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Issue # 58

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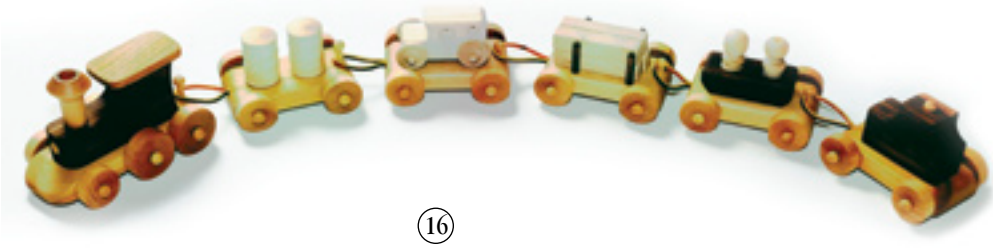
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editor'sletter

BY CARL DUGUAY

I think that the act of creating is an integral part of what it means to be human. We see it in young children making mud pies, fashioning toys out of sticks and bits of paper. Go to any community centre and you'll see throngs of people of every age signing up for painting classes, square dancing or flower arranging.

Creating makes us feel useful and purposeful. It can give us a unique feeling of having accomplished something really special. And receiving something that another person has invested their time and energy in making from scratch is a testament to their affection and love for us. Some of the fondest memories I have of our daughter are the small things she made for us when she was no bigger than a hobbit.

When I ask people why they've become involved in woodworking I'm always amazed by how many talk about the importance of creating something with their hands. Of course, they mention a range of other reasons, but the act of creating usually seems to be front and center in their minds.

Michael Kampen's 'Childhood Memory Box' is a fitting project to spearhead this issue of the magazine. Michael created this shadow box for his niece, so that her mother would have a place to store little Suzy's hand print creation. A bit of memory created to last a lifetime.

In fact, the whole magazine is filled with the acts of creation. Henriette Corbeil's 'Sunrise' intarsia creates a panorama of the Laurentians that she loves so much. Garnet Hall has created a set of lovely toy trains that would bring joy to any youngster (or young person at heart). Given the importance of eating in our daily lives, baking and cooking are probably two of the most popular creative endeavours worldwide, and Paul Ross's 'Cherry Serving Tray' is the perfect way to present culinary creations. Taking things one step further, Scott Richardson has fashioned a tool that he uses to create unique hand made gifts. And, to help you enhance your woodworking skills (so you can be that much more creative in the workshop), Vic Tesolin shows you how he cuts fine dovetails, while Michael shows you how to build one of his favourite router accessories.

I also want to bring your attention to Vic's new six-part series on hand planes, in which he'll shed some light on the perceived 'mysteries' of hand planes and provide you with various options for solving your hand planing challenges. Vic will show you how to set-up and sharpen plane blades and give you techniques and tips on how to use them. You'll be hand planing like a pro in no time.

Ain't woodworking wonderful!

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Sanding Frame and Plunge Router

I would like to thank you for the super magazine and awesome articles. I have just retired and finally found time to read them.

Just a couple of questions that I am sure you can answer. I live in a small village called Caroline, 100km west of Red Deer. I build a various assortment of projects from jewellery boxes to corner hutches, and from small garages to large shops. So when I read your article on sanders (Aug/Sept'07, Issue #49), I was quite interested in the Dewalt DW433 particularly as there was an optional sanding frame available. However, when I went to Lowes, and spoke to the clerk, he had no idea what a sanding frame was. However, I went ahead and bought the sander. My first question to you is where in Alberta could I buy the sanding frame, and at what price?

Also, I recently bought a Bosch combo

router (Model RA1161) that replaced my 30 year old Sears router. As I have never used a combo router before, I am looking for a good book on routing.

Thank you very much for your attention to these questions and I am sure we will be communicating even more as I read your magazine.

Len M. Caroline, MB

Thanks for your kind words. We do our best!

The sanding frame you are looking for is part # DW4055, and sells for $115.80. I suggest you contact a couple of the hardware stores listed in your local phone directory and ask them to order that part for you. If there is no local supplier for DeWalt products in your area, call House of Tools (1-800-661-3987) and order one from them.

For your second question, there are several good books on routing. The one we recommend is 'Woodworking with the Router' by Bill Hylton (ISBN: 0762108002). You can order it from your local bookseller or online at www.chapters.ca. For a review of the book go to our On-line Product Reviews at www.canadianwoodworking.com/Newsletters/reviewindex.htm.

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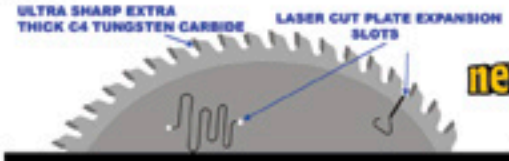

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 BY MICHAEL KAMPEN

Childhood Memory Box

Children love playing with messy, gooey things and adults love to preserve those early childhood memories. This project is great for both.

Mounted in this memory box along with a photo taken on the day the handprint was made, this project will preserve childhood memories for a lifetime. Make one every year to have a record as they grow up.

The construction of this memory box is straightforward. Basically it's a simple box with mitered and reinforced corners topped with a mitered face frame. The construction process is made easier with some of the jigs featured in our ShopJig series in past issues: the miter sled (Dec/Jan '09, Issue #57); and the spline jig (Aug/Sept '08, Issue #55), which uses a biscuit joiner to reinforce miter joints with feathers. These jigs make the construction much easier and are well worth the time it takes to build them.

Begin by carefully choosing the wood for the project; because the pieces are all narrow it is best to choose straight-grained wood for a clean appearance that won't distract from the contents. I chose red oak for this project as it is readily available, and with careful selection, the stock can be cut to show vertical grain on the faces of the frame pieces. Walnut presents a nice contrast to the oak for the feathers.

Mark out all of the pieces on the stock for best appearance, and then cut out the individual pieces. The box sides are shaped to hold the contents and the glass cover. When milling the sides, the bearing surfaces are cut away, and without sufficient surface area to register on the router table it can be difficult to keep the piece stable. To avoid this, and to keep you working safely, leave a 'foot' on the back edge when making the second cut. This will support the piece and keep it level during the routing process.

Milling the Sides

- Start by cutting the long sides (A) and short sides (B) to size.
- Use a Pocket Hole Jig, kregtools.com, to drill a hole for a screw 3 ½" in from the end of each piece. Place another pocket screw hole offset from the center by 1" on each of the long sides.
- There are four basic steps involved in cutting the sides, as shown in the accompanying illustration. First, install a spiral bit in your table mounted router, set the fence to make a ⅛" x ¼" cut, and rout the rabbet for the glass on the front inside edge of the side pieces. Second, move the fence back and rout out most of the main section that holds the contents, leaving a small foot in place. Third, move to the table saw and cut a groove along the length of each piece to define the bottom of the rabbet for the back. Fourth, tip the pieces up on edge and run

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them through the table saw, making the cut to complete the rabbet for the back.

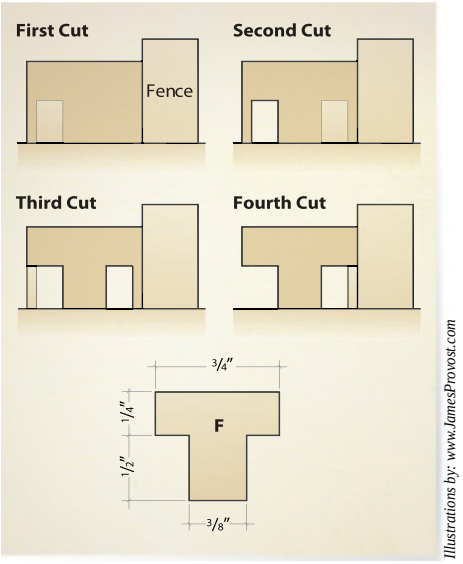
• Use the miter sled on the table saw to cut the miters for the four corners.

• Mix up some five minute epoxy, elmers.com , and lightly butter both sides of the joint to ensure adequate epoxy coverage on the end grain. Carefully assemble the frame and apply a band clamp, applying pressure to keep the joint tightly closed until the epoxy hardens.

• Mitered joints are not very strong, and although this project won't be subjected to any stress, adding the feathers to the corners reinforces the weak glued miter joint as well as providing an interesting design element when contrasting woods are used. When the epoxy has set, use the spline/feather jig and a plate joiner to cut the slots to slip the feathers into.

• Mill material to thickness for the feathers (C). Slip a piece of cardboard into the slots and trace the corner of the box onto it, staying about ⅛" away from the surface; cut this out to serve as a pattern for the feathers. Use this pattern to mark the feathers onto the stock and then cut the individual feathers free using a scroll saw or bandsaw.

• Use an artist's brush to apply glue to the inside of the slots and then press the feathers into place. Be sure that the feathers bottom out completely in the cut or there will be visible gaps after sanding. Set the frame aside to dry.



Steps in cutting center divider

The Face Frame

The miter joints in the face frame are held together with epoxy. Cleaning up this messy adhesive on profiled edges can be problematic and cause finishing problems later. To avoid any potential problems with the epoxy interfering with the finish, or the finish from interfering with the epoxy, follow these simple steps for a perfect hassle-free result.

• Cut the long sides (D) and short sides (E) to size and sand the top and outside edges for finishing.

• Insert a beading bit in your router table and cut the bead on the outer edge of the frame pieces.

• Use a classic cove bit to profile the inner edge of the frame pieces on the router table.

• Sand the profiles on a drill press equipped with a sanding mop, stockroomsupply.com. This is the easiest method available to sand routed surfaces without noticeably altering their profile.

• Apply a coat of Watco Oil to the frame pieces and follow this up with a couple of good coats of wax.

• Cutting the miters after finishing ensures that there is no finish on the end grain to interfere with the epoxy. Use the miter sled to cut the miter joints at the four corners.

• Mix up a batch of epoxy and assemble the frame with a band clamp. Be sure that the frame is square or it will not fit on the box properly. The epoxy may make it a little tricky to tighten up the band clamp as the pieces will want to move and spring apart as the clamp is tightened. Another option is to use corner clamps, but this will raise the pieces off the bench making it more difficult to get a perfectly flat result. You can use some straight edged wood fastened to your workbench at 90º to each other to act as fences, with bench dogs and wedges supplying the clamping force on the other two sides. This keeps your pieces level on the bench, ensuring a flat result. Use a 23 gauge, 1" headless pin driven in from each side of the joint to provide some mechanical strength.

Feathers in place

• Clean up any epoxy that squeezes out of the joint; the wax will keep it from sticking to the surface.

The Box Content

The medallion is mounted on one side with a photo on the other side. A divider is installed to provide a separation between the two. In profile this piece looks like a 'T' with the top section notched to accommodate the rabbet for the box contents.

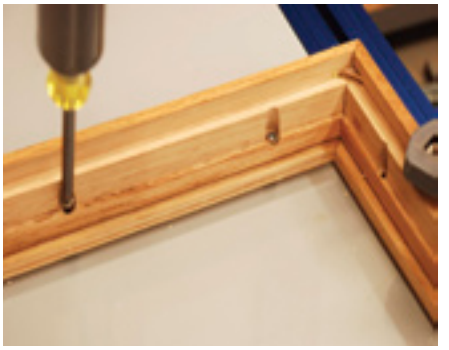
• Cut stock for the center divider (F) longer than required; it is safer to perform the following operations with a longer piece than with a short one.

• To cut the rabbets into both sides of the divider you will need to make only one change in the fence setting on your table saw. Set the fence on your table saw to make the first cuts on the inside of the piece. Make the first cut and then simply reverse the piece, running it through for the other side. Move the fence out enough and repeat this to remove the remaining material.

Prepare a blank for the medallion surround (G). The medallion will be too thick to fit on top of the ¾" thick piece that serves as the background on that side of the box, so you will need to rout a depression into the surface to be able

Close up of box corner

Frame and box clamped for assembly



Drive pocket screws into face frame

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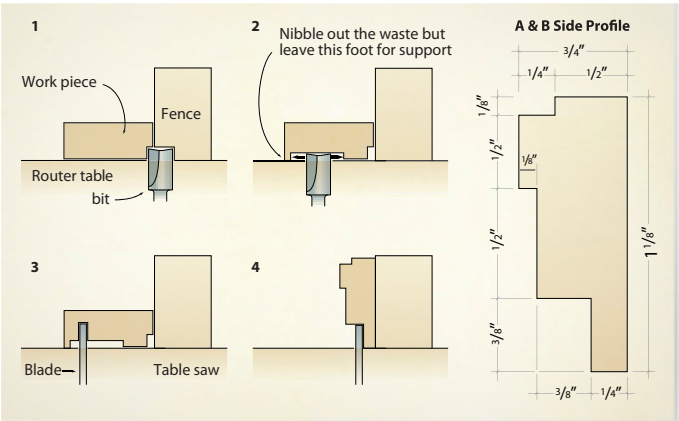
to recess the medallion. To accommodate the thickness of this particular medallion, I had to cut a round mortise that was 5 5/8" in diameter and almost 3/8" deep. Your dimensions will likely vary from this.

I used computer software to design the depression in the medallion surround and then passed the file on to a CNC router to carve it out while I went for lunch, carvewright.ca. Alternately you can mount the blank on a lathe and turn the depression. When mounting the blank be sure to use short screws that do not penetrate into the area that you are turning. Alternately you can fasten a sacrificial block to the back of the blank with a glue and paper joint to provide the added depth for the screws. Another option would be to use a circle cutting jig, workshopsupply.com, to cut a circle into a piece of plywood and then use this piece of plywood fastened to the blank to guide a dish-carving bit to carve the depression.



MATERIALS LIST (All measurements in inches)

Part		Qty	T	W	L
A	Box long sides	2	3/4	1 7/8	15 9/16
B	Box short sides	2	3/4	1 7/8	9 5/8
C	Feather stock	1	3/16	1 1/8	24
D	Face frame long sides	2	3/4	1 1/8	16 1/16
E	Face frame short sides	2	3/4	1 1/8	10 1/8
F	Center divider	1	3/4	1	8 5/16
G	Medallion surround	1	3/4	6 1/8	8 1/4
H	Back	1	1/2	9	14 7/8
I	Glass	1	1/8	8 3/8	14 7/16

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• Cut a piece of Baltic birch plywood to size for the back (H). Because the contents will cause the shadow box to be heavier on one side than the other, it is best to hang it on two nails spaced several inches apart. Install a keyhole bit, leevalley.com, in your router table and set the fence back about an inch. Run a stopped keyhole slot across the top of the back.

• Sign and date the back for a positive record of the date. Suzie was too young to write when she made this hand print, so I used the CNC router to engrave a message marking the occasion. As the children learn to write, have them use a felt pen to write the message themselves.

Sand and finish all of the visible wood surfaces now, before final assembly. Take the box in to a glass shop and have them measure the opening and cut a piece of glass to fit.

Assembly

To avoid shifting the face frame on the box as the pocket hole screws are driven in, it is best to clamp the two solidly together. I use a Kreg Klamp Table, kregtools.com, which makes it simple to clamp them together and hold them solidly in place with only two clamps.

• With the box and face frame clamped together and securely clamped to your bench, drill a pilot hole into the face frame for each pocket hole screw. If you don't drill a pilot hole, the screws are likely to crack the narrow frame stock.

• Separate the two pieces and insert the glass and then clamp it again. Drive in the pocket hole screws to hold everything together.

Back inscription

• Use epoxy to fasten the medallion to the surround and when cured, set it in place.

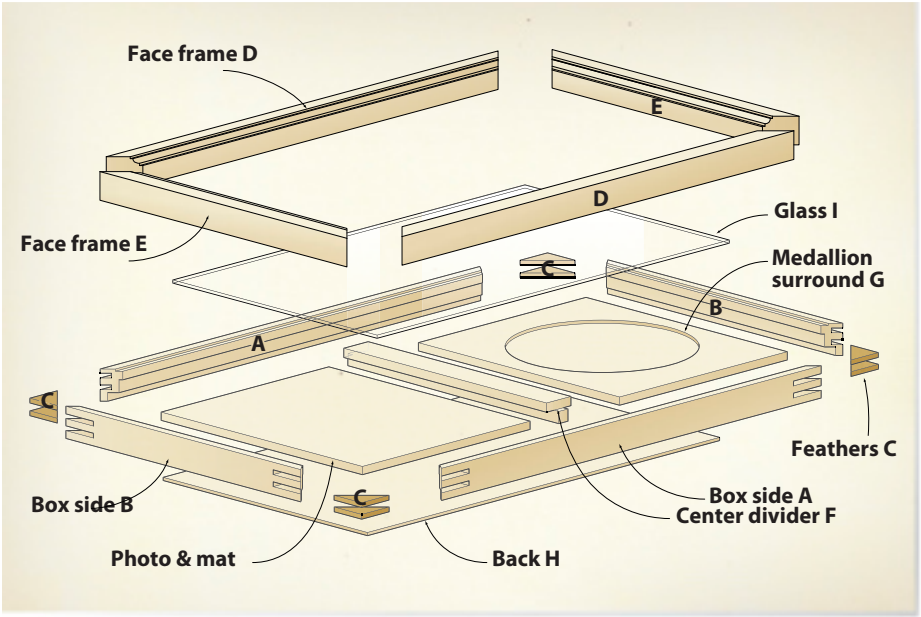
• Set the divider in place and snug it up to the medallion surround. Use a couple of 23 gauge pins driven at an angle through the surround and into the box sides to hold it in place.

• Measure the opening and cut your matted photograph to fit; cut a template to fit the opening using card stock and then center this on the mat to mark your cuts. Cut cardboard filler pieces to size to fill the space behind the photograph.

• Set the back in place and drill pilot holes for some #4 x ¾" screws. Fasten the back in place being sure to recess the screw heads *below* the surface.

This box provides a window to the past. Make one every year as your children grow and they'll be treasured for generations.

MICHAEL KAMPEN
mkampen@canadianwoodworking.com



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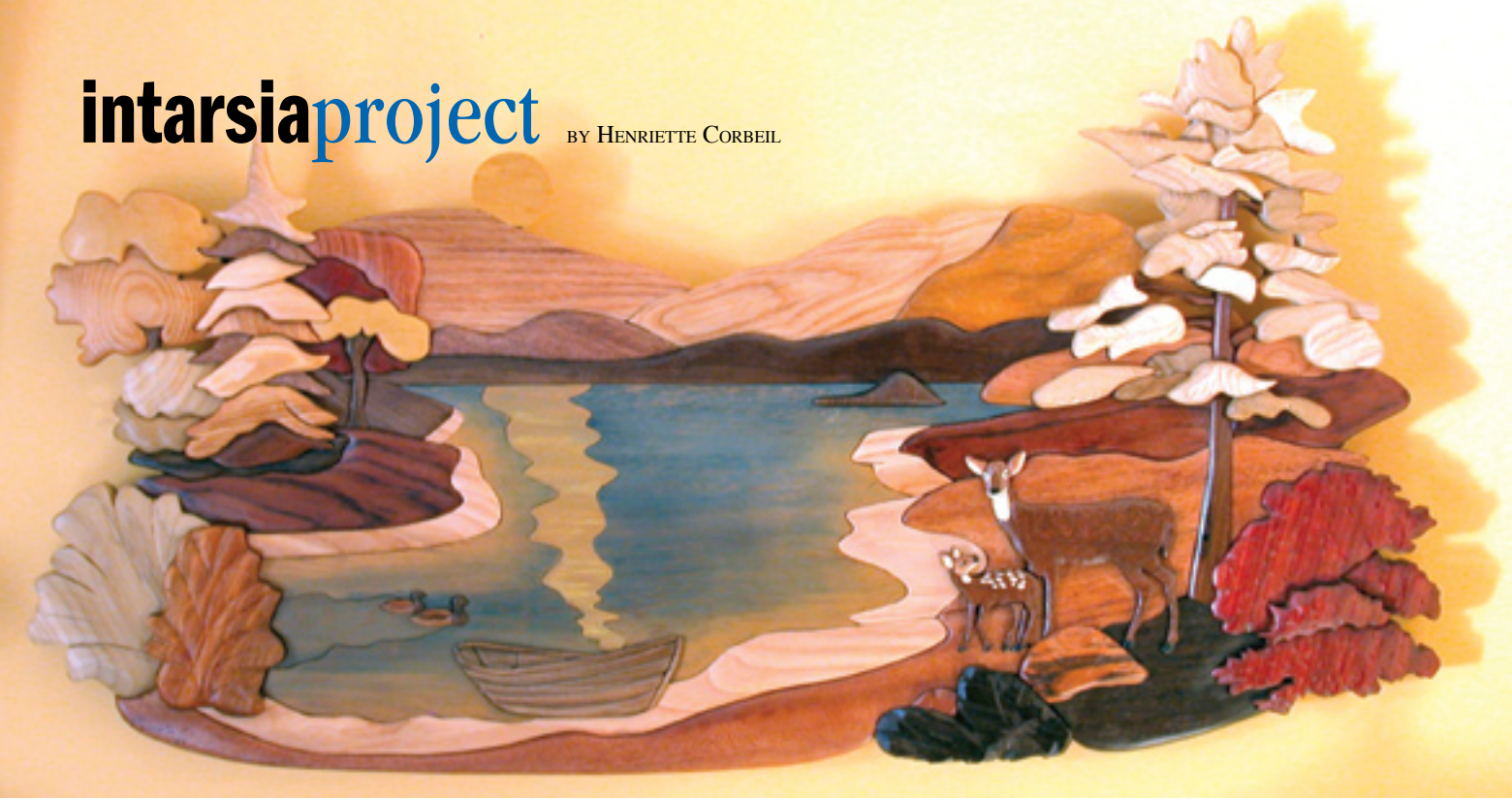
BY HENRIETTE CORBEIL



Sunrise

The Laurentians is a vast region of Quebec known for its lakes, valleys and mountains. For the intarsia artist it provides countless design opportunities.

This intermediate level project contains 137 pieces of wood of various species. The pieces vary from ¼" to 1" thick, with the final project size measuring 16" by 30". You can photo-enlarge the pattern to customize the size of the project, but bear in mind that some of the pieces are quite small, so don't reduce the pattern too much. On the pattern, I have indicated wood grain direction (arrows), wood shading, and wood thicknesses in eighths of an inch.

Initial Preparations

As with any intarsia project, I begin by making four or five copies of the project pattern, and label one of them 'Master'. Tape a sheet of waxed paper on top of the master copy; you'll assemble the project on this sheet, and the waxed paper will help keep it from getting too scruffy.

The selection of wood will have a tremendous impact on your project finish. 'Pure' intarsia is made by using woods in their natural colour (without applying a stain). I personally don't mind using a little bit of stain or acrylic paint in order to get the colour I am looking for, or simply to enhance a specific area of the project. Sometimes, just a little touch-up can make a huge difference. In this project, I wanted to tint the lake, so I selected cedar for that piece, as it works great with acrylic paint.

Along with colour, you need to consider grain direction. Different woods will suggest different kinds of movement. For the boat on the shore I selected a piece of grey maple that had the perfect curves in it, while for the mountain at the top, I used ash; its distinctive grain pattern suggested hills and valleys. Cedar and poplar are usually very good for suggesting water, while I have a preference for Brazilian lacewood for deer fur. Even though I have suggested some wood species you should make your own choices depending on the wood that you have at hand.

When choosing wood thickness, keep in mind that you can use shims on the pieces that are not part of the contour, as the shims will be invisible underneath. Using shims can reduce material cost for more expensive species, but it does take more

Match wood grain for boat

First three areas cut and ready to fit

Glue cut paper templates on wood

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time because you have one extra piece to cut and glue underneath the top piece. I try to purchase most of the wood I use at building supply stores as I can select pieces with unique grain patterns. Unfortunately such stores tend to stock only domestic wood species. For exotic woods you will need to purchase from specialty wood suppliers; fortunately many of these will ship small quantities direct to you. Wood shows are also a good place to stock up on smaller exotic woods.

Transferring the Pattern to Wood

Rather than using the tracing method with carbon paper, I use the cut and paste method, gluing each pattern piece onto the wood, to eliminate tracing variations from the original pattern. I begin by using a yellow highlighter to mark the lines I want to cut on the pattern copies. This helps reduce cutting mistakes, as there are a lot of surrounding lines from adjacent pieces on the pattern. I cut the pattern pieces along the lines I have marked, and then I regroup them based on wood colours and thicknesses required. I attach the patterns to the wood with a glue stick or with spray adhesive.

Cutting the Pieces

I like to cut many pieces of wood at the same time or even the entire project all together when it is not too complex. For a large project like this, I cut a smaller area first and fit the pieces tightly together before cutting other pieces around it. Breaking the project down into more manageable areas makes it less intimidating. I usually start toward the middle of the project and work my way out. In this case, I started by cutting the lake, the pine tree on the right side, and the fir tree on the left side. I worked around these three areas until they were all connected together.

Before cutting I identify the pieces to be cut at the end of the project – the buffer pieces. The idea is to allow you to redraw the buffer piece pattern using adjacent pieces already cut as guides to ensure a tighter fit. For example, on this project, I marked the piece at the bottom of the fir tree as the buffer piece. I started by cutting the trees, then I completed the area by cutting the buffer piece last.

Make sure your scroll saw blade is perpendicular to the table, and cut right on the line. Be careful not to push too hard on your blade because your cut edge may not be straight. This is more likely to happen with thick hardwood such as bubinga or oak. When a lot of pieces are similar, I number them with a red pencil on the back. The boat side pieces are a good example of this. If I do not intend to fit the pieces together right away I will tape them together - this saves a lot of time trying to figure out what goes where.

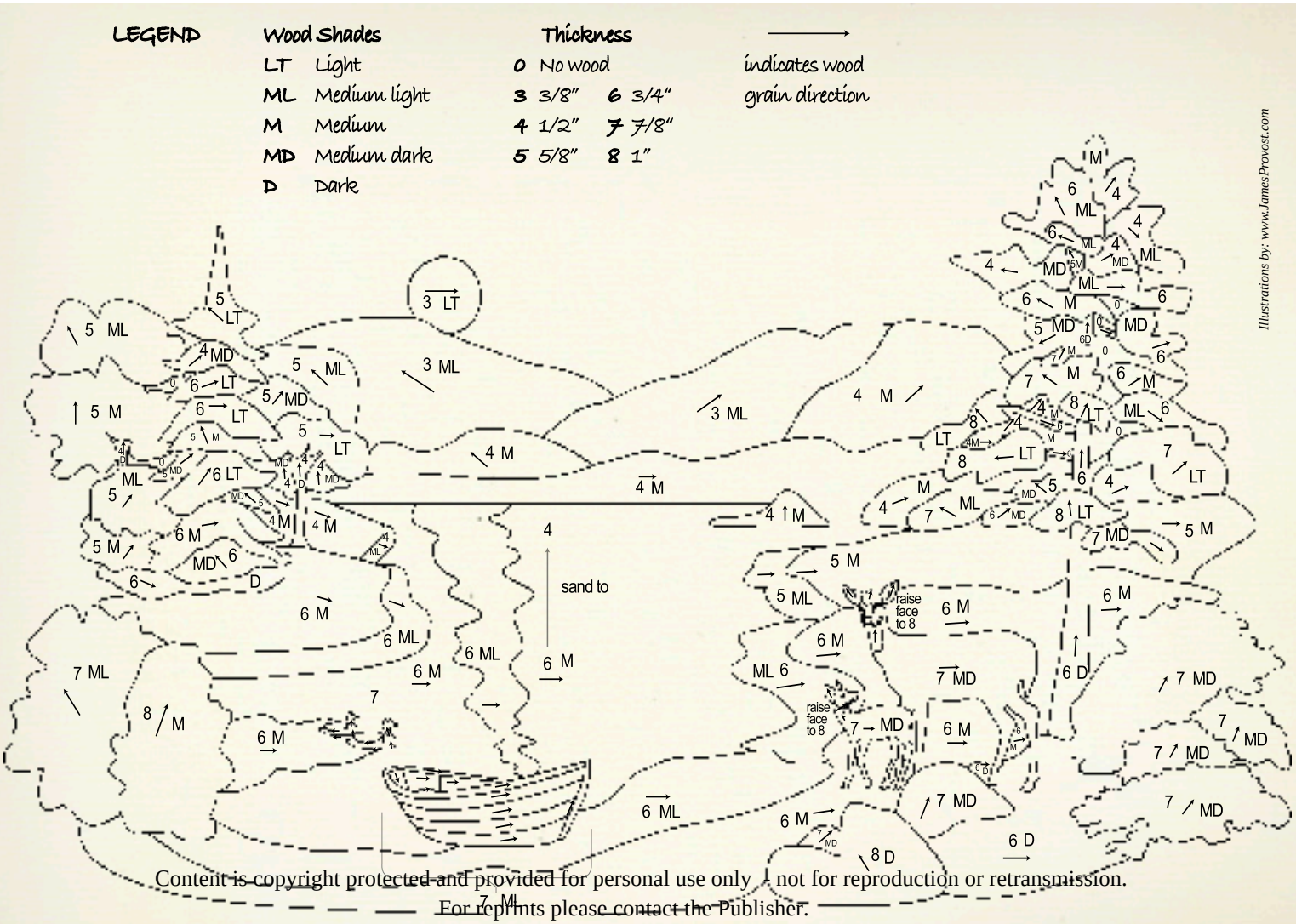
SUPPLY CHECKLIST

- Birch plywood – 1/4" x 16" x 30"
- Variety of hardwood for the project pieces
- Acrylic colours, finish, label, hooks and wire
- Double sided tape, yellow highlighter.

Fitting the Pieces

Fitting the pieces of an intarsia project together is much like doing a puzzle. When complete, the project will be perfectly assembled on top of the master plan.

Sand the bottom of each cut piece to remove the irregularities (fuzz) left by the blade, and then remove the paper on the



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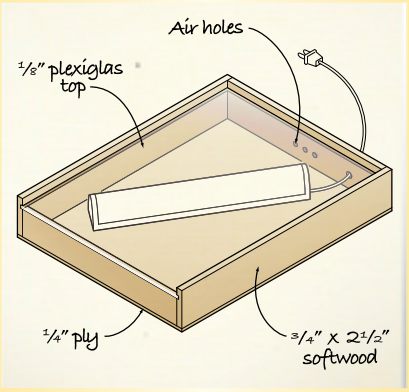
top surface with a sander. So that you don't inadvertently get the two sides confused, mark the bottom of each piece with a red pencil, which will show up on both pale and dark woods.

Check the pieces for fit, ensuring that the edges are square. This is essential for a good fit. If a cut needs to be adjusted, you can use an oscillating spindle sander to make the cut edge square. Be careful if you use a rotary tool, such as a Dremel, as it is more difficult to keep the edge perpendicular to the wood piece. You may have to do a little bit of sanding here and there to improve the fit. Small gaps of 1/32" are usually acceptable as they won't be visible on the finished assembly. A large gap equally spaced is much better than a gap that varies in width.

If you see that you have deviated too much from the plan, you can trace new lines based on the adjacent parts that are already cut (as I do for the buffer pieces). For better precision, I take a mechanical pencil with 0.5mm lead to make sure I follow the edges very closely. I also use a homemade light box, which makes it easy to see the gaps between wood pieces. I put the pieces on the light box, find any gaps, determine where I need to sand, and then mark the piece on top with a red crayon where it needs sanding. It is very hard to eliminate all the gaps.

Light Box

A light box is simple to make. Make a frame of 3/4" x 2 1/2" softwood, the length of the pieces depending on how large a box you want. Using the table saw or router table, mill 3/16" grooves about 1/4" down from the top edge on three of the frame pieces. The Plexiglas top slides into these grooves. Cut the top of the fourth frame piece so that it fits under the Plexiglas. To assemble the frame I simply screwed the sides together, and then screwed a 1/4" piece of plywood to the bottom. I also drilled some air holes and an access hole for the light fixture cord.



Raising and Lowering the Pieces

Once the pieces all fit together nicely, it's time to raise or lower individual pieces where necessary. Shims can be made from any scrap wood, veneer or plywood, and are glued to the bottom surface of a piece. To lower a piece measure how much you want removed from the piece, place a reference line around the bottom of the piece, and use a sander to remove the excess material.

It isn't a good idea to shim contoured pieces as the shim will be visible from the side when the piece is finished. If you absolutely must shim, use a shim of the same wood species that was used to make your piece.

Shaping, Sanding, Texturizing

To remove a lot of wood fast you can use a belt or disc sander equipped with coarse sanding paper (60 - 80 grit). Complete the shaping using an inflated drum sander, or a rotary tool with a finer grit paper (100 – 120 grit). It's good practice to frequently compare a piece's thickness against the other pieces; this will help ensure you don't remove too much material. Reference lines, which let you know when to stop shaping, are also a good idea. Identify the edges that should not be rounded on the pattern. Water is a good example. You don't want to round any of the water piece edges. When you have a tree in front of mountains, you round the tree edges but not the mountain edges.

Example of acceptable fit

Pine tree fit completed

Keep buffer zone for last piece

Mark contour before cutting next piece

Side view of raising shims

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The more time you spend shaping your pieces, usually the better three dimensional effect you are going to get. Intarsia is not just a matter of cutting pieces and fitting them together like a flat puzzle. I used a bow sander to sand edges of narrow curves (i.e. the bushes). Once pieces are shaped, you may need to do finish sanding to eliminate any visible sanding marks. Remember to sand in the grain direction, progressing up to 220 grit, or until any scratches disappear. If you plan to stain the wood, this step is critical. The wood surface needs to be as smooth as you can possibly make it, as stain will highlight any sanding marks.

For this project, I decided to give the bushes, long grass and pine tree needles some texture instead of leaving them with a plain surface. You can do so with a variety of tips on a rotary tool, with sanders or carving tools. For the pine needles, use a 1⁄16" cutting disk on the rotary tool to make some marks on the surface. You can use the same tool for the long grass bush on the left side of the project. For the bush on the right side I used a sanding tip to do the texture.

Applying a Finish

Apply one coat of clear wood sealer on pieces you don't want to stain or paint. I prefer to do this step before gluing because it will protect the wood from unwanted glue stain afterwards. Make sure you allow the sealer time to dry. Always test your staining or colouring on a scrap piece of wood. Hardwoods and softwoods do not react the same way when stained. You don't want to destroy your project at this late stage.

I decided to paint both deer faces, some white dots on the baby's back, and also their hooves, as I felt that the pieces were too small for me to cut and sand properly. On the water I used yellow highlights to show that the water is not deep close to the shore and also to show the sun's reflection on the lake. To make the yellow I blended crocus yellow and golden brown acrylic paint. I applied midnight blue acrylic paint in the deep water area first and blended gently with the yellow towards the shore, using a clean dry rag. Acrylic dries very fast so I mixed it with a little bit of water and quickly wiped it off with the rag allowing the wood grain to show up through the acrylic coat.

LIST OF WOODS USED IN THIS PROJECT	
Boat, lake and sand beaches	Cedar, hickory and grey maple
Bushes and trees	Padauk, mahogany, bubinga, canary wood, cedar, yellow birch, yellow heart, pine, poplar, santos rosewood
Deer	Beech and Brazilian lacewood
Ducks	Jatoba, Madagascar rosewood, walnut
Land and island	African mahogany, bubinga, cherry, shedua, walnut, wenge
Mountains and sun	Canary wood, yellow heart, mahogany, oak, walnut and white ash
Rocks	Gonçalo alves, jatoba and Peruvian walnut

Gluing and Final Assembly

Place a piece of waxed paper on the master pattern if you haven't already done so. Position all of the pieces on the full pattern. Waxed paper can be easily peeled off the bottom of the assembly once the glue is dry. Put glue on the bottom ¼" of the pieces you are assembling, starting with the lake (center of project) and moving towards the outside parts. Use a toothpick to spread the glue more evenly at the bottom of each piece. A toothpick can also be used to remove the glue that squeezes out between adjacent pieces. Apply sufficient pressure to make sure the bottom remains flat. Once the project is dry, clean the glue from the bottom edges, if necessary.

Put your project on a ¼" thick backing board, which will add strength and provide a nice surface for the final touches. Trace around the perimeter of the project onto the backboard. Don't forget to also mark the areas inside the perimeter that you also want to remove. Drill holes for blade insertion where necessary, and cut the backboard about ⅛" inside the lines you draw. You can also tilt your blade when cutting the backing. Remove the fuzz by sanding the edges, and then put your assembled project on the backboard to see if any area needs to be re-cut. The backboard should not be visible. I use a rotary tool to sand the edges at an angle providing a nice smooth transition from front to back.

Paint the edge of the backboard in black using acrylic paint or a black marker. Once the paint is dry, glue and clamp the project to the backing board, cleaning up any glue that may have squeezed out. After the glue has dried, apply a finish. I apply three to four coats of a spray varnish. Sanding is generally not required between coats. I use a thin black Sharpie pen to sign and date each piece on the front, and glue a label to the back that shows the different types of wood used in the project. Attach a hanger wire to the back of the piece and it's ready to hang on the wall.

This is an enjoyable project to make. While there are a lot of pieces, and it takes time to cut and assemble everything, it isn't an overly difficult project. On a landscape like this you can remove or add details here and there to better match your taste or to adjust the amount of effort you are prepared to devote to the project. I am more than happy to answer your questions or receive your comments.

HENRIETTE CORBEIL
corbeilintarsia@xplornet.com

Mark piece for lowering

Mark adjacent piece thickness to shape

Use rotary tool to make round edges

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BY CARL DUGUAY

3 Easy Steps to Grain Filling

For an ultra smooth, glass-like surface on open pored woods (such as oak, ash, walnut or mahogany), fill the grain before applying your topcoat.

There are both oil-based fillers and water-based fillers - you can use the former only under oil-based finishes, while you can use water-based fillers under any kind of finish (with the exception of oils or oil blends, like tung oil, boiled linseed oil, or Danish oil). I've used two brands of grain filler with good success: Bartley fillers, lawrence-mcfadden.com, and Mohawk fillers, mohawk-finishing.com.

Grain filler comes in a range of colours, from natural to dark brown. Choose a colour that compliments the colour of the wood you are using, or the final colour you want to achieve if you plan to stain the wood. Your surface should be sanded before applying the filler; I usually stop sanding when any milling marks or sanding scratches are fine enough that they don't show, usually at 150 or 180 grit.

Step One – Seal Open Pores

This is an optional step, though one I always take. If you don't apply a seal coat the filler will colour the wood in addition to filling the pores. If you apply a seal coat, the filler will only fill the pores, and not impart any colour to the wood. The seal coat is nothing more than a thinned coat of the finish that you apply to the wood. If you are using varnish or polyurethane, dilute varnish by 50% with mineral spirits, apply a thin coat and let it dry for several hours. Remember that varnishes do darken most woods. Alternately use a super blond shellac if you want to impart the least amount of colour to the wood. There is no need to sand the seal coat.

Step Two – Stain the Wood

If you plan to stain the wood, do it now. Two of the few woods that I stain are mahogany, as I think it looks so much more elegant with a brown mahogany stain and red oak, a great wood to work with, but I really dislike its bland, amber tone. I apply the stain as per the instructions on the container, and let it dry thoroughly. In a case like this I'll also choose a dark grain filler. Optionally, you can mix the stain in with the filler, or add a tint, such as Mixol Universal Pigments to the filler and apply both at the same time.

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Step Three – Apply the Filler

You'll need an applicator (used paint brush, plastic trowel or stiff piece of cardboard) and some coarse scrap material – that flannel shirt with the monkey photo on it that Aunt Bertha sent you is a good choice – and a clean piece of cotton cloth. Begin by mixing the filler thoroughly. If you find it too thick you can add some mineral spirits to bring it to the consistency of pancake batter (that is, for an oil-based filler). Use the applicator to spread the filler across the surface of your work piece. Then use some scrap material to rub the filler into the wood pores. I use a figure eight motion, rubbing for a couple of minutes.

As you rub you'll notice the filler beginning to thicken. This can happen pretty quickly, depending on how much mineral spirits you added to the filler. At this point rub the filler off against the grain. Then take a clean piece of cloth and do a final light clean up of the surface, rubbing with the grain. Allow the piece to dry overnight. For woods with deep pores, like walnut, you can apply a second coat of filler. Just repeat the same method outlined above. Once the piece is dry you can lightly sand with 320 grit sandpaper.

That's it. You're now ready to apply your chosen finish. For an ultra smooth, glossy finish try applying four or five coats of varnish, letting each coat dry in between. Allow the finish to cure for a week or so, and then wet sand with wet/dry paper or Abralon sanding pads from 800 to 2000 grit. Top off with a buffing compound, and then an ultra fine rubbing compound. For more information see "Rubbing the Finish", Issue 38, Oct/Nov '05.

Mohawk fillers are available from richelieu.com. Bartley fillers, Mixol pigments, and Abralon pads are available from woodessence.com.

CARL DUGUAY
cduguay@canadianwoodworking.com

VaraTrue

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BY PAUL ROSS

Cherry Serving Tray

A serving tray is a great way to embellish any dining room table. Try different woods for dramatically different results.

Turning a tray is an excellent means of enhancing your outboard turning skills, as all the turning is done on the left side of the headstock. The big advantage of this form of turning is that you can keep your body behind the gouge at all times. When turning inboard (the right side of the headstock) and performing a shaping cut on the bottom, you have to pull the gouge toward you, because the lathe bed is in the way. Another advantage of outboard turning is that it usually accommodates a much larger stock diameter. Of course, not every lathe has outboard capacity. You can still turn a serving tray, but the diameter will be limited by the capacity of the swing over the lathe bed.

For this project I used an 18" diameter piece of black cherry. The thickness started at two inches; however a one inch piece could also be used. A two inch block of wood is not only heavy, but spins at a very high velocity. Mount the piece on a screw chuck making sure that the flat surface of the wood is tight against the jaws of the chuck. You'll want to position your body behind the gouge and push toward the headstock. Keep your arms close to your body; this will give you much better control of the gouge. Use the gouge to true up the outside, making the piece almost 90% round.

The next cut is a facing cut made across the face (flat surface) of the piece with a bowl gouge. If you're right handed, push the gouge with your right hand with the flute facing the direction of the cut. At this point, cut the spigot that will hold the piece onto the chuck when you flip it onto the other side. While for most of my turning I mount the work piece onto a spigot, for this tray I've chosen to expand into a recess. There are two reasons for this. First, I do not have a lot of thickness of wood to sacrifice for a spigot (particularly if you are using 1" thick stock). Second, because the piece is flat, there is a lot of mass to absorb the force of the jaws pushing out. Use a ¼" parting tool to cut the step into the recess. Next, using a scraper, remove the excess wood in the middle and clean it up by lightly scraping.

When shaping the bottom of the tray you can once again push with your body behind the gouge. When the shaping is finished, you still need to smooth the surface before

Position body behind gouge and push towards headstock

Use scraper to refine surface

¼" parting tool cuts step into the recess

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sanding. This is done by scraping the surface with a scraper. I use a large tool for this as the size of the tool absorbs some vibration. Once again I can get my body behind the tool for support, although you don't need a lot of strength. You want to be firm yet gentle at the same time, letting the scraper do most of the work.

At this point you can add a decorative bead on the top of the tray before removing the piece from the screw chuck. First pre-cut the top rim and then form the bead. Follow this by power sanding the bottom. Remember that you must have proper dust extraction when power sanding; it creates a lot of fine dust. Power sanding with a power drill equipped with a Velcro pad and abrasive sanding disc is a very efficient method of sanding. The drill revolves in one direction with the piece of wood revolving in the other direction. Once the sanding is completed to your satisfaction, flip the piece onto the chuck and expand it into the recess. Use a bowl gouge to make an entry cut to establish the edge of the tray.

Using the large round nose scraper again, refine the top surface of the tray. When you are cutting the recess for the chuck, make a little design in the recess and finish the recess completely. This small design will take your eye away from the purpose of the recess, making it look like part of the tray. Otherwise, just turn the recess slightly concave and still add in a little design.

I finished this piece with three coats of salad bowl finish, because it is food safe as well as very durable. The piece will look beautiful on any table as a serving tray or a fruit platter.

PAUL ROSS
www.chaletwoodcraft.com

Scraper cleans up the recess

Gouge shapes tray bottom

Scraper finishes tray bottom

Cut the top rim

Power sand tray bottom

Spindle gouge makes entry cut on tray edge

Scraper finishes tray top

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 BY GARNET HALL

Train Set

Every child loves a toy train. This simple train set is as much fun for a youngster to play with as it is for the young at heart to build.

You can build this train set with a small handful of spare wood, while the wheels, pegs, people and smoke stack are commercial toy parts, stockade.ca. The train has six interchangeable pieces held together with leather loops. Leather is safer than metal hooks, holds better than magnets, and is easier for small hands to handle.

I began by shaping the bases for the engine (A) and the other five cars (H) out of ⅝" birch, although you can also use ¾" stock. The engine base is a bit longer than the other bases, but all are the same width. Don't fret if your stock is a tad narrower or wider than my dimensions. Once the bases are complete, drill holes for the wheel axles (G). The wheels I used have ¼" holes so I used 7⁄32" x 1" pegs. Drill holes at least ½" deep. Don't drive the pegs in too tight – the wheels need to turn freely.

I used black walnut for the engine body (B), passenger car body (O) and caboose body (Q). Once these are shaped, drill a ⅝" hole in the top of the engine body for the smoke stack (D), and two ¾" holes in

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the passenger car for the people (P). I also drilled ¾" holes ⅜" deep on either side of the caboose for windows and installed a 7/32" peg in the top. Don't drill the window holes all the way through, as there is the possibility a child could get their finger stuck in the hole. Attach a top (C) to the engine (I used a small piece of pau amarillo). I purchased milk cans (I), but you could just as well use ¾" dowels. Use pieces of birch for the logs (M) or thick twigs -just remove any bark and make sure they are clean. The posts are simply ¼" dowels. They need to be about 1 ⅛" above the car base to support the logs.

The back wheels (F) on the engine are 1 ½" in diameter, and the wheels (K) for the passenger car (J) are 1" in diameter. All the other wheels (E) are 1 ¼". All the wheels use the same size axle (G) except the car (J), which uses a smaller axle (L).

Leather shoelaces make excellent pull cords. You'll need about 4 ½" for each car. Drill 7/32" holes in the front end of each car (except the engine), glue in the two loose ends of the cords, and then drive in a short piece of ⅛" dowel to secure the cords in place. Install posts (G) on the back of each car, except the caboose, so that the cars can be connected together.

Toy Safety

Children can be rough with toys, and any part that falls off might end up in a mouth. When it comes to building a wooden toy it's always better to overbuild. A few simple safety precautions will go a long way towards alleviating mishaps.

- Use a hardwood like birch or maple as softwoods like cedar or pine can splinter easily. Cedar can cause an allergic reaction in some people. Remember small children are most likely to put any toy in their mouth. I find that birch machines well, is easy to cut and sand, and doesn't tend to splinter. It's also readily available and fairly inexpensive.
- Round over all edges, including window holes. A ¼" rounding-over router bit works well for this. After rounding all edges, sand the whole toy including inside window holes to at least 220 grit. A flap wheel, stockroomsupply.com, will help speed up the sanding.
- Glue wheels and other small parts on tightly. The wheels or parts should withstand a 25 pound pull. For example, if you hang a 25 pound weight to a wheel, it must hold. The best axle material is a fluted dowel. The glue on the grooves swells, locking the dowel tightly into place.
- Any removable parts must be of a certain minimum size to reduce the likelihood of choking, and it's best to avoid metal screws, hooks or nails. Consult Health Canada's *Industry Guide to Canadian Safety Requirements for Children's Toys and Related Products* for exact minimum dimensions of small components (613-954-5995 or info@hc-sc.gc.ca and ask for publication HC4045).
- Usually I don't apply any finish on toys though I have used raw linseed oil at times. It is oil derived from flax seeds, which people have long eaten for health reasons. If you warm up the oil and then dip in the toy, the oil soaks in deeper and dries faster. Leaving the toys natural eliminates any worry about reaction to a finish, particularly those nasty ones that contain lead. If you make the toys to sell, it's a good idea to attach a tag to each toy, informing the consumer of the wood and finish used.

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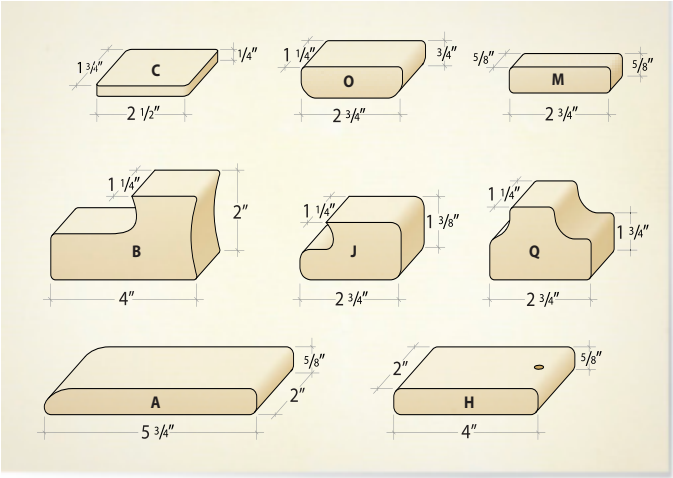

Illustrations by: www.JamesProvost.com

You can make a train set like this over a two to three hour period on the weekend, or a bit longer if you have a little engineer helping you along.

Choo choo.

GARNET HALL
www.sawbird.com

MATERIALS LIST (All measurements in inches)

Part		Qty	T	W	L
A	Engine base	1	5/8	2	5 3/4
B	Engine body	1	2	1 1/4	4
C	Engine top	1	1/4		
D	Engine smokestack *	1			
E	Small wheels *	22	1 1/4		
F	Caboose back wheels *	4	1 1/2		
G	Axles and posts *	19	7/32		
H	Car bases	5	5/8	2	4
I	Milk cans *	2			
J	Car body	1	1 3/8	1 1/4	2 3/4
K	Car wheels *	2	1		
L	Car axles *	2	5/32		
M	Logs	4	5/8	5/8	2 3/4
N	Log supports	4	1/4 dowels		1 1/4
O	Passenger car body	1	3/4	1 1/4	2 3/4
P	People *	2			
Q	Caboose body	1	1 3/4	1 1/4	2 3/4

* Items purchased

woodworkersgallery

To have your work considered for the Woodworkers Gallery submit photos to editor@canadianwoodworking.com

Sheridan lectern

Mark Rose, Burlington, ON

This lectern was commissioned by the President of Sheridan College to be used at the variety of official events hosted by the college each year. It was constructed using solid walnut with a curly veneer front over a curved form. The design blends modern and classical styles to create a sense of visual importance and solidity.

Spectator's bench

Tony Belbeck, Brampton, ON

The design for this soft maple, upholstered, spectators bench is simple, yet ergonomically satisfying. Glue, screws, dowels and corner blocks provide the bench with strength and stability. The top arm has a shallow circle routed out and lined with felt, to hold a beverage, and a hook cut out to hold a pool cue. The bench is finished with a walnut stain and lacquer spray.

Chest

Lars Olsson, Hamilton, ON

This white pine chest was built as a wedding gift, and showcases Lars' first attempt at hand cut dovetails on a large project. The chest has a brass plaque under the lid detailing the marriage, and a hand written note on the underside with an inlaid 2007, 25 cent piece. The finish is five coats of amber shellac on the outside followed by paste wax. The inside is finished with two coats of amber/blonde shellac mix, with the aromatic cedar bottom left unfinished.

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BY SCOTT RICHARDSON

Traditional Hook Knife

Hook, crooked or bent - whatever you like to call them, these knives are exceptionally versatile tools that you can make yourself.

Carvers, craftspeople, and woodworkers of every stripe would benefit from having a good sturdy hook knife in their tool box or on their workbench. A strong hook knife gets into places nothing else will. It's an excellent tool for carving wooden bowls and spoons, masks, wooden musical instruments, cabinet handles and just about anything with an intricate shape.

The process of making a knife is relatively simple: anneal (heat) the steel to make it soft and flexible, use a hacksaw to cut out the blade shape, use files to refine the shape, and then harden and temper the blade. Some grinding speeds up the process but you have to be very careful not to burn the steel.

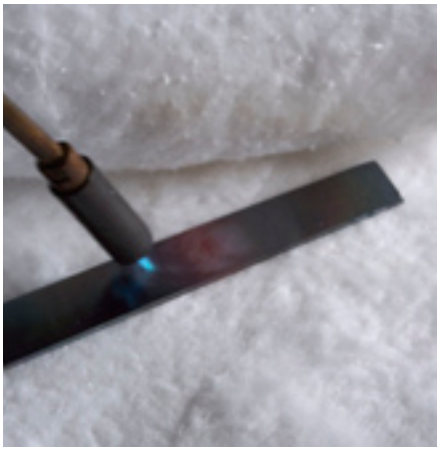
Material Sources

There are two sources for tool steel. For the first time knife maker it's best to purchase a piece of steel from a steel supplier. The steel will be annealed (heat treated) and relatively easy to work with. The more adventuresome reader may want to use a piece of recycled steel. I use bandsaw and gang saw blades from lumber mills because of their tensile qualities and strength. These 1/8" thick blades are made of Swedish steel with a combination of molybdenum, chromium, and nickel, and have a high carbon content. The exceptional tensile strength lends itself to an excellent edge. To make a double bevelled hook knife with a 3" blade you will need a piece of ⅛" thick steel, ¾" x 6". Check the Yellow Pages of your local phone directory or visit metalsupermarkets.com.

Annealing Makes Steel Soft

If you use steel from a supplier it will already be annealed. If you use recycled

Sources of quality steel



Anneal the blank

Cut lines laid out

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steel you will need to anneal it before you can begin to shape it. Annealing is a straightforward process.

• Split a piece of 2 ½" x 10" x10" ceramic wool, PSHCanada.com, into two pieces, each approximately 1 ¼" thick, and lay the re-cycled steel blank on one piece of wool.

• Using a propane torch bring the steel blank to a dull red. This will take about 10 minutes. Don't keep the flame in one spot; move the torch back and forth across the entire blank. Once the blank becomes dull red keep it at that colour for at least five minutes, moving the torch from one end of the blank to the other. Use the other half of the wool to reflect heat back onto the steel.

• Cover the blade with the other half of the wool so that it completely envelopes the red steel. Let it cool slowly overnight. In the morning you should be able to bend the steel with your fingers. If you can't bend it easily, the steel is not annealed. You will have to repeat the heat treating process.

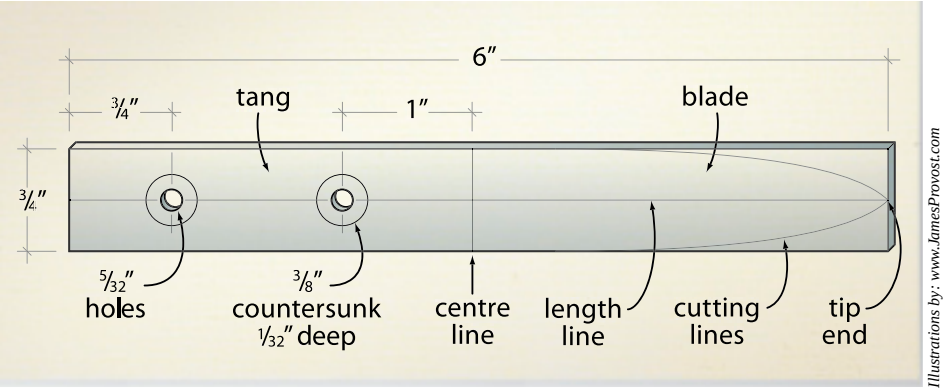
Shape the Blank

Begin by selecting the clearest side of your steel blank, the side with no nicks or scratches, as the back. Then select one end as the tip end. You can mark these with a red felt tip pen. On both sides of the blank use a fine felt tip marker to draw a line across the middle of the blank. This is the center line, which divides the blade into a 3" tang and a 3" blade. You'll also need to draw a line lengthwise down the center of the blank, from end to end. This is the length line. These lines lay out the cut lines for the knife.

• On the tang side mark a bolt hole 1" down from the center line. Mark a second hole point on the center line ½" from the end of the tang. Drill both holes using a 5/32" bit.

• Using a ⅜" bit, drill a countersink hole 1/32" deep into both the bolt holes. These holes will accommodate two #8-1 ½" pan head stainless machine bolts. I would advise using a drill press for this, as it's too easy to drill right through the blade if drilling free hand.

• From the tip end, draw 2 curved lines, one on either side of the center line. These are the edge profiles of the knife. Place the blank in a vice, use a hacksaw to cut out the profile along the blade portion of the blank, and then file flush to the curved lines. If you are using the vice on a woodworking bench cover it with cardboard, newspaper or a cloth to make clean-up easier.



Illustrations by: www.JamesProvost.com

Set the Tang into the Handle

Almost any hardwood will do for the handle. Here is a great way to use up that special cut-off you've been saving for a 'special' project. You'll need a block about 1 ½" x 1 ¾" x 11" for the handle.

• Remove a 5" x 1" wedge from the block, ensuring that the new surface is flat and true.

• File the sides of the blade tang so they're flat and parallel to each other.

• Place the tang on the bevelled surface up to the center line marked on the blade. Outline the tang with a sharp pencil.

• Using a sharp chisel or a Dremel rotary tool, rout out a 1/16" deep recess in the block to hold the tang. It is important to achieve as perfect a fit as possible.

• Mark the bolt holes through the tang onto the wood, and then drill ⅛" diameter

Nuts recessed into handle

Tang set into handle

Blade secure in vice

Shape the blade

Heating to cherry red re-hardens blade

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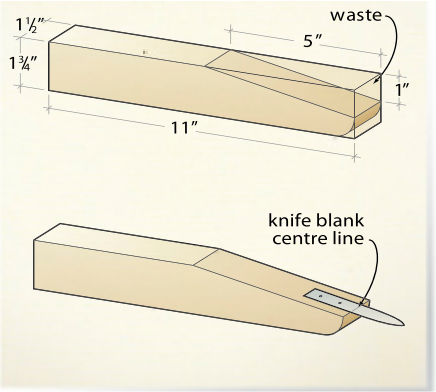

holes straight through the block.

• Place the tang into the recess in the handle. Screw in two #8-1 ½" stainless machine bolts and snug the blade and handle together with square nuts to make sure it fits.

• Trace the nuts onto the block and countersink them 1/16" below the surface.

• Now you can shape the rest of the handle to suit your grip.

Files Form the Blade Bevel

You will need a couple of files to shape the blade bevel. I use a 8" flat bastard and a 6" mill bastard file for initial shaping, following this with shop made sanding sticks. Mill six pieces of wood, each ¾" x 1 ⅜" x 12", with square, crisp corners. Wrap each with a sheet of no-fill sandpaper, starting from 100 grit and ending with 1000 grit. Wrap the sheets tight and put three staples on an edge. Staple the two ends and the middle. Alternately you can buy commercial diamond encrusted files or aluminum oxide hones from most tool suppliers.

• Remove the blade from the handle, and place the blade securely in a vise with the clearest side facing down.

• Shape a bevel on the blade edges down to the center line, from the tip of the blade to the cross line on either side of the center line. As you file down the side, leave the blade with a gentle curve, starting your exit ¾" before the cross line. Gently drop the outside end of the file, lift up and off.

• Once the bevel has been formed use the sanding sticks like files to finish the blade and sharpen the bevelled side edges only (face side) on an oil or water stone.

Form a Hook on the Blade

From this stage on you will be working with a small, very sharp blade. Work carefully, and where convenient, wear work gloves. The success of this step really depends on how well the steel is annealed. Tool steel won't bend if it's not properly annealed, it is more likely to fracture or break. Recycled saw blade steel will be a bit stiff even when it's annealed because of its alloy content. The alloys gives saw steel some of its tensile strength, which lends itself to a superior cutting edge.

• Cut two flats on a 1 ¼" x 12" piece of dowel so that you can hold it securely in a vise.

• Install the knife blade on the handle, and screw the bolts snug, giving them a quarter turn more.

• Place the tip of the blade on the dowel parallel to the floor. Using a small wooden mallet, begin to shape the hook with even, rapid taps, bending it evenly around the dowel. Start at the tip with a soft touch, strengthening your taps as you begin striking the mallet against the thicker portion of the blade. Move the blade slowly into the mallet. Make sure the mallet taps are square to the blade, otherwise the bevel edge will get bent, creating more work. Continue the mallet work until you have created the hook you want.

• While the blade is still in the handle, hone it as sharp as possible. Wrap a sheet of 600 grit wet/dry sandpaper around a piece of dowel or broom stick and hone the inside of the hook. To deal with any damage to the edge and for sharpening the hook after it is hard, make two more dowel sanding sticks with 360 and 240 grit. Use dowel sanding sticks for the inside of the hook and straight sanding sticks for the back; they are inexpensive and work very well. As an option you can purchase cone and flat, water stones, or diamond bench stones. Do a good job on the back of the blade, as once the hook is hardened and tempered it will be sharpened from the inside only.

Heat the Blade to Re-Harden

For the hardening process you will need a one litre can filled 2/3 with olive or canola oil warmed to body temperature, a propane torch set into a small bucket of sand for stability and safety, your piece of ceramic wool, and a pair of Vise Grips, irwin.com. Have a bucket of water around in case something that shouldn't, starts burning. Place the can of oil and the bucket with the torch in sand on opposite sides of the wool on a work table. If you're right-handed have the torch on the left and the oil on the right. If you're left handed place the torch to the right of the oil. This way when you have your hook at the right colour you can secure it in the Vice Grips and quickly douse it in the oil without losing the temperature.

• Take the blade out of the handle and place the blade on one piece of the wool. Lay the other piece of wool beside the blade for heat reflection. Always be aware of the razor sharp, thin, soft edge.

• Warm the oil in the can to body temperature on a stove. Have the Vise Grip adjusted to hold the blade securely and ready. Do a practice run smoothly and quickly attaching grips with one hand to the end of the tang, from under the flame, off the wool to where it would land into the center of the oil can, like a perfect dive, but don't go into the oil. When the real quenching in oil happens, don't touch the sides or bottom of the can with the blade.

• You want to achieve an even cherry red in the blade down ¼" past the first bolt hole. This way, when the differential tempering happens you'll know that this vulnerable spot is tough. Light the torch and start passing the flame over the blade. The cutting edges are thin and the tip is particularly vulnerable, so when passing over the blade you will want to focus more on the thick center.

• The metal will begin to turn pale straw, then progressively turn to straw, bronze, brown, purple, blue, and then blue green. Spend more time at the center line, and shadows will pass over the blade. It will begin to glow cherry red. Keep the cherry red and make it grow towards the tip, constantly evening out the colour. At this

SUPPLY CHECKLIST

- ⅛" x ¾" x 6" piece of high carbon steel
- 1 ½" x 1 ¾" x 11" block of hardwood
- Propane torch, hacksaw, Vise Grips, wood mallet
- Black marker, stapler
- 8" flat bastard and 6" mill bastard files
- 5/32", ⅛", ⅜" inch drill bits for steel
- ⅜" x 10" x 10" piece of ceramic wool
- 1 ¼" x 12" hardwood dowel
- Two #8-1 ½" pan head stainless machine bolts with square nuts
- 6 sanding stick blocks: ¾" x 1 ⅜" x 12"
- Sandpaper: 100, 240, 360, 500, 800 and 1000 grit
- 1 litre can filled ⅔ with canola or olive oil
- 5 litre container filled ¼ with sand
- 1 litre container filled with room temperature water

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point the tip and thin edges are vulnerable. If you let it get too hot or glowing orange you're burning out carbon. At yellow you're ruining the metal and there is distortion. This situation happens very quickly, so watch that tip closely. When it passes into a cherry red evenly across and from tip to tang, attach the Vise Grips to the end of the tang, and in one smooth motion douse it into the oil.

• Wiggle the blade vigorously, tapping the sides of the can with the Vise Grips and always keeping the blade submerged. Slow down, gently stirring until the blade can be handled. The blade right now is as brittle as glass, and is ready to be tempered.

• Wipe off the blade and clean the tang to show the brightness of the steel. Test for hardness by passing a file across an inside edge. If it skates, you've got hardness. If the file doesn't skate the inside edge you will need to repeat the heat treatment process.

Temper the Blade

You now need to temper the blade to take the brittleness out of the hardened steel.

You temper the blade by heating it in your kitchen oven preheated to 460ºF. You will need a litre container of room temperature water and some tongs to remove the heated blade from the oven.

• Place the blade on a middle rack, making sure you have a clear view of the brightness of the steel. Leave the blade in the oven for about 10 minutes, until it turns the colour of straw. Check the colour by very quickly cracking open your oven door and looking at the blade colour every five minutes or so (do this with goggles on or you will lose your eyelashes).

• When it reaches a straw colour, douse it in the litre of room temperature water.

• You will need to remove some hardness from the tang to assure the blade won't snap at the handle. Turn a stove-front element on to its maximum setting and place the tang end up to the first bolt hole on the element. When the tang begins to turn blue and extends just past the first bolt hole douse the blade in room temperature water. This technique is called differentially tempering. Remember to use oven mitts to pick up the blade.

Once the blade cools, all that's left to do is mount it into the handle. You can leave the handle as is – time and use will give the handle its own distinctive patina.

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BY VIC TESOLIN

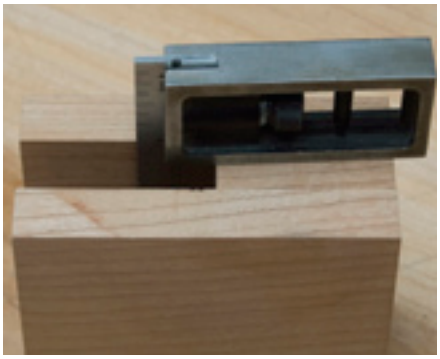
Hand Cut Dovetails

Cutting dovetails with hand tools can be a relaxing and extremely rewarding experience. The fine pins and custom layouts of hand cut dovetails also elevate your work to a higher level.

In today's woodworking world, there are many machines and jigs that can cut dovetails very quickly. That is if you don't include the time learning how to use the jig, setting up the jig and making all the necessary test cuts to make sure the jig does what you want it to do. These jigs are also limited by the fact that you can't make pins any smaller than ¼", due to the fact that the smallest router bit shank is ¼". I prefer the look of tails with tiny pins because it assures my clients that the joinery is hand cut with the attention that fine furniture deserves. A craftsman has no limitations when cutting dovetails by hand. You can cut them any size, with any number of tails, and in whatever pattern you desire. However, this technique like anything else, takes practice.

Before you start, your hand tools must be sharp in order to effectively hand cut any type of joinery. Dull tools will provide less than desirable results, which can be

Shoulder paring block



Check to ensure block is square

Scribe layout lines

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frustrating and could possibly lead to an injury. Forcing dull hand tools through wood is laborious and dangerous, so hone your tools before you begin. As with all projects, begin with stock that is milled precisely to the same width and thickness, and crosscut square at the ends.

Shoulder Paring Block

A shoulder paring block will allow you to trim the shoulders on the tailboard squarely. To make this jig, mill up an extra board to the same thickness as the pieces that you are going to dovetail together. It's best to do this at the same time that you are milling the tail and pin boards to ensure they are all the same thickness. Cut and glue the pieces together with PVA glue ensuring that everything remains square. Once the jig is clamped up, remove any glue squeeze-out on the inside of the jig and put it aside to dry.

After the glue has set, remove the clamps and slip a square into the slot and check to see that the inside surface and the top are square. If not, correct the problem with a few judicious plane passes to square it up.

Prepare the Boards

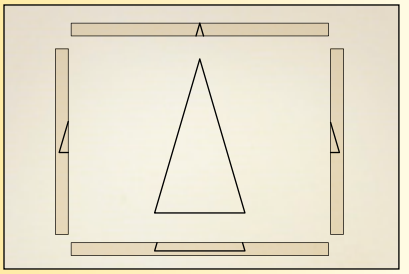
It's important to hand plane the inside surfaces of your boards to get rid of machining marks because once the pieces are together, this task becomes exponentially more difficult. Once this is done you need to identify how the boards will be laid out. In the case of a box you need to identify a back, front, and sides. As well, the insides and outsides of the boards need to be clearly marked. The easiest way to do this is to mark the inside, outside, top and bottom of the boards. (see the Cabinetmakers Triangle sidebar.)

Set a marking gauge about 1/32" wider than the thickness of the boards you are joining. The easiest way to do this is to 'clamp' the board between the fence and knife of the marking gauge. Setting the gauge this way will ensure that the tails and pins will sit proud of the boards allowing you to flush trim them easily. Scribe a line all the way around the ends of the tailboard and on the two faces of the pin board. For those of us with less than perfect eyesight, darken the

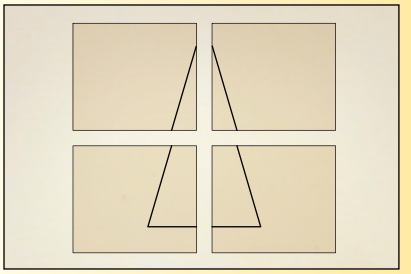
Cabinetmakers Triangle

Marking all the parts for a project can become a truly confusing issue. Parts become cluttered with numbers, letters and words. An easier and less confusing way is to mark your project parts with triangles. It completely does away with the clutter of words and often, indiscernible symbols written on your work stock. This technique works with just about everything you'll build, including panels, tabletops, legs, aprons, and casework. The concept behind this technique is quite simple - if you can draw a triangle you can use this system. All you have to do is mark your parts so that when you put them in the proper orientation they make a triangle. Once marked, the parts can be all mixed up on your bench and sorted out in seconds.

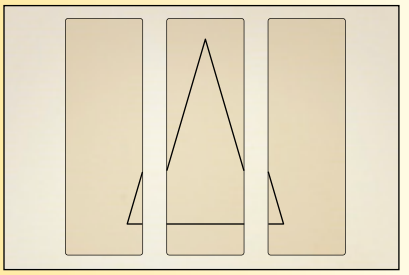
This is a simple and quick way to keep yourself and your project parts sorted out. You will never confuse the inside and outside of boards, or misplace a left leg for a right one again. So erase all of your words, arrows and numbers and let the clarity begin.



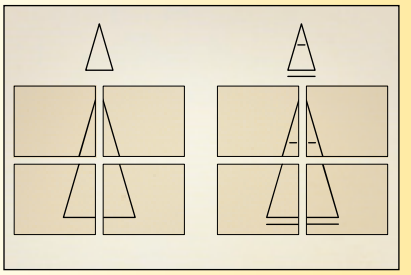
In the case of a box



For a set of legs



Even layout multiple boards to be glued into a panel



For two sets of legs for two tables you are making simultaneously

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Set marking gauge

Tail board

Pin board

Mark the tails

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knife lines with a 0.5mm pencil to make them easier to spot.

Tails First

I'm a 'tails first' kind of guy and this is mainly for efficiency. When dovetailing drawers, I can gang the sides together and cut all of the tails at once. As well, whichever side you cut first becomes your template for the other side. I find it easier to mark using tails rather than pins. In the end, it really doesn't matter what you cut first because once the joint is assembled you can't tell the difference. When marking the tails, there is much discussion as to what angle the tails should be cut at. As well, there are many jigs designed to aid a woodworker in marking these angles. I normally use a small bevel gauge set to around 10º to mark the tails. The number of tails you use is a personal choice that will depend on the width of the boards being joined and the aesthetic you are going after. Keep in mind, the more tails you have the more glue surfaces you have available to keep the joint together. Once the tails have been marked you can transfer these marks onto the end grain of the board. At this point, make sure that you identify the waste areas with an 'X' to ensure that you cut on the proper side of the line.

Clamp the tailboard into a vice at an angle that allows the tail lines to run straight vertically. This allows you to orient the saw vertically instead of trying to cut a straight line while holding the saw at an angle. Saw all of the marks (i.e. the layout lines) going in the same direction and then angle the board the other way to saw the other marks. Ensure that you don't saw past the scribe line. I usually stay within 1/32" of the line to ensure that I don't overshoot the line. Now you can turn the board horizontally and saw off the waste for the shoulders. Again, stay clear of the scribe line by 1/32" so as not to overcut the line.

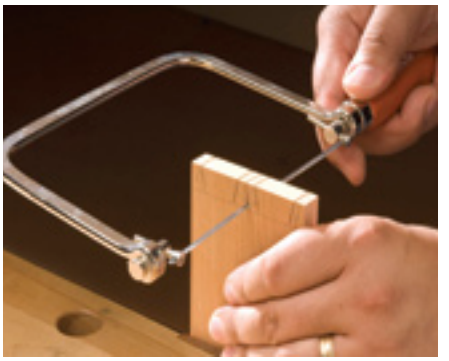
Make a relief cut in the waste between the tails. This allows room for the coping saw to remove the waste without damaging the sides of the tails. With a coping saw, slide the blade into the waste kerf and saw out the waste. Again stay clear of the knife line allowing room to chisel out the waste.

Remove the Waste

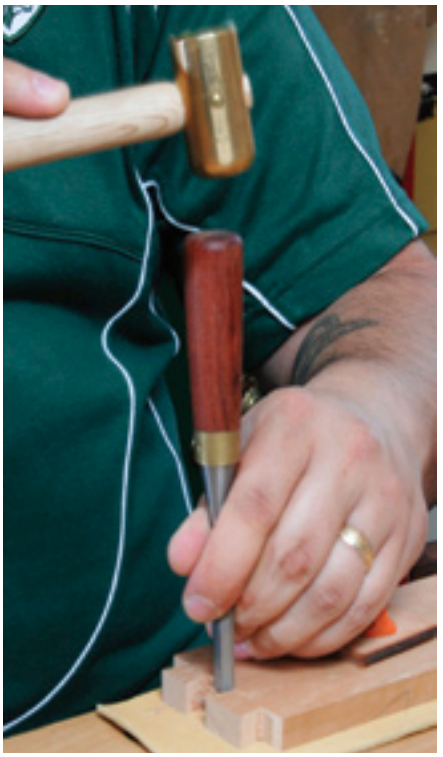
Remove the tailboard from the vice and clamp it onto your bench, using a caul to protect the wood from dents. With a chisel and mallet start chiselling out the

Transfer lines to end of board and mark

Align board so cut lines are vertical



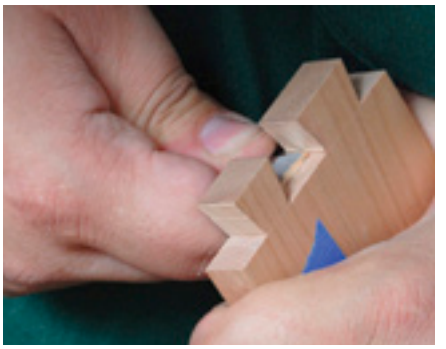
Use a coping saw to remove waste



Chisel out remaining waste

Set up shoulder paring block

Use block to pare waste



Pare bottom of pin socket

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remaining waste. Don't go directly to your knife line at this point because your chisel will have a tendency to dive and you'll remove more wood than you'd like. As well, only go about halfway through to prevent blowing out the backside and putting unsightly chisel marks on your bench surface. Once you've nibbled out the waste, place your chisel into the knife line and ensure that the chisel is fully seated. The easiest way to judge this is to gently twist the chisel. If it is all the way home it should stay put. At this point gently strike the chisel removing the last shaving of waste. Now, flip the board over and repeat the waste removal on the other side, slowly working back with the chisel towards the knife line.

Now we get to use the shoulder paring block jig. Slide the jig onto the side of the tailboard and line it up so it is just a hair above the knife line. This ensures that there is a tiny amount of extra material on the shoulder to eliminate the chance of a gap being visible from the top of the joint. If the jig fits sloppily, place a piece of masking tape on the tailboard side to take up the space. Place the tailboard with the jig into a vise and clamp it firmly so the jig is not allowed to slip on the tailboard. Using the widest chisel you have, rest the chisel on the paring jig and carefully pare away the waste. To make the cut smoother and easier use a sweeping cut instead of trying to plunge straight in. Repeat the process with the other shoulder.

Refine the Tails

It is important to refine the tails at this point. Ensure that the sides of the tails are square with the face and that they are flat. If your sawing wasn't as accurate as you'd like, now is the time to pare to the saw lines to refine the shape of the tail. Also, make sure that the bottom of the pin socket is flat and square to ensure a square and gap-free fit. All of these refinements are important because the tails are going to become the pattern for cutting the pins. Take the time now to ensure everything looks good because once you transfer the pattern over to the pin board you can't make any changes to the tail.

Mark the Pins

When you're happy with the tails, place the pin board in the vise with the end of the board flush with the bench surface. Ensure that the pin board is in the proper orientation by consulting your marks. Place the tailboard on top of the pin board and line up the two boards. With a 0.5mm pencil, trace the shape of the tails onto the pin board. Make sure the tailboard doesn't move during this process. Clamp the tailboard to the bench if you'd like some extra assurance. Once you've transferred the marks, remove the tailboard and mark the waste immediately. The waste will be the space that the tails will occupy. Now transfer the marks down the sides of the pin board using a square and mark the waste on the sides. Marking the waste at this point is imperative because if you saw on the wrong side of the line now your dovetails will be ruined.

Cut the Pins

Place the pin board in the vise and make your saw cuts. Ensure that you don't remove the lines or saw down past the scribe line. Cut another kerf down the center of the waste piece and using the coping saw, remove the bulk of the waste. As with the tails, use a chisel to remove the remainder of the waste, ending with placing the chisel into the knife line and making a clean cut to the scribe line. Now with a wide chisel, begin paring the sides of the pins to the lines. It's important not to remove too much material or remove the line because you will have gone too far. Repeat this process for all the pins and ensure that the corners are free of debris and all surfaces are flat and square.

Final Fitting

Once the pins have been pared it's time for the final fitting. Attempt to place the tails into the pins. The fit should be pretty close but should require some final paring. When doing the final fitting of the joint, be sure you only remove material from the pin board because the tails were your pattern. I find that placing some pencil lead along the bottom edge of the tails helps me in finding where the fit is snug. The lead will transfer onto the pins and show where to pare. At this point, the paring cuts should

Trace tails onto pin board

Transfer marks onto sides of pin board

Pare the sides of the pins

Apply glue to pins

Tap the joint home

Plane end grain flush with sides

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be extremely light to prevent too much material from being removed. Again, you must have sharp tools to remove such fine shavings. When the joint comes together halfway you're almost done. I don't normally bring the joint together completely when dry because every time you put them together and take them apart, the joint becomes increasingly loose. Once they go together halfway, inspect the surfaces and ensure that they are flat and square. Now you can pull them apart and get ready to glue them up.

Assembly

When you're ready to glue, ensure that you have everything you need to get the task done. When I glue up dovetails I use PVA glue, a pipe cleaner, a small hammer, and a block of a soft wood, like poplar, small enough to fit between the pins. Place the pin board in the vise and using a pipe cleaner paint some glue onto the long grain surfaces of the pins. You don't need a lot of glue here. I aim for not having much in the way of squeeze-out because it can be quite difficult to remove from the inside of the joint, and it risks leaving glue smears that only show up after a finish is applied. Take the tailboard and place the joint together. Glue is not a lubricant so the joint should be a little harder to get together now. Using your soft block and hammer, gently tap the joint home. Once the joint is fully seated, remove it from the vise and check the inside surfaces for square. If it's out of square, use your hands to gently push or pull the joint into square. It is usually not necessary to clamp a dovetail joint because the joint itself, if fitted properly, will hold itself in place.

Now place the joint back in the vise and using a sharp smoothing plane set for a light cut, plane the end grain flush with the sides. Ensure that you plane starting from the corner so you don't accidentally blow out the grain at the ends. If there are any small gaps between the tails and pins, rub a little glue into the gaps and rub the area vigorously with some fine shavings from your earlier planing. Small bits of wood will break off the shavings and stick into the glue, filling the gaps.

Fine, hand cut dovetails are a hallmark of good craftsmanship. Master this joint and elevate your woodworking projects from the mundane to masterful.

VIC TESOLIN
www.victesolin.ca

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productnews BY THE EDITORS

Titebond Instant Bond Adhesives

Cyanoacrylate (CA) wood adhesives have been on the market for a number of years, and their popularity among woodworkers is rapidly spreading. No wonder - they are perfect for repairing hair line cracks and those inevitable wood splits; gluing up small parts, particularly for hard to reach joints or surface areas that are difficult to clamp; and quick assembly of jigs and fixtures. And best of all, they bond just about anything, including wood, metal, glass and plastic. Franklin International, titebond.com now has a line of four ethyl-cyanoacrylate based adhesives that are bound to cover all your 'instant' gluing needs. Four viscosities are available (thin, medium, thick and gel, in 2oz, 4oz and 8oz sizes), taking between 5 and 15 seconds to set and from 30 to 60 seconds for initial cure. If these glues don't act fast enough for you, use their Instant Bond Activator. It dramatically accelerates the curing of all Titebond Instant Bond Adhesives.

From $9 (2oz) to $40 (8oz) at Home Hardware and building supply stores across Canada.

Tormek T-7/TNT

Sharp tools make for easier, more accurate and more enjoyable woodworking. By far, the most popular sharpening accessories for honing blades and chisels are waterstones. Unfortunately, most grinders come with conventional dry grinding wheels, typically spinning at speeds of up to 3,750 RPM – enough to ruin the temper of your tool. Turning at a slow 90 RPM, the Tormek T-7 Water Cooled Sharpening System, tormek.com, with its 2" x 10" wide sharpening wheel, will put the perfect edge on all your shop tools (as well as your kitchen knives and garden tools). The exclusive Square Edge Jig, included with the T-7, changes the task of grinding tools square from tricky to foolproof. The jig references from the flat side of the tool for unparalleled ease in tool mounting. It has travel limit stops that prevent you from running the tool off the edge. The T-7 System also includes the Angle Master, honing compound, stone grader, diamond truing tool, handbook, instructional DVD, and a generous 7 year warranty. $707.99 at bigbeartools.com.

Subscription Draw Winner

Tom Rawley (Tom's Tiny Tool Shop, Cambridge, ON) with his new biscuit joiner, and the first project he made with it: a wine cabinet.

Tom is a retired Nuclear Engineer and has been at woodworking for as long as he can remember.

The entire wine cabinet is assembled with biscuits (and glue). The only exception is screws to hold the adjustable feet and the escutcheons that hide them.

The cabinet is made from oak and oak veneered plywood.

Tom tells us that the King biscuit joiner is an easy and enjoyable unit to use, and that the tool is accurate, thus affording the capability for quick set ups.

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 BY MICHAEL KAMPEN

Router & Bit Care

Keep your router and bits clean to avoid the problems caused by the two deadly enemies of all powered woodworking tools - heat and dust.

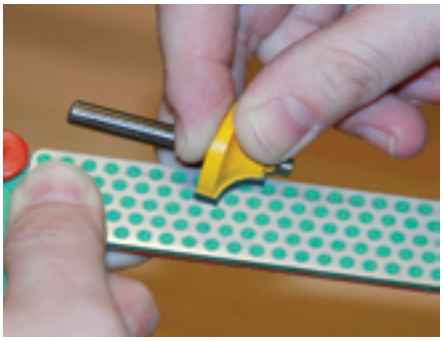
In conversations with other woodworkers across the country I am constantly surprised by the number of problems they have with their routers that could be eliminated with some routine maintenance. Do away with problems caused by heat and dust with a regular maintenance schedule and your router will provide years of trouble free service.

Bit Maintenance

As with many of the tools in a workshop, it is at the cutting edge where the actual work happens. When the carbide edges of router bits cut the wood (does anybody still use high speed steel bits?) they are subject to a build-up of pitch and resin. Certain woods, like pine, are worse in this regard than others and can gum up cutting edges after routing several dozen feet. Other species, such as oak or ash, may not noticeably affect the bit for months. As the pitch builds up on the bit, it will increase the temperature on the cutting edge and the body of the bit, and this begins the degradation of the bit. When the cutting edge loses its ability to remain cool in use, the carbide edge is placed under additional

Remove and clean the bearing

Scrub the bit with a brass brush



Sharpen the cutting edges

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stress, and this will ultimately affect the integrity of the bit and the sharpness of the carbide edge.

If you are working with a piloted bit, one with a bearing on top, remove this bearing with an Allen key. Bearings are one of the first things to fail on a bit. They guide the bit along the edge of a work piece and must spin freely to avoid marking the wood. As the bit is used, minute particles of dust will get trapped in the bearing and will slowly reduce its ability to rotate freely. When the bearing spins relative to the wood along which it is moved, it will start to leave a faint shiny surface behind. If the dust prevents the bit from rotating it will leave a burn mark on the surface. Remove the bearing carefully as some brands have small brass washers or shims under them that can easily get lost. Place the bearing into a small sealable plastic container (my favourite is an old 35mm film canister), add a little Varsol, and then shake it vigorously for a few minutes. Remove the bearing from the solvent and place it on a piece of paper towel to wick out the excess solvent. I also use compressed air to blow out the bearing as well. Never hold a small bearing in your fingers and then direct a spray of compressed air at them, as this is a dangerous practice, instead, wrap the jaws of a cheap set of pliers with electrical tape to protect the surface of the bearing and then use this to hold the bearing when you blow it out. If you can't restore the bearing to new condition using these methods, replace it with a new one. Before treatment with the Bostik bearing lubricant I can hold a bit by the bearing, and when I spin the bit freehand, it will make about 4 revolutions before stopping. After treatment and cleaning, the same bearing will spin at least a dozen times before stopping.

Tighten and lubricate the bearing

Lee Valley Bit Holders #16J03.61

With the bearing removed you will be left with a solid bit of steel to clean. Several companies make proprietary cleaning solutions for edge tools and these can make the job easier. Products such as Blade and Bit, leevalley.com, from Boeshield, boeshieldcanada.com, and Freud's Fresolv, freud.ca, are designed to dissolve the pitch and make it easy to remove. It has been common practice for some woodworkers to spray their bits and blades with oven cleaner and then to attack them with a brass brush. However, research by Freud has found that oven cleaners are very corrosive (you are not told to wear gloves during use to make a fashion statement!) and that it will degrade both the carbide edges as well as the brazing that holds the carbide to the body of the

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bit. Pay particular attention to the stud on top of the bit that the bearing mounts to and clean this area thoroughly. Be sure that there is no debris inside the threaded hole before you reinstall the bearing or you may never get it off again.

The point of contact between the router and the bit is the collet and shaft and these should receive careful attention as well. Any build-up on the shaft or on the collet will cause your bit to either slip during use or, more likely, to seize in the collet making it impossible to remove. Clean and inspect the shaft every time you change the bit. I use some cleaner and coarse steel wool to remove stubborn residue and just some medium steel wool in between major cleanings. Give your cutting edge a quick visual inspection every time you change the bit, but if you are doing a major clean up of your bits, inspect the cutting edges with a loupe. The loupe will magnify the edge allowing you to check it closely for nicks and dulling. If your bit has major chunks missing from the edge, then the damage may be too severe to repair by sharpening. For edges that are not badly chipped you can use a small folding diamond hone to dress the back (flat) edge of the profile. I prefer the Diafold hone, leevalley.com, from DMT, dmtsharp.com. This foldable hone has 600 grit on one side and 1200 grit on the other. A couple of stokes is all it takes. This diamond hone is meant to be used dry so there is no mess to clean up.

Reinstall the bearing and tighten the Allen screw completely. Check this screw after using the bit a short while to be sure it is still tight. Before using the bit, apply some bearing lubricant to the bearing if it has one. This lubricant will keep the bearing spinning freely without attracting and trapping dust, which will ultimately destroy it. I also spray my bits (and other cutting tools for that matter) with DriCote cutting lubricant. It does a good job of inhibiting glue, pitch, and resin build-up on cutting surfaces, and reduces cutting friction, and hence heat build-up.

Invest in some decent storage for your bits. Keeping them loose in a drawer is sure to damage the edges. Drilling holes in a piece of wood to store them is not the best option since moisture from the wood may cause corrosion on the shafts, which will ultimately cause them to stick in the collet. I prefer to use the composite bit holders available through Lee Valley that can easily be screwed to any surface where they are needed. Whether built into a cabinet or a wall, proper bit storage will safeguard your investment in these expensive accessories.

Router Maintenance

Whether your router is used free hand or used in a table, unplug it before performing any maintenance. As you unplug the router, inspect the power cord for damage. Look at the end and check each of the blades to be sure they are still firmly attached. If one or more is loose, or if you are missing the ground blade on a router that came with one, replace the end. Use a good quality cord end from Hubbell or Arrow Hart, westburnedirect.ca, that will stand up to the abuse it will see in the shop.

I can't stress this point enough. If you have your router mounted in an enclosed router table you absolutely must have it connected to a decent dust collector or you risk shortening its life dramatically. When I designed and built my router table (Issue #47, AprMay '07) I contacted the product engineers at Delta/Porter Cable to confirm that the airflow I was allowing for would be sufficient to cool the big Porter Cable 7518 monster I was going to put in it. They agreed that it was critical that a table-mounted router be connected to a dust collection system and that it should not only draw air from around the bit, but also from around edges of the front door to keep the router cool. In practice, my enclosed routers are always spotless, free of dust and cool during use while the one in an open table is constantly in need of cleaning and runs considerably warmer.

Use your shop vac to vacuum any loose debris from the air vents at the top and bottom of the router. With the larger debris clear, use some compressed air with a precision blow gun to clean the fine particles from the router motor, plunge mechanism and collet. Dust on the inside of your router will reduce its ability to cool itself, which will raise its operating temperature. When dust builds up on the bearings they begin to have more resistance to rotation and this also builds up heat.

Most routers have brushes that are easily accessible through ports on the side of the router. A sure sign that your brushes are nearing the end of their useful life is the loss of power when the tool is used and excessive sparking visible from the motor area. Open the access covers and pull the brushes out. Inspect brushes and replace if necessary; the minimum brush length should be in your owner's manual or available through the manufacturer's website.

The collet should receive a thorough cleaning as well. Pull off the retaining nut and collet and drop them into a solvent bath. Use a brass or stiff nylon brush to scour the inside of the end of the shaft. Any debris in here will make it very difficult to remove the collet and bit. To clean the collet use a small brass or nylon brush on the inner section and then take some kraft paper (any paper shopping bag would be happy to help out) and fold a strip over lengthwise until you have something that fits into the gaps but still gives it a good scrub, and work it back and forth. After doing this, run the brush up the center to remove anything that may have been deposited in the center. Use a brush to clean the threads on the router and on the inside of the collet nut. For plunge routers, consult the owner's manual for your specific model for instructions on how to clean the plunge mechanism. Inspect the bases for burrs that may mark the surface of the work piece.

The little bit of time spent on maintaining your router and router bit investment will pay off over the long haul in reduced down time, longer life and lower frustration.

DMT Diafold hone

MICHAEL KAMPEN
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BY VIC TESOLIN

Hand Planes

No single tool personifies woodworking and craftsmanship like the hand plane. Understanding it's purpose and function can make your woodworking both more enjoyable and productive.

As a studio furniture maker, I'm fortunate to spend my days in a woodworking studio. I'm surrounded by machines that cut, trim, bore, bend, flatten, shape, mortise and size. However, I'm most content when I'm out of the machine room and into the bench room, with a hand tool, finishing off what the machines can't do. I have many hand tools, some would argue too many, but the tools that occupy the most amount of space in my tool cabinet are my hand planes.

Hand planes have been around for thousands of years and their basic configuration hasn't changed substantially since their invention. Essentially a plane consists of a sharpened iron that is held at a specific angle by the plane body to result in shavings being cut. Over the years, planes have been made with different materials including wood, metal,

Block plane

Shoulder plane

Bench plane

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bronze, brass, and combinations of wood and metal. In the early 20th century, there were many companies, including Stanley, Millers Falls, Sergeant, and Record, which produced comprehensive lines of hand planes. Many of these companies either no longer exist or have moved away from making high quality hand planes. Fortunately, companies like Veritas, veritastools.com, Clifton, clico.co.uk, and Lie Nielsen, lie-nielsen.com have continued the tradition of producing high quality tools for professionals and amateurs alike. As well, there are specialized toolmakers like HNT Gordon, hntgordon.com.au, and Sauer & Steiner Toolworks, sauerandsteiner.com making beautiful, high quality infill planes for discerning clients. These planes are not only extremely functional but are individual works of art.

Increase Your Efficiency

Many people feel that hand planes are slow, cumbersome and inefficient, but this is simply not true. With an understanding of how planes work and some time practicing, hand planes can substantially increase your efficiency as well as reduce both noise and dust in your shop. Many tasks in my furniture studio can be completed faster with hand planes than they can with machines. For example, putting a chamfer on the edge of a board with a router or table saw involves set-up time, making a series of test cuts, and finally making the cut. Usually I still have a surface full of milling marks that need to be removed. And, with a router bit spinning at 30,000 rpm, there is always the risk of tearing out wood fibres or burning the wood. Conversely, I could have picked up a smoothing plane, placed it on the edge of the board at approximately 45º and made a series of judicious passes that would result in a flat chamfered surface as smooth as glass and ready for finishing. Not only would my results be visually superior but also I would have completed the task in a fraction of the time.

Reduce Dust and Noise

In the case of surface preparation, using smoothing planes instead of sanding greatly reduces the amount of airborne dust, which your lungs will be thankful for. As well, using a plane to remove machine milling marks will result in a better quality surface in a fraction of the time compared to an orbital sander. The surface will have more clarity because the surface has been shorn cleanly with a sharp plane iron instead of excoriated into smoothness by sand particles. However, the best reason for using hand planes is the absence of a universal motor. There is nothing better than the soft sound of a hand plane passing over a surface compared to the unpleasant din of an electric sander.

Vintage circular (compass) plane

A Plane for Every Task

Smoothing planes come in a variety of styles, and are only one type of hand plane that can be utilized in the work shop. Block planes are can be used for dimensioning both long and end grain. A low angle version of the block plane makes it easier to sever the more difficult end grain. The shoulder plane is used to adjust the shoulders of a tenon or rabbet and comes in a range of sizes to tackle any sized joint. Using the shoulder plane allows you to sneak up on the fit of a tenon where a machine may take off too much material. Sometimes 1/1000 of an inch is the difference between a snug fit and a loose joint.

Then there is a host of specialty planes that can handle tasks like mortising hinges, plowing groves for panels, and cutting dados into case sides. As well, there are planes that shape complex mouldings for cabinets or edge profiles for tabletops. There are also specialty planes that can handle convex and concave surfaces allowing you to shape curves with relative ease.

Editors Note
Stanley, stanleytools.com, will be introducing five premium hand planes later this year, including a redesigned No. 4 smoothing plane, a low-angle jack plane, a shoulder plane and two block planes. We'll be bringing you more information and in-depth reviews of these planes as they become available.

More to Come

This is the first of a series of six articles on hand planes. In this series, I'm going to shed some light on the perceived 'mysteries' of hand planes and provide you with another set of options for your woodworking challenges. I'm going to show you how to set up and sharpen all of the aforementioned tools and give you tips on how to use them. Hand planes are a large part of the workflow in my studio and I honestly couldn't imagine making furniture without them. Hopefully, after reading these articles and practicing the techniques within them, you too will begin to use hand planes more often in your woodworking. Your eyes, ears, and lungs will thank you and your finished pieces will be the better for it.

VIC TESOLIN
www.victesolin.ca

Side rabbet plane, small router plane, and router plane

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BY MICHAEL KAMPEN

Tool Storage Bags

When you need to do an installation or a repair outside the shop, having the right tools with you is essential.

As a commercial and industrial electrician on the West Coast of British Columbia I spent several years servicing customers in remote locations that were accessible only by a long boat ride, float plane or helicopter. Under conditions like this it was critically important that I pack every tool that I was likely to need to complete the job ahead, while also anticipating and packing for the inevitable 'unexpected' problems that would come up. This led me to develop a system of packing tools that was both efficient and thorough, a system I still use to this day as a full-time woodworker, both in my shop and for the portable tools I take on the road. When I began using this system, the only containers I had available to use were Rubbermaid totes, track bags and an old beat up metal toolbox. Storing and sorting my tools was a challenge, at best. Now there is a myriad of options for taking tools on the road in an orderly fashion.

When I put together a tool bag, I group tools together according to what they do. For example, the first dedicated tool bag I saw was made of heavy-duty leather for electricians. After many years of use toting a complete set of electrical tools to thousands of jobs, it is still going strong. Most importantly, since I started using this system, I've not accidentally left any tools behind after a long day.

Almost every tool company has a tool bag or tote in their product line and they all have different features, from the basic soft-side bags like the Samona and Irwin to the more specialized bags like the Veto XL. There is a solution for everyone from the casual woodworker to the serious professional. Before you pick up a bag you should have a clear idea of what you want to use it for. A bag used to haul hand tools such as pliers, screwdrivers and wire cutters will need to

Samona 32113

Irwin 4402013

Veto XL

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have different features than one used to haul carpenters tools, such as a framing square, hand saws and hammers. Hauling small power tools like sanders and drills requires yet another configuration.

When you show up at a customer's house with all of your tools neatly laid out in a tool tote it will leave a favourable impression that will be reinforced every time you can quickly access every tool you need as the job progresses. And you'll be less likely to leave a tool behind.

Tool bags come in a wide range of sizes, and the largest of these bags will virtually hold a shop full of tools. A closed top design will keep the contents from spilling out should the bag tip over or roll about in your trunk. This was the major weakness of the first tool bag I bought – it was as tall as it was wide and long, and every time it tipped, the contents would end up all over the place.

When packing your bag, try to group similar function tools together, and then always return them to the same place. If they always occupy the same space then the bag will soon relax to accommodate them more easily. Over time the location of each tool will become imprinted in your memory – you'll be able to quickly access the right tool without having to search through the whole bag. At the end of the day you'll quickly be able to see if anything is missing.

The Samona 32113, samona.com, soft side bag is an open design great for jobs that will require hand tools or renovations that you'll need some small power tools for. This bag is arranged in a tool tote format with a rigid handle over an open 16" wide central space that is great for holding sanders, drills and other small power tools. Around the outside it also has 13 generous pockets, a 12 piece drill bit compartment, a saw slot and straps to hold a level. There are five pockets inside with eight straps for secure storage. It also comes in a kit (Item 32100) that includes both drill/driver and cell phone holsters.

The Irwin 4402013, irwin.com, soft side bag is a semi-closed design that leaves an open space around the carrying handle. This feature allows you to carry longer items such as saws and rulers that would otherwise not fit. The Irwin bag is much more compartmentalized than the Samona version. There is an 18" wide central tool well. On the outside front of the bag there is a zippered pouch and when the bag is opened there is a clear pouch on the inside as well, great for holding smaller items that are easily misplaced. The interior is divided into 13 pockets with 22 straps and there is storage for a level on top.

The Veto XL, vetopropac.com, is a closed hard-side bag that is, without question, the top of the line. It is built tough to withstand years of service work by professional contractors; in fact, it even comes with a five year warranty. The snaps and loops are all metal with the bottom three inches of the bag made of a hard polypropylene to provide water resistance. The bag itself is made of PVC impregnated denier with the seams all solidly backed up. My favourite aspect of this bag is the closed format that is a better option for long-term storage as well as frequent transport; the closed top keeps stray items from falling into the bag in storage and transport and the closed format keeps everything contained in the event of a spill. Open the bag and the Veto XL is fully loaded with 67 heavy duty pockets. These allow you to arrange all of your tools in an orderly way keeping everything you are likely to need at your fingertips, which will increase your efficiency on the jobsite. Fully loaded with tools, a bag such as this represents a considerable investment and it should offer the tools protection as well. A tool that is abused during transport will arrive on the job in poor condition, unfit for the task at hand. The Veto line was developed by a contractor for professionals in the trades and products built to these standards naturally cost more - think of these as another tool, not just a bag. They also offer the advantage that they are specifically targeted at certain uses, providing specialized products for specific niches. Of the six models that Veto makes you're sure to find one that suites all your tool carrying needs.

Tool bags might not be large enough to hold all the tools you need for on-site work, particularly if you need access to several power tools in addition to a range of hand tools. For those who live in a small house, condo, or apartment and don't have space for a shop with proper tool storage, stuffing you tools into half a dozen tool bags might not be the way to go. The Stanley Fat Max 020800R, stanleytools.com, four-in-one mobile work station provides an efficient alternative. Pull it out when needed for full access to all your tools and then simply park it away until next time. When closed the Stanley measures a mere 22" wide by 17" deep and 29" high, small enough to fit into a closet or under a workbench. Opened, it provides four storage options - a 6" deep top box; a removable tool tray; a parts bin with eight 4" x 5" x 4 ½" compartments; and 14 ½" deep lower box. The Stanley uses an innovative cantilever multi-level system that allows access to all the four storage areas at the same time. Ball bearing slides ensure the compartments move smoothly even under load. A telescopic handle and large thick 7" rubber coated wheels make it easy to move the box, which is made of a durable, impact resistant plastic. There are large, heavy-duty metal latches with padlockable eyelets. The Stanley has enough room to carry a full-sized router, circular saw, drill/driver and sander, along with load of hand tools and a goodly assortment of hardware.

Keeping your valuable tools in a protective bag will not only protect your investment, by keeping everything together, it will ensure you have what you need for the job at hand. Whichever style of tote you choose, you can take your tools with you, at least to your next job.

MICHAEL KAMPEN
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Stanley FatMax 020800R

Easy to transport

Four storage compartments

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 BY THE EDITORS

Compact 12V Drill Drivers

With leading edge battery technology, the new generation of 12V compact drill drivers deliver superior performance in a smaller package.

Drilling holes and driving screws is a common task in many woodworking and home renovation projects. While you may need the power of a corded drill for some of those tough jobs, the new generation of 12V compact drill drivers have ample power for most tasks.

When the first small corded T-handle drill driver came out years ago it quickly became our favourite, so much so that we bought two more. After many years of rough jobsite use, these trusty workhorses were finally retired in favour of newer cordless technology. What we liked so much about those original T-handle drills was the balance and the compact size, both of which made working with them all day a pleasure.

This new generation of 12V drills are ideal when you have to drill and drive a lot of small screws, but you can certainly use them for drilling holes up to 3" in hardwood. The four models we looked at all feature lithium-ion batteries, and weigh between 1.5 and 2.4 pounds. All use a ⅜" chuck, except the Milwaukee (¼" hex). Prices range from a low of $99 for the Ryobi to a high of $179 for the Bosch.

As with all tools, consider the work for which you intend to use the tool – this

Compact (L), Super compact (C), Full size (R)

3/8" keyless (L) and 1/4" hex (R) chucks

T-style (L) and pistol grip (R) handles

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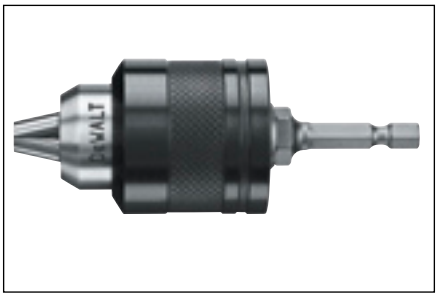
will serve as a guide for your purchasing decision. Will this be a general purpose drill/driver that you will use to drill holes as well as drive fasteners? If so, then a model with a keyless ⅜" chuck might be more useful than one with only a ¼" hex mount, particularly if you have a large investment in conventional round shanked drill bits. You can, of course, use any hex shanked accessory on a ⅜" chuck drill – it's just not as quick as on a hex mount drill. One of the most popular accessories is a universal driver adapter – a single holder for any ¼" hex driver bit.

If you will be primarily using hex shanked bits, then the easy, one handed bit changing on the Milwaukee will come as a pleasant surprise. After-market chucks, like the DeWalt DW0521, dewalt.com, are available that enable you to hold round bits in hex shafts. Lee Valley, leevalley.com, also has a handy set of hex shanked adapters that convert round shanked bits into hex bits, along with centering bits and socket drivers. So even with a hex mount, there is nothing keeping you from completing your tasks.

The four models we looked at feature the new lithium-ion battery technology; the improvement over previous batteries is startling (for an overview of this battery technology, see "Lithium-ion", Issue #49, AugSept '07). Lithium-ion batteries do not have a memory, which means that they can be charged or topped up at any point during use. These batteries also deliver more power over a longer time than previous batteries and when left on a shelf for an extended period they will not lose their charge. They are also much lighter, which results in a weight reduction on the tool making these drills more pleasant to use for an extended period of time. All of these models, other than the Ryobi, ship with a charger that will recharge your batteries in 30 minutes; the Ryobi model takes somewhat longer at 40-50 minutes. As battery technology changes, many customers are feeling frustrated that every new improvement in batteries means investing in a whole new tool platform. Companies like Bosch and Milwaukee have eliminated this by making their new 12V platform (the 'M12' line for Milwaukee and 'Litheon 12V Max' line for Bosch) the new standard for their ultra compact series of tools. Both companies have a number of companion tools on their 12V platform, including flashlights, cut saws, and impact drivers. For the consumer, all that matters is that the batteries for these tools are all interchangeable, allowing you to add to your collection without having to deal with multiple battery types and charging systems. The one really innovative, and practical feature of the new lithium-ion batteries is that as the charge fades, there is not a corresponding fade in power from the drill. The tool will work at full power until the charge drops too low at which point it will simply stop working altogether.



DeWalt DW0521 adapter

Battery fuel gauge

The Ryobi has a more conventional T-handle, which means you can stand it up on a work bench. You can't do this with the pistol grip units. But, we find the pistol grip models easier to use in small, restricted places. The handles on the Bosch and Ridgid feel somewhat bulkier than on the other drills, and anyone with small hands might find them somewhat uncomfortable in use. We also found them a bit top-end heavy. The Milwaukee is particularly well balanced, and comfortable in use.

Where these tools really shine is in the shop when installing hardware on furniture, working in confined spaces, and around the home or cottage for general drilling and screw driving. Setting a #4 or #6 screw into a hinge on a cabinet requires a different torque setting than would setting a hinge on an exterior door. To avoid overdriving the small screws most of these drivers come with a multi-position clutch setting. Use the clutch engaged at a low setting for installing furniture hardware, but for taking full advantage of the 220 inch/lbs of torque that the Bosch PS30 delivers, one of the higher settings is in order. Most of these reserve the final setting on the clutch for drilling holes, and the clutch is disengaged in this position. The Bosch

Milwaukee has a highly focused beam

Ridgid beam is wider

Hex chuck with accessories

Use hex accessories with adapter

Lee Valley 50J03.20 Hex Shank Drill Adapters

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