

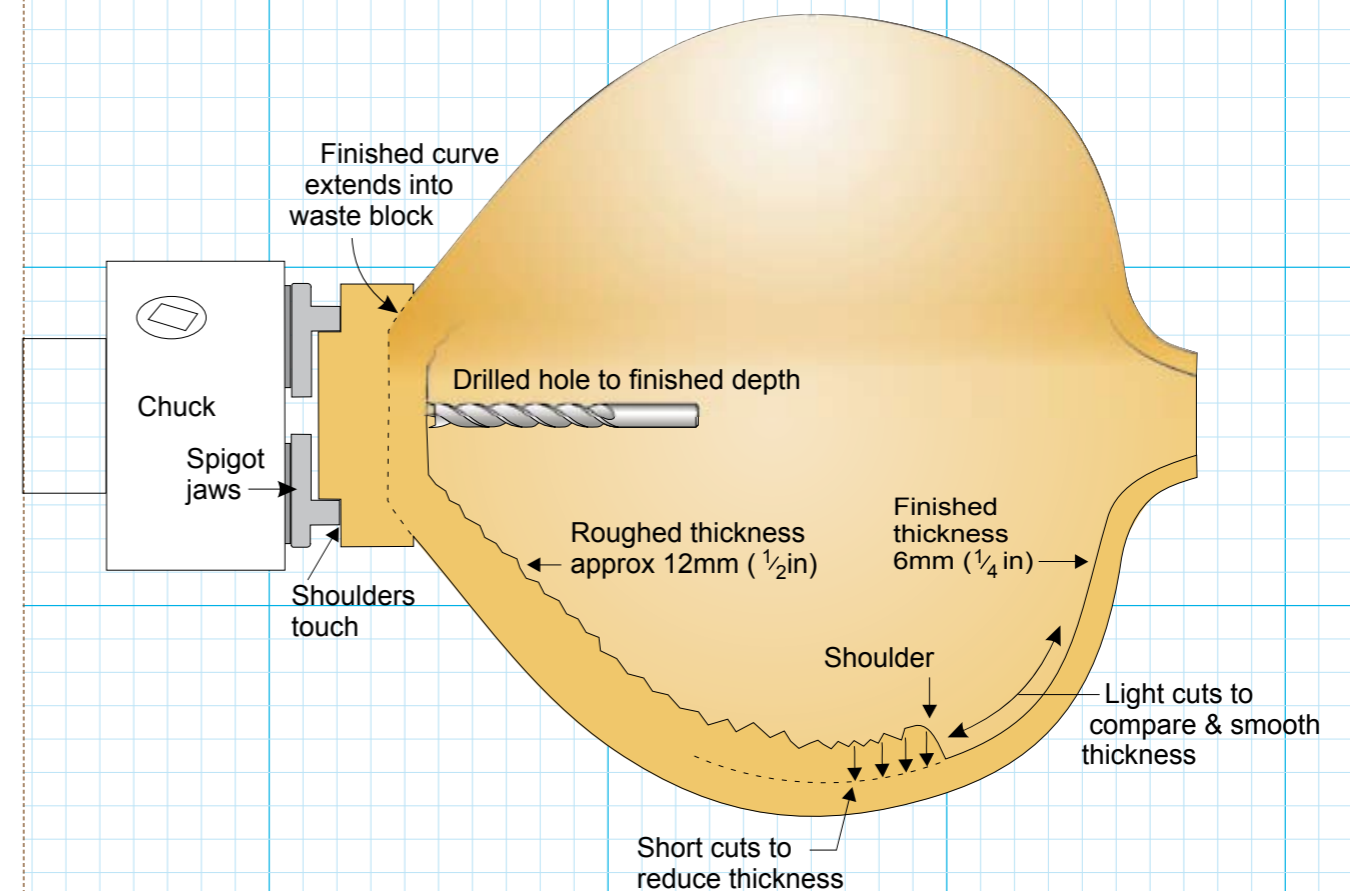
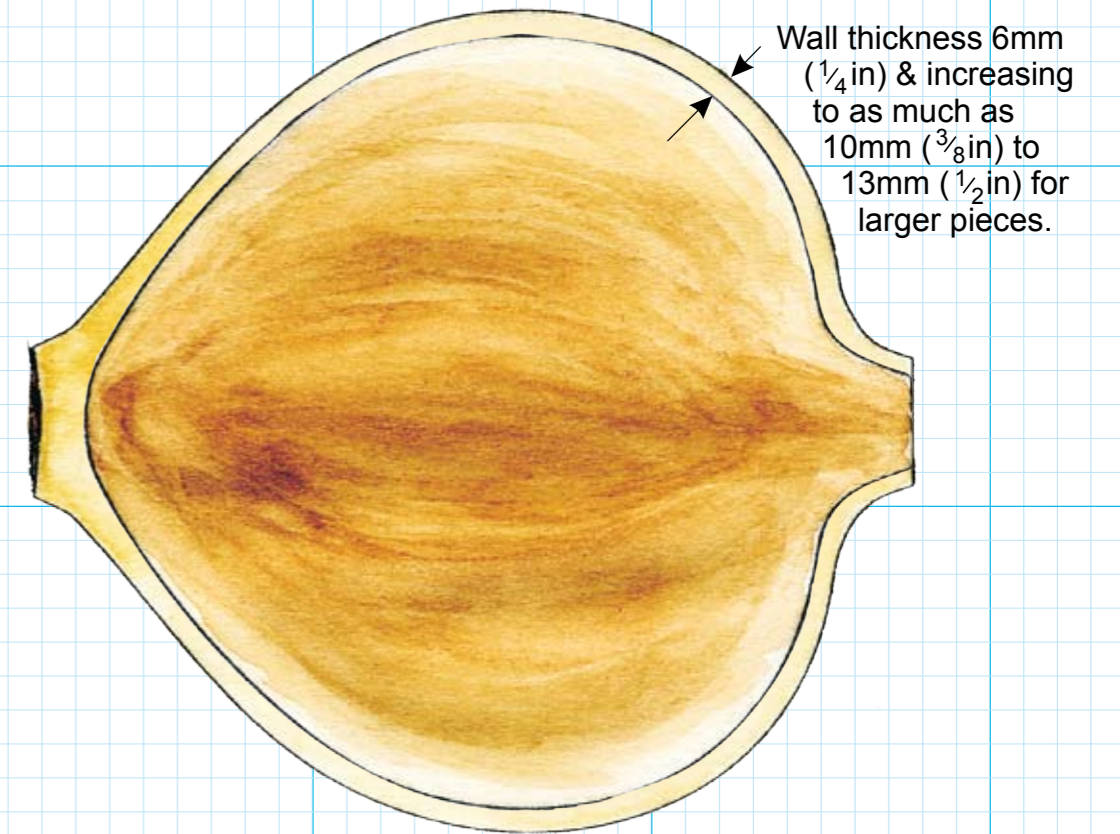
# How to create the perfect hollow form

