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DECEMBER/JANUARY 2010
ISSUE #63

CANADIAN **Woodworking** & HOME IMPROVEMENT

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5 Great
Projects
for the
holiday
season

Build a Beautiful
Sideboard
for your dining room

Add style
to your table
with Hand-made
Chopsticks

Crown
Moulding
for your
Vaulted Ceilings

How to
maintain
Finishes

SPECIALTY PLANES
3 Planes to perform specific tasks

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vtesolin@canadianwoodworking.com

As a studio furniture designer and maker, a lot of what I design cannot help but be influenced by others who have designed furniture before me. When studying to become a designer/maker, I spent many hours studying the work of masters, not self-proclaimed masters, but masters who earned the respect of their peers for their designs and approach to studio furniture. It saddens me when I think that two of these masters are no longer with us; Sam Maloof left us in May and James Krenov passed away this September. Both of these craftsmen had a tremendous influence on me as I studied the art of studio furniture making and they have inspired many woodworkers in their lifetimes.

Sam and James were so prolific that Sam's work appears in places like the Renwick Gallery and James has lent his name to a style of studio furniture simply known as Krenovian. From Sam I learned that organic shapes and flowing curves can make a design appear welcoming and warm. From James I realized that wood is not just another media to work with. His work taught me to slow down and to take the time to thoughtfully bring boards together into a harmonious piece of furniture. My only regret is that I never had the chance to study under these true artists.

In the world of studio furniture makers, there are plenty of makers who call themselves *masters* but these two men truly did master their craft. These craftsmen no longer walk among us but their work and their teachings will live on. So long, Sam and James ... you will not be forgotten.

Vic Tesolin



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Your magazine is SICK!

I have just finished reading the Oct/Nov issue, which I received this morning, and it was excellent. I like your new look. I have every issue of the magazine since it began 10 years ago, and still go back to look at past articles. Regarding your expanded content, I'm glad that you are still a 'woodworking' magazine and that the home improvement projects remain woodworking-based.

BTW:

I just spent a couple of weeks camping with my daughters, so my vocabulary has been 'youth-anized'.

To put it in their terms, "your magazine is sick!"

Mark Eaton

www.simplyrouting.com

Willing to Share

I have just completed reading the latest copy of *Canadian Woodworking*, and the editorial was the most interesting to me. Is your workshop really only 170 sqft? I have a whopping 264 sqft, and have been trying to find a design that would be functional for working in this space for some time. I have searched the net, read magazines and discussed it with friends who are woodworkers. I have incorporated many designs and my own plans but still have not come up with a solution. Would it be possible for you to share some ideas or a sketch of the layout of your shop?

Terry B

Calgary, AB

Terry:

Funny you should ask. I'm in the process of writing an article on the subject of making a small space functional for woodworking. The article will focus on my shop and will include drawings to help illustrate some of my solutions. As well, I will explain why I made some of my decisions regarding tool selection and location. So stay tuned and your questions will be answered soon.

Vic Tesolin, Editor CWHI



A River Runs Through It

by Brian Penning
Baie D'Urfe, QC

This bench is made starting from a single walnut board with a strip of maple marrying the two halves of the board back together. Maloof-style joinery connects the maple legs to the seat and no fasteners were used. A router template was made for the dish bit to follow the maple stripe. I finished this bench with Minwax Antique Oil with a little gloss marine varnish added. It took me approximately 40-50 hours to complete the piece.



Turned Pen

by Jonathan Stopples
Ottawa, ON

Always on the lookout for something unique, I came upon a beautiful Honduras Rosewood Burl pen blank, which is becoming harder and harder to find. I chose a Rhodium and Black Titanium kit to complete the look. It was challenging to turn, but once it was all polished up with CA glue it was clearly worth the effort.

Show your work to the world! Visit canadianwoodworking.com and join our forum!



Correction

We regret that there were a few errors in the chart in last issue's '14" Band Saws' article. The Steel City 50130 band saw is a two-speed saw, not one-speed as indicated in our comparison. The retail price is \$899.99 until end of December with a list price of \$1176.47. The warranty is five years but the granite top has a 10-year warranty. It does not come with a mitre gauge but there is a re-saw guide included with the fence. We apologize for any confusion this has caused.

We made an error in Carl Duguay's web address at the end of Carl's last article (*Streamlined Workbench*, Oct/Nov '09, Issue #62). It should have read 'finewoodworking.ca'.

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Visit steelcitytoolworks.com to find your nearest distributor.



Lee Valley Veritas Joinery Saws

Lee Valley Tools has added to their joinery saw line-up with the recent introduction of the Veritas Small Crosscut Saw and the Veritas Fine-Tooth Dovetail Saw. These two saws join the pre-released Dovetail saw. All saws in this line feature the innovative spine and well shaped bubinga handle featured on the first Dovetail saw. The Fine-tooth Dovetail

Saw is perfect for someone who prefers to work with a fine-tooth saw. This saw comes with a 20 tpi blade that is 9 1/2" long and a 0.020" thick carbon steel blade with 0.003" of set per side. The teeth have a rake angle of 14° and an included angle of 60°. The depth of cut is about 1 9/16". The Fine-Tooth Saw retails for \$69.00.



The Small Crosscut Saw is filed with alternating bevel angles that sever rather than tear wood fibres for clean cuts in cross-grain applications. This saw has a 9 1/4" long, 0.020" thick high-carbon steel blade with 16 tpi set 0.003" per side. The teeth have 15° rake and bevel angles and the depth of cut is about 1 9/16". The Small Crosscut Saw retails for \$69.00.

For those who are interested, the saws can be purchased in two different sets. The set of three saws includes both dovetail saws and the crosscut saw (save \$38 off the individual prices). For those who already own the 14 tpi dovetail, they offer the 16 tpi crosscut and the 20 tpi dovetail saws as a pair (save \$19). For more information on these saws, please visit leevalley.com

Tripair Xylophone Kits



Looking for a great gift idea this year? Why not make some music? Making a xylophone from any of the three kits from Tripair is one of the simplest woodworking projects, if you have the bars. These xylophone bar kits, now available in three scale ranges, with each bar tuned to the required pitch, produce a pleasant musical scale. To help amateur musicians, all bars now come stamped with the corresponding note, such as C, C#, etc.

The stamped bars are made from .075" thick x 1" wide steel, deburred for complete safety, and zinc-plated to keep them looking shiny for years to come. Each kit comes with comprehensive yet simple instructions for making a simple xylophone. The xylophone can be as simple as a plank of wood with the bars evenly spaced and supported with soft foam or felt. Taper the plank for a more purposeful look, or use slender bars of exotic wood for added pizzazz.

Whether you are a grandparent or parent making the xylophone for (or with) your youngster, or looking for a simple project to help initiate your aspiring percussionist to the love of both music and woodworking, nothing could be more ideal.

The kits are available at Lee Valley and come in 8, 13 and 25 note sets that are priced at \$4.95, \$14.50 and \$24.50, respectively. Visit leevalley.com for more information or to order.

New Machines from Craftex

Busy Bee has announced the introduction of three new jointers and two new thickness planers to their Craftex line of machines. All of these machines feature new indexable spiral cutter heads with four rows of German-made carbide tipped inserts. Spiral-type cutter heads produce cleaner, smoother and much quieter cuts versus standard planer knives. The machines also include larger motors than their existing line. The new jointers are available in 6", 8" and 12" models with introductory pricing of \$1049, \$1425 and \$3125, respectively. The jointers also have a parallelogram bed design that ensures table accuracy every time. The new thickness planers are available in 15" and 20" models with introductory prices of \$2025 and \$2925, respectively. The thickness planers both have enclosed cabinets and two speeds to ensure great planing results. These five new tools will be available for purchase by late October, 2009. For detailed information on these new tools, check out busybeetools.ca.





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Specialty Planes

Some hand planes get used faithfully in the shop to do common tasks, but what about those specialty planes designed to do one thing and do it well? Here are three planes that do singular tasks with incredible efficiency.

BY TED BROWN

Scrub Plane

Have you ever wanted to remove a lot of wood in a short time? If so, the scrub plane is the tool for you. Designed to remove large amounts of wood in a hurry, these tools are very sturdy and feature thick irons. If you do not own a jointer machine, you can use a scrub plane as your tool of choice for coarse flattening of boards. The finish is rather rough, so remember that this is for coarse work only, followed then by clean-up using a jack or smoothing plane. Heavier is better in a scrub plane to reduce chatter. These planes usually run about 10 3/4" long, and use a 1 1/2" wide iron.



Simple design – Scrub planes are designed for one purpose only – quick and efficient removal of stock.

Photos by: Brian Hargreaves

The iron is installed bevel down, similar to a smoothing plane, and there is no chip breaker on this tool. The iron is a stout $\frac{3}{16}$ " thick and typically 1 $\frac{1}{2}$ " wide. The leading edge of the iron sports a significant camber with a three-inch radius. The plane body is a rather simple design using a fixed bed rather than an adjustable frog assembly. The mouth is massive by comparison to smoothing planes, allowing thick shavings to pass through without clogging. Iron adjustments are manual. Set the depth of cut by sighting the iron projection with the plane inverted. Clamp the iron in place by tightening the thumbscrew on the lever cap. I often use a tiny Japanese plane hammer to make slight depth adjustments by carefully striking the rear end of the iron. Iron preparation is the same as other plane irons (to refresh yourself with sharpening techniques, see Apr/May '09, Issue #59) with the exception of grinding the three-inch bevel. You will have to incorporate a hand rotation like a windshield wiper motion during grinding to re-establish a clean grind at approximately a three-inch radius. The three-inch radius is a starting point and you may wish to modify it to better suit the type of work you are doing.

To surface a rough plank, first survey the plank for flatness using a four-foot rule over the length to identify high



Flattening boards – One of the primary uses for the scrub plane is flattening and dimensioning rough lumber by hand.

points; mark those with a wide carpenter's pencil. Place the same rule across the plank at several locations to identify raised areas for removal. Clamp the plank on your bench between bench dogs and place shims beneath the warped plank to keep it relatively flat, and to keep it from rocking while you are planing.

Starting at the far end of the plank, make cuts at 30 to 45° to the edge of the plank. Work your way up the plank overlapping successive cuts. Remember that you still have to consider grain direction, so try to plane with the cathedral-shaped patterns on the inside of the plank, the side



Be thorough – Planing in both directions will help to flatten the board quickly and accurately.

of the plank that was innermost on the tree. Conversely, plane against the direction of the cathedral pattern on the outside of the plank.

Change direction and plane perpendicular to the first set of cuts you made. Once you have made a set of plane passes from both directions, survey the new surface with your four-foot rule and continue planing until you have flattened the plank. Once your plank is flat you can refine it further by using a jack or smoothing plane. At this point you should have a plank that is flat enough to be used as a reference surface for a planer or you can continue working it by hand.

Scrub planes are also quite useful for removing the bulk of the waste material when shaping a bevel for a tabletop or for tapering a table leg by hand. If you have large amounts of stock to remove, the scrub plane should be your choice.

Skew Rabbet Plane

Today you may view this tool as a very specialized tool, but a little knowledge about its origins may just change your view of this lovely tool. When we think of a rabbet, most of us think of using it at the back of a cabinet, or as part of a frame. In fact, these tools have a broad variety of uses, cut cleanly, and avoid the noise inherent with motorized routers.



Rabbet away – This plane will keep your router silent while it cuts rabbets in relative silence.

These planes were made of wood in the 1800s, with a large snail-shaped opening on the outside face for lateral shaving ejection. Cutting the sole completely across to accommodate a full-width blade made it challenging to construct wooden

skew rabbet planes. The large cutout forced the designers to bulk up the area above the mouth to keep the toe section from flexing.

Modern iron planes are very strong, and are machined and ground to exacting tolerances. One of the intriguing

aspects of the skew rabbet design is that the 30° skew angle pulls the plane tight against the shoulder of the rabbet as you cut. The planes are fitted with an adjustable fence for the width of the rabbet, and an adjustable shoe to define the depth of the rabbet. As with other rabbet planes, these planes use a scoring spur to reduce tear-out at the intersection of the horizontal and vertical walls of the joint.

The modern planes still use side ejection of the shaving. The side of the blade that runs against the vertical wall of wood is relieved to make up for the skew angle, such that it does not protrude beyond the inside face of the plane. The iron bed is set at a typical bench plane angle of 45°. The Veritas plane is 9 3/4" long and weighs in at 3 1/2 pounds.

The skew in the blade also provides a lower effective attack angle, and a very clean cut. The skew also directs the shaving out laterally, and reduces the

amount of force required to push the tool. Veritas makes this plane in left- and right-hand versions to ensure that you aren't forced to plane against the grain. Another sweet refinement is a spur that is adjustable for depth, and lateral position. If you remove the forward fence post and look into the hole, you will find a screw that will adjust the lateral position of the spur. Just behind the front knob, there is another locking screw. Release the tension on this screw, and then you may rotate the spur for more or less cut depth. Mounted eccentrically on a shaft, the spur adjustment is a nice piece of engineering that works well.

Grind your blade at about 25°, and then micro bevel the leading edge to a couple of degrees higher. Honing and backside polishing are the same as for bench planes – all you need is two stones; a set of 1000 and 4000 grit Japanese water stones.

