

TURNING NATURAL AND BARK EDGED BOWLS

Prepared by Lou Pignolet for wood turning course at North House Folk School

Safety : Woodturning is dangerous so always take precautions to use safe practices such as eye protection, dust mask, and face shield. We will go over safety procedures in the class!

Purpose: This document supplements the course. The only way to learn woodturning is to do it and experiment. You can't learn by reading or watching, so dig in and enjoy the action.

1. Selection of wood and bowl shapes. Wood for natural edged bowls comes from logs, branches, or stumps that have their bark or under-bark preserved. There are two types of natural edged bowl shapes from logs, boat shaped and end-grain, shown in the following images.



Boat shaped (black walnut)



end-grain cross section (maple)

Logs that are close to round are best suited to make natural edged "boat shaped" bowls. The most dramatic boat shaped bowls have a thick jagged bark, as shown in the above left image. Logs that are very unsymmetrical are best suited for end-grain bowls where the bark edge shows the natural cross section of the log as illustrated in the above right image. The image below (to the right) shows a top view of this bowl, clearly illustrating the unsymmetrical shape of the log.

End-grain bowls are turned along or parallel to the trunk of the tree so the center of the tree is near the center of the bowl. The part of the tree most suitable for this type of bowl is often near the stump where roots branch out giving dramatic unsymmetrical shapes. The image below is of an end-grain bowl made from an elm tree with an asymmetric shape.



End-grain (elm from Grand Marais library)



Top view of end-grain maple bowl

It is difficult to visualize how the boat shaped bowl emerges from a log. The next photo of a round birch log, a split log, and a boat shaped bowl blank should help to illustrate this.



A round birch log shown whole, split, and cut into a boat-shaped bowl blank

The bowl blank above leads to a boat shaped bowl. The top rim of the bowl can be visualized along the edge of the blank. The boat shaped curvature is a consequence of the round shape of the log. Note that the base of a boat shaped bowl is near the center or core of the tree (but it should not contain the pith) and the top or rim of the bowl is the outer bark. The bowl therefore emerges “sideways” from the tree. The images below show two birch boat-shaped bowls made from a bowl blank similar to the one in the above photo.



Open form boat shaped bowl



Slightly Closed form boat shaped bowl

These images show that there is a wide variety of forms possible, depending on how you shape the bowl while turning from similar bowl blanks.

There are other natural edge bowl shapes possible. If you can visualize a bowl cut from a log or stump, you can turn it. I especially like bowls cut from crotches in trees and from burls. These bowls frequently contain dramatic grain patterns and colors. Chatoyance is also common in such bowls. Chatoyance is the 3D shimmering “cats-eye” effect that is highly desirable. Images of some bowls from crotches and burls are illustrated below.



Birch bowl made from a crotch (end grain)



top view (chatoyant ray in center)



Bowl made from a birch crotch



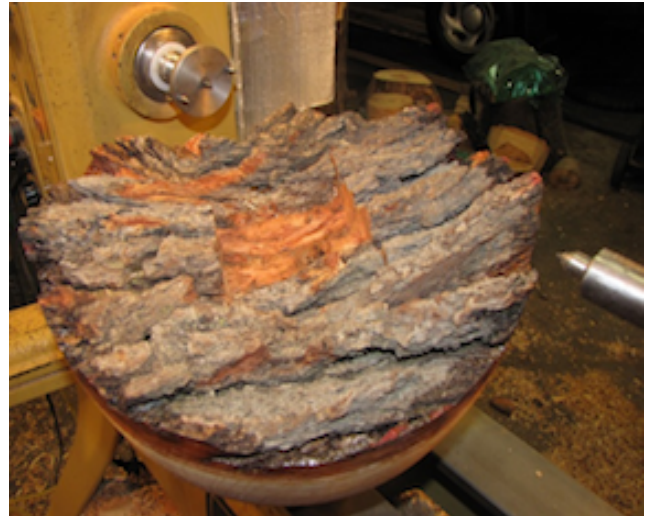
bowl made from a birch burl (lots of chatoyance)

Bark edged bowls can be made from any part of a log, stump, or burl. Let your imagination run wild and don't believe what you read in bowl turning books. Many are far too conservative in this regard. You can turn a bowl from any direction you want in a log. Let the shape of the wood, the grain, and your creativity guide you. One caveat is that some shapes and cut directions lead to less stable bowls, especially when turning green wood. Drying can lead to cracks and checks. There are a lot of tricks to stabilize such bowls during drying. We will deal with this below. I turn most of my bowls from green wood. Turning green wood is easier, and many pre-dried logs will be cracked or checked.