NEW  
series

This month **John Jordan** shares his secrets on selecting, orientating and cutting green wood to produce hollow turned vessels

The first thing I do each day before I start turning is a bit of lathe maintenance. I polish up the toolrest to ensure the tools move smoothly, spray the bed and moving parts on the toolrest base with lubricant, followed by the spindle threads, then give it a wipe with a paper towel. Often, because the wood is very acidic and wet, I clean and spray the lathe at the end of the day to take care of rust. The simple act of polishing the toolrest and making the parts work smoothly will immediately improve your turning, with no practice or expense required.

## HOLLOW FORM DIMENSIONS



PHOTOGRAPHS COURTESY OF AUTHOR

SHAPING THE HOLLOW FORM



I start the piece by mounting it between centres, which gives me the option of shifting the piece to achieve the best orientation. I can shift either end, or both, to adjust the balance, grain patterns and colour, or to avoid defects etc. I will turn a little, then stop and check the piece and adjust it if needed – a continuation of the process that started with laying out and sawing the log. I use a standard four-prong spur drive and a ballbearing

cup centre in the tailstock, but I also have an extra large, screw-on spur drive for large pieces.

I roughly shape the piece at a modest speed – I rarely turn faster than 1000rpm and I start the rough shaping at around 300-600rpm. I start the process with what will ultimately form the bottom of the piece toward the tailstock end, set the toolrest at a 45° angle and start turning on the corner.

I use a 12mm (1/2in) side-ground bowl gouge to make fairly heavy cuts and aim to go for the basic shape. I turn from small to large diameter on side-grain pieces and large diameter to small for end-grain work. There is not usually a need to turn the piece into a cylinder first, as that can often be wasted effort. After a few shaping cuts, I turn a waste area and rough tenon. This waste area is important as it gives support to the piece while hollowing and allows enough wood to finish the last part of the unturned shape down to the foot.