To set your depth of cut, place the plane on a test piece and lower the blade until it just touches the wood, across its entire width. Adjust the blade laterally until the right side of the blade is flush with the side of the plane. To assist in the lateral adjustment, clamp a block on top of your test board, place the inside face of the plane against the block, and then adjust the blade laterally until it too is flush to the block. Snug the lever cap to hold the blade in place. At this point, you can advance the two blade position setscrews until they just touch the blade. These screws allow you to place the blade in the same lateral position after honing. The key is to get the bottom of the blade parallel to the sole, and the side of the blade parallel to the inside ground face of the plane body. You may now make slight adjustments in the lateral tilt of the blade with the setscrews. To keep the setscrews in place, but not permanently, I suggest using some removable

Compass Plane

Compass planes are fun to use, and make for that matter. Craftsmen have made convex wooden planes for years in a fashion similar to wooden bench planes, with the addition of a convex sole. The sole is typically not a consistent radius, tending to be flatter toward the leading edge of the tool, giving the user some variation in the curvature created. I have made convex wooden compass planes – they are great fun to make and use, but they are limited in use to small variations in the curve you impose on the sole during construction. In this case, however, we will be looking at the metal version of the compass plane, the circular plane.

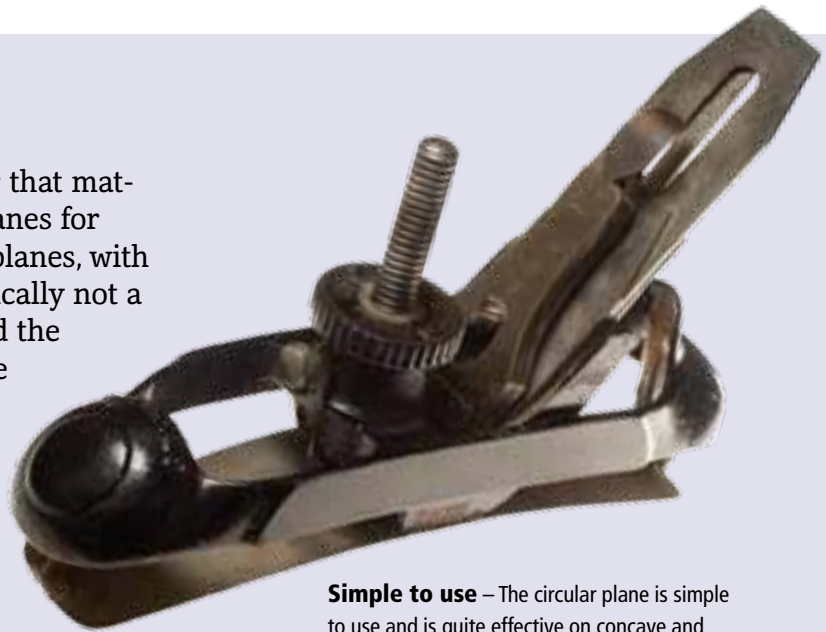
The Stanley #20 (pictured here) and the Stanley #113 are examples of metal circular planes. The advantage of the metal versions is that you can create variable curves in either convex or concave forms. The curve created is a circular radius. The Stanley #20 is about 10" long by 2 1/2" wide and uses a 1 3/4" wide blade.

These are great tools when you need them, but are obviously a specialty plane. Whereas the metal plane is adjustable over a wide range due to its flexible sole, it also suffers from the flexing of said sole. The older planes also used a thin iron, which tends to chatter due to flexing. Nonetheless, if the iron is sharp and

the cut is light, these tools will perform reasonably well.

These are typical metal planes, with a frog angle of 45° and a grind angle of 25°, the same as those used for standard bench planes. The tool uses a cap iron, lever cap, depth of cut hand wheel, and a lateral adjustment lever that is essentially the same as other bench planes.

Adjustment of the sole is an iterative process, but once you have matched the radius of, say, a round table top, the work becomes fun again. Simply unlock the forward thumb-screw, and then adjust the large forward located hand wheel to change the shape of the sole. With the frog attached to the



Simple to use – The circular plane is simple to use and is quite effective on concave and convex surfaces.



☞ **Steady as it goes** – Be sure to check often to ensure that you are planing as close to vertical as possible for good results.

forth on the wood as you gradually increase the depth of cut. Once you have a desirable shaving thickness, tighten your lever cap down to reduce chatter. You want to remove material quickly, but stop short of tearing the fibres. As you approach the final rabbet depth, reduce your blade extension for a finer, cleaner cut. Remember to make the last adjustment in the clockwise direction to eliminate backlash.

As with all hand tools, take care to keep the plane vertical during the cut. If you want to keep the rabbet square to the face of the board, keep that tool absolutely vertical during the cut. Apply some inward force on the fence to keep it flush with the edge of the board. I find it useful to check the rabbet shape just before my last few passes – this allows for some minor correction to the shape of the rabbet that creeps in due to biases applied by the user during planing; yes, it happens to all of us.



Set up – Take the time to set this plane up properly and you will have great success.

screw thread locker to keep the screws from drifting over time.

Back the blade out of the cut slightly using the depth of cut adjuster. Adjust the fence to width and lock the collets. Adjust the shoe for the maximum depth of the rabbet, and you are ready to cut. Move your plane back and



Adjustment – Using the adjusting knob will change the shape of the sole of the plane.



Cleaning a curve – Adjust the plane to take a fine shaving to get good results when working a curve.

sole, it moves up or down in unison with the sole. With the flex in the sole, a small mouth opening, and a thin iron, these tools are not well suited to deep cuts. Keeping the cut light also tends to reduce clogging.

The tool cuts a wide variety of curves for the cost of one plane, but it suffers from chatter, some tearing, and clogging. If you view the tool as a shaping tool, rather than a finishing tool, you will have a better relationship with the circular plane. Remember that we want to plane downhill, or with the grain, so you will have to change directions when the wood objects and begins to tear. If you experience tear out, use a spoke shave, card scraper, or block plane on gentle convex curves to clean up the cut after using your compass plane. The key to obtaining finishing shavings with the compass plane, however, is keeping the cut light, the sole ahead of the blade in contact with the wood, and the iron sharp. I think that a Stanley #20 is the bee's knees when you need it. Try to find a used one for \$100 or less and you will have a tool that is of good value.

These three specialty planes are great additions to any woodworker's tool kit. They allow you to work more efficiently in some cases and provide an alternative to using loud power tools all the time. As with any new tool purchase, try them out on some scraps first before you work on the real thing. Mastering them takes some practice but the reward is well worth it.



TED BROWN
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Marking Gauge



Marking gauges are a basic yet essential shop tool for quickly and accurately marking layout lines on your stock. This marking gauge allows you to mark with a pencil or a pin and, as you will see, is quite simple to make.

BY MARTY SCHLOSSER

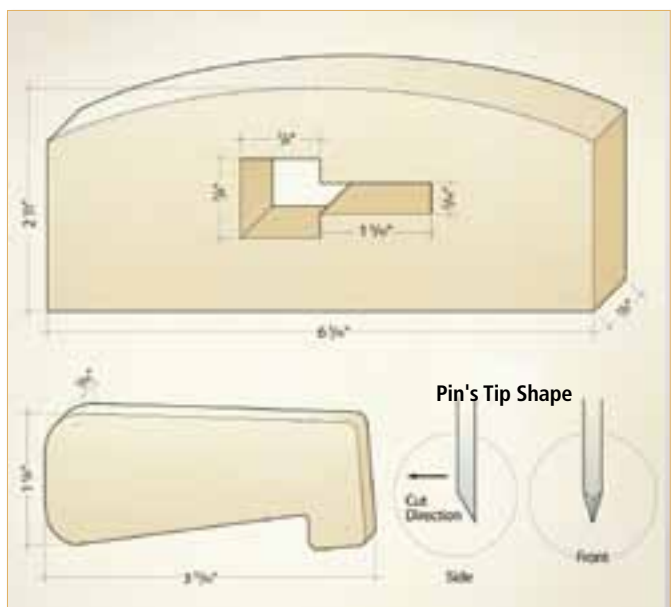
This marking gauge has three main parts: a beam that holds the pin, as well as a pencil, a fence and a beam locking wedge. Although any stable wood could be used, it is important that it is free of checking or knots that could weaken the gauge. I used ash for the beam and padauk for the rest of the gauge because of the beautiful colours and textures of these woods. Besides, these wood scraps had been languishing around the shop collecting dust for ages and I couldn't think of any better use for them than to make myself a functional tool.

Fence

Start by making the fence (A), as it's easier to make the beam (B) to fit the fence's mortise than the other way around. After ripping and planing the fence to its final thickness, leave it oversized until you have finished making the mortises for the beam and wedge (C). Using your mortising method of choice, chop the beam mortise and then the majority of the locking wedge, stopping $\frac{3}{16}$ " short of the far end. Now, using a chisel, carefully cut out the 10° ramp that complements the locking wedge's angled side. As you may have surmised, this ramp enables the locking wedge to seat firmly against both the far side of its mortise and the side of the beam. Clean off any roughness with rasps and files.

Materials List

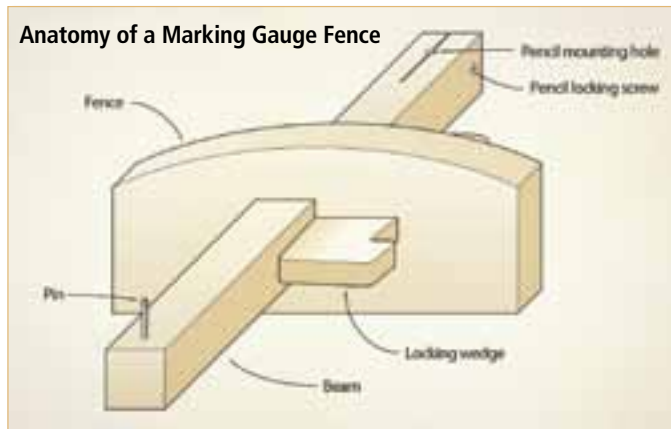
Part		Qty	T	W	L
A	Fence	1	$\frac{3}{4}$	$2\frac{1}{2}$	$6\frac{3}{16}$
B	Beam	1	$\frac{7}{8}$	$\frac{7}{84}$	12
C	Wedge	1	$\frac{5}{16}$	$1\frac{5}{8}$	$3\frac{15}{16}$



A Fortunate Mistake

It is worth mentioning that my original design called for a narrower locking wedge than my final design. This came about because, when machining the fence, I failed to respect the African

Anatomy of a Marking Gauge Fence



padauk's brittleness and splintered the underside quite deeply. Rather than discard the piece and start all over again, I decided to simply widen the mortise. This mistake resulted in my gauge having an unusually wide locking wedge, which I subsequently found to be much more comfortable for holding than other gauges that have narrower wedges. Mistakes can sometimes lead to successes.

Give the top of your fence a nice round arc as shown in the sketch and smooth out the edges sides using rasps and a scraper. Some prefer to leave these areas just as they come off the rasp, so as to make gripping them easier in use.

Beam

Taking your measurements directly from the mortise in your fence, rip the beam, leaving it about $\frac{1}{32}$ " wider and higher. This gives you enough material to make a perfect fit, allowing the beam to slide freely without any hint of sloppiness. Once you are happy with how things fit, turn your attention to the pin and pencil mounting holes. For the pin, simply insert the nail you'll be using as your pin into your drill and slowly drill through the beam, being careful not to split the underside as the nail exits. This produces a perfect-fitting pin that is neither too tight nor too loose.

Sharpen the point of the pin with a fine file, as shown in the drawing, and your pin will cut rather than scrape a clean line. Now that the pin is out of the way, turn your attention to making the pencil



Strike a line – The marking gauge makes it very simple to mark a parallel line.

mounting hole. Most pencils seat firmly in a quarter-inch hole, but measure yours before going ahead and drilling the hole. Then saw the slot and drill the hole for the pencil locking screw. Check to ensure the pencil mounts firmly into place when you tighten the locking screw and make any adjustments necessary.

Locking Wedge

With your beam in place, measure the wedge mortise opening to make sure your measurements are the same as mine. Before cutting the angled face of the wedge, double-check the angle of the ramp area of the mortise, and if it is anything other than the 10° my design calls for, adjust the shape of the locking wedge accordingly. As you had done with the beam, start by making the wedge thicker than its final dimensions calls for, and then finish up with hand tools. All sides of the locking wedge should be quite smooth in order for it to operate easily.

Trial Fit – Then Finish

Do a final trial fitting and smooth out any rough edges that you find unpleasant to the touch. Apply the finish of your choice, be it oil and wax or a top-coat such as polyurethane or varnish. To allow everything to operate smoothly, lightly wax and buff all surfaces. Your new tool is now ready to serve you.

Design Options

The great thing about making your own marking gauge is that you can customize it to best fit your needs. Here are a few ideas:

Rounded beam. Some prefer the underside of their beams to be slightly round. If that is your choice, simply round the underside of the fence beam mortise and the corresponding face of the beam to fit.

Mechanical pencil. You may wish to mount a mechanical pencil in lieu of a wooden pencil as I have done.

More delicately-sized pieces. If you find the fence, beam or locking wedge to be thicker than desired, simply adjust the sizes as you go along. The only caution is regarding the thickness of the fence; ensure it is adequate so there is enough thickness to allow the beam to be held firmly into position and not wiggle during use.

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CHOP STICKS

This hand-made set of chopsticks will make a great non-traditional gift for the sushi-lover on your Christmas list.