The next section will explain how a bowl emerges from the blank.

2. Cutting a bowl blank and mounting it on the lathe. A bowl blank for a boat-shaped bowl is shown as the right image in the top photo on page 2. I use a chain saw to cut the split log into the blank, but a band saw can also be used. Before cutting I sketch the round bowl shape on the bark side of the split log using a sharpie pen and a drafting compass. The bowl blank is mounted on the lathe with the center of the bark side attached to the headstock of the lathe. Attachment can be achieved using a faceplate, but it is best to use a two-prong drive or an Elio drive.¹ These last two options require use of a rotating drive in the tailstock of the lathe to hold the bowl in place. The following images show how this works.

The photo to the right shows an Elio drive¹ (with three adjustable pointed prongs) attached to the head-stock of the lathe. The prongs of the Elio drive are driven into the center of the thinned-out area of the bowl blank. The blank is also secured with a rotating drive (seen on the right in the photo) attached to the tailstock of the lathe. I have found this the best way to mount a bark edged bowl on a lathe. The three points on the Elio drive and the tail stock rotating drive hold the bowl well and they permit easy adjustment of the orientation of the bowl blank.



An Elio drive¹ ready to attach to a bowl blank

The photos below show the complete set-up of a bowl blank mounted on the lathe using an Elio drive and a rotating tailstock drive. You can easily adjust the position of the bowl blank by moving the point of attachment of the rotating tail stock drive and adjusting the screws on the Elio drive. This adjustment is important because you want the final bowl to have similar height of opposing rim points. We will demonstrate this in the class. The lengths of the three pointed prongs of the Elio drive are individually adjustable, giving maximum flexibility with unsymmetrical bowl blanks. Elio drives are available in three different sizes from Langer Craftworks.¹ A bowl blank secured to the lathe in this way is quite stable and impossible to fly off, except if the blank flies apart due to unstable wood. More on this later, but be aware that some wood can simply split apart while spinning.



Two views of an aspen burl mounted on a lathe using an Elio drive and a rotating tail stock

The next photo shows a boat-shaped bowl blank mounted to a lathe using a faceplate. This bowl blank is ready for turning and no tailstock is needed. The faceplate is attached to the bowl blank using screws. I often use a rotating drive on the tailstock with a faceplate mounted blank to give extra stability.



A birch bowl blank mounted with a faceplate

Faceplate mounting is difficult if the bark is thick or uneven. It is also tedious to adjust the bowl blank once mounted. The Elio drive or a two-prong drive permits easy adjustment (aligning the blank) by simply moving the position of the rotating tailstock.

Mounting an end-grain bowl blank is best accomplished with use of a faceplate. Use a compass to find the *best* center position and secure the faceplate with screws. Try to visualize the final bowl. The center position should be near the center of gravity of the bowl and this can be tricky with wildly unsymmetrical shapes. End-grained bowl blanks are best cut with a chain saw. Determine the approximate height of the bowl you want, add an inch or two, and make two parallel cuts perpendicular to the axis of the log. The following photo shows an end-grain blank with a faceplate ready for attaching to a lathe.



End-grain blank with a faceplate (maple)

3. Turning a boat shaped bowl. The art of turning a bowl on a lathe using gouges, cutters, scrapers, and chisels is best learned by trial and error with some guidance from an experienced wood turner. I tried learning from books, but had most success watching wood turners and by experimenting. The bowl gouge is the easiest tool to use. Experiment with a piece of wood and you will soon see exactly how the gouge cuts best and how to use it as a scraper. The photo to the right shows some typical cutting tools. I recommend a 3/8" and a 1/2 or 5/8" HSS bowl gouge to start.



2 gouges, cutter, and 4 scrapers

Mount the bowl blank using a faceplate, a two-prong drive, or an Elio drive¹ (Fig. 1 below shows a faceplate). Adjust the blank so it is symmetrically positioned relative to the axes of the lathe. You want the top edges of the bowl to have similar height. Cut the profile (outer shape) of the bowl using a gouge (Fig. 2 below). You have free choice with this shape. The shape shown below is the easiest to turn. Cut a foot at the bottom making sure the diameter of the foot will fit into the jaws of a 4-centered chuck (Fig. 3 below). Reverse mount the bowl using the chuck (Fig. 4 below) and hollow out the bowl keeping the thickness as constant as possible (Fig. 5 below). The thickness can be anything you want. I aim for $\frac{1}{4}$ ", but some bowls look and feel nice being thicker, especially ones with thick bark. Sharp tools are a must to get a smooth cut and uniform thickness. I frequently sharpen my tools while turning. We will discuss sharpening techniques during the class.