Many turners make the mistake of putting a tenon right onto the piece without this waste area, then find there is not enough wood where it is needed to continue the finished curve down to the desired foot/base/bottom, as the illustration on page 7 demonstrates. The toolrest is then moved to the top of the piece and the wood is shaped in the same way, working ever closer to the desired shape, regularly stopping and checking the work to look for any defects or checks that were missed. I then re-centre the piece if required and I will sometimes discard the piece if I am not happy with it at this stage. This is not as wasteful as it may seem, as at this point I have very little time invested in it and as much as several days work may be put into a carved or textured piece. It is important for me to feel like the piece is going to turn out to be the best I can possibly create

CREATING THE TENON



For now, the basic shape is all I am looking for. When I feel I am satisfied with the basic shape, I will carefully true the tenon for mounting in the chuck. It is imperative that the tenon/shoulder junction to be cut is clean and square, or even a bit undercut so the shoulder of the chuck jaws will touch the wood shoulder. This shoulder-to-shoulder contact is what provides

resistance to flex and chatter – it is not enough simply to grip a tenon.

On larger pieces (12in upwards) I will usually use a 115mm (4 1/2in) or even a 150mm (6in) faceplate with screws. There is no negative effect to using faceplate/screws, but the new generation of chucks works very well on small-to-medium-scale work. The chuck does add several

inches to the length of the workpiece, so there may be more flex and chatter when hollowing taller or larger pieces.

It is also important that the shoulder on the chuck or faceplate matches up with the shoulder on the lathe spindle to eliminate chatter and to be sure of this I never use a plastic washer under the faceplate. Instead I put a little lubrication on the threads, and snug up the chuck with the wrenches, allowing easy removal when the time comes.

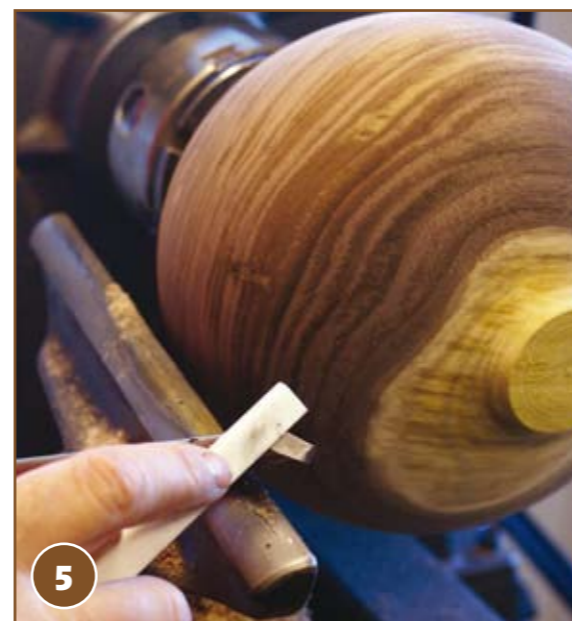
The work is placed into the chuck, ensuring the shoulders are held tightly together so as to create a snug fit. If the piece runs basically true, I will put the key back in the chuck and tighten securely. It also pays to check the tightness a couple of times during the turning process as green wood tends to compress. If you experience excessive chatter at any time, stop and check the chuck to spindle, and chuck to wood tightness

REFINING THE SHAPE



The next stage is the final refinement of the shape. Here, I will make basic bevel-rubbing gouge cuts as needed, then use the long edge of the gouge to shear scrape the surface

**“A light burr, raised on the edge with a fine ceramic slipstone allows me to make the shape nearly perfect and the surface extremely smooth, whilst taking minimum sanding”**



A ceramic slipstone is used to raise a burr on both the gouge and shear scraper. This burr edge allows me to make the shape nearly perfect and the surface extremely smooth, whilst taking minimal sanding. In most cases, it provides a nice surface to draw my layout lines for carving. I spend as much time as needed at this stage, as the elegance of line and form are very important to the success of the finished piece. Sometimes it comes easily, other times it can be a bit more difficult. Taking the piece off the lathe and standing it upright to view can be helpful and sometimes I need to just take a break and come back to it afresh



When it looks about right, I use a double-ended shear scraper of my own design to complete the last bit of subtle shaping/refinement. This tool works just like shear scraping with the gouge, but is more effective



Use a 10mm (3/8in) drill held with a pair of locking pliers and carefully mark the inside depth on the drill with a piece of tape. It is important that this hole is accurate as I do not want to leave too much wood in the bottom, or worse, too little. I use the detail gouge to clean up and shape the opening, then make a small dimple for the drill and push the drill in an inch or two at a time. I pull it out frequently to clear the chips. If it is forced or not cleared of chips it could bind up



HOLLOWING



The hollowing tools I use are 8mm (5/16in) square high speed steel (HSS) cutters with a full radius on the end. These are simply little scrapers that use the burr edge from the grinder to cut. They are large enough to take a nice sized cut but not so large as to get too much cutting edge engaged when working in the shoulder, or deep in the piece.