BY ROB BROWN

If you're anything like me you're always looking for a simple, unique holiday gift to make for friends and relatives. There are lots of projects that play a Christmas carol, hang on a tree, or involve Santa Claus, but this one does none of those things. Although sushi isn't a Christmas staple (though I think it should be), your gift will transcend the holiday and be enjoyed all year round.

Making chopsticks is a great way to use some of that exotic wood you've been hoarding. With a little planning,

you can use off-cuts from different projects. Dense, non-porous woods work best, with straight grained stock. Hard maple, rosewood, African blackwood and jatoba are some of my favourites. Don't go any softer than black cherry, or the chopsticks will flex while in use and feel like a cheap set of disposable ones. If you really want to get fancy you can laminate a number of species together.

Size and Style of Chopsticks

When settling on a size it's a good idea to have a look at different chopsticks and see how they feel while you use them.

A slight change in length or thickness will affect how they feel in your hands. The chopsticks I make are usually 10" long and start from stock that is just over 1/4" in width and thickness. There are also different styles, depending on the country of origin. Chinese chopsticks are square in cross-section, where they are held, and taper to a round, blunt tip. These are the style I like. Japanese chopsticks are usually shorter than Chinese ones and taper to a pointed tip. There are also slight variations in Vietnamese and Korean chopsticks.

Put Your Hand Tools to Use

This is largely a hand-tool project and you can do it entirely with hand tools if you prefer. I use some power to help break out the stock and bring it to rough size, then turn to hand tools to shape the chopsticks. Joint and plane the stock to just over 1/4" thick, then rip the strips to width on the table saw. From this point forward it's hand tools. Cut the strips to finished length. Draw two lines in a '+' shape on the tip of the chopstick that



Mark your blanks – This step is essential for ensuring that your sticks stay even while shaping.



Shape the tip – Gradually work the tip of the stick down to an octagon shape. Pay close attention to the layout lines to guide you.

divides the end into equal quarters. Extend each line up the side about 2". These lines will give you reference points as you shape the chopsticks. Also put a line about 4" away from the handle end and extend it around all four sides. This line indicates the division between the start of the taper and the square handle end.

Use your block plane to create a tapered chamfer on the four corners of the tip. The tapered chamfer should start just after the 4" line and deepen as it nears the tip. The goal is to end up with an octagon on the end of the chopstick. With the block plane, remove about $\frac{1}{32}$ " of material on each of the eight faces that make up the tip. At this stage the octagon should still be there, and be about $\frac{1}{16}$ " smaller. Take a couple of light passes on the eight edges, slightly reducing the diameter and rounding the tip. While doing this, ensure the '+' is still centered on the tip. By now the lines that extend 2" from the tip have been removed, but the 4" line and the '+' on the end of the tip are both still there. Now that the tapered tip



Simple decorations – Use a sharp knife to adorn your sticks with a simple carved pattern.

is shaped lightly, chamfer the four corners of the handle.

Refine and smooth the shape of the tip and the handle with a sanding block. The cross-section of the tip is round while the cross-section of the handle is mainly square. Ease the sharp edges on both ends and remove the '+'. Finish sand to a fine grit.

Although you could finish here, I like to add a bit of ornamentation to the handle. A sharp knife can be used to create some notches or a piece of contrasting veneer can be inserted into a saw kerf. Even relief carving could be used. Search the Internet for ideas of what you can do to dress your sticks up. You'll be amazed by what you find.

A Place to Rest

Traditionally, the tips of chopsticks sit on a chopstick rest to keep the tips of the chopsticks off the table; the table stays clean and the chopsticks don't pick up anything from the table that eventually makes its way into your mouth. These little objects can be made from just about any small scrap of wood. As for design, as long as the chopsticks will not roll off the rest while in use you have achieved your goal.

A Safe Finish

Because these chopsticks will be coming into contact with food you want a finish that's non-toxic. There are many choices, but I choose 100% pure Tung Oil from Lee Valley. Apply the first coat very liberally. After 30 minutes re-apply the oil to any end grain or other areas that sucked up a lot of the finish.



Jazz it up – Using a thin-kerf handsaw, make some slits at the end of your stick and glue in some contrasting veneer.

Let it dry thoroughly – for some oils that's a day or more. Before you apply each additional coat lightly abrade the surface with 0000 steel wool and apply coats of oil until you're pleased with the finish. Ideally, it's nice to re-apply a coat every year or two to freshen the look and renew stain and water protection, but that will be up to the lucky owner.

With a bit of practice you will be turning out chopsticks by the dozen, all just in time for Christmas. The first pair will take a fair bit of time, but once you get the hang of it they move along pretty smoothly. For a nice presentation you can wrap a strip of hand-made paper around the chopsticks to keep them in pairs. If you want to go that extra mile for someone special, and you have the foresight to start your holiday production line soon enough, make a small box to fit your hand-crafted chopsticks.

ROB BROWN
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Installing Crown Moulding

PART TWO



Sloped ceilings are quite popular in houses – adding crown moulding really adds to the value and the beauty of the home.



Make it easier - Cut patterns used to set up compound mitre cuts at the saw for a ceiling turn.

BY ROGER KNAPP

Unfortunately, many installers do not attempt this part of the moulding project because of the challenges that the sloped ceilings present. In this, part two of the crown moulding series, I will demonstrate how I calculate and install crown moulding on sloped ceilings and vaulted/cathedral ceilings. You will see that the combination of horizontal and vertical turns are not at all difficult and can be achieved with great success.

Let's begin with the tools required. Along with the tools listed in part one (Oct/Nov '09, issue #62), you will need a tall sturdy ladder to safely reach the peak of the ceiling. You will need to reposition your crown stop on your mitre saw so the moulding can be placed right-side up. If you have a shop-built stop, as I used, all you need to do is drill holes to reposition the jig so that the moulding is positioned right side up with the top flange

against the fence and the bottom flange against the stop.

Once you have your crown stop repositioned I recommend you take the time to cut four patterns that you will keep at the saw for reference. Make them about 4" long and use a 20° mitre setting for the cuts. Label them accordingly:

- Vertical surface – right inside
- Vertical surface – left inside
- Vertical surface – right outside
- Vertical surface – left outside

Making use of these patterns will avoid the confusion during the saw set-up for the compound mitre cuts. Woodworkers using a compound mitre saw and cutting the moulding on the flat will also find these patterns indispensable.

Let's look at the differences between the horizontal crowns that were installed in part one of this series and the crown that will be installed on a sloped ceiling. With the horizontal crown we measured the corner of the walls to determine the angle of

Photos by: Roger Knapp Illustrations by: James Provost



Get the numbers right - Example of measuring ceiling slope with angle finder.

the cuts. Now, with a sloped ceiling, it is the ceiling turn or (ceiling corner) that is measured to determine the angle of the cuts. I use the term 'ceiling turn' because I think it best describes the crown changing angle on a vertical wall surface. The ceiling turns can occur as an inside or outside angle and are always measured with an angle finder. Because we are measuring the ceiling turn angle, the cuts are performed with the moulding set right side up in the saw. To make this clearer, take a pair of the patterns you have just cut and hold them together to close the joint and you will see that the bottom flanges are on the same plane.

Standard crown is designed to fit to a wall that has a flat ceiling, and when it is placed to a sloped ceiling there is a large gap where the top flange contacts the ceiling. To correct this, the back of the crown must be reshaped. You need to measure the angle of the sloped ceiling to the wall. Then cut the back of the top flange with a block plane or rasp to create the same angle as the slope. The bottom flange is

never modified, and remember, it is critical to maintain the correct spring angle when the crown is held against the wall. What needs to be noted is that the modified crown rests higher up the wall and the crown depth block cannot be used to locate the position of the lower flange. I find that a short piece of the modified moulding placed against the wall, held at the correct spring angle, can be used to locate the lower flange and then pencil mark the wall.

In the lead photo you can see that I have installed the horizontal moulding and I had the crown turn the corner and run it up the sloped ceiling. This joint is a combination of wall and ceiling turns and is accomplished by cutting and installing a wedge-shaped transition piece between the horizontal and sloped crowns and is performed as follows.

In the illustration I have laid out the pieces. Joint B/B is a typical 90° wall inside corner for the horizontal moulding and is cut upside down on the saw. Now we need to calculate the angle for Joint A/A, which is a ceiling turn for the sloped ceiling moulding and must be cut right-side up on the saw.

Of course, most saws do not have a 74° mark on the mitre saw scale so you subtract 74 from 90 ($90-74=16^\circ$). The reason you subtract 74 from 90 is because both angles are measured from the fence and

you want a reading from the "0" position on the scale. 16° is the mitre setting on the saw.

It seems like a lot of math, but it works. Just make sure you measure the ceiling slope angle accurately in the first step and make the calculations as described and it will work out. The transition piece has no length and must be cut to point. Make the cuts for joint A/A and remember that this is a ceiling turn joint and must be cut in the "right-side up" position.

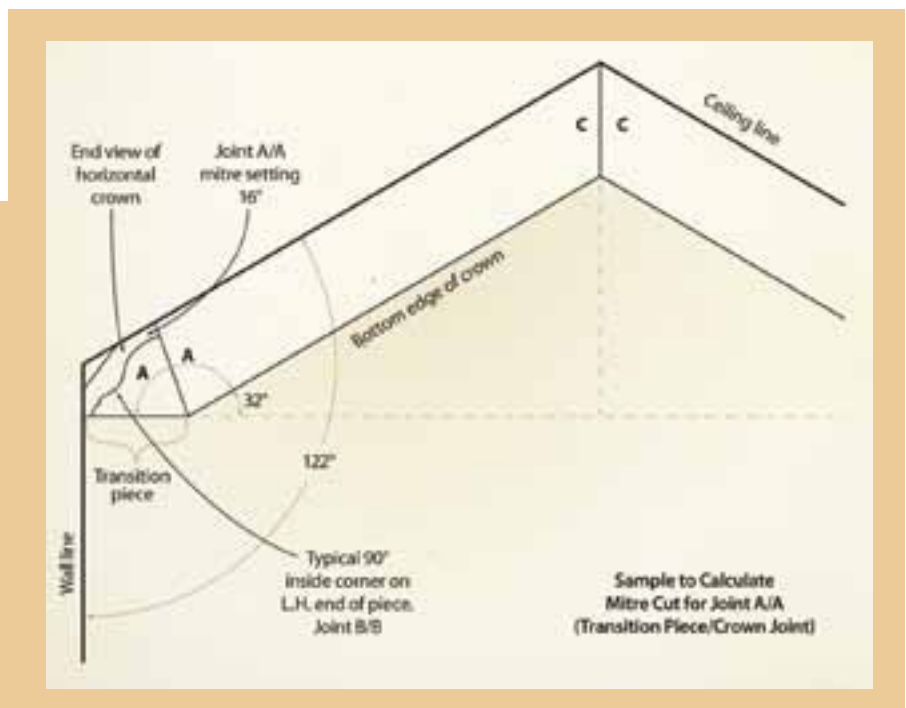
Glue the transition piece to the horizontal crown with fast-setting glue like five-minute epoxy, as nailing would surely split it. Fit and install both crowns using the normal installation procedure, making sure to maintain the spring angle to ensure a tight fit at the transition piece. You can use this procedure any time the wall meets an upward or downward slope ceiling. Only the mitre cuts will change to accommodate an inside or outside ceiling turn.

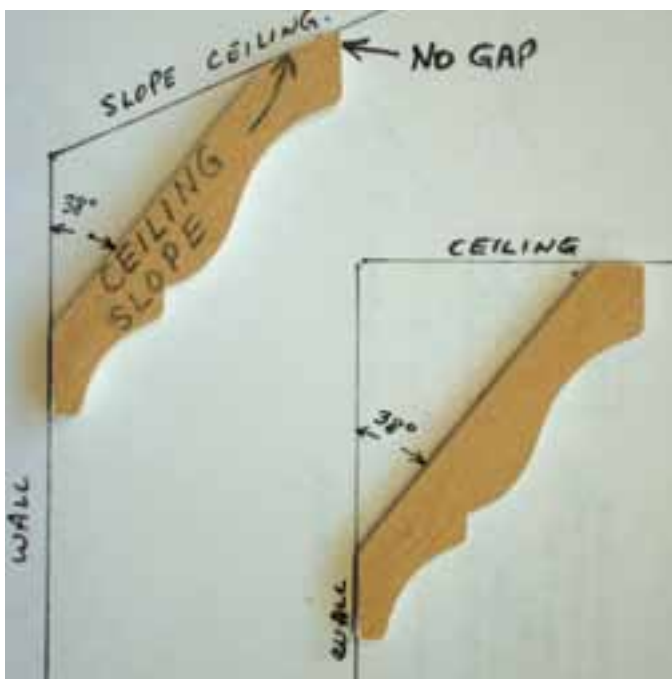
The last joint is the peak of the cathedral ceiling. This is a ceiling corner joint and again the crown needs to be placed right side up on the saw. Accurately measure the ceiling angle and divide the measured angle by two and this is your mitre setting (this is Joint C/C in the illustration).

Occasionally you may find a situation that is not covered in this article, and when

Do the Math

- Measure the slope of the ceiling (mine was 122°)
- Now subtract 90° from the wall/ceiling slope ($122-90=32^\circ$). This is the acute angle of the horizontal line to the slope of the ceiling. What we want is the ceiling rake angle so you must subtract that result from 180 ($180-32=148^\circ$)
- Now the mitre is $\frac{1}{2}$ of that measurement ($148 \div 2 = 74 \frac{1}{2}^\circ$).
- This is the mitre cut for joint A/A.