1. bowl blank on the lathe



2. profile has been cut



3. profile with foot



4. foot held in 4-center chuck



5. hollowed out bowl



6. completed birch bowl

Bowl thickness can be measured with a bowl caliper and it is OK to make the bowl a bit thicker at the bottom, especially if the bowl is relatively thin. This can give the bowl a nicer feel and stability. The in-line skate wheels shown in Fig. 5 above are used to steady the bowl while hollowing and are especially useful with thinner bowls. The bowl-steady shown is made by Oneway² and attaches to the lathe bed. The completed bowl is shown in Fig. 6 above, but if you turn green wood (which I prefer), the bowl must dry for several months before sanding. All bowls turned from green wood will warp while drying (and hopefully not crack or check, see tricks in the last section). Warping is not noticeable in a natural edged bowl since the bowl *naturally* has an unsymmetrical appearance. The bowl-steady is

especially useful for thin bowls, but it sometimes leaves a mark in wet green wood. This mark can be impossible to sand away, so set the bowl-steady with minimal contact pressure!

There are a variety of forms possible with boat-shaped natural edge bowls. I have shown an open form in the example above. Below are shown some other forms.



closed form (maple)



intermediate form (tamarack)



open form (mountain ash)



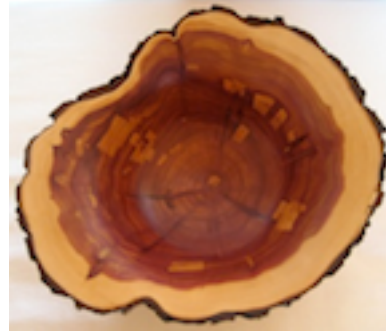
open form (birch)



intermediate form (black walnut)

I let the wood select the form. Try to show off the most dramatic elements of the wood and the bark. Let your imagination go wild. Some forms simply don't work while others are spectacular. You just have to experiment and get a feeling for what works, but never stop trying new forms. You can also vary bowl wall thickness. With thick dramatic bark it sometimes works best to have thick walls, even up to an inch with large bowls.

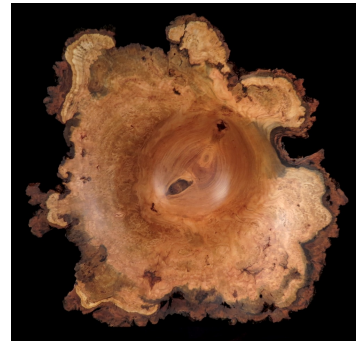
4. Turning an end-grain bowl. The most spectacular bowls are turned end-grain, but you need a piece of wood that lends itself to this type of turning. The most dramatic bowls come from logs or branches that have very irregular shapes, far away from round. I generally use a faceplate to mount the bowl blank since the blank is cut perpendicular to the axis of the log. You can cut nearly straight-in (from the side, perpendicular to the axis of the log) with a bowl gouge to give a rather flat top to the bowl and then curve down to the base. Two examples are shown below. In this case you get a bowl that is not very deep but is nice for showing off the grain and markings in the wood. Note that the center or core (pith) of the tree is near the center of the bowl. I sometimes cut an end-grain bowl with a round log to show off a spectacular grain, but the shape is not so interesting. In Hawaii, where I learned wood turning the trees are often far from round and you will see amazing end-grain bowls that have very unsymmetrical shapes, like petals of a flower.



End-grain bowl with nearly flat top (red cedar)



End-grain bowl with nearly flat top (maple)



End-grain bowl with a more jagged rim turned from a cherry burl

I often turn burls that wrap completely around the log. Such bowls are seldom “round” and give great results.