Too much cutting edge may result in the tool grabbing and thus being hard to control. Most of the best hollow vessel turners I know use the same type tips, even if their tool configuration is different. I do sometimes use a slightly larger (1/4-3/8in) tip in the straight tool when turning side-grain, since it is not used in

the shoulder or tight areas. I never use large teardrop-style scrapers due to the high probability of a catch. I find I get a nice smooth interior surface by using a light touch with a sharp cutter, and the smooth, polished toolrest also helps me to achieve this.

The hooktool works because the tip is close to the centreline of the tool, meaning there is no twist or torque as long as the toolrest is behind the curved portion of the tool – this geometry makes the tool very easy to control.

The curved section of the tool is very slim and shaped to reach into vessels with small openings, which is the type of work I produce



As the inside opens up and if the cutter is nice and sharp, the shavings will be too long to blow out, so they are hooked out with a bent wire. A vacuum can be used

but ensure it is cleaned out after use, as the green wood shavings will mould and the unhealthy mould spores will be blown around next time the vacuum is turned on



The straight tool is tapered on the end and uses the same, or slightly larger cutter as the hooktool version.

There are not any major differences in hollowing end-grain versus side-grain. On end-grain vessels, the hollowing cuts are usually made from the centre to the left, cutting across the end-grain and peeling side-grain, which is the easiest to cut. If the tool is pushed in, it is head-on into the end-grain and can be grabby, particularly as the tool goes deeper. If cutting to the side causes excess flex and chatter, I may need to take light cuts toward the centre as this is along the axis of the lathe.

The piece being worked on here is side-grain and I start cutting toward the centre. Grain direction does not really matter much here and I will cut in any direction that is convenient and feels most natural for me. My first goal is to make some working room inside the piece, and I work to open up the inside 50-75mm (2-3in) with the straight tool, stopping to clear the shavings as needed. Progress is slow at first as there is little room for the shavings, but I can progressively remove more wood as it widens. Shavings are cleared with an air nozzle and compressed air



The cuts are then continued, alternating between the straight and hook tools and working my way down the vessel. As soon as the shavings start to interfere with the cut, I stop and clear them out. If one tool is not reaching the area I am working on easily, I simply switch tools. The wall thickness is kept fairly even and plenty thick enough at this point, although I do thin it out just inside the opening so there is room for the tool to move

REFINING THE INSIDE



To prevent possible checks, it is sometimes helpful to dampen the piece with a wet cloth or spray mist from time to time, particularly when using porous woods that tend to dry on the end-grain faster. Lights, fans, heat and low humidity all add to timber drying too fast. I work quick enough not to need to do it on smaller pieces, but nearly always do it on a major, or large, piece

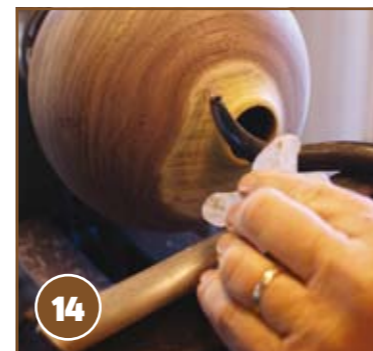
**“It is sometimes helpful to dampen the piece with a wet cloth or spray mist from time to time, particularly when using porous woods”**



For this piece, I want to make the initial or rough wall thickness about 12mm (1/2in), or about twice the finished thickness. This is plenty thick enough and strong so the piece will keep its shape and still be chatter free for the finish cuts. For this, I start at the top of the piece again and make short cuts to the left, stopping around about where I think the thickness will be correct, then swing the tip toward the centre, advancing the tool a little and moving it to the left again, and so on.