Make some changes – Back of crown is modified to fit tightly to a sloped ceiling.

it happens simply apply what you know about “inside” and “outside” wall and ceiling turns, make some test pieces and you will find a solution is quick at hand.

Installation tips

- For safety reasons, cut the transition piece from a crown that is at least one-foot long.
- For safety reasons, if you choose to cut away the back of the upper flange for the horizontal crown at the table saw, instead of using a block plane, make sure it is done in a safe manner as there will be a lot of the saw blade exposed.
- Backing strips may not be required behind the horizontal crown because the slope puts the crown much closer to the wall top plates.

- Always use the crown moulding templates as a guide to help you envision the joint and to make the cuts at the correct compound mitre angles.
- If your mitre joint is not tight at top or bottom it is likely that the spring angle is not maintained and you need to twist the crown to close the joint. (It is worth mentioning again because this is the most common cause of a poorly fit joint.)
- Avoid smudge marks on your hardwood crown moulding by staining and sealing the surfaces before cutting and

Crown Buildup

In the wood moulding industry there is a term called crown buildup. This is when the installer is looking for something exceptional in the form of a wider and more ornate crown for a room with a high ceiling and to possibly complement other existing trim work. This buildup is accomplished by adding case and base trim to the crown to create a combination that is unique and personalized to fit the decorative needs of the room. Crown moulding and base trims come in numerous sizes and shapes and their combination is only limited by your imagination. So, if you wish to create a unique look I would encourage you to Google “crown moulding buildup” for ideas and then visit your local wood moulding store.

Part three of this series will deal with making and installing crown moulding on a curved wall. The procedure can also be used to make a crown for a curved cabinet case.



Proper transition – The transition piece is cut to a point and is glued to the horizontal crown.

installing. After installation, nail holes can then be filled without fear of filling the surrounding pores causing blotchiness.

- Whether you used a crown made of MDF or stained hardwood, apply DAP paint-able caulk along the length of the moulding where it contacts the wall and the ceiling to fill the gaps and produce a finished look. I first apply a $\frac{1}{16}$ " bead of caulk along the moulding and then take a vinyl scraper and pull it at a 45° angle to force the caulk into the gaps and create a smooth joint. My scraper is 1" x 2" and the corners have a radius of $\frac{1}{16}$ ".

Finish off with a little filler and paint and then join everyone together to admire your work.



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Tools and Supplies

There are many ways to hold and turn a blank like this in the lathe. I prefer to use a four-jaw chuck. Some of the dimensions shown are for a Teknatool Supernova chuck, so if your chuck is a different make it will probably require different measurements. If you prefer to use different chucks or tools, that's okay. However, these are the tools that I used.

- Four-jaw chuck
- 25mm (1") jaws
- 50mm (2") jaws
- Woodworm screw
- Tailstock live center
- 1/2" spindle gouge
- 1/4" spindle gouge
- 1/2" bowl gouge
- 3/16" diamond parting tool
- 1/16" narrow parting tool
- 3/4" skew
- Swan-neck hollowing tool
- Calipers
- Jacobs chuck
- 7/8" Forstner bit
- Depth measuring jig
- Sanding media
- Wipe-on polyurethane finish
- Paper towels

Christmas ORNAMENT

Turn this heirloom-quality Christmas ornament for someone special on your list this year.

BY ALLAN CUSWORTH

Christmas ornaments made of wood have traditionally been considered treasures that are passed down from generation to generation and they often occupy a very special place on the Christmas tree each year. This project will allow a woodturning enthusiast to become immortal! Well, okay, maybe I am stretching things

just a little, but I predict that your creation will certainly attract a lot of attention.

Turning Christmas ornaments has always fascinated woodturners. Some of us have painted them with solid colours, while others have created beautiful pictures on their globes. Some creations have long ornate icicles and finials on them and some have none. I have studied the techniques of many other woodturners worldwide and the methods I

have used to make the ornament in this project are a compilation of these techniques. Out of the many different ideas on this subject, I have selected a project that most turners with a little bit of experience should feel comfortable making. I do use some specialized tools for hollowing out the globe but, other than that, most common woodturning tools will do the job.

Wood Selection

The goal is to make a piece that is big enough to be seen on the Christmas tree and yet not too heavy to weigh down the tree bow. With that in mind, I selected a piece of box elder burl (Manitoba maple for some readers) for the globe and red Honduras mahogany for the finial and icicle. Box elder is naturally coloured with red streaks that, when coupled with the red mahogany, give the ornament a Christmas look right from the start.

It is important to work safely when using any woodworking tools, equipment, and materials, and a face shield and dust mask should be worn when applicable. Also be aware of the toxicity of any domestic or exotic wood you decide to use. Some woods, such as makore and cedar, can cause serious health problems.

Basic Design

I like to take the time to draw the design I want to make before I start to turn wood on the lathe. It is much easier to make



Shaping the globe – Once the globe is turned, smooth and finish sand to at least 800 grit to achieve a glossy finish.

changes on paper than it is on a piece of wood in the lathe.

The overall dimensions for this ornament are 2 ½" in diameter by 7" long. The globe is 2 ½" in diameter by 1 ¾" high. In my opinion, and that of other designers, a globe that is slightly flattened on the top and bottom yields a more pleasing shape than a round one. The icicle on the bottom is twice as long as the globe is high, or 3 ½" and the finial on the top is 1 ¾" long. I try to follow the natural design ratio that Mother Nature has provided. Some people call it the 'Rule of Thirds'; others call it the 'Golden Mean.' Basically, this places the middle of the globe about ⅓ of the way down from the tip of the finial.

Since burl has a multitude of grain directions, it doesn't matter which way the piece is mounted on the lathe. If using a grained wood, I suggest orienting the grain direction vertically. The globe, finial and icicle will then all have the same grain direction. In my opinion, that simply looks better.

Forming the Globe

Start making the project by preparing a 2 ¾" by 2 ¾" by about 3 ½" long block of wood for the globe. If you choose an exotic wood you may want to cut a smaller piece and use a glue block to save on expensive material. Drill a ⅝" diameter by ¾" deep pilot hole in the center of one end and mount the blank in the lathe on a Woodworm screw in the 1" jaws of the four-jaw chuck. Bring the tailstock live center up for support and rough turn the blank to a cylinder with a spindle roughing gouge or a skew. Pull the tailstock back and true up the end of the block using a spindle gouge or skew. Make a dimple at the center. This is to guide the depth drill later.

Mark the 1 ¾" globe height dimension on the cylinder and, using a ⅜" diamond parting tool, cut a groove to make an approximate ⅞" diameter tenon. Form the outside shape of the globe. Sand this surface starting with a grit size that will remove your tool marks and progress through the grit sizes to at least 800 so you can end up with a glossy finish. Note that each grit size in the progression should not be more than 50% finer than the previous one or you will leave scratch marks.

With a ⅞" Forstner bit in a keyed Jacobs chuck in the tailstock, drill a center hole to within ¼" of the bottom of the globe. Do not drill any deeper as wood is needed to support the globe for hollowing it out. I made a 90° angle depth gauge from a



Globe blank – Mount the blank and round it off to start.



Base tenon – Cut the base tenon into the blank before shaping the globe.

piece of $\frac{5}{16}$ " drill rod. It lines up with the end of the bit flights when placed in a chuck hole on the Jacobs chuck. Using this gauge shows exactly where the tip of the bit is located when I'm drilling out the center.

Hollowing Out the Globe

Hollow out the globe with a swan-neck hollowing tool by taking small cuts starting at the mouth of the access hole. A number of specialty Christmas ornament hollowing tools are available on the market. A Google search for 'woodturning +ornaments +"hollowing tools"' will yield some interesting reading. Some people make their own by grinding Allen wrenches into angle scrapers and mounting them in handles.

Make the cuts parallel to the outside surface of the globe to reduce the chance of breaking through. Leave a heavier wall thickness for support at the back of the globe during the hollowing process. Remove the shavings often as a build-up on the tool can cause the wall to crack. Check the wall thickness with your thumb and finger caliper and verify the feel with a set of calipers periodically. Gradually reduce the wall thickness to approximately $\frac{1}{8}$ " or less. The thinner the wall, the lighter the finished ornament will be.

When the globe is hollowed out and sanded to your satisfaction you should finish it before you remove it from the tenon as it will be more difficult afterwards. Apply two or three coats of wipe-on polyurethane with a paper towel. I do not use cloth to apply finishes because if the cloth catches anywhere it can cause a serious injury to your fingers.

To remove the globe, bring the tailstock with the $\frac{7}{8}$ " Forstner bit back up and drill through the back of the globe into the tenon. If the tenon is $\frac{7}{8}$ " diameter, the globe will drop onto the bit shank. If not, a small cut with a skew at the outside bottom of the base will release it.

Making the Icicle and Finial

I prefer to make the icicle and finial from one blank because this saves the need to chuck up two separate blanks. The blank for this project is a piece of red Honduras Mahogany $1\frac{1}{2}$ " square by $6\frac{1}{2}$ " long. This allows for a $3\frac{1}{2}$ " long icicle and a $1\frac{3}{4}$ " long finial plus some material for chucking, gluing tenons and some final cuts.



Access hole – Bore the $\frac{7}{8}$ " access hole to accommodate the hollowing out process.



Remove the insides – Using the hollowing tool of your choice, hollow out the inside paying attention to the wall thickness at all times.

Place the square end of the blank flush against the chuck base in the 50mm (2") jaws on the four-jaw chuck. Bring up the tailstock live center and round off the blank with a spindle roughing gouge or a skew. Back off or remove the tailstock and live center.

The bottom point of the icicle will be at the tailstock end of the blank. Leave $\frac{1}{8}$ " at the tip of the blank for removing the live center dimple. Mark the $3\frac{1}{2}$ " icicle and $1\frac{3}{4}$ " finial length dimensions on the blank leaving a $\frac{1}{4}$ " allowance between them to make the icicle mounting tenon. You will also need the same allowance for the finial tenon later. You can also mark on the design elements if desired. I kept the finial design reasonably simple for this project since I feel that a simple design often looks better. However, if you want to make a



Apply finish – With a paper towel, apply three coats of wipe-on poly before parting the globe off.



Two blanks in one – Use one blank long enough to form the icicle and the finial. Round-off the blank and mark your design elements with a pencil.



Shaped icicle – Once the shaping is done, finish sand and finish the icicle.

more intricate design, the element at the tip should be the smallest. Sizes should get progressively larger towards the base of the icicle.

Shape the tip element using a small spindle gouge, or a skew if you are comfortable with it, and sand it before shaping the next one while there is more wood to support the stress. Use the same grit size sequence as used when forming the globe. Make the outside diameter at the top 1 1/8", large enough to completely cover the 7/8" hole in the globe with a little surface to spare. Shape the last element of the icicle to make a smooth transition area for gluing the icicle to the base later.



Be precise – Size the finial for a good fit in the globe's access hole.

Define the top surface using a 3/16" diamond parting tool. To make sure the icicle tenon fits the globe, use a vernier caliper to transfer the 7/8" ID of the globe hole to the OD of the tenon. Don't make the fit too tight so that you have a little space for the glue joint. Using a 1/16" narrow parting tool, carefully make an angled undercut at the base of the tenon. This will allow the icicle edge to fit closely to the surface of the globe and will also provide a place for the excess glue to go when the pieces are glued together later.

Apply two or three coats of wipe-on polyurethane with a paper towel as was done on the globe. After the finish is dry, carefully part the finial off at the top of the 7/8" diameter tenon with a 1/16" narrow parting tool. Make the cut on an angle to remove some wood, which will reduce the weight of the finished ornament.

The finial is made in the same way as the icicle except that it is much shorter. The elements should complement those on the icicle. I like to leave the tip element large enough to drill a 1/16" hole through from the side using a V-block on my drill press to hang the ornament. Make sure the hole is perfectly centered or the ornament will hang lop-sided. You may want to drill the 1/16" hole in the top of the finial and screw in a brass eyelet. This hole can be drilled with the 1/16" bit held in a Jacobs chuck in the tailstock.

Assemble the ornament by gluing the icicle and finial into the holes in the top and bottom of the globe by putting glue on the tenons only. I use PVA glue and allow sufficient time for it to dry thoroughly. Make sure that no glue is applied to the inside surface of the escutcheon to avoid any squeeze-out on to the globe.

The final touch is to thread a piece of ribbon, gold thread or put a brass wire hook through the finial hole and get ready for the compliments and requests from all your friends and relatives.

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Contemporary sideboard

The combination of heart and sap wood give this sideboard a one-of-a-kind flair.

BY ROB BROWN

This is a challenging project that covers many different techniques, so don't get caught up in the entire project at once.

In order to simplify things, approach the construction in four stages: the carcass, the doors, the interior and the top.

The Carcase

Once the parts are all laid out, start breaking out the main case parts. The

legs will finish at 1 1/4" thick, while most of the other case pieces will finish at 7/8" thick. The panels should be taken down to 7/8" thick for now, even though they will finish thinner. Proceed by jointing one edge of each of the legs and rails.