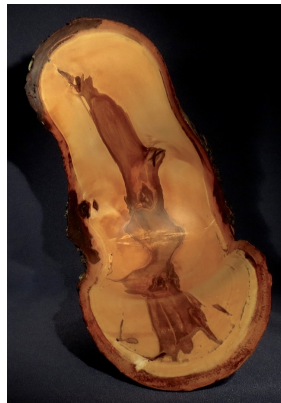
End-grain bowls are more difficult to turn compared with the boat shaped bowls for two reasons. You are turning more “air” (with irregular shaped logs) requiring very steady gouge holding, and you are always turning against the grain. The wood turnings are often more like sawdust than the usual long curled turnings. This requires the use of a dust mask or respirator. The term “turning air” means the time the cutting tool is not in contact with the wood. An extreme example is turning a “wing” form shown below. This requires a lot of experience and good confidence. This piece was cut from a curved birch branch mounted sideways on the lathe. A wing form is best if it also looks like a bowl. This one looks more like a boomerang, and it never sold. I gave it as a gift to a friend. It was my experiment to see

how difficult it is to turn such an extreme shape. Once done, I felt I could tackle any wild shape. A good exercise!



Birch wing form

Crotches in trees can also be turned end-grain as shown below to give a strange looking bowl.



Bowl turned end-grain from a crotch in a birch tree. The crotch is shown in the right image.

These examples show that if you can visualize a bowl when looking at a tree, you can turn it! My favorite wood to turn comes from burls.

5. Turning bowls from burls. Burls provide the most interesting wood grain patterns as well as unusual shapes for bark or natural edged bowls. The photo to the right shows some birch burls of various shape and size. It is important to keep the full size of the burl when cutting it from a tree. A burl can usually be cleanly cut from the bole of a tree with little damage to the tree. I usually study a burl for some time before deciding how to cut a bowl blank. Try to visualize how a bowl will emerge and try to keep the bark or natural edge on the bowl.



Birch burls ready for turning

This bowl was turned from the birch burl on the far left in the photo of the five burls above.



This bowl is shallow and was mounted on the lathe using a faceplate screwed onto the flat bottom of the burl. I cut straight into the side of the burl to preserve the bark and the nice shape of the burl. The foot of the bowl was cut from the round top of the burl. The most interesting grain is usually near the outer part of the burl.

Some burls have odd shapes that present challenges and opportunities for spectacular bowls. The following series of images show some examples. This bowl shows great chatoyance.



Unusual aspen burl and resulting bowl with a spectacular grain figuring



Gnarly maple burl and resulting bowl with spectacular shape

Bowls from solid burls are strong since the grain is randomly oriented, and you don't have to deal with end-grain issues while turning. Burls do present some potential problems. Burls often have hidden voids and rotten spots that can cause a piece to fly apart while turning. Be extra careful with lathe speed, wear a face shield, and stand out of the line of fire while working with burls. See the section on Tips and Tricks for information on stabilizing burls while turning.

Crotches in trees and stumps present similar challenges and opportunities. My philosophy is to look for stressed wood and wood with radical shapes. Stressed wood often shows the most interesting grain with flaming chatoyance. Crotches are often stressed as are severe curves or bends in a branch. Stumps near the roots give the most radical shapes as well as interesting grain and colors. A potential problem with stressed wood is that it may crack while drying, and if you let the wood dry prior to turning, it will most likely crack and not be turnable. Best to turn green wood and learn the tricks to minimize cracking while drying.

6. Tips and tricks in turning and drying natural and bark edged bowls.

Cyanoacrylate glue to stabilize green wood: I generally turn green wood. The advantages are that turning is easier since the moisture provides some lubrication, the bark is still intact, there is less fine dust, and green wood is generally not cracked or checked. The disadvantages are that the turned bowl will warp and sometimes crack during drying, and the bark will sometimes become unattached and even pop off. Since natural edged bowls already appear unsymmetrical, the warping is not noticeable, and you can get interesting distortions. You must use a glue to stabilize the bark and to minimize cracking. The best glue is a cyanoacrylate resin (or superglue). This glue quickly sets up in wet wood and readily soaks into soft wet areas. It also sands well without gumming up the sand paper. You need very thin (low viscosity) glue for this purpose. A good source of this glue is from Starbond.³ I use their EM-02 very thin glue for stabilizing the bark and stabilizing soft areas in wet wood. You will need a lot of this glue so buy the 16 oz quantity. The 16 oz product also comes with extra bottles and very fine replaceable tips. It is good to buy some of the accelerator, which causes instant setting, and also some de-bonder (you will glue your fingers together and the de-bonder will soften the set glue). Acetone also works as a de-bonder. I have studied the chemistry of cyanoacrylate glue. There are different derivatives ranging from the most common methyl or ethyl (cheapest and most irritating to the eyes) to the octyl (strongest and least irritating). The octyl derivative is used for medical purposes and is the most expensive. It is great for sealing up a wound. You can buy a stronger and less irritating butyl derivative, but it is a lot more expensive. I generally use the least expensive and thinnest (Starbond EM-02) for wood hardening and stabilizing, but sometimes use a stronger one for stabilizing problem bark. Starbond lists their products by viscosity, strength, and volatility (irritating to the eyes).