After making a few cuts, the tool is lightly moved up and down over the section that was just cut, smoothing and feeling if it is relatively even. With the lathe stopped I check the thickness with my

fingers when they will reach, and callipers when they will not. By completing short sections at a time, there is not much danger of going wrong. Anytime there is any doubt as to where I am cutting, I immediately stop, clean it out and check where I am. A flexible LED light allows me to look inside after blowing it out, but I make no attempt to see inside when turning as I rely on a mental image to know exactly where I am. This process is continued until the hole in the bottom is reached. By getting a relatively smooth and even wall at this point, it is then fairly simple to go down the wall and reduce it by half for a finished thickness of around 6mm (1/4in) in this case



A nice fresh burr is always put on the cutter for the finish cuts and I wipe a block of beeswax along the toolrest, to ensure as little drag as possible. I want to feel the tip cut, not the tool dragging on the rest. These finish cuts will be made with the heel of my left hand lightly resting against the toolrest and the expansion and contraction of my fingers controlling the tool movement, as this is very effective in making short, controlled cuts. The tool is moved down the wall using these short cuts, aiming for the finished thickness and leaving a distinct shoulder at the point the cut stops. I check the thickness with my fingers and if satisfactory and smooth, I now have two references; the shoulder lets me know where to start the next cut and the known thickness gives me something with which to compare the next cuts



I put the tool right on the shoulder, just lift it away and turn the lathe on – a remote switch is really helpful here. I will then make one, two or three short cuts to the left, stopping where I think the thickness should be and then lightly move the tool back over the previous area to compare and see if the cuts blend in with the

known thickness – the rhythm to this is pretty easy to pick up. The shavings are blown out and the thickness is checked. Here, I may take a look with my light, which will allow me to keep the mental picture of where I am. If there is a bump or rough area, I note it relative to the shoulder, making it easy to find and smooth up

HOLLOWING IN STAGES

Each section is finished before moving on to the next and as the piece gets thinned out, it may go a bit out of the round and be flexible, so I try to avoid backing up. When the bottom is reached, a light pass is made across and either blended into the side or stopped, depending on the shape of the piece. Before removing the piece from the chuck, I check the depth with the drill or a depth gauge and mark the outside bottom. The thickness of the bottom is about the same or slightly

more than the wall thickness. The key to a successful hollowing process is to follow this logical, step-by-step approach, finishing each section and then moving on to the next.

The finished thickness can vary, but 6mm (1/4in) to 8mm (5/16in) is a nice thickness for a smooth, sanded or lightly textured piece. That thickness will easily dry without problems and is thick enough to have a mechanical strength that will help it keep its shape and is not so fragile that people are

**“The thickness of the bottom is about the same or slightly more than the wall thickness”**

scared of it. Most of the pieces I make are 10mm (3/8in) or even 12mm (1/2in) to accommodate the deep carving I often do. These thicker pieces are more likely to dry unevenly, so I always put them into a cabinet to moderate the drying

REFINING AND FINISHING THE BOTTOM



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The piece can now be sanded, but I am more likely to wait until it is completely dry because usually I will draw and carve the piece. To turn the bottom, a small tenon is turned on a waste block to fit just inside the opening of the piece and the piece is then pinched between centres. Usually, the mark from rough turning between centres is on the bottom of the piece and so it should therefore be accurately centred



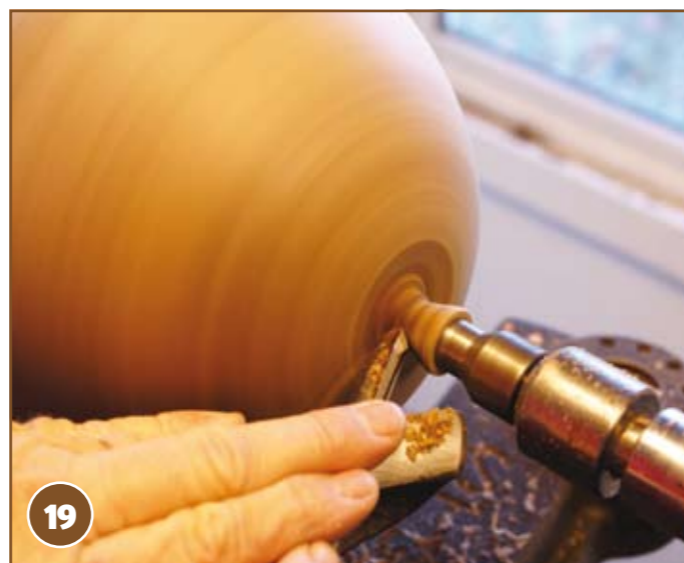
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Having a revolving cup centre with a very small point makes it easy to shift around if needed. The tailstock is tightened with light pressure and friction will drive the piece for removing the excess wood around the base. A small detail gouge is used, taking fairly light cuts and gradually working toward the finished shape, keeping the bottom thickness in mind