Cut the legs to finished length. Lay out and cut the 3/8" wide mortises in the legs to accept the four side rails. Use a plunge router equipped with an edge guide to cut the mortises. At the same time, machine a groove to accept the gable panel. The groove and mortise

are the same distance from the inside edge of the leg, but the mortise needs to be 7/8" deep, while the groove to house the panel is only 1/2" deep. The tenons on the top side rails are going to be haunched, so make sure to stop the mortise 1/2" before exiting the top end of the leg. This will increase the strength of the mortises. Band saw the curve into the outside edge. Fair the curve with a block plane.

Cut the side rails to final length. Make sure you add the length of each

Photos by: Rob Brown Illustration by: James Provost



Two cuts – one set-up – You can use the same fence set-up to cut both the mortise and the groove.

tenon – $\frac{7}{8}$ ". Cut the tenons on each end of the side rails, and then notch the tenons of the top rails to create the haunched tenon. Adjust the edge guide on your router to produce a groove in the top and bottom side rails that will accept the gable panel.

Determine the size of the gable panels by dry assembling the gable frames. Cut the stock to rough length, edge joint each piece and glue the boards together. When dry, plane the panel down to about $\frac{5}{8}$ " and cut to size. Machine a rabbet around

the outside of the panel so it will fit into the grooves in the legs and side rails.

Cut a $\frac{1}{2}$ " wide x $\frac{1}{4}$ " deep groove on the inside of the lower side, front and back rails to house the case bottom. Sand and assemble the two gables.

Lay out the hand-cut dovetail joint that will secure the front and back top rails to the upper side rails of the gable assembly. When the front top rail is fastened in place, its front surface will be flush with the back surface of the front legs. The back top rail should mirror this position. Determine how long the top rails need to be. Make sure that the distance between the left and right legs finishes at 42", and that you have accounted for the length of the dovetail joints. Cut the top rails to length. Cut the tail portion of the dovetail joint on the ends of both top rails. Mark where the dovetail pins will have to be cut on each gable and carefully cut the other half of the dovetail joint.

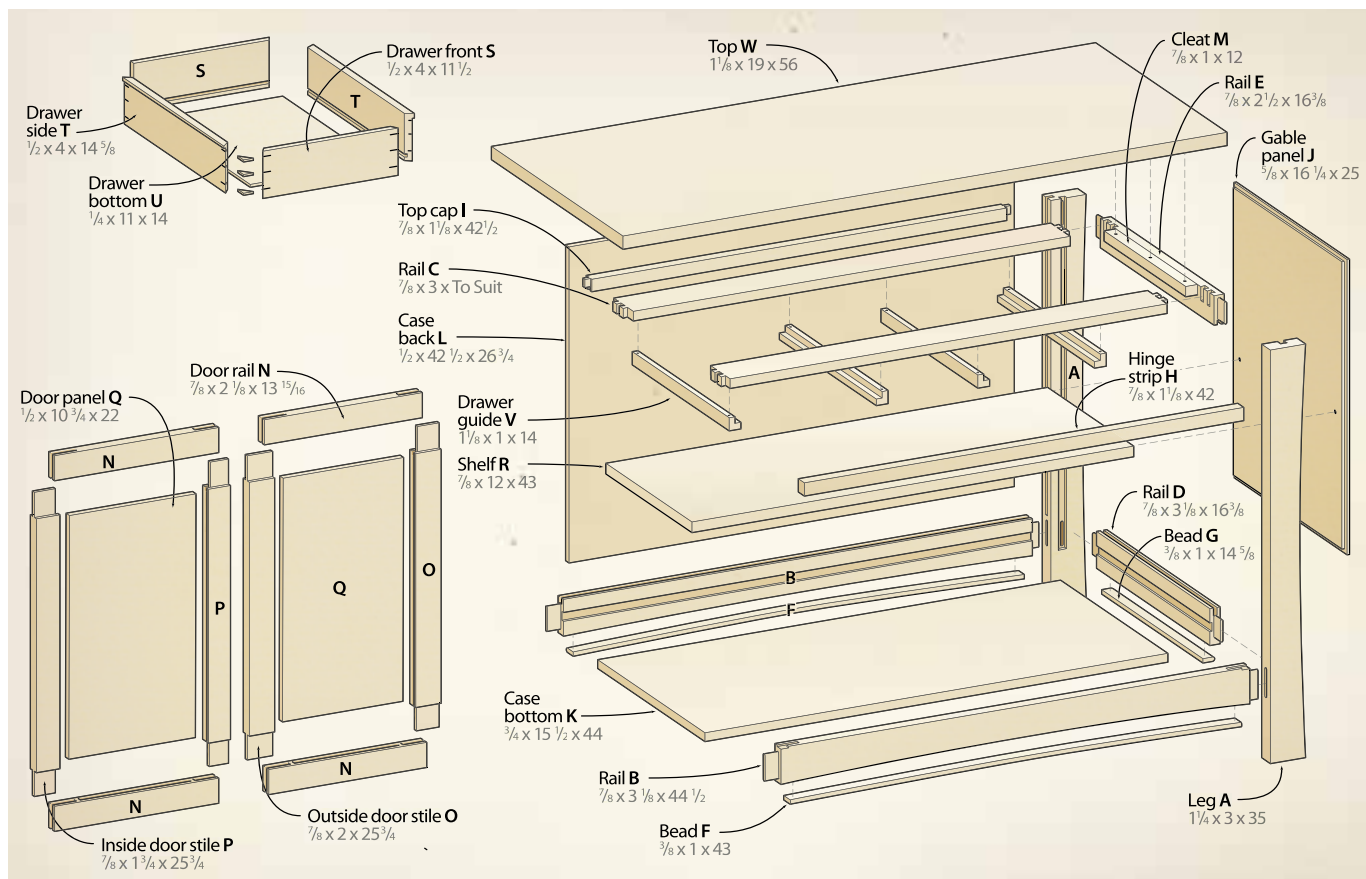
Lay out the mortises on the inside face of each leg. These mortises will accept the lower front and back rails. With a plunge router and edge guide, cut the mortises to a depth of $1\frac{1}{4}$ ". The $\frac{3}{8}$ " wide mortise should be as close to the

DEFINITION

Break out: In woodworking terms, this refers to cutting out parts from a rough board to use and later refine as project components.

outside of the leg as possible to cause minimum interference with the tenons of the side rails. Cut the low rails to length and machine a tenon on each end. You will have to round the edges of the tenon with a file or rasp in order for it to fit the round mortise. Cut the mortises in the lower front rail to accept the knife hinges. Although some planning is required, this operation is much easier to do now than when the case is fully assembled. Mock-up a door and rail to experiment with before cutting a mortise in the finished rail. A router and edge guide will do most of the work, and a sharp chisel will fine-tune the fit of a knife hinge.

Lay out a curve on the lower front rail with a flexible batten. Cut it with a band saw and smooth the curve with a block plane. Mill a $\frac{3}{8}$ " x 1" strip that will be the bead on the underside of the front



and side bottom rails. At the router table, machine a $\frac{1}{2}$ round with a $\frac{3}{16}$ " radius bit on the front of each of the three bead pieces. Sand the bead and the front rail and glue the three pieces in place. You will have to cut the side pieces to length to fit them in place, but the front bead should be cut to final length after it has been glued in place.

Dry assemble the case to determine the overall dimension of the case bottom. Glue the bottom up and, when dry, machine a rabbet around its four edges so that the case bottom will fit snugly in the groove already machined in the four bottom rails. You will also have to cut notches in the four corners to fit around each leg.

With a plunge router fitted with an edge guide, machine a groove in the rear bottom and top rails as well as the rear legs in order to accept a back panel. Sand the parts that make up the case. Because there are many parts (two gables, four rails and a case bottom) you should glue the case in two stages. The first stage is still going to be a handful, so it's best to have someone to assist you. Dry assemble everything and then start the first assembly. The only part you can leave for the second assembly is the upper front rail – everything else must be assembled the first time. Make sure everything is square, especially the door opening. Once everything is dry, apply small notched glue blocks between the lower front rail and the gables. These glue blocks will help strengthen this important joint.

Cut and clamp two cleats flush with the upper portion of the gables. Eventually you will screw through the cleats to secure the top.

Cut a back panel and machine a rabbet around all four sides. This panel will slide down the grooves in the legs and into the groove in the rear bottom rail. Machine the top cap, which will fit on top of the back. This top cap will have a tenon on either end which fits into the groove in each leg. Sand and glue everything in place. When assembled, the top cap will finish flush with the rest of the upper surface of the case.

To finish off the carcass, machine a hinge strip of the same thickness as the front top rail. Cut it to fit between the

front legs. Both the hinge strip and the lower front rail need to finish with the same reveal against the legs – about $\frac{1}{8}$ ". In order to eliminate any problems with glue squeeze-out, cut a $\frac{1}{8}$ " x $\frac{1}{8}$ " groove in the back of the hinge strip, close to the bottom edge of the surface that is to be glued. Any extra glue will remain trapped in the groove instead of oozing out from the joint.

Cut the mortises for the hinges then clamp and glue the strip in place. With the first, and most difficult, step complete you can focus your attention on the next step – the doors.

The Doors

When making doors, I often make them about $\frac{1}{16}$ " oversized on each of the four sides. Once the door is assembled I can trim it to size and make sure it is square. This process also leaves a clean edge.

I used a slip joint to secure the four corners of these door frames. It's a strong and fairly easy joint to make. When cutting the parts to size keep in mind that the frame stiles and rails will extend all the way to the outer edge of the door. Cut the pieces to finished size. With a tenon jig in your table saw, cut the female slots in each of the rails. With a dado blade in your table saw, machine the male end of the joint. This joint is strong because there is a lot of face grain glue surface area. There is also a mechanical aspect that helps hold the joint together. Once all of the slip joints have been made, plane the stiles $\frac{1}{16}$ " thinner than the rails. This difference in thickness will help hide any slight variations once the frames are glued up.

Machine a $\frac{1}{4}$ " wide x $\frac{5}{16}$ " deep groove on the inside edge of the door frame that will house the door panel. This groove will have to be stopped at both ends of the rails so that it isn't visible from the doors' sides.



Knife hinges – It is much easier to mortise the knife hinges when the piece is apart than when it is assembled and glued.

I used book-matched solid wood for the door panels. Cut the wood to rough length and re-saw it, creating a pleasing match for the panel. Glue these two pieces together then plane them to final thickness. Trim the panels to size and



Forget the plan – Dry assemble the parts so that you know exactly what size to make subsequent parts.



Give the glue an escape route – In order to eliminate any problems with glue squeeze-out cut a $\frac{1}{8}$ " x $\frac{1}{8}$ " groove in the back of the hinge strip.

run a rabbet around the perimeter. Sand the frames and the panels then assemble the three doors.

Trim the doors so that they will just barely fit into the opening. Machine the mortises for the knife hinges and install the hinges – I usually use only one screw at this point so I have the option of making a slight adjustment if the door doesn't fit perfectly. With the four doors hinged in place, trim each door so that there is a $\frac{1}{16}$ " gap around each side of the four doors.

If you decide to use hand-made pulls instead of store-bought pulls, rout a small mortise in the door frame to accept the handle. Machine or hand cut three pulls to fit the mortise and provide you with a comfortable, positive grip. This is a good opportunity to add a unique touch to a project. Sand the door frame before installing the pull. Break any sharp edges and sand the doors.



Pull joinery – Use a small mortise and tenon to secure your shop-made pulls.

The Interior

Cut four drawer guides $1\frac{1}{8}$ " high x 1" wide x 14" long. Machine a $\frac{9}{16}$ " high x $\frac{1}{2}$ " wide rabbet in the top corner of each guide. Install the outside two guides so that when the drawer is pulled out the door will not interfere with its movement. The guides will eventually be glued and screwed to the underside of the top rail, but for now just use screws. Install the other two guides so that the drawers will bypass the middle door when it is pulled out. It is important to note that the drawer guides will act as door stops, so position them appropriately. With the guides installed, drill a $\frac{3}{16}$ " hole in the back upper corner of the door and install a 'press-in bumper,' available at leevalley.com. These bumpers will stay in place over time and will cushion the door when it closes.

With the guides in place you can determine the width of the drawers and



Floating Drawer – Not only do the drawer guides give the appearance of a floating drawer, but they will act as a stop as well.



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the size of the drawers' top cleat. Construct the drawers and attach the top cleat on the upper portion of the drawer sides. Drill a hole with a 1" diameter in the center of the drawer face to act as a finger pull and round over the edge to create a comfortable feel. Use a block plane or rabbet plane to fine-tune the fit of the drawer. These drawers can be pulled out of the cabinet and brought to the table to make setting a large table easier, avoiding the need for a drawer stop. Drill a $\frac{3}{16}$ " hole in the bottom corner of each drawer and install more rubber 'press-in bumpers.' They will work wonders in terms of preventing scratches on any surface on which you place the drawer.

Laminate enough wood to make a shelf. Cut it to size then drill four holes for shelf pins. A nice touch is to create small notches in the underside of the shelf that register in the shelf pins so that the shelf will not slide forward. I also use a spokeshave to create a slight arc on the front of the shelf, which gives a lighter, more delicate look to the shelf.

Top

Choose some interesting wood for the top and laminate the boards together. After planing those to final thickness, cut the top to size. I went with a 1" overhang on the front and back and a 4" overhang on the left and right sides. I also chose to keep the front and back edge of the top straight and to add a profile to either end. You can experiment with different overhangs and edge profiles to achieve the look you want.

Use screws to attach the top to the base. Because the top is solid wood, it will move with changes in humidity. One way to protect against splitting the top is to drill oversized holes in the cleats and rails then use washers and screws to secure the top. The screw will be able to move slightly within the oversized hole.