When turning a bark edged bowl using green wood you must apply superglue to the soft wet area (cambium layer) just under the bark. I saturate this area after turning the bowl profile and again on the inside after hollowing out the bowl. Use a lot of glue. Also watch the bowl while drying and if any sign of bark separation occurs, hit it with superglue immediately. The same can be done on small cracks as soon as they appear. The Starbond superglue also comes in black and brown colors. Areas around knots will usually crack while drying and the

black superglue is ideal for stabilizing knots. Use good ventilation while applying superglue as the fumes are irritating and toxic. Be careful not to drip excess superglue on good areas of the bowl. This will cause a stain that may be difficult to sand away later, especially in soft light-colored woods such as bich. If this happens (and it will) a trick to minimize the appearance of a stain is to simply coat the entire bowl or a larger area with a thin coat of superglue. You can apply that with a cloth quickly as the glue will set up as you work. Many people are allergic to superglue fumes during curing. You can buy the much more expensive non-volatile derivatives. I recommend using a fan to blow the fumes away from your face and put on a face shield.

Drying turned bowls: There are several tips for drying a bowl turned from green wood. Cracking is a problem with some woods, especially in the winter when the air is dry. You can minimize cracking by slowing down the drying process or speeding it up. Slow the drying by placing the bowl in a container such as a paper bag or a box with some moisture present for a month or longer. Alternatively, you can paint on an end-grain wood sealer (e.g. Anchorseal 2 from Packard woodworks⁴) and let the bowl sit on a shelf for at least several months. With experience you will learn which wood types cause the most problems and how to deal with each. I find it helpful to check on a bowl often during the first two weeks of the slow drying process. If a small crack appears, I apply a small amount of superglue, hand sand, reapply glue, and sand some more. Filling a small crack with fine sanding dust and thin superglue makes it nearly invisible and stops a crack from spreading. A method for quick drying is to use a microwave oven. Place the bowl in the oven and turn it on high for a 30 seconds or so. Let it cool and repeat until steam formation stops, but be careful since the thicker areas will become very hot and crack. This generally happens in the foot of the bowl. Microwave drying can also produce some interesting warping effects. Experiment with drying methods. Most bowls need several months for slow drying. Thin bows (less than ¼") will dry quicker. I have read about building a small kiln for controlled drying. This probably will work, but the above methods also work with a little observation and experience.

Remember that wood is a natural living material and warping and cracking is a natural process. Some finished bowls will seem fine until they are moved to a different environment such as from Minnesota to a real dry area, and then a crack will appear. Not much can be done to prevent this and such problems depend on the type of wood, stresses in the wood, shape of the bowl, and thickness of the bowl. I tell people to avoid rapid changes in temperature and humidity, and to keep a bowl out of direct sunlight. A crack can also add a special charm to a bowl, especially when *repaired*.

Dealing with a crack in your bowl: You cannot hide a crack in a finished bowl, period. The human eye is very good at seeing a crack no matter how much you try to hide it. So, if your bowl has a crack it is best to incorporate the crack into the design of the bowl. Most often I simply fill the crack with fine wood powder and drip in thin super glue, and sand over it. This shows a sealed smooth dark line where the crack was and often looks good. You can use other colors of wood dust or even powdered stone such as turquoise (available in wood turning catalogs). Fine ground coffee actually works well for a black filler. I have also used a woodburning tool to embellish a crack with a series of small bowtie shaped designs that look like sutures. In Hawaii you will often see this on beautiful bowls, but the master turners