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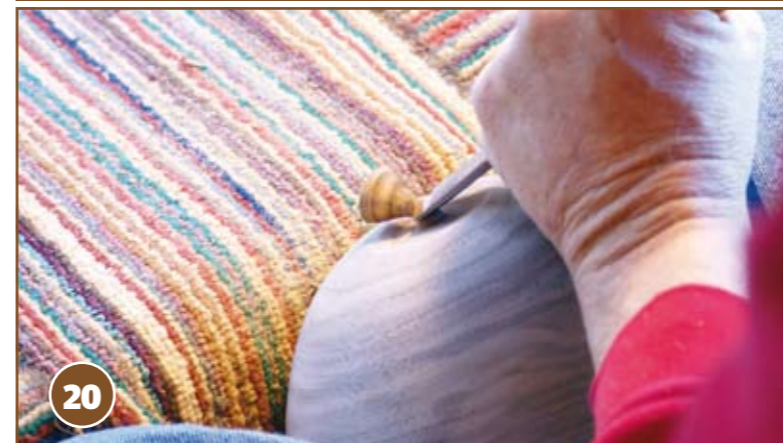
I shear scrape with the gouge and shear scraper to blend in to the curve of the vessel



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Most of the bottoms on my pieces are just a simple concave shape, which I cut with the detail gouge

REMOVING THE NUB



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The nub is turned as small as seems prudent and the remainder pared away with a carving gouge. Later, after the piece is sanded or carved, I flatten the edge of the concave bottom with a sanding block

and usually carve the bottom, leaving the tool marks from the gouge. Sometimes, I will hand-sand it smooth and occasionally use a 25mm (1in) sanding pad in the drill press

FINAL FORM AND FINISHING



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To keep the piece from drying too quickly, I place it in a cabinet with the door closed to moderate the airflow. A few days is all it takes for the piece to dry, larger pieces may take a bit longer. The vessel does need to be dry before I do any heavy carving or there is a possibility it may crack along a deeply carved line. If I want a smooth piece, I will put it back on the lathe the same way I turned the foot, but with a flat revolving centre to keep from marking the bottom. The piece will be

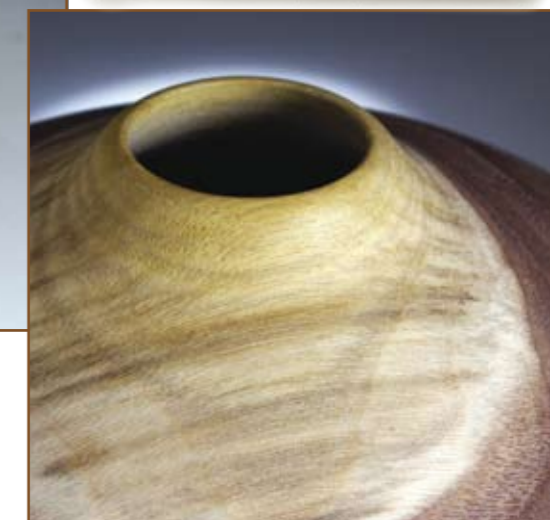
out of round, so the lathe speed therefore needs to be very slow. Sometimes I use an orbital sander instead of remounting the vessel onto the lathe and I will hand-sand as appropriate – 320 grit followed with 0000 steel wool is typical, but can vary depending on the type of wood.

After sanding, I sometimes use an oil finish, but most often use a spray acrylic lacquer/artists fixative. This is a fairly flat finish that can be polished up to any level of sheen

Handy Hints

I use an armbrace handle of my own design, and I find that the Stewart and Robert Sorby handles work in much the same way and are particularly suited to short-bed lathes. Ensure that the lathe is around elbow height at the spindle to get the most out of the armbrace handles. Some people like straight handles and others use some of the various versions of a captured handle. The captured handles or systems are fine and may be helpful to the casual turner, but I prefer hand-held tools most of the time as they are less cumbersome.

As much as possible, simpler is better and I do on occasion use a captured handle on a large piece. Often, these types of handles/systems use a laser as a thickness gauge. Again, there is nothing wrong with this, it works well, but it does add complexity to the turning process. Regardless of the handle type, the hooktool advantages are the same, as is the hollowing process.



NEXT MONTH... John shows us how he adds carving and texture to his hollow forms