Finishing

After removing any glue squeeze-out, check the entire piece for any scratches. Remove the doors, drawers, shelf and top so that each piece can be finished individually. Apply the first coat of varnish thinned about 20%. Each additional coat can be thinned slightly, but this is not necessary. Thinning each coat



Let the wood speak – Using a combination of heart and sap wood provides a nice aesthetic that showcases the wood's natural colours.

will cause the finish to dry a little more slowly and give you a bit more time to brush on the finish. Be sure to sand between coats in order to remove any dust nibs or imperfections. After the final coat, let the finish on your new sideboard cure for a few days then rub it with 0000 steel wool and wax. Wax will help keep the finish scratch and stain-free while also providing a smooth feel.

This is not a simple weekend project. It can quickly become overwhelming, but keeping the four stages in mind – the carcass, the doors, the interior, and the top – the entire construction will be simplified. And when you've completed this sideboard, don't tell your friends it's easier than it looks. Heck, tell them it's harder than it looks! Only you will know the truth.

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Caring for a Finish

Accidents may happen – these simple techniques can keep your furniture looking like new for many years to come.

BY MARTY SCHLOSSER

Of course you knew better, didn't you? You were in too much of a hurry to apply finish equally to all sides of that dining room table you had spent the past six weekends tenderly bringing to life. And because of that, the solid table top has cupped badly and cracks are beginning to open up in a few places. All this trouble because you had been in such a hurry to get it done before the

annual family Thanksgiving dinner.

It needs to be reinforced that the above scenario is responsible for more premature finish failures than other single cause. Simply stated, you need to give those hidden and not-so-obvious parts of every piece of furniture the same level of attention for finishing. And that means surfacing too, whether you scrape or sand prior to putting on the finish. The same idea applies, albeit to a lesser extent, to staining, tinting or toning operations. If your particular finish calls for the first

coat to be cut (reduced, that is) with thinner, such as is the case with most oils or topcoats (varathane, shellac or lacquer), whatever you do one side must be done to all. In fact, it's a terrific idea to first try out the finish on the underside or less observable areas of a piece before tackling the top. Stain, oil or topcoat, wax, polishing ... every step the same.

Furniture Placement

Okay, so you paid attention to applying the finish correctly. You're out of the woods, right? Not so fast. Whenever possible, don't place that beautiful piece of furniture where it'll be exposed, day in and day out, to extreme humidity and temperature swings. Forced air registers, fireplaces and windows that are frequently kept open are also traps waiting to be sprung on your finish. The same goes for direct sunlight exposure. At the very least, close window sheers and you'll be surprised at the difference this simple precaution makes.



Initial buffing of wax – Buff with a clean cloth until the waxing swirls are all gone.

Dealing with Standing Water or Beverages

Plant pots are notorious for causing those white or black rings that spoil a finish, so ensure you place them on a saucer or other such arrangement to catch and hold excess water. The same goes for beverages. Provide your guests with coasters and whenever those inevitable spills occur, wipe them up with a clean, dry cloth as soon as possible.

Proactive Protection – Waxing

A monthly waxing will do wonders for keeping virtually any finish at its best. But don't follow your Aunt Betsy's theory that if applying a light coat of wax each time is good, then a whole lot of wax is even better. Less is indeed more when it comes to waxing. The waxing process is simple. Fold a clean cloth into a pad that is slightly larger than your hand and lightly load the pad with wax, right out of the tin. Start at one corner of the piece, then apply the wax sparingly, using a circular motion as you advance across the piece, from left to right. Continue applying wax in a logical, efficient manner, overlapping each row of circles until the entire section is covered. Go onto the next surface. Reload your cloth with wax only when it's getting dry. Don't go onto a third surface until you have buffed the first one or the wax will have become too hard to buff out. Take a second clean cloth, fold it as before, then start at the original place, using back and forth motions and buff the surface until the circular pattern is no longer visible under a strong light. It's highly unlikely that the second section will be ready for its first buffing right away, so rather than simply



Removing heavy wax build up – Use a turpentine-dampened cloth to remove built-up wax.

waiting, go ahead and apply wax to the third section. Go back to the first section and, again using a fresh cloth (our third one, right?) fold it into a pad then do the final buffing, this time ensuring you rub with the grain. The surface should be as smooth as glass. Move onto the second surface and carry out the initial buffing procedure. Leapfrogging in this manner, you should be able to finish off even the largest piece of furniture without running into any difficulties. That is, as long as you give the wax enough time to harden up, but not so much time that it becomes excessively hard and therefore difficult to rub out. Your buffing cloths will eventually become choked with wax build-up, so keep enough on hand to allow you to finish the entire piece in one waxing session. Two final words of advice: first, areas that are subject to a lot of wear will almost always need to have wax applied each waxing session, while other, less lightly touched areas may simply need to be buffed or have only the slightest amount of wax applied. Running your fingers over the piece will reveal those areas that need wax and those which require only buffing or only some wax and a buffing. Second, as with oily rags, wax-soaked rags may self-combust, so lay them over the lip of your shop's garbage can and allow them to "dry" at least overnight, and dispose of them on garbage day.

Removing Heavy Wax Build-up

By applying wax sparingly and ensuring you buff completely, you shouldn't

have to worry about wax build-up for a long time, perhaps forever. If your furniture's getting clammy to the touch on humid summer days, chances are that there is a build-up and you'll need to resort to stripping the wax from the piece. Again, this isn't a difficult proposition, but it'll take you a bit of time. Lay a plastic drop cloth on the floor and place your piece on it. I like to start with the underside of most pieces, as that's often where the greatest build-up will be concentrated. Dip a clean, folded cloth into turpentine, wring almost all of it out and then begin lightly rubbing the built-up wax until it all comes off. Heavily built-up areas may require a second going over, and perhaps you'll need to resort to 0000 steel wool instead of the cloth. Either way, once the wax has been removed, use another, clean dry cloth and wipe the surface off before moving onto the next section. Once the wax has been completely removed, take a good look at the piece. If the finish has been worn away, re-waxing alone won't be enough and the finish will have to be restored afresh. Hopefully, though, you've been giving the piece the proper care and attention it deserved and you'll only have to use wax to bring it back to its former glory. As with most things in life, "an ounce of prevention is worth a pound of cure" when it comes to caring for a finish.

MARTY SCHLOSSER
martywoodworking.ca





This modern shelf is highlighted by the classic look of hand-cut dovetails, which produces a look that is both traditional and contemporary.

Floating Shelf

BY TOM FIDGEN

This hanging shelf and drawer will provide you with ample opportunity to practice your dovetailing skills. If it has been some time since you last cut dovetails, begin by cutting several practice ones before embarking on this project. Need a bit of a refresher? Then see ("Hand Cut Dovetails", Feb/Mar '09, Issue #58). Of course, not everyone is comfortable cutting dovetails by hand, so you could choose to use a router and dovetail jig.

Prepare the Stock

I used 5/4 mahogany for all the shelf pieces (A, B, C), milling them down to 7/8". This thickness will make fitting the through dovetails a little more work, but will benefit the custom-made hanging cleats on the rear of the uprights. At this time I also mill the drawer parts; the drawer front and back (D) and sides (E) all finished at 5/8". This is a bit thicker than most of the drawers I build, but the thicker stock is needed to house a dado

for the drawer runners. For the drawer bottom (F) I use poplar, milled down to 1/4", while the drawer runners are 3/8" rosewood. You don't have to use these same woods, feel free to select stock that suits the decor of the room in which you'll be hanging the shelf.

Cut the Joinery

Once you have the pieces milled to the desired thicknesses, lay out and cut the dovetails for the main carcass. I scribe the material thickness on each piece and then lay out the dovetails. I think most woodworkers have their own favourite methods of dovetail layouts; my method uses two sets of dividers.

After you have the dovetails cut out, mark the inside of the drawer box to cut out the dado for the drawer runners (G). You can mill the dados on the table saw with a dado blade or on a router table. In my woodworking I like to use as many hand tool techniques as possible, so if you enjoy cutting the dovetails by hand then you might want to cut the dados with a back saw and a router plane.

Shelf Glue-up

When you have the drawer runner dados cut, dry fit the pieces and prepare for the glue-up. I like to use a smoothing plane to lightly plane the parts to remove any milling marks before gluing up. It's a lot easier to get into the corners now than when the shelf is together. Using a hand plane not only means no sawdust in the air, but it gives the wood a smooth, glossy look and feel that is time-consuming to achieve with sandpaper. When doing glue-ups I try to break them into sub-assemblies. I find this makes the process a little slower but usually ends up with better glue joints. I glue up the outside vertical piece with the long main shelf horizontal piece as well as the drawer box vertical. Separately I glue up the drawer box top and the final outside vertical. Once the glue has set I finish up by fastening these two sub-assemblies together.

Make the Drawer

I used a traditional method of drawer-making for this piece. Begin by milling the stock, making sure it's smooth and



Dovetails – Hand-cut dovetails add a classic feel to a contemporary design.

flat. I shoot all of the edges on a shooting board to assure everything is square (see “Shop Jig: Shooting Board”, Oct/Nov ‘07, Issue #50). Before I do anything else I cut a shallow groove with a small plough plane on the inside bottom of the drawer sides. This eliminates any room for error when laying out the dovetails and shows me exactly where the drawer bottom will be. After cutting the groove I take a marking gauge and scribe, on the ends of each piece, the thicknesses of their mating pieces. On the inside scribed edges I like to cut an extremely shallow rabbet using a skew angle block plane; this will leave a tiny shoulder that will help a great deal when lining up the drawer side to the front when tracing the tails on the drawer front. The next step is to take the drawer sides and lay out the dado for the drawer runners. Again,



Traditional drawer bottom – The solid wood bottom panel is held in place with a screw that goes into an elongated hole to allow for wood movement.

instead of taking a pencil and drawing in some lines, I actually take a shallow cut with a hand plane to show me where the runners will go.

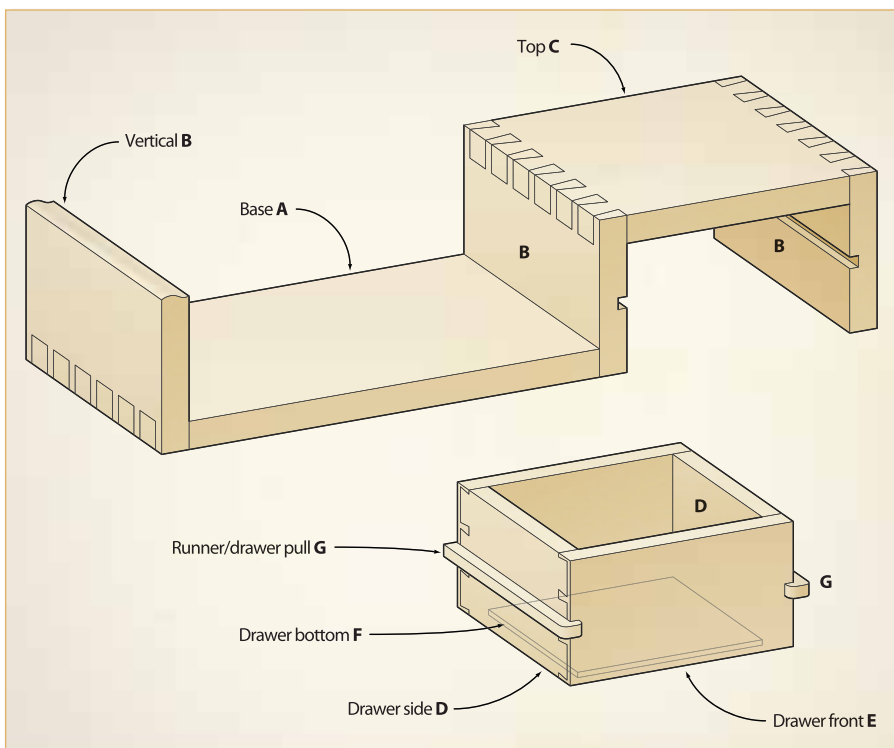
I like to use half blind dovetails in the drawer front and through dovetails in the back. Once the dovetails are laid out, go ahead and cut the pieces. When all of the pieces have been cut and cleaned up I take the two drawer sides and the drawer front, and finish cutting out the groove for the bottom using a plough plane. The back of the drawer gets cut narrower so the drawer bottom can slide into the groove from under it.

I use solid wood for the drawer bottoms. If you choose solid over ply, make sure you run the grain side-to-side so any expansion in this piece will move front to back. After the drawer is assembled to this point, I mill a $\frac{3}{16}$ " groove into the bottom of the drawer sides, front and back, and then rout a matching rabbet on the drawer bottom.

The drawer glue-up is straight forward. The important thing here is to ensure that the corners are square so that the drawer will fit into the housing smartly. After the glue has set, I finish cutting the dado in the drawer sides that the runner will go into. I used a piece of rosewood for its strength in this application. The runners are pressure-fit only; if done right no glue is necessary. Since these runners actually double as drawer pulls I simply shape the ends into a pleasing profile. That completes the drawer; do a test fit and then apply some finish to the piece. I used a hand rubbed oil and varnish mixture that really brings out the shimmer in the flame birch drawer front.