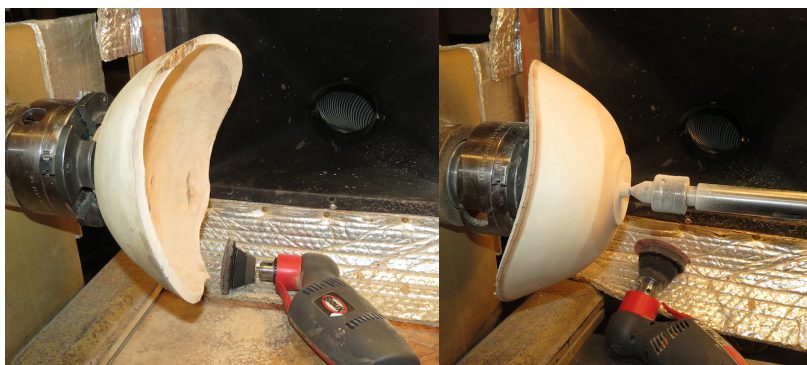
actually rout out small bowtie shaped holes and inlay a darker wood. This looks classy but is very tedious. I have seen advertisements for mini-router bits and bowtie inlays, but have not tried these products.⁵ I have found that burning in the bowties appeals to many people and is easy to do. Another method is to fill the crack with a different material, such as colored stone powder mixed with epoxy. A green malachite color looks nice with dark wood. A variety of products are available for this purpose. A friend drills small holes along both sides of a crack and weaves small tree roots (spruce or fir) or copper wire to suture up the crack. I think that can look really nice. Use your imagination to make the crack look appealing. My philosophy is to avoid unnatural embellishments, thus using dark wood dust (of finely ground coffee) to fill the crack with superglue is my preference.

7. Sanding and Finishing.

Most of my wood bowls are bark edged and unsymmetrical. This makes sanding tricky since you cannot just spin the bowl on a lathe and let the machine do the work for you. Sanding with hand held abrasives as a bowl spins on the lathe causes sanding marks that run across the grain. Sanding pads would also be torn apart as they hit the sharp, not to mention damage to your hand. I seldom sand a bowl while spinning on the lathe. You want the sanding to be as random as possible. I use a rotating reversible power angle drill (45 deg and not 90 deg angle) with a variety of hook and loop pads of varying thickness/softness. It is best to use a 2" pad holder with 3" pads so they bend around curves. It is important to rapidly move the drill randomly around to avoid grooves in the wood. A soft touch is necessary as well. This takes a lot of practice! I typically spend 2 to 3 hours sanding a bark edged bowl and use: 80, 120, 180, 240, 320 and 400 grit sanding disks (Merka Abranet fabric disks work great and they are porous so sanding dust falls away)⁶. With these amazing abrasives you can sand at several thousand RPM with practice. I actually use a pneumatic angle sander that can rotate at 5000 RPM! I want to stress that you must move any rotating sander around rapidly and randomly with a light touch or you will get circular sanding marks or deep grooves. I typically hold a bowl with a chuck on the lathe (power off) while sanding the inside of a bowl. I then reverse mount the bowl using a jamb chuck on the inside and the tailstock on the outside (centered on the foot tenon). I first re-turn away the tenon and make a proper base/foot for the bowl, then sand the outer part of the bowl but again without spinning the bowl with the lathe. The only time I sand using the lathe spinning is near the foot. See the images below of a bowl held on the lathe with a chuck during the sanding and foot returning process. Dust collection during sanding is important. I have a dust collector hood mounted near the bowl while sanding (see image below) and I wear a positive pressure respirator with HEPA filters (for example: TREND AIR/PRO Airshield and Faceshield dust protector or the 3M Versaflo respirator that has the HE filter and pump in a back pack (*top of the line but expensive*)). I also have a ceiling mounted air filter in my shop running during any dust producing procedures.

Images of my Sanding System

Left image shows bowl held by its tenon with a chuck for sanding the inside with a rotary sander. Right image shows bowl held in place via the tailstock against a jamb chuck (cork ring or turned wood piece). I also re-turn and sand near the foot with the lathe spinning. Note the dust collection hood behind the bowl and my angle drill with sanding pad.



I also re-turn and sand near the foot with the lathe spinning. Note the dust collection hood behind the bowl and my angle drill with sanding pad.

