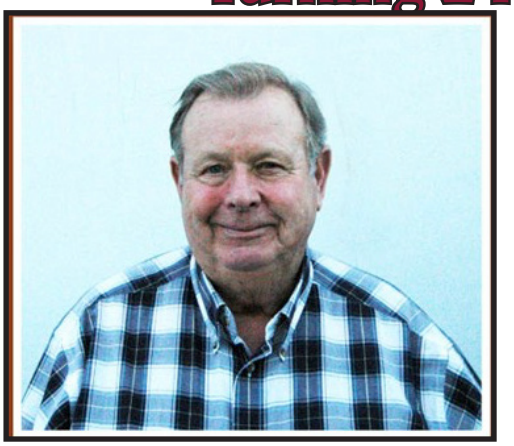

Larry Roberts

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NATURAL-EDGE TURNINGS

INTRODUCTION

This session will touch on some basic to slightly advanced techniques combined with information about types of wood suitable for natural edge vessels ,plus styles, shapes, size and..... The purpose is to increase one's confidence, abilities, comfort level and knowledge.

24.5 x 6

LARRY'S THOUGHTS ON TURNING

We see many vessels with manmade embellishments such as dyes, paint, carving; the list is virtually endless. While these can be very interesting and artistic, I think nothing can compare with the natural beauty of the wood exposed by the artist's hand. Turning a bark edge piece is the artist's attempt to give the tree new life and expose the inner beauty previously hidden by the tree itself. When I am turning a piece of rough or ill- formed wood, I feel blessed to have the ability to give homage to nature by collaborating with her to create something unique in itself. I feel a great sense of self-satisfaction when the completed vessel is worthy of nature's gift to me; but, extremely disappointed when my skills fail. I keep these failures on a shelf in my shop as a humbling reminder and a challenge. Creating natural-edge turnings forces one to think "outside the box" constantly in both lathe work and life.

10 x 15 Bradford Pear

NATURAL-EDGE

Any vessel that retains the bark or the Cambium layer is a "natural-edge" turning. The form can be (functional or decorative) open- bowl, enclosed hollow form, twig pot, candlestick and..... Bowls are of two general types; one is where the edge of the bowl is typically slightly, uniformly curved and smooth. The other is wildly undulating and varied. Smooth edges are usually formed from a straight grain limb/log with even/consistent bark. These will be either end grain or side grain. End grain can take the shape of a candy dish on a pedestal, perhaps with a lid. How about a deep open vessel with a beautiful tall base? Maybe a large bread bowl, salad bowl or an open vessel filled with turned spheres of various sizes and wood varieties (can we leave some natural edge on spheres)? Side grain can be crescent shaped and oblong, closed (urn)form with narrow top or wide flowing edge. Here is where your imagination should kick in. Surprise yourself! What-ever you perceive as your finished product, let creativity take the lead and listen to the wood with whom you are a partner.

GETTING STARTED

When preparing to turn side grain, that is when the grain is at 90 degrees to the bed of the lathe, some considerations begin with the chain saw. Choose a log with fine bark and straight grain. The growth rings ideally should be concentric; if not, compensation can be made at the lathe. When turned, the growth rings should be spaced evenly to the bottom of the vessel. Cut the log length at least to 1 1⁄2 X the diameter. If it is cut a little too long, some length can be removed in the turning process. Too short? Start over. Center the length on the lathe with the blanks' ends in the same plain. To adjust, place the end of the tool rest almost touching the "high" end, hand rotate the spindle until the opposite end comes in line with the tool rest point. Any gap should be closed 1⁄2 the distance to the tool rest point by very slightly loosening the tool rest and taping the end toward the tool rest. Rotate again and adjust accordingly. The blank will now be perpendicular to the bed of the lathe. Close the tailstock firmly to mark the work. Now loosen the tailstock slightly and center the blank to the lathe's center axis by eye. Tighten tail stock very firmly to mark the final points for the head and tail. Circle points with marker. At this point, the grain should be elliptical with the pith at the center and the larger ellipse concentric at the head stock. Remove from the lathe and drill hole the size of the spur drive and the tail stock size about 1" deep. Remount, tighten firmly, rotate by hand, check centers and clearance, assuming all is well, start at slow RPM and increase speed to your comfort level (safety first). Higher RPMs reduce the amount of air between cuts and thus smoother, easier operation and less operator fatigue.

LET THE FUN BEGIN

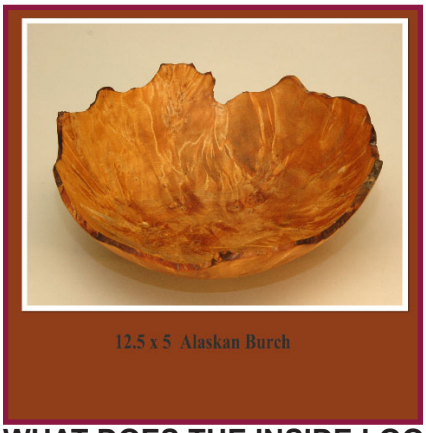
13 x3 Mesquite Root

Style and shape are paramount. The sides should not be any deeper than 1/3 to 1/2 the thickness of the vessel excluding the foot. Any deeper and the vessel will be too flat and taller will result in a vessel with heavy, squat proportions. Sides should be even thickness. The foot or base should be very visible and in proportion to the main body or none at all (called a rocking vessel). The base should be non- obtrusive and raise the vessel from the table to differentiate the two. Another option is to make the base a significant part of the vessel; perhaps, 1/3 the height of the main body. A deeply hollowed base is highly attractive and desirable, particularly among turners. Just watch someone pick up the turning and look at the bottom. The bottom is at the tail stock. Rough out the blank by removing stock from the tailstock area, point to the perceived upper diameter of the top which results in a long arch. This is the blank from which the vessel will emerge. Next, at the tailstock region, turn a tenon to the anticipated height and diameter of the base that will also accommodate the chuck when reversed. Between the juncture of the tenon and the top diameter, create a shape that is pleasing to you. The tenon will later become the base. An uninterrupted fair curve looks best. Reducing the overall diameter may be needed to achieve the desired shape.(Bend a yard stick to see a fair curve). Watch the top middle of the blank and if the sides are not the same height, adjust the tail point moving it toward the high side. Recut as needed, minimum. Sand to 120.

WHAT LOOKS GOOD

Decide whether the wall will be thick, thin or in between. Wall thickness should be relative to vessel size and bark type. In general, the larger the vessel the thicker the wall. Large heavy bark requires walls thick enough to show the character of the bark. Sometimes, removal of the bark enhances the style. Many turn everything thin and the end result can be very pleasing. However; sometimes, technical skill interferes with aesthetics. Generally, short heavy bottom vessels have little artistic appeal. (Think of a stew cooking pot or a lightbulb standing on its large end). Also avoid angular sides, sharp curves, competing styles on the same piece. Let highly- figured wood speak for itself. Don't over-embellish. Simple lines properly executed look great and are elegant.

Taller vessels typically look better divided visually with about 30% of the mass above center and 60% below center and the other 10% at base, middle, lip or wherever. This rule of thumb can be applied most anywhere. Trying to use ALL the blank is a poor idea resulting in poor designs. Concentrate on design principals. Pleasing round shapes have been around for thousands of years (Egypt, Greek, American Indian pottery). Don't try to re-invent art.



12.5 x 5 Alaskan Burch

THICK OR THIN

Decide whether the wall will be thick, thin or in between. Wall thickness should be relative to vessel size and bark type. In general, the larger the vessel the thicker the wall. Large heavy bark requires walls thick enough to show the character of the bark. Sometimes, removal of the bark enhances the style. Many turn everything thin and the end result can be very pleasing. However sometimes technical skill interferes with aesthetics.

WHAT DOES THE INSIDE LOOK LIKE

Remove work from centers and loosely mount tenon in a chuck. Bring the tailstock to bear in the center of where the spur drive was and tighten chuck lightly. Rotate to check if it turns true. Adjust as needed, tighten chuck securely, tighten tailstock, use light cuts to turn body to true. Flatten area from 1 inch of outer edge to center of the work to a depth of approximately one inch. Drill whole 1⁄2 inch diameter to a depth of 1⁄2 the thickness of the main body. Later, the whole depth can be extended as needed. Begin by removing a cone- shaped waste area at center. For the next cut, just move out for another pass stopping just before the bottom of cone cut. Continue step cuts ending short of the previous cuts to one inch from outer diameter (OD). Repeat process. There should be a reveal about one and one half inches deep out to near the OD. Mentally establish wall thickness and prepare for three adjacent cuts paralleling the outer surface of the vessel. Carefully watch the cut being made and the outside surface lines should be parallel. Adjust the cut as needed. Remember the bevel is the cutting line. Stop before bottoming out. Second cut is the second chance to get it right. Proceed with parallel cut to outside, stop short. Last cut and finish cut. Bevel should be parallel to both the outside face and the previous cut (that was done perfectly). At bottom pare off to right. Repeat. At each side junction blend the two surfaces with very light sheer scrape before next step. Repeat, repeat....Do it right the first time because the walls will be too unstable for a late pass. Carefully watch the depth. Don't make a funnel. Sand to 120.

"SU PRISE! SU PRISE!"

7 x 7 Sweetgum

Turning the outside has already exposed some of the inner features. As the inside is turned, things will be further revealed. I have found insulators, nails, wire, bullets (several in one blank) , hard knots, punkie spots, bright colors, unusual grain, bark inclusions, cracks and rocks. Sometimes these things cause the piece to be sadly discarded but mostly they just become "design opportunities" sometimes leading to an unusual or even spectacular turning." A natural edge blank is like a box of chocolates, the contents are unknown until it is opened," FORREST GUMP.

FINISH NOW OR LATER

With natural edge vessels the answer is easier than with formal vessels. Things with irregular- shaped openings may warp, twist or even crack (ouch) without notice and of no consequence. Therefore, many species may be finished without delay. Mesquite burls of any kind will yield best results. Some others do well particularly turned thin and allowed to set in a paper bag for a week or more after finished. Straight grain pecan turned moderately thin outside the pith is great both as bark edge and formal. Many turners “twice turn” by leaving the walls thick enough to dry, warp and be turned to their final shape. A multitude of drying methods are used; home-made kiln, paper bag, burred in a box of its shavings, lacquer soaked + bag and many other methods. Ask most any turner and a different idea is presented. For impatient people, such as I, the one turn to finished is worth the risk of losing the piece in the name of patience and time saved.

WHAT IS IT? WHY?

It is thin- walled because the shape and wood looked good and I wanted a test of skill.
The heavy bark was interesting and a heavy, thick body presented some challenges and the blank was big so the bowl is big.
It looks like that because of a fantasy, the other one was just for fun.
It is artistic and I wanted the tree to have a new life.
This bunch is functional. BECAUSE; my grandmother made wonderful, love- filled biscuits in a bread bowl and salad tasted better served in wood. Glass and metal have no character. I like wood. The vessels are because I am.
Bases big or small I love them all. Bases lift the turning up from the surface and cause the eye to see the whole vessel. Rocking bowls have no base and novelty swing and sway. The French showed us that tall lidded vessels are very nice and quite elegant.
Whatever the size, style, shape or form, if it pleases you, then; it is correct. It is nice to please others and *YOURSELF*. It is your creation collaborating with nature however you perceive that entity.

A BAD DAY AT TURNING IS BETTER THAN A GOOD DAY AT WORK !!!!!!!!!!!!!!!!

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Jim Tanksley

Turning Big Natural Edge Mesquite Bowls

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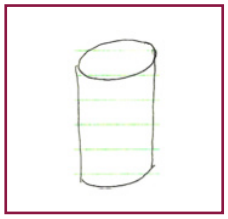
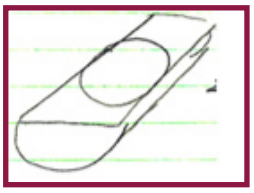
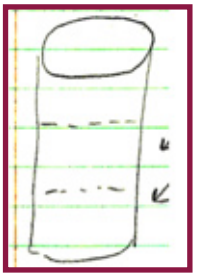
1. Cut the log.
   a. Determine if you are going to cut up the log for side grain turning or end grain turning.
   b. Side grain cut the log in sections with the max being about 4 inchs longer than your lathe will turn.



Split the log in half. Use templates (disk) made from plywood or plastic to determine size.



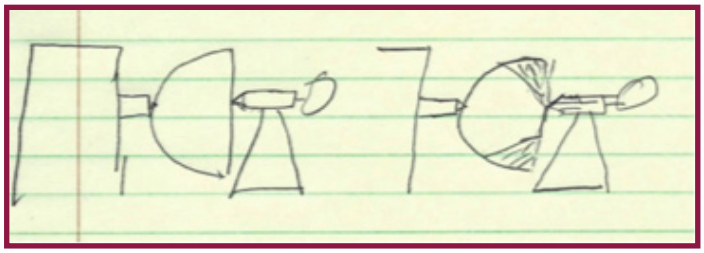


c. End grain the diameter of the log determines the max size of the bowl, cut the sections into lengths from 8 inches to 12 inches.

2. Seal ends with anchor seal immediately. Spray with insecticide to prevent bores
3. Prepare the wood for the lathe
   a. Side Grain Bowls- use the bandsaw and cut the half log into a circle, lay the flat part down when cut ting.
      i. Re-seal the ends with anchor seal
      ii. Side Grain – take a forester bit and drill through the bark on the curved side to allow the spur drive to seat into solid wood. Mark the flat side turning location at the point where the bark side is perpen dicular to the ways.

   b. End grain – mark the turning point on both ends and drive your dead center or spur drive in with a rub-ber hammer.

4. Turning the Bowl
   a. Side grain bowls- face the barkside towards the headstock.



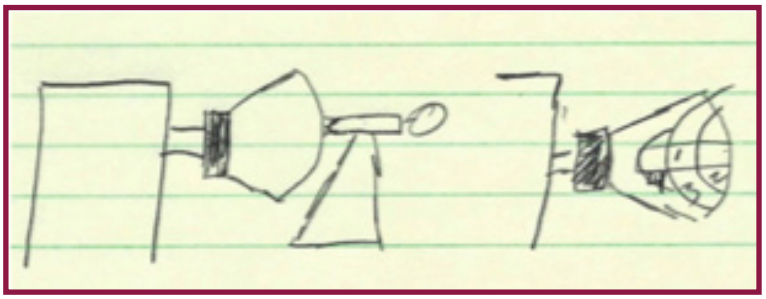
b. Begin shaping the bowl from the tailstock towards the headstock with a bowl gouge
   i. Practice your cut from beginning to end making sure you are shifting your body and not free handing your cuts
   ii. Remember your ***ABC***s – ***A***nchor the gouge, ride the ***B***evel, ***C***ut-keep the flute closed so you don't get a catch

c. End grain bowls are the same as spindle turning. You cut from the top towards the bottom. Mesquite is very forgiving though, you can really cut either direction. Be careful with the top edge bark, always cut towards the bottom.

d. Turn a tendon for your chuck. Be sure the top of the jaws are square with the wood and the tendon doesn't bottom out. Depending on your chuck you may have to taper the tendon.

e. Reverse the wood on the lathe and put in chuck.

f. Start hollowing out the bowl. If it is side grain your cuts should be from the outside towards the center. If it is end grain cut from the center towards the outside edge. Depending on the depth of the bowl you may want to drill a hole in the center within a ½ inch of the bottom. Continue your cuts in a step fashion. Once you get to the wall thickness you want at the top make your final cut and don't go back. Feather each section as you take your final cuts. I use a bowl gouge with 40-degree angle grind for the sides and 60-degree angle for the bottoms. Use a scraper with a negative rake to avoid catches.



g. Reverse the bowl and use a jam chuck or vacuum chuck. Use the center point, which was estab lished when you started out turning between centers, to align the live center in the tailstock. Tighten firm but don't over do it. The bowl should turn close to true, if not re-adjust. Take your time and include a ring or two to sign your piece.

This document is intended to be high level instruction to provide a understanding of the process, suggest taking a lesson or at least spending a day with an experienced turner when you try your first big natural edge mesquite bowl. Remember woodturning can be dangerous always wear gloves, eye protection, make sure the lathe is on a low speed when starting, don't wear long sleeves, use dust protection, etc. Practice at your own risk, no liability to author. Have fun turning

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SEGMENTED WOODTURNING

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MATHEMATICAL FORMULAS AND CONCEPTS:

A circle contains 360°
Circumference = Diameter x π(3.1416)
Diameter = Circumference ⁄π(3.1416)
Segment length = Circumference⁄Number of segments
Segment Angle = 360⁄(2 x the Number of segments)
Number of required segments = Circumference⁄Segment length
(Number of segments x Segment length)⁄π(3.1416) = Diameter

CALCULATING COMPOUND MITERS:

Most angles for compound mitering are more easily found in charts, but for those with an interest…
(Using a calculator with trig functions)
Miter Angle (MA) = inverse tan (1 ÷ {cosS • tan[360 ÷ (2N)]})
Blade Angle (BA) = inverse tan (cosMA • tanS)
MA is the miter angle
S is the slope of the vessel (measured from horizontal to side)
BA is the saw blade angle (the bevel cut)
N is the number of staves

CONSTRUCTION OF PLATONIC SOLIDS:

Shape	Miter Angle
Tetrahedron (a form built from four triangles)	54.735°
Hexahedron (a six-sided cube)	45.000°
Octahedron (a form built from eight triangles)	35.264°
Icosahedron (a spherical form built from twenty triangles)	20.905°
Dodecahedron (a spherical form built from twelve pentagons)	31.717°

VESSEL BUILDING BASICS:

1. Before designing the vessel, construct the feature ring and then use its dimensions to determine the vessel's largest diameter.
2. Mill your boards and use board thickness as the ring heights (less 1/16 inch for flattening waste).
3. Create a blueprint overlaying rectangles representing the rings and segment end views.
4. Do the math to determine the segment lengths (diameter X 3.14 divided by the number of segments).
5. Rip boards and cut segments. Start with the widest (inside to outside) rings first so leftover material can be reduced for less wide segments. Be sure to mix the source of your segments. Use half-ring technique and assemble rings. Prepare two waste blocks that match the diameters of the top and bottom rings. Use faceplates mounted to waste blocks.

VESSEL BUILDING BASICS: (Continued)

6. Temporarily mount the base ring with hot melt glue.Temporarily mount the base ring with hot melt glue.
7. Install a floating base in the base ring (if diameter is greater that about 3.5”).
8. Remove base ring, protect the floating disc with blue tape, and glue the base ring onto the base waste block.
9. Flatten the base ring.
10. Use centering device and glue ring #2 into place.
11. Glue top ring onto top waste block.
12. Flatten top ring and mount ring adjacent ring.
13. Continue stacking lower and upper rings.
14. Turn exterior of both upper and lower halves. Occasionally hold the halves together in order to examine the profile.
15. Turn the inside to a consistent wall thickness (about .25” to .3”).
16. Glue halves together. Use masking tape barrier to avoid glue squeeze-out contamination on inside during the joining of two halves.
17. Turn off the upper waste block and clean up the last glue joint (inside and outside).
18. Allow the vessel to “cure” for a week before final sanding and applying finish of your choice.
19. Part the vessel from the base waste block, reverse mount, clean up the under side, sign, and finish.

Remember...

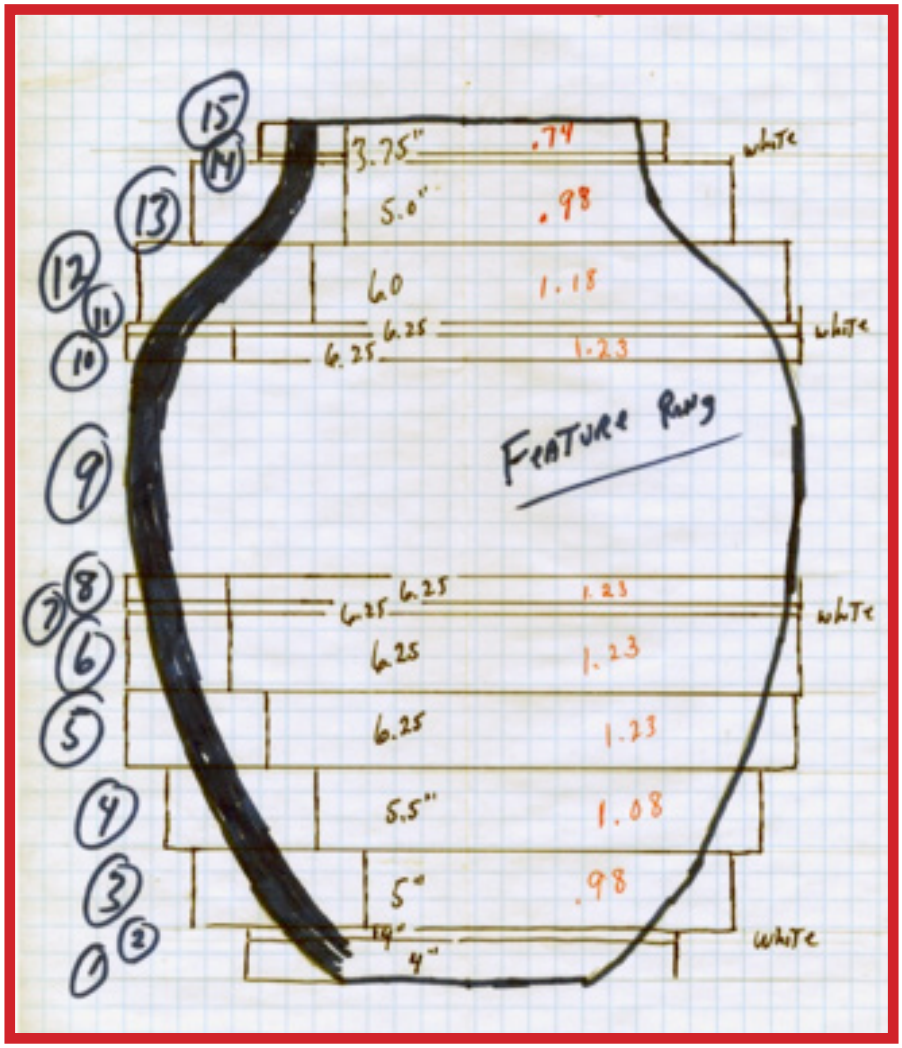
- Use only dry wood (under 10% moisture content).
- Avoid cross-grain intersections longer than 1” of opposing wood grain orientation (shorter if possible).
- Always consider the shape as the most important design element (more important than wood type, color combinations, etc). - Never glue two surfaces together that do not fit perfectly and remember - Do not resort to “filling” a joint imperfection; re-do or replace as necessary. The defect will usually show and you will inevitably regret the lack of perfection later.
- Avoid an abundance of “oily wood to oily wood” glue joints.
- Keep, and inform others to keep your turnings from excessive exposure to direct sunlight.

Ring Number	Ring Diameter	Miter Angle	No. of Segments*	Width of Segments*	Height of Segments*	Length of Wood Segments * Type	Board Length**
1	5.66	18^0	10	1.50	0.40	1.78 ebony	18
2	6.33	18^0	10	1.50	0.13	1.99 holly	20
3	8.83	9^0	20	2.50	0.80	1.39 bubinga	28
4	11.00	9^0	20	2.13	0.80	1.73 bubinga	35
5	12..50	9^0	20	1.69	0.80	1.96 bubinga	39
6	12.75	9^0	20	1.00	0.13	2.00 holly	40
7	12.75	9^0	20	1.00	0.19	2.00 holly	40
Feature	12.75	18^0	10	0.88	1.63	n/a n/a	n/a
9	12.63	9^0	20	1.29	0.19	1.98 ebony	40
10	12.31	9^0	20	1.29	0.13	1.93 holly	39
11	12.00	9^0	20	3.44	0.80	1.89 bubinga	38
12	8.00	9^0	20	2.63	0.80	1.26 bubinga	25
13	4.11	18^0	10	1.00	0.13	1.29 holly	13
14	3.75	18^0	10	0.9.	0.40	1.19 ebony	12

* All figures represent inches.

**Rough estimate based on the length of segments times the number of segments

Sample Blueprint



Checkered Hollow Forms

This technique can be adapted to many sizes and shapes, but the basic procedures remain the same,

1. Select two woods with good contrast (a light color and a dark color). More than two colors will also work if you align the pieces appropriately.
2. Mill an equal number of identically dimensioned strips of each wood. Once again, variations in width will work if they are assembled in the correct order. For your first attempt at this technique, I suggest keeping things simple with just two different woods, milled all the same thickness (very important).
3. Glue together strips into a “cutting board” style lamination. In general, the lamination should be about 3 or 4 times longer than its width.
4. Clean up the lamination.
5. This step is optional. Re-saw the lamination(s) lengthwise and clean them up into identical thinner laminations. If you skip this step, your vessel will just have taller individual layers.

6. Using the final width and thickness of your lamination(s), design a vessel shape. The height of your vessel should be a multiple of your lamination thickness. For example, if your lamination(s) is 1⁄2” thick, your vessel might be 10 layers tall or 5” tall. The width of your lamination will determine the maximum diameter of your design.
7. Use a compass and draw circles on your lamination(s) being very careful to place the point of the compass precisely into the middle seam of your lamination.
8. Using a band saw, cut discs from your lamination(s).
9. Use a compass to transfer diameters from your paper design to the discs.
10. Place double-sided tape on the opposite side of the disc and then using your lathe tailstock’s cone center, position the discs onto a backing plate on your lathe. Be extra careful to position the disc as centered as possible onto the backing plate.
11. Use a thin parting tool to cut individual rings from the disc(s). Place the cut disc onto your design blueprint and confirm that you have the correct outside and inside diameters for each ring. It’s a good idea to label the discs before things become confusing.
12. Using your tailstock’s cone center, glue the base disc onto a waste block. Do the same thing with the top disc onto another waste block.
13. True up these discs and proceed to add more rings. You may want to join two rings together in order to speed up the assembly process. Use a magnifier to inspect the seam intersections. You should only have to focus on the two end grain sides; the other intersections should line up automatically.
14. As you stack laminate the rings into the vessel shape, do a minimum amount of turning. Keep the vessel wall as thick as possible until most of the assembly is completed.
15. Join all rings to form two halves of the vessel. The final seam location is your choice. I usually locate my final seam just above the centerline.
16. Individually turn the outside of each half. Frequently hold the two halves together in order to determine and create the most pleasing profile.
17. Turn the insides creating a consistent wall thickness.
18. Remove the top half from its waste block. A parting tool works.
19. Using your tailstock cone as a centering device, glue the two halves together.
20. Finish turn the outside profile.
21. Apply sanding sealer (or proceed with your favorite finishing process).
22. Scrape sanding sealer off and apply another coat. Repeat as necessary to fill the wood pores.
23. After scraping the last coat of sanding sealer, proceed to sand the vessel.
24. Apply finish coats of your choice.
25. Remove vessel from waste block and finish the underside.
26. Sign your work.
27. Have fun!

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Craig Timmerman

Turning A Sphere

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Tools & Supplies

- Roughing gouge
- Spindle or bowl gouge
- Parting tool
- 3/8 inch Beading and parting tool or flat skew
- Round nose scraper
- Mallet
- Four-jaw chuck
- Live center with removable point (or live center and separate cup center)
- Drive spur
- Masking tape
- Sand paper

Wood

- Two pieces of wood
  — Sphere piece
    - Slightly longer than diameter - suggest 3 inch square, 3.5 inch long, not smaller than 2 inch for first one
    - Must be dry or wood that doesn't move much
    - Harder woods are better
  —Jam chuck
    - Slightly larger in diameter than sphere piece (suggest 3.5 inch square)
    - About same length as sphere piece, but can be shorter
    - Preferably a softer wood than sphere

Process

1. Preparing the wood
   - Turn both pieces of wood to a cylinder
   - Add a tenon on each piece to fit your chuck
2. Marking sphere dimensions
   - Chuck the sphere blank into your four-jaw chuck
     —Re-true the cylinder if needed
     —Mark the length on the cylinder to match the diameter, this is where the the sphere is parted off
     —Mark the center line of the sphere
       - **IMPORTANT**: center line must remain visible until the very end

3. Rounding off the first end
   - Round off half of the cylinder into a semi-circle--doesn't have to be perfect
     —Use your bowl or spindle gouge for this
     —The closer you are, the less work there is in later steps
     —The closer you are the better it will fit in the jam chuck
   - Mark the center point of the end of the sphere with a pencil mark
   - Part off the piece at your length mark

4 Prepare jam chuck
   - Chuck the jam-chuck blank into your chuck
   - Re-true cylinder if needed
     — **IMPORTANT**: Can re-use these jam chucks, but must re-true inside and outside
   - Turn a recess to fit the rounded end of your sphere
     —Use gouge for initial shape, then finish with round-nose scraper
     —Better if this is a "U" shape than a semi-circle
     —Taper the sides – more narrow as you go in, allows you to easily adjust the chuck if you make it too big
     —Want a very snug fit
     —When you test fit the sphere, try to keep the jam chuck edge ¼ inch to 3/8 inch away from center line of sphere
   - When you have your fit, taper the outside of the jam chuck so the edge thickness is about 1/16 inch - 1/8 inch thick
     —Can easily be done with spindle gouge or use drill bit
     —This is used as an ejection hole to pop out a sphere that gets stuck in the jam chuck

5. Jam chuck the rough turned end of the sphere
   - Insert rounded end of sphere piece into jam chuck
     —Be careful to get it centered--use center line as your guide
   - Wrap masking tape around edge of chuck and on sphere
     —The tape holds better if there is less space between chuck edge and the sphere. This is why we tapered the outside of the jam chuck.
     —**NOTE:** Run the tape away from you (wrap it clockwise) so that is won't come off when the lathe spins
     —**IMPORTANT**: The tape is NOT the thing holding the sphere in place. It merely reduces the vibration so it won't shake out as easy. You cannot pad the jam chuck with tissue. If your jam fit is not tight enough, re-turn the jam chuck.

6. Rough turning second half
   - Round off the second end of the sphere into a semi-circle
   - Take light cuts here as you only have the jam fit holding the piece
     —You can bring the tailstock up for support, but take the point out of the live cent
   - Mark the center point of the end of the sphere with a pencil mark

7. Marking the true sphere diameter
   - Take the sphere out of the jam chuck
     —If it is stuck, use your knockout bar to poke through your ejection hole
     —Also can just use a mallet and slight rap the jawed chuck while applying pressure to the sphere. The vibration caused by the mallet will get the sphere out in almost all cases.
     IMPORTANT: Do **NO**T strike the jam chuck! Doing that will knock it off center.
   - Rotate the sphere 180 degrees (grain running perpendicular to lathe bed) and fit sphere back into jam chuck

—It does not have to fit perfectly
—Bring the tailstock up to support it. **IMPORTANT**: Use a cup center or remove the point from your live center.

- Draw a line between the center "points"
- With a parting tool, cut a groove on the line you just drew.
  —Cut the groove until the groove is a continuous circle around the sphere
  —**NOTE:** If you want a sphere of a very specific size, cut the groove until the depth reached is the diameter you want the sphere to be.
- Color in the groove with a pencil—**IMPORTANT**: Don't forget this step**!**

8. Smooth one half of the sphere

- Re-chuck the sphere in the original direction (grain/groove running parallel with bed)
- Make sure the piece is centered as best you can
- Tape the piece in place with masking tape
- Use the beading and parting tool to scrape the sphere down to the groove
  —Tips on using the beading and parting tool
    - Sharpen only on one side
    - Burr created does all the cutting, but only lasts 15-20 seconds
    - Sharpen often—especially with wood that likes to tear out!
    - Take light cuts
    - Tool rest height should be set to cut with the cutting edge right at the center
- Stop the lathe often to check on progress
- When the pencil mark disappears you are done with that section
  —If you have pencil mark showing on one side, but not the other, keep turning until it is gone on both sides.
    - This will happen if you don't get sphere centered in the chuck
    - Don't worry, it won't affect the final sphere
  —**IMPORTANT:** Do not cut anymore once the pencil mark is gone. Mark that area off with a pencil mark so you don't touch it again.
- Do **NOT** turn the center line away
- When pencil mark is gone or nearly gone on the entire half, sand that side
    - **IMPORTANT**: Keep the sandpaper moving!

9. Smooth second half of sphere

- Remove sphere from chuck
- Re-chuck with finished side in the chuck
    - Depending on how good your rough semi-circles were, the sphere may fit without modifying the chuck
    - If have a loose fit, cut the jam chuck back until you get a tight fit

May need to hollow out the chuck more

- Make sure the piece is centered as best you can
- Tape the piece in place with masking tape
- Use the beading and parting tool to scrape the sphere down to the groove
- Your final cuts will be at the center line
    - Remember that you need to round in both directions at the center line
- Sand the second side

Possible problems

- Can't remove sphere from the jam chuck

—Use a mallet to strike the jawed chuck (the metal chuck) while applying pressure to the sphere.
—Use a knockout bar to pop out the sphere through the hole you drilled in your jam chuck

—Carefully cut the jam chuck away
- When complete, the sphere has a “high-spot” at or near the center line

—Often happens when the jam chuck is fitted too close to the center line
—Can also occur when one side sanded more than the other
—Fixes
—Re-chuck again using opposite end of last chucking point
  - Turn the high spot away with the beading and parting tool and then re-sand

—Can possibly rotate the sphere 180 degrees and sand away the high spot
  - This might take multiple re-chucks to fix

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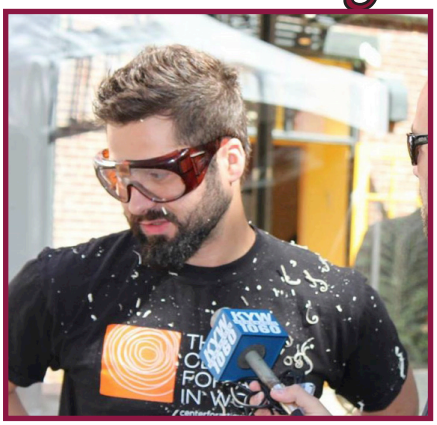

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Brief Primer for Sculptural Turning

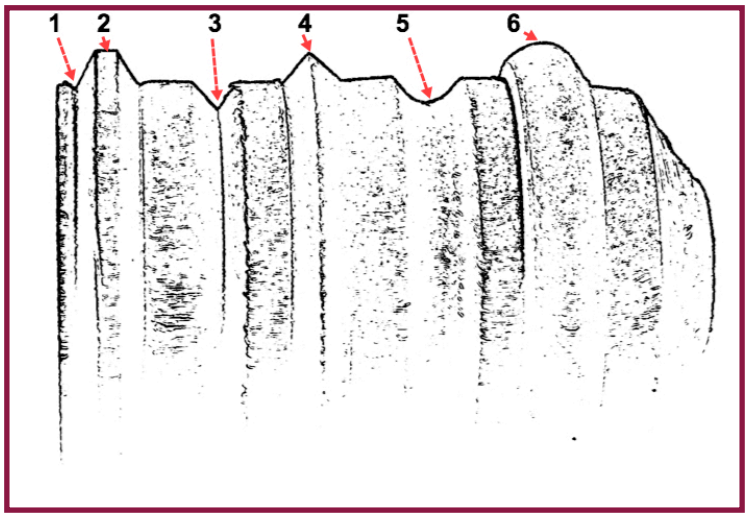
The lathe presents wood workers with a unique tool for shaping their medium of choice. It allows for shapes and textures that would be unlikely to achieve with other traditional wood shaping methods, such as hand tools and power carvers. In many regards, the forms created may prove rare even within the broadest view of sculptural enterprises. In this primer, the strengths of the wood lathe will be examined as well as some technical tips to get someone interested in such an endeavor started.

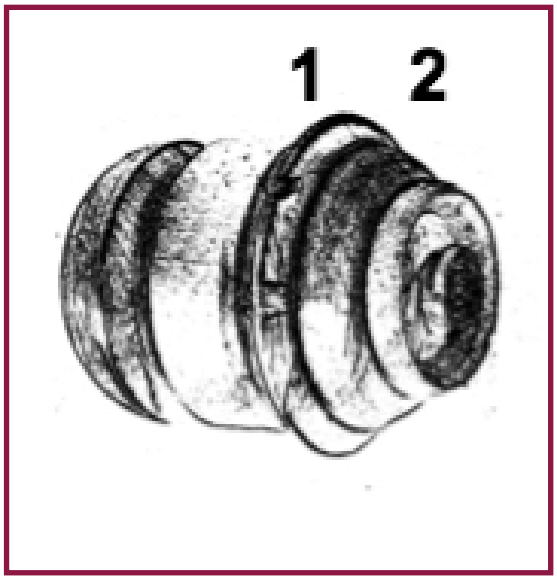
Disclaimer of Sorts: I ask that to all those familiar with traditional turning be patient with the somewhat basic description that follows, as it is my hope to allow one to start rethinking about the machine's processes, as opposed to the products that are a result of them. Please bear with me, and if possible try to forget what a lathe typically makes, and follow me as we reconsider what a lathe can do.

1. The Shapes

When considering the wood lathe's properties for sculptural pursuits, the dominating feature, both visually, and structurally is the circle. The lathe spins wood from a central point, allowing cuts that follow a 360 degree path through space(that is, of course, if the shape of the original stock permits). Whatever profile that is shaped on the lathe, that profile will be carried around the circumference of the turning. The profiles possible are of course endless, but there are some basic iterations of cuts that are worth mentioning. These profiles in this primer will be the basic vocabulary of multi-axis turning that is then built upon. Clearly this is not a comprehensive approach, but one that hopefully can be useful in thinking about the lathe and the shapes it creates.

Here we have a number of cuts, from left to right, a (1) lowered and (2) raised flat, a (3) V cut like a trench, a (4) raised V like a mountain, a (5) U cut like a valley, and a (6) raised U like a hill. Simple profiles to consider and build with.



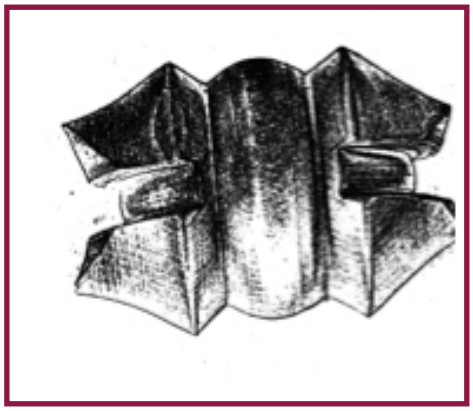


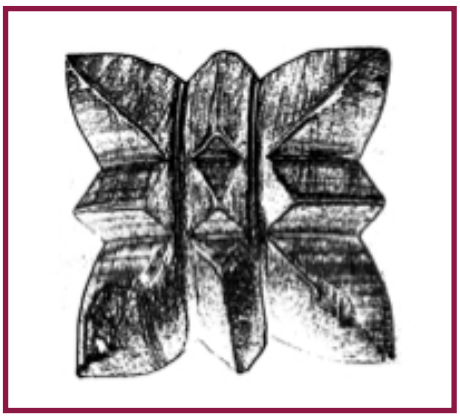
This is an important and somewhat subtle concept to consider when shaping: This is a turning with two raised V cuts, made nearly identical in profile, but (1) was made by engaging the wood while standing parallel to the axis, with the tool at nearly a right angle to the axis, while (2) is the opposite, standing at right angles to the axis with the tool nearly parallel to the axis. Same profile, drastically different results depending on how the cut is made in regards to the axis. In (1) notice how the shape is similar to that of a very fat pizza cutter, while in (2) the shape is somewhat reminiscent in orientation to Stonehenge, if there were no hollows of course.

These profiles can be mixed and matched for varying visual results, all the while with keeping in mind our intention to remount this piece and essentially reuse these profiles from another perspective. Understanding how profiles turn into shapes with the use of the lathe, and that where the profile is made as well as its orientation effects its final shape will help a turner build up the skills to create novel forms with greater control.

2. Interesting Combinations

After a turning has been mounted once on the lathe, and shaped in some significant way, to then become a multi-axis turning the piece must be remounted on a different set of axis. These images following are combinations of the basic cuts described earlier.





This process produces drastically different forms than traditional single centered turning, and these are just a combination of two-axis.

3. The Merits of this Technique

Using a wood lathe as a circular cutting tool can create powerful carved effects. As has now been demonstrated with the previous series of images, striking 3 dimensional surfaces and shapes can be created with multi axis turning, and the forms become even more compelling when the true geometry of the object is considered. Circular forms are the simple foundational quality of lathe based work and a profound tool we can use when trying to stand out or just add to the vast visual expanse of sculpture as a whole. It can be our contribution. Now surely round, truly circular forms exist elsewhere in other mediums, however with some further investigation we may discover what the merits of a wood lathe and the process of turning offer.

If we start with ceramics, wheel thrown objects would be the way one could make circular forms, and while one may be able to do some type of off axis work with some deal of practice and planning, it would be difficult to achieve the crisp, and one could even say indiscriminate cuts of a wood lathe. Unless the lathe is turned down quite slow(and this is an interesting technique in its own right) the lathe will cut circularly, regardless of what shape the object starts with, and other than the profile cut, and the placement of the axis, there is little one can do other than allow the lathe to cut in true circular paths. If we want to build a form out of circular planes with little blending, the wood lathe comes out ahead.

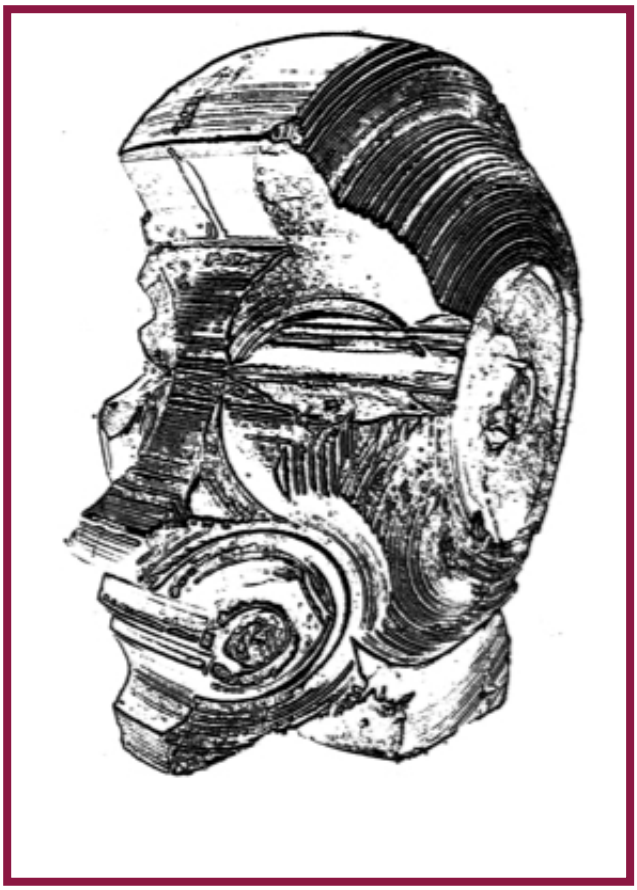
Metal of course can be worked on what is a metal lathe, and due to its rigidity can be worked into any form in a subtractive manner very similar to wood. With that said, it requires a great deal more effort to shape metal in such a way, as well as devising ways to hold the metal, while wood can be very easily moved between centers to allow quicker more expressive forms. The process of multi-axis turning between centers keeps the maker directly engaged in the process. The tool marks, and even rended fibers of the wood can still be visible in the piece, and slight imperfections in the circular cuts can persist, allowing a geometric, yet still living object. While this distinction may seem subtle I feel it is from this particular approach that wooden multi-axis turned sculpture truly shines. A metal lathe could not truly add the human element, while a wood lathe can add slight quirks and imperfections to an otherwise perfectly round shape.

So now we can see that while wood is more rigid and exacting than wheel thrown ceramics, it retains an expressiveness that would not be easily attainable with metal. On a spectrum akin to Goldilocks and the three bears, not too hard, not too soft, but just right. Glass depending on if it were worked hot or cold would fall on either end of this spectrum, but never quite in the sweet spot that wood finds itself in. Of course there are many other materials, but in general wood, or materials of similar workability, worked into shape via multi-axis turning between centers presents novel results.

Now with all of that said I feel any material can be manipulated into nearly any shape, however they will present their own quirks and qualities that should be embraced. In going through other materials/processes it was to hopefully foster a better understanding of our own(wood turning).When the material and process are working together to create results that best suits them, I feel it makes the sculpture stronger for it. And if we can then deal with content appropriate to this (in turnings' case a circle, and the myriad of things that can mean), we have the material, process and subject all working towards the same goal, that being expression, and can create very holistic sculptures that are consistent right down to their bones.

4. A Living Geometry

Now that we have talked about the merits of the technique, as well as the basic building blocks of multi-axis turning, we may now explore it in what I would call descriptive endeavors. In this section I will impart more personal experience and goals as this is the work I am currently making, I apologize for the change in tone.



I think about a wood lathe at times like a filter to re-imagine what I see, or a very strange camera that takes pictures in only arcs and curves. Without the process of multi-axis turning, I would have never created or even envisioned this human likeness, as the process and design are a singular entity. If you consider drawing with a pencil for a moment, the way it interprets or expresses reality even when purely naturalistic, is rather abstract it creates images in gray tones, often consisting of lines that are not truly there, and of course a flat image from what was originally three-dimensional. The same goes for a wood lathe, although unlike a pencil, when we "draw" with the lathe it tends more towards abstracted compromises, and does not have quite the unbounded ability to capture as a pencil to paper as a lathe to open space.

This is an image of a purely turned likeness of a human head, and much like the two axis turnings, this piece is made up of many simple cuts, put in my best effort of the "right" place. By turning a form between centers and using only circular cuts, even the most rigorous naturalism ends up becoming an abstraction. So I say "right" cuts somewhat jokingly, as my only goal was to communicate a human head, and the way it looks is a combination of what I felt important to try and capture, the accuracy of my cuts, and the abstracting limitations of a wood lathe.

I think about a wood lathe at times like a filter to re-imagine what I see, or a very strange camera that takes pictures in only arcs and curves. Without the process of multi-axis turning, I would have never created or even envisioned this human likeness, as the process and design are a singular entity. If you consider drawing with a pencil for a moment, the way it interprets or expresses reality even when purely naturalistic, is rather abstract- it creates images in gray tones, often consisting of lines that are not truly there, and of course a flat image from what was originally 3 dimensional. The same goes for a wood lathe, although unlike a pencil, when we "draw" with the lathe it tends more towards abstracted compromises, and does not have quite the unbounded ability to capture as a pencil to paper as a lathe to open space.

5. Language of the Lathe

This next series of images is an attempt to visually document the thought process behind turning descriptively. When looking at an animal, first see if there are ways to break the animal down to circular shapes. After picking out some starting places that seem like a good area for a lathe to capture, then consider how to bridge the gaps. There is more to turning an animal form than just circles, but also the half circles, arcs, dips, bumps, tapers, spikes and all manner of other shapes that once a turner builds up a vocabulary of shapes with the lathe, a vast language opens up that only the lathe can speak. Once enough hours have been spent practicing shapes and form, the process can become very intuitive, like carving with a chisel, just removing parts that are need removing in order to expose the animal within the block, adding details as needed to help bring it to life.

These turned forms were then carved by hand to add certain details, as well as textured as the multi-axis work can come off the lathe a bit rough at times. Paint was added to further enhance them, but they are far from realistic, the structure built of circular forms, and the lathe's input left on every surface. The abstracted quality is a hamstrung naturalism, and a true collaboration of subject and process.

There are a number of benefits to working this way on the lathe, which may not be readily apparent. Other than the novel visual and structural qualities that have now been talked abut at some length, there are some technique benefits as well.

One of those is the lathe's strength at symmetry, and while the lathe typically makes objects 360 degree symmetrical, multi-axis turning allows for relatively easy bilateral symmetry as well, which is useful for animals and the like. By having centers positioned in a mirrored way on each "side" of the turning, simply by making similar cuts the axis guarantees a consistency to the other mirrored pair or centers. The lathe allows for good freedom of shape, but also measured consistency much better than purely carved by hand in this way.

Another technical benefit is that forms turned on a lathe in this way can be shaped fast and fluidly, giving them an economy of line similar to that of a comic book. The sheer shaping power a lathe offers allows for quick "sketches" that can then be revised and refined, and in the end allow for fast structurally complex forms.

Tips and Tricks

There are always many paths one may travel to reach the same place, and there are a number of ways to turn to achieve good results, and likewise with multi-axis work. These are some simple tips one may use as a starting point to build up their own skill set and procedures.

Safety
When doing multi –axis work, there are times when the work before you feels dangerous, and when risks need to be taken to achieve the desired result, make sure you are aware of what could go wrong. Ideally nothing could, but in reality something always can. Measure your risks, and one way of learning about a multi-axis process is by starting with small pieces of wood, learning the cuts, then building up to more substantial pieces. This will let you practice your form, make design adjustments, build confidence for when there is more wood spinning at high speeds, as well as let you anticipate what could go wrong.
Things to watch out for when turning multi axis work include:

Soundness of Material- When doing multi axis work, at times the speed that can be turned at will be slower than normal turning, and at times can put quite a bit of force across the wood tangentially, make sure that the timber you are using is sound with few checks or cracks. Ideally the wood is freshly cut and still somewhat wet, this allows for strong fibers and easy cuts.

Safe Centers- To turn multi-axis between center one easy place to start is of course with the centers. As opposed to spur centers, or any other mechanical drive centers, I recommend safe centers as pictured. These allow perfectly adequate control with even quite large forms, and allow simple stoppages of the wood from spinning that would otherwise have been catastrophic catches. This can of course be preferred given the frequent non-continuous cuts of multi-axis work.

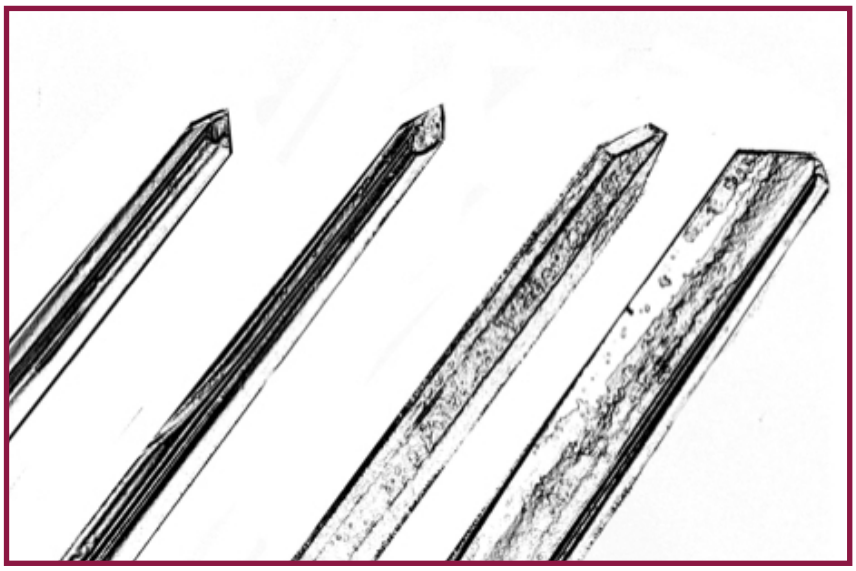
Center Placement and Security- So with the type of centers sorted out for use, we can now determine where best to put our centers. There is a constant balancing out to be dealt with in regards to design and safety. Sometimes where the ideal next set of centers would be placed simply does not lend itself to a safe secure mounting, and at these times design must take a back seat to safe procedures. That being said, pushing what is possible is necessary at times and finding a good balance while understanding the risks can lead to good results. A quick test for secure centers is after they have been tightened on the turning stock, rotate the piece by hand and hit with your hand or a rubber/wood mallet to see if anything gives. Be wary of any short grain, as it can give out to inertia.

Testing Paths of the Turning- While rotating the wood and testing for security of centers, make sure that any asymmetrical parts of the turning will spin clear of the tool rest or any other surface that may be in their path, this is an important step, and easy to forget if not used to out of round stock.

Start Turning-At this point if the lathe is variable speed, which unless you are turning very small objects it absolutely should be, lower the speed to as low as it goes and turn the lathe on. Stand to the side of the piece, as opposed to directly in front of it as you would while turning and slowly bring the speed up to a place you feel comfortable with. The faster the speed of the lathe the cleaner the cuts, but from a shaping perspective, as using the lathe as more or a giant carving tool, it is okay if the surface is a bit rough(and in many ways can actually be used to one's advantage).

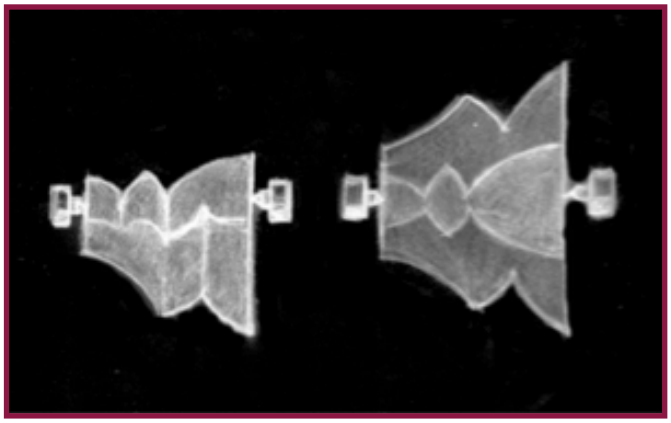
Proper Tools- A good gouge with a steep bevel, and one with a bit more shallow bevel along with a sharp parting tool can do a great deal of the multi-axis work. It is also helpful to have a roughing gouge just to get material removed quickly. Here are Images of the tools recommended, but not necessary. Any tool that is not too 'grabby' so to speak can get the job done. That being said, certain projects might be impossible but the technique can be done with anything.

Knowing what you are cutting- Many times when doing multi axis work, one side will be turned, while the other ideally will remain unscathed. A simple rule to achieve this is by putting centers as far away from the side you want turned as possible. By doing this, it presents the wood you want removed to the cutting tool much sooner, and requires removing a great deal to actually hit the side you don't want to.



That being said, at some points, the margin for error can be quite small and forces you to have a good sense of what both “sides” of the turning are doing. One way to figure this out is by turning the lathe off after just barely cutting the wood to see exactly where you are removing material. This is recommended whenever there is uncertainty (and if the situation is so delicate that even brief cutting could mess up the progress of the piece, you can spin the wood by hand and use a pencil or marker as if it were the tool to gather the information needed).
Another way to gather this information is by a term from here on out referred to as ghosting. Ghosting is watching both profiles of the turned object while the lathe is running. For a visual description, there is a solid looking middle section, which is actually the back profile, and a fainter section that is the profile that you are going to change on that particular set of axis. Sometimes the faint section can be so ethereal as to require colored backdrops (dark/black for lighter materials, and light/white for darker materials). It may also help to try to turn in a place that has little clutter at least behind where you turn, as well as changing eye level to get a better look at what is going on.

This image is of two different versions of the same object ; on the left, the object at rest, held between centers, while the object on the right in the piece with the lathe turned on. The ghosting effect can be seen here, where the edge closer to the center, or top edge creates a more solid looking form as it spins, while the side far from the center, or bottom edge will make what looks like a phantom form around the other visual form created by the top edge.



By cutting into this form, you will only be affecting the side/profile of the turning farthest from the center (bottom edge), until of course you cut into the inner form, which is the top edge profile, at which point the piece is going to be nearly perfectly round wherever the inner form was cut into.(Depending on other axis it could be very far from round, but in fact, but as a rule of thumb that is what normally would happen, as well as what would happen if done to the piece in this image).

6. Textures

We have now gone over many aspects of shaping forms on a wood lathe, but another aspect of any sculpture is the outside surface, or the “skin” of the form. Certainly the lathe is exceptional with enough turning skill in creating pristine surfaces, and that is one option when considering the final look/structure of a piece. However the wood lathe offers many other options, that when the process and material work together, can lead to very interesting textures that would be difficult to reproduce with other means.
As this primer is more geared toward multi-axis turning, and turning descriptively, I will just go over this one texture to consider as it pairs well with animal forms. Multi-axis work sometimes tears grain, or leaves otherwise rough surfaces. At the start I tried removing this roughness from multi-axis forms but have grown fond of the history it tells of the piece, and the maker’s hand so to speak. I try to simply manage the roughness, leaving it in parts, and in some cases try to turn the form rougher yet.

Here is a group of turned forms where the grain has been peeled back in successive cuts, a visual/structural texture that I feel would be nearly impossible with any hand tool. The results vary, but the grain orientation and wetness of the wood play a big part. This texture seems perfect for hair or feathers, and would work well with turned animal forms.

In the end, there is so little that has been done in any field compared to the potential of a near limitless future. I hope this primer is helpful, and leads to new creative endeavors.

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SWAT 2015 EVALUATION FORM (For Demonstrators from Attendees)

Class Title:_____

Demonstrator:_____

Please answer the following questions using a number from 1 to 5 where: 1 is Poor, 2 is Fair, 3 is Average, 4 is Good and 5 is Excellent. Please provide comments in the space provided. You may provide additional comments on the back of this form.

Demonstrator:

The demonstrator is knowledgeable on the topic.	**1 2 3 4 5**
The demonstrator provided a good presentation of the class.	**1 2 3 4 5**
I had ample opportunity to ask questions.	**1 2 3 4 5**
I would recommend the demonstrator for future classes.	**1 2 3 4 5**
I would attend another class with this demonstrator.	**1 2 3 4 5**

Class Content:

The content of the class met my expectations.	**1 2 3 4 5**
The class was a good use of my time.	**1 2 3 4 5**
I will utilize knowledge/skills from this class in my turning.	**1 2 3 4 5**
I would recommend this class to other turners.	**1 2 3 4 5**

Class Logistics:

The equipment was adequate for this class.	**1 2 3 4 5**
The time allotted to this class was adequate for the topic.	**1 2 3 4 5**

Comments:_____

_____

_____

_____ _____

Class Title:_____

Demonstrator:_____

Please answer the following questions using a number from 1 to 5 where: 1 is Poor, 2 is Fair, 3 is Average, 4 is Good and 5 is Excellent. Please provide comments in the space provided. You may provide additional comments on the back of this form.

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Class Content:

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The class was a good use of my time.	**1 2 3 4 5**
I will utilize knowledge/skills from this class in my turning.	**1 2 3 4 5**
I would recommend this class to other turners.	**1 2 3 4 5**

Class Logistics:

The equipment was adequate for this class.	**1 2 3 4 5**
The time allotted to this class was adequate for the topic.	**1 2 3 4 5**

Comments:_____

_____

_____

_____ _____

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SWAT 2015 EVALUATION FORM (Attendees)

Name: _____
Address :_____
City: _____State: _____ ZIP: _____ Phone: _____
Email Address: _____

Return This Form by 10:30 A.M. Sunday to be Eligible for the Drawing

****

Please answer the following questions using a number from **1** to **5** where **1** is Poor, **2** is Fair, **3** is Average, **4** is Good and **5** is Excellent. Provide comments in the space provided. You may provide additional comments on the back of this form. How do you rate Waco as a site for the Symposium? Please consider the city, the distance you traveled, your accommodations and the symposium facilities: **1 2 3 4 5**. Comments? _____ _____
_____

Please rate the demonstrations, consider the range of topics, the quality of the demonstrators and the subject matter, the quality of the audio/video and the number and size of the demonstration rooms: **1 2 3 4 5**. Comments? _____ _____
_____ _____
_____

Please rate the Handbook. Do you prefer a printed version like last year's or a the digital version available this year?
Circle one: **Printed** **Digital** Comments: _____
_____
_____

Please rate the Vendors, consider the number of vendors, products offered, prices and booth appeal and access: **1 2 3 4 5**. Comments: _____
_____

Please rate the meals, consider the lunches, the banquet (if you attended) and the price: **1 2 3 4 5.**
Comments: _____
_____

Please rate the Instant Gallery, please consider the quality and number of pieces displayed, the manner in which they were displayed and the courtesy and helpfulness of the gallery attendants:
1 2 3 4 5. Comments:_____
_____

Please rate the Saturday Banquet and Raffle (if you attended)? Consider the program, the quality of the audio/video, the quality and number of raffle prizes, the 2-for-1 and Gallery raffle items. **1 2 3 4 5.** Comments: _____
_____
_____

Please rate the signs. Were the signs place in appropriate areas? Was the information easy to read and helpful? **1 2 3 4 5**.
Comments: _____
_____

Please rate the ladies activities if you attended. Were the topics of interest and well presented? Comments: _____
_____

How do you rate your overall experience at the 2015 SWATurners Symposium? **1 2 3 4 5**. Comments: _____
_____
_____

Do you plan to join with us for the **25th SWAT Symposium** in 2016? **YES** **NO** Would you recommend it to your friends? **YES** **NO**
If the answer to either question if NO, please tell us why. _____

Note: Name and address information provided above will only be used to notify the winner of the drawing and to create a mailing list for the for the 2016 Symposium in Waco.
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