Materials List

Part		Qty	T	W	L
A	Base	1	$\frac{7}{8}$	$7 \frac{3}{8}$	$14 \frac{7}{8}$
B	Verticals	3	$\frac{7}{8}$	$7 \frac{3}{8}$	$4 \frac{7}{8}$
C	Top	1	$\frac{7}{8}$	$7 \frac{3}{8}$	$8 \frac{7}{8}$
D	Drawer sides	2	$\frac{5}{8}$	$3 \frac{7}{8}$	$7 \frac{3}{8}$
E	Drawer front/back	2	$\frac{5}{8}$	$3 \frac{7}{8}$	$6 \frac{1}{8}$
F	Drawer bottom	1	$\frac{1}{4}$	cut to size	
G	Runners/drawer pulls	2	$\frac{3}{8}$	$1 \frac{1}{16}$	$7 \frac{7}{8}$





Double duty – The drawer runners not only keep the drawer on track, but they act as pulls as well. Shaping a pleasing shape on the pull end will add a subtle detail to the project.



Custom hangers – These hidden, shop-made hangers will provide a strong and hidden fastening point for wall hanging.

Custom Hanging Cleats

One of the special things about this shelf is the way it looks as if it's suspended when mounted on a wall. There is no visible hardware. To accomplish this I made some custom hanging cleats in the two outside vertical pieces. Begin by cutting some extremely hard wood or brass to size. Next drill out a smaller hole in the top on your drill press, and then follow with a larger hole just below the smaller one. Take a small file or saw and connect the two holes, making a

keyhole effect. I like to drill and countersink for screws now as well. Next, take the two cleats and lay them onto the actual shelf. Mark around them with a sharp knife. Follow this by cutting out a shallow mortise so the cleats won't be proud of the finished back when installed. This is the perfect job for a small router plane. Test fit as you go, being careful not to cut out too much. Now drill two larger holes on the shelf back, underneath the cleats, being careful not to interfere with the area

the countersunk screws will go. Once drilled, clean up the area, and then glue and clamp the cleats in place. When dry, install the screws.

This shelf is at home in a kitchen setting, an entertainment room or just by the front door to hold keys or sunglasses.

TOM FIDGEN
tomfidgen.blogspot.com



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Inlaid Cutting Board

The attention to detail on this cutting board allows you to take something very utilitarian and make it beautiful and meaningful.

BY GLEN FRIESEN

My mother-in-law has dedicated her life to the service of her community and her family. Her gift is the ability to perform feats of magic in the kitchen and graciously share her creations with others. When deciding on what to construct for her for Christmas, I thought it only fitting that it should capture this aspect of her life. I decided to construct a butcher-block cutting board and inlay a short, relevant saying, cut

from mother of pearl, in the front edge of the board.

I constructed the cutting board in classic butcher-block fashion with the cutting surface composed completely of end-grain hard maple. The 1 3/4" x 1 1/2" pieces that make up the surface of the board have the end grain alternated or rotated, so the end-grain forms a 'pattern' when viewed from above. The alternating end-grain also reflects light differently, which enhances the look of the board. The Peruvian walnut border is also installed so that the end-grain is exposed to the

cutting surface. This allowed the pieces to be bent easily around the gently-curved sides of the board without having to heat, steam or perform a bent lamination. To keep the board from sitting flat on the countertop and possibly being suctioned on when cutting wet substances, I added six 1 3/4" diameter by 1/4" thick Peruvian walnut feet.

The inlay that customizes the piece and enhances its sentimental value is cut from white mother of pearl shell. Although the inlay consists of only five words, it transforms the piece from a nice cutting board to a family heirloom. Inlay has become a vital component in all the significant pieces that I construct.

I purchased seven bdft of 2" hard maple for this project. In hindsight, I should have purchased more because blemishes would appear when exposing large amounts of end-grain, and having more wood than necessary would have given me more choices when removing blemishes and orienting the grain. I also purchased the widest Peruvian walnut boards that I could find to laminate together to cut the 1 3/8" edge strips with the grain oriented up and down. The chosen board yielded 5" of width and, to



Keep things straight – A paper pattern of the grain orientation will help when you are laying out the sections.

make sure that I would have enough, I purchased a piece 5' long. Approximately 10 sq in of mother of pearl was used.

Preparing Material for the Cutting Area

It is not essential that the finished cutting board is the exact size of the drawing. Joint and plane the 2" maple to maximum thickness. In this case the maple finished to 1 3/4" with both sides clean. Set the table saw fence to 1 5/8" and rip the strips. Joint the strips on both of the cut sides.

Cut the finished strips into 30" lengths. This is more than you need, but will give you options later. Laminate 10 strips together and remember to orient the end-grain appropriately. The extra piece allows you to stagger the grain pattern on final assembly. I used Titebond 3 for the glue-up. When the glue has dried, rip the lamination into 1 3/8" strips across the lamination. This will give you ten 1 3/4" x 1 1/2" by 1 3/8" thick, end-grain pieces glued together.

Clean up the long-grain sides to prepare them for the next lamination. I used my vertical wide-belt sander, but any drum sander would work. Even taking very fine passes with the thickness planer works, although it just feels wrong to do this. Once the edges are true, laminate 15 strips together. This will make a piece approximately 23" in length. Remember to offset the ends of the pieces to enhance the grain pattern of the cutting surface. Allow to dry and then carefully sand the cutting board blank to 1 1/4" in thickness.

Preparing Material for the Border

While waiting for glue to dry, I surface the Peruvian walnut board. Mine finished

Materials List

Part		Qty	T	W	L
A	Hard maple	1	1 5/16	15	23
B	Peruvian walnut	2	1 5/16	9/16	23
C	Peruvian walnut	2	1 5/16	9/16	15 1/2
D	White mother of pearl	10	.050		



Glue it up – You shouldn't need many clamps to bring the cutting surface together if care has been taken during the milling process.

to 5" wide and I planed it to 5/8" and then sanded it to 9/16" thick. Cut ten 5" long pieces. Assemble two pieces 5" wide by 26" long and be sure to glue long-grain to long-grain. When the glue has dried, carefully sand the pieces with a palm sander and be sure both sides are clean. Now you can rip 1 5/16" strips off of the end. This will yield a bit more than you need, but you should have six 1 5/16" wide by 26" long pieces, four of which will be needed for the border.

Final Shaping

Once the glue has dried and the maple cutting surface has been sanded to thickness, cut it to its final shape. I made a template from paper to ensure that I achieved the proper form without experimenting on my maple blank. Place the template on the prepared maple blank and draw a line, in pencil, around the template, then remove the template and inspect your line. The edge pieces should be the same size on each side as discrepancies will be easily visible in the

finished product. Carefully remove cut marks on the disc sander.

Attaching the Border

Once the maple cutting surface is in its final form, mark the edges on some 2" pine and cut four clamping cauls that perfectly match the curved contours. Using the clamping cauls, carefully test-fit the walnut border one piece at a time. Carefully mark the corners. Because of the curve of the board, these mitres are not 45° angles. I custom cut each corner. In this case, the actual setting on my mitre saw was approximately 36°, but this will vary depending on how much curve you put on your cutting board. Carefully fit all sides of the border and make sure all the mitres fit tightly. Do a 'dry fit' test run and, if it all fits well, glue the border on with Titebond 3.

The clamping cauls should ensure a good glue joint.

Completing the Assembly

Remove the clamps once the glue has dried and sand the entire board.



Attaching the border – Using custom shop-made clamping cauls will ensure even clamping pressure.

Be careful not to embed the dark walnut sawdust into the light-coloured maple when sanding. Sand with 100-grit first, then 150, then 180 and finally with 220-grit. Cut six $\frac{1}{4}$ " thick by $1\frac{5}{8}$ " diameter disks to act as feet for the cutting board. I used the drill press and a $1\frac{3}{4}$ " hole saw with the centering bit removed. I used six feet on this board to give it extra support when being used, but on the $2\frac{1}{4}$ " thick version that I created, I used only four. Sand the feet thoroughly and place them on the bottom of the cutting board and glue them on with Titebond.

Installing the Inlay

Installing a meaningful inlay has become very important when I construct projects for people who are close to me; I feel that it really enhances the sentimental value of the project. Installing a basic inlay is not as difficult as one might expect. Select an appropriate font and size of font for the inlay and print several copies of the text. Cut the complete saying out of the paper and carefully decide on its final placement on the walnut. Do not cut each letter out carefully, but rather cut out the words, avoiding all the lines. When the text on the cut out paper is in the proper position, attach it to the walnut with cyanoacrylate glue. The shell was purchased from Rescue Pearl (rescuepearl.com). Since shell comes in small pieces, approximately 2 sq in for a larger piece, the text will often have to be cut as individual letters; this is why multiple copies of the text are necessary. Attach the patterns to the shell with cyanoacrylate glue as well. Use a jeweller's saw with a 2 – 0 blade and a V-block and carefully cut along the pattern lines on the

paper attached to the shell. De-burr the shell when the cutting is done with a small file. When the shell inlay is ready, attach it to the paper pattern on the walnut with balsa wood cement and allow to dry overnight. With a very sharp X-Acto knife, etch the walnut at the edge of the shell and rout out the cavity using a $\frac{1}{16}$ " bit chucked in a Dremel tool. Set the inlay slightly proud of the surface and make sure the inlay fits in the cavity. Do not force the inlay into place because shell breaks quite easily. When the inlay fits the cavity, insert it and flood the area with cyanoacrylate glue. Allow it to dry and then sand it with a block and 80-grit paper. Using the X-Acto knife, clean out all the air bubbles that show up as light spots in the glue. Re-flood these areas with glue, allow to dry and re-sand.

Sand with progressively finer paper and finish with 220-grit.

Applying the Finish

Since this board was going to be used to prepare food on a daily basis, I wanted a finish that was food-safe and easy to apply so it could be refreshed easily. I applied several coats of mineral oil because it is safe and easy to apply.

This is a very practical project that could be undertaken on a weekend. It is extremely functional and, with the custom inlay, a tribute to its user.



GLEN FRIESEN

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Three Must-Have ROUTER BITS

With so many bits available, which ones are the most useful?

BY STEVE MAXWELL

Too much choice can sometimes be a bad thing, and router bits are a case in point. There are thousands of different bits available these days, as well as hundreds of different pre-packaged router bit collections. But which bits are really the most useful? Which profiles yield the biggest improvement in your work? What terrific bits don't you know about yet?

Answers to these questions will be at least a little bit different for each woodworker, but after more than 25 years in the shop, I'd like to show you three families of router bits that are not

only amazingly useful, but are often under-appreciated. Add these bits to your collection, and they may well become your all-time favourites too.

#1 The Flush-Trim Bit:

Curved part duplication, easy mortises and accurate dados

Any router bit with straight cutters and a bearing that matches the diameter of those cutters is called a flush-trim bit. That said, there are dozens of different kinds, each able to empower your router to do marvellous things.



Flush-trim – These bits are essential for pattern routing, especially when making multiple parts that must be the same.

Flush-trims are great because they let your router follow the outline of a curved pattern (sometimes called a 'template'), automatically imparting the shape of that pattern onto your work piece. The most common type of flush-trim bit has a bearing on the end, opposite the shaft. This type is typically used in a table-mounted router, with the height of the bit adjusted so the bearing rides on the edge of a pattern as it's fastened to the top surface of your work piece. Prepare a plywood or hardboard template of the precise shape you want to create, rough-cut your wood about $\frac{1}{16}$ " larger than the pattern all around using a jigsaw or band saw, temporarily fasten the pattern to the wood with double-sided tape or finishing nails, then run the assembly around the spinning flush-trim bit. As the bearing rides on the edge of the pattern, it allows the cutters to trim away only the wood that extends beyond the pattern. You get exact duplication of the pattern on your work piece. It's a powerful technique.

The only hitch in this good news story has to do with wood grain. As long as your router bit is cutting with the grain, excellent results are virtually guaranteed. But if the curved shape of the wood leads the cutters to cut against the grain, you could get rough results or even chunks of wood torn out of your work piece if you don't do something about it.

Flipping the work piece/pattern sandwich upside down, so the template sits

underneath the work piece (sliding on the router table top), solves this problem by changing the direction that the wood is fed into the bit. To make this happen, however, you've also got to change your flush-trim bit from one with a bearing on the end to one with a bearing on the



Double bearings – These bits allow you to flip a work piece over to rout in the proper direction according to the wood's grain.

shaft. And while this is a pretty big hassle, it's something that can be easily avoided.

Another, much better alternative involves using a flush-trim bit with bearings on both tip and shaft. This specialty double-bearing bit makes it easy to rout smoothly and safely along the edges of all curved patterns, flipping back and forth to deal with whatever grain direction is at hand. At worst, you might have to raise and lower the bit slightly, so the bearing continues to ride on the edge of the pattern as it sits on top or bottom, depending on how the wood is oriented during that part of the cutting session.

Another kind of flush-trim bit has the bearing only on the shaft. Although you could use this bit for duplicating parts too, it's best suited for plunging down into work pieces from above, with the bearing directed by a pattern. You'll find this kind of bit ideal for making mortises and dados of all sizes.



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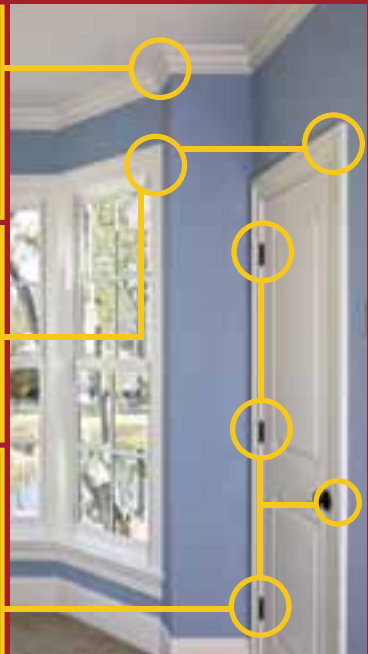
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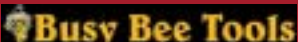




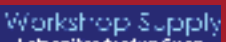














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#2 The Chamfer Bit: Classic edge treatment, small and large

While the chamfer profile might seem ho-hum at first, it's actually one of the most versatile and enduringly attractive, so don't overlook it. Unlike many other decorative edge treatments, the subtlety of the chamfer is almost never overpowering. Even when you want very crisp lines on a project, a delicate, 1/16"-wide chamfer makes sense. It helps edges resist breaking and wear better than a perfectly square corner, and since it's cut with a router, it's more consistent than sanding corners slightly rounded by hand.



Large and small
– Chamfer bits come in a variety of sizes to accomplish a multitude of tasks.



Large scale work – Using a large stopped chamfer on large timbers adds another dimension to your work.

At the other end of the size spectrum, large chamfer bits are one of the best ways to make heavy, outdoor woodwork look great. A honking-big 2 1/2" dia. chamfer bit set to mill a 1/2" or 3/4"-wide chamfer on the edges of a 6x6 or 8x8 makes ordinary, pressure-treated posts look like parts of fine, timber-frame joinery. You can also use this approach to good effect on interior beams and posts, too. For best results, start and stop these chamfers several inches away from the ends of the beams you're milling. The transition between routed and unrouted corners looks great.



Upscale panel – Using the bullnose can create dynamic surfaces like this beadboard panel.

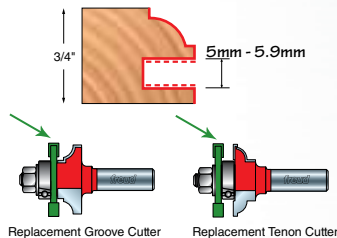
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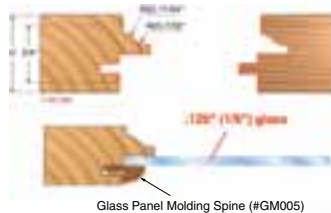


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Not only is this the perfect replacement bit for the Porter Cable Hinge Butt Template Kit (model #59381) it can also be used as a 1/2" flush dado cutter. Simply replace the bearing with a new flush trim ball bearing and you can easily cut 1/2" dados and grooves. This optional ball bearing (#62-103) will soon be included with the bit at no extra charge. Another added bonus from Freud!

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#3 The Bullnose Bit:

Clean, elegant trim and a better fit

In the router bit world, 'bullnose' refers to any bit with a semi-circular, concave profile. The most useful versions have a bearing on top, though this bearing isn't always used. In fact, most of the bullnose work I do happens on a router table, with a fence and feather board supporting strips of wood that I'm making into trim. The bearing is still there, it just sits out of the way, behind the fence.

Bullnose profiles are useful in two major ways: first as stand-alone trim stacked together with other trim elements to produce intricate mouldings, and second as a decorative detail routed into the face of adjoining parts or bead board paneling. The real beauty of bullnose in this application is the way it makes the transition



Bullnose bit – This bit is available in many sizes and can provide a host of decorative elements to your woodworking.

between adjoining surfaces less critical. A little bit of mismatch where two cabinet doors meet, for instance, is much less noticeable when the curved edge of a small, bullnose profile is located right along the side of one door stile.

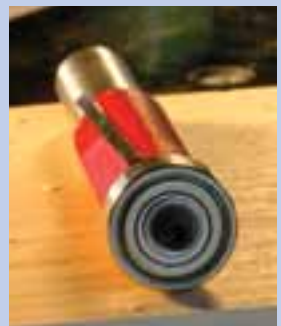
Flush-trim, chamfer and bullnose router bits are certainly not the only ones you'll need, but they can vault your work to a new level, in ways that are often overlooked.

STEVE MAXWELL
steve@stevemaxwell.ca



Angled Cutters Mean Smoother Cuts

Slicing wood yields the smoothest cuts, and that's why the best performing router bits have cutters that are angled relative to the shaft. Though it doesn't look like much, this leading-edge cutter geometry results in a slicing action that handles contrary wood grain better than router bits that hack away at the wood square-on.



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Red Oak

(*Quercus rubra*)



This common wood is perfect for a whole host of uses.

BY JONATHAN STOPPLES

With over 250 species of oak worldwide, Northern red oak is North America's most widely used and available hardwood. Northern red oak grows from south eastern Ontario all the way out to the Maritimes, trees usually measuring 60-80 feet with a diameter of about 3 feet. Red oak belongs to the beech family (*Fagaceae*).

Characteristics

Straight grain and prominent rays define this classic wood, although the rays are usually shorter and darker in colour than white oak. The sapwood is almost white, usually measuring no more than two inches thick, while the heartwood is a light reddish brown. Red oak has a coarse texture and is extremely porous.

Working Properties

Typically red oak machines quite well but watch out for splintering and chipping. If possible, avoid cutting across the grain. Not the most fun to work by hand although it turns and steam bends fairly well. Because of its large pores, consider using pore filler before attempting to stain or finish the wood. Pre-drilling for installing screws is also recommended, due to the woods density.

Shrinkage

(green to kiln dried)

Radial	4%
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Volumetric	13%

Physical Properties

Red oak is a strong, dense hardwood with good steam bending qualities, high shock resistance, medium bending strength and stiffness. It has a specific gravity of 0.63 at 12% moisture content.

Uses

Being the most commonly used hardwood in North America, red oak's uses are extensive, including mine timbers, railroad ties, architectural interiors, flooring, millwork, cabinetry, plywood, coffins, pallets and more. The bark in red oak is rich in tannin, used in tanning leather. Supplies of red oak are plentiful and because it's one of the faster growing species of oak, chances are it will remain widely available and inexpensive for years to come. Red oak runs about \$3.75-\$4.25 per bdft for 4/4 select and better.

JONATHAN STOPPLES

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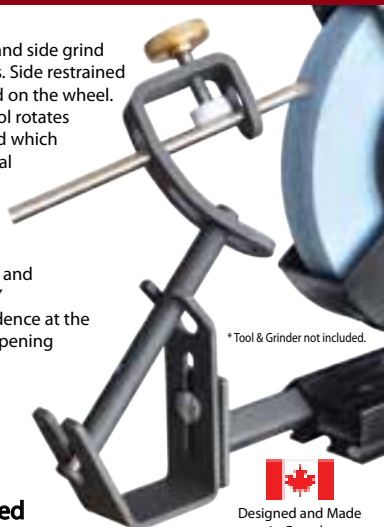
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Christmas Wrap

The year is finally wrapping up and with it ends the seemingly unending saga of my woodcarving. Since this is the Christmas issue I thought it appropriate to write a Christmas carving tale. And no, I will make absolutely no reference or sad pun about carving the Christmas goose. Although I probably could if asked nicely. Anyone? No?

Okay then, the truth be told, the sad end to my carving career nearly came about late one Christmas Eve. At the stroke of midnight I was visited by a spirit, likely the scotch, who foretold the coming of the ghosts of carvers past and present. I shakily enquired as to what happened to the third one but alas, I was informed that there would only be two ghosts as I clearly had no future as a carver.

That Christmas I had decided to surprise my wife with a carving of an Olde-Tyme Father Christmas. Don't ask how I knew she wanted one because it's still a mystery to me. Although, the previous June I had begun to find magazine pictures of old Santas pasted to various surfaces of the house, the shop, inside the car and even one scotch-taped to my forehead one morning. It all helped to clue me in. You don't have to beat me over the head to get my attention.

As Christmas crept closer I remembered those photos. I began by carving an intricate staff for the old beggar to lean on and I started to carve a woven

wicker basket for his back to eventually hold hand-carved teddy bears and other presents. I carved a large pocket in his cloak to fit a cute little puppy that would snuggle deep inside. I began so many extra little carvings that I nearly ran out of December before I even started on the Father Christmas.

Christmas Eve arrived early that year so I packed the unfinished staff in one little box and the partially completed presents for his pack in another. The roughed-out puppy was dropped into a little ring box with a ribbon and the figure was placed in a box all by himself. That way it looked like she was getting far more than she really was and I would look better.

Christmas morning came and Kelly and the kids leapt from bed at the stroke of about 9:30-ish! They do love their sleep! Kelly shoved the kids aside in the excitement to reach her presents first. The boy careened off the couch leg while our Number One daughter deked around the dining table trying an end-run to the tree. Our emergency-backup-daughter, being small, was able to sneak her way across the room using the dog as cover.

Shreds of gaily coloured wrapping paper flew and bright curly ribbons fluttered through the air as presents were viciously torn open and just as quickly discarded in the search for the next treasure. Kelly hefted the box containing the figure and as she started to unwrap it I began my apologies. I tried to explain that I had run out of time because I was trying to make it the best Father Christmas ever, just for her. As I handed her the other packages containing the staff and the puppy and other accoutrements I told her I could complete the carving now that I had the time.

Eleven years later and the carving still sits in my shop, covered in sawdust. The pocket for the puppy lies empty, the dog long lost. The staff still looks like a piece of dowel and the presents are mere blocks of scrap pine somewhere. So please, let my story be a lesson to all you spouses. Cut out the photos in April! Merry Christmas!

DON WILKINSON
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Illustration by: Mike Del Rizzo



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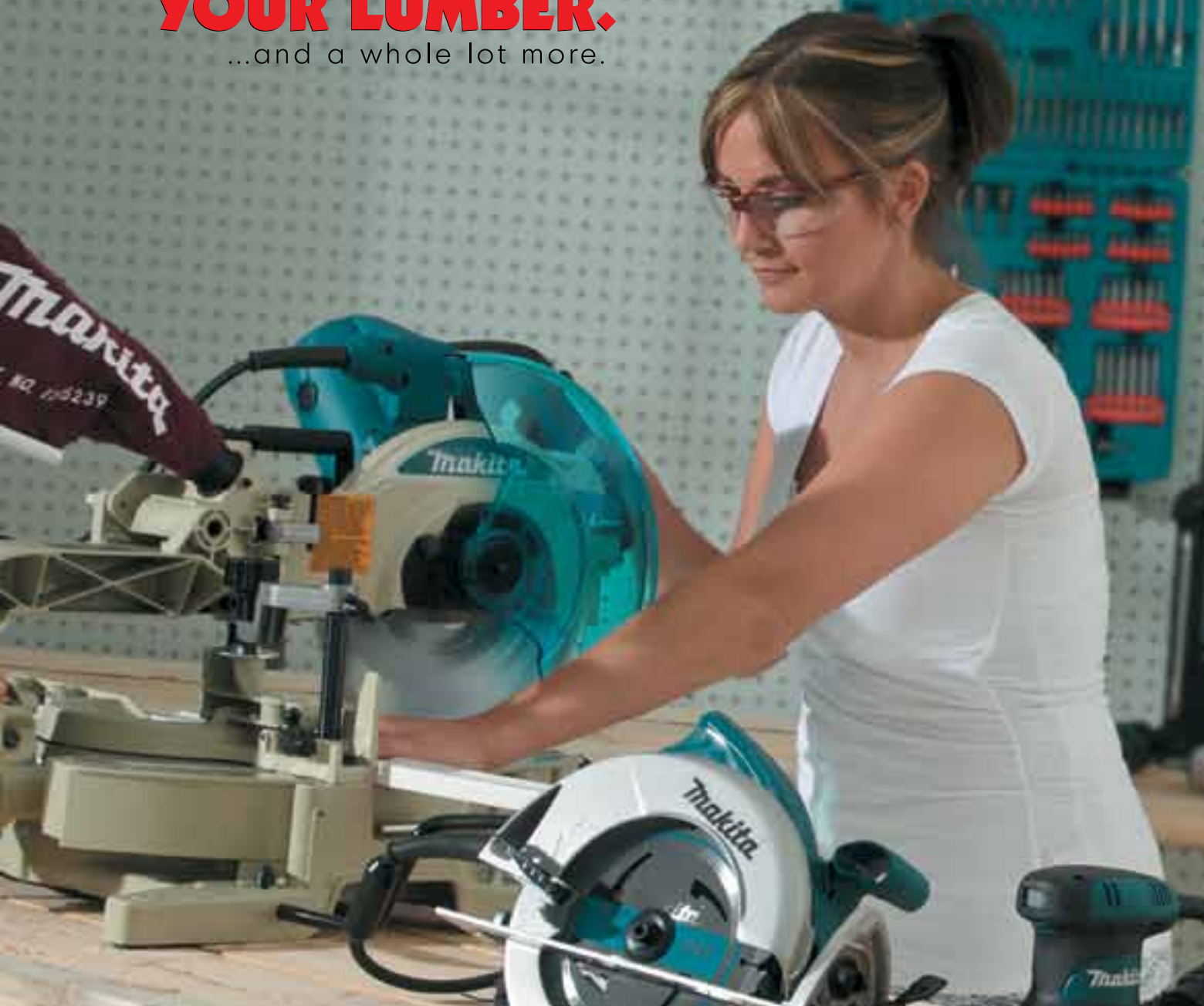
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