Angle drills for sanding: Angle drills for sanding are available at many places. You need one that has a speed of at least 1300 rpm and is reversible. I prefer Milwaukee brand drills but they are expensive (\$200 new and usually around \$70 used). I buy used ones on eBay and wait for a good deal. Much cheaper Chinese models are also available for under \$40. I tried one and only use it for very light sanding, but it works with loud bearing noise. You can buy four of these for the price of one Milwaukee, but they are unlikely to last as long. Sanding disk holders, various pads, and the pad holders are available at all of the wood turning stores.⁴

Finishing the sanded bowl: Everyone has their own preferred finishing process. I use a tung oil finish that I make up with a 50:50 mix of pure tung oil and citrus solvent (orange peel oil), available from the Real Milk Paint Co.⁷ You can also use a commercial tung oil finish such as Minwax brand, but you don't know what drying agents are used and they can be toxic, but if the bowl is not for serving food that would be OK. I apply a generous coat of the oil, let it soak in a few minutes, wipe it off with a soft cloth, let it dry for several days, and resand the entire bowl at 600 grit using an angle drill/soft pad. You can repeat this step is needed (tung oil soaks in and seals inside the wood). I next apply a beeswax/walnut oil paste (I make this myself from local beeswax), wipe it smooth and uniform using a soft cloth, let it dry for a day, and sand with 800 grit fabric abrasive to remove the wax ridges, and finally buff with a lambs wool pad (I use a hook and loop pad and the angle drill). This works for me, but you should try different processes. For example, walnut oil works well in place of the tung oil, spray-on lacquer or poly, try different commercial waxes, etc. Whatever you use will take practice to get it right.

Making a bowl translucent: If you have been to Hawaii and seen the translucent Norfolk and Cook Pine bowls, you have experienced something special and memorable. How do they get such beautiful translucence? There is a process for this, but it will not work with all wood types. Once a bowl is sanded it can be soaked in an oil mix for a week or so. One such mix is 4:1 mixture of clear Danish oil and boiled linseed oil. I currently use just clear Danish oil and it works the same. I have a friend in Sweden who uses mineral oil. This oil soak replaces moisture in the wood with oil, dramatically enhancing translucence. It works great with Norfolk Pine. I have experimented with our local woods. It works with thinly turned aspen, spruce, and light birch wood. It does not work with darker woods or older birch. The key is to use light colored wood that is thinly turned. The oil-soaked bowls must be wiped and

dried for at least several weeks before applying the usual varnish and/or wax finish. It is great fun to experiment with new woods. You never know what will happen.

8. Health and Safety Issues. There are obvious safety issues while turning wood. Any rotating chunk of wood can fly apart or come loose from the lathe and wind up in your face. Avoid high speeds! You do not need high speeds to get a good cut if your tool is sharp. Wear a good polycarbonate face-shield always while turning! Try to stand out of the *line of fire* so if a piece of wood does come loose it will not hit you. Do not let others stand in the area of danger in front of your lathe. Turning and sanding also can cause carpal tunnel problems. I wear shock-absorbing gloves when turning or sanding and try to wedge the turning tools under my armpit to minimize vibrations. Sanding is dangerous due to the fine dust, so wear a good quality N95 dust mask or a positive pressure respirator with HEPA filter (the best are expensive and a bit cumbersome), and have a dust collector with a dust hood running all the time while sanding. Some woods are very toxic (black walnut, yew, spalted wood) and can cause severe problems for your lungs. I used the Trend Airshield positive pressure dust filtering system for several years. It is poorly made and heavy on the head. The filters are also simple cloth bags. This system with extra battery and accessories will cost around \$500. I recently purchased the 3M Versaflo system and although it is expensive (\$1300) it is excellent with real HEPA filters and the air intake with pump in a back pack, away from the dust source. If you are planning to do a lot of wood turning and sanding, I strongly recommend this system to protect your lungs.¹²

9. Equipment, Philosophy, and Resources. There are many woodturning books and catalogs available.⁴ The catalogs are useful when purchasing woodturning products and you will see this is a very big business. You don't need a lot of fancy equipment so don't get caught up in all the hype. A saw for cutting the blanks, a variable speed lathe, several bowl-blank mounting drives, a 4-center chuck with several sets of jaws, a few high speed steel gouges (3/8 and 1/2 or 5/8 inch), a grinder with 80 and 100 - 180 grit wheels, a sharpening jig, and basic sanding supplies will be adequate to give lots of fun turning bark edged bowls. There has been a lot of recent interest in **carbide turning tools**, especially for hollowing out bowls. Students often bring them to my classes, so I have tried them and even purchased a carbide cutting tool for hollowing (round carbide cutter). The carbide tools actually work like scrapers while HSS gouges cut cleaner. Carbide tools are easy to use since catches are less of a problem and the round cutters work well for hollowing. The square cutters remove wood rapidly, but they also tear up the wood. I feel one gets a better cut with a sharp gouge with less grain tearing. Fast wood removal may seem nice but the faster the tool works, the more tearing of end grain is likely. Carbide tools stay sharp longer, but all turning tools gradually get dull and need sharpening. It is actually easy to sharpen the carbide cutters using a 600 grit diamond hone. I typically sharpen my high-speed steel (HSS) gouges often during turning and at least every 10 minutes when turning hard wood, and I sharpen my carbide cutting tools after a week of use.

Here are some **tips on sharpening and shaping your turning tools**. I recommend using a variable speed grinder with 8" grinding wheels. Many are available. I have a Rikon 1hp slow speed grinder I got from Woodturners Wonders.⁸ The new cubic boron nitride

(CBN) wheels⁸ are excellent but expensive. I have one 80 grit and one 180 grit wheel set up with the Oneway Wolverine jig⁹ for my HSS gouges. The Wolverine jig will give your gouge a standard shaped grind. This is the simplest grind that does not have the sides or wings of the gouge shaped back, like in the so-called fingernail grind. Most of my gouges have the standard shape and they can be quickly sharpened very gently with CBN wheels with minimal wear of your gouges. The bevel angle of the gouge can be easily shaped and maintained. I have gouges with 45 to 60 deg bevel angles. The higher angle gouges are best for hollowing the bottom of a bowl. The fingernail or swept back shaped gouges are more complicated to grind and require a special jig (Oneway Varigrind⁹ or Woodcut¹⁰ jigs), or a Tormek sharpening system¹¹. You can buy gouges with this grind but will have to set up the jig to keep the shape. I have several gouges with the fingernail grind. In my class you can try these. This shaped gouge is more aggressive and can remove wood quickly, but is also prone to catches, especially when approaching a ridge. I recommend first learning to use the standard shaped gouge with different bevel angles and learn how to sharpen these. Only after gaining some experience, try a fingernail grind. I have found the fingernail grind works best for classic flat edged bowls, while the standard grind is best for bark edged and unsymmetrical bowls and burls. You do not want to turn more challenging unsymmetrical pieces with the more aggressive fingernail shaped gouges. I turn a lot of end-grain bowls and a fingernail type gouge will catch frequently.

*My wood turning **philosophy** is to get enjoyment and satisfaction from turning a chunk of wood into a beautiful bowl. I love working a piece of wood and feeling somehow connected to this piece of nature, even talking to it so it tells me how to best bring out its beauty. This is alchemy at its finest, and provides amazing relaxation and an escape from the stresses of life.*

References and Notes (footnote numbers are embedded into the text)

It is best to copy the urls and paste then into your browser as all of these links do not work properly.

1. The **Elio drive** is available from the Wood Turning Tool Store at <https://woodturningtoolstore.com/>. There are several sizes. These are the easiest way to mount a bowl blank, permit adjustment of the blank, but require the use of a tailstock.
2. The bowl steady is made by Oneway and available from Packard woodworks at <http://www.packardwoodworks.com/>.
3. Starbond glue web site: <https://www.starbond.com/>
4. Packard Woodworks and Craft Supply are good sources of wood turning products <http://www.packardwoodworks.com/> and <https://www.woodturnerscatalog.com/>
5. Tools for inlaying bowties into a crack in a bowl: <http://www.bigislandengraving.com/>
6. Merka Abranet sanding disks are available from Beaver Tools at the best price. Buy them in quantities of 50. <https://beavertools.com/customer/account/login/>.

7. The Real Milk Paint Company: A great source of non-toxic paints and oils

<https://www.realmilkpaint.com/shop/oils/pure-tung-chinawood/>

8. I purchased my CBN wheels from Woodturners Wonders:

<https://woodturnerswonders.com/>

9. Oneway jigs: <https://oneway.ca/products-category/sharpening-grinding-jigs/Vari-Grind>
and <https://oneway.ca/products-category/sharpening-grinding-jigs/Grinding Jig>

10. Woodcut Trugrind system: <https://www.woodcut-tools.com/>

11. Tormek sharpening system can be purchased from Amazon.com or Ebay

12. The 3M Versaflo dust filtering system is available on Amazon.com and Ebay. Here is the url for the Amazon package: https://www.amazon.com/3M-Personal-Protective-Equipment-51131173781/dp/B007PB4C38/ref=sr_1_3?ie=UTF8&qid=1527967363&sr=8-3&keywords=3m+versaflo&dpID=41EoeyynM7L&preST=_SX342_QL70_&dpSrc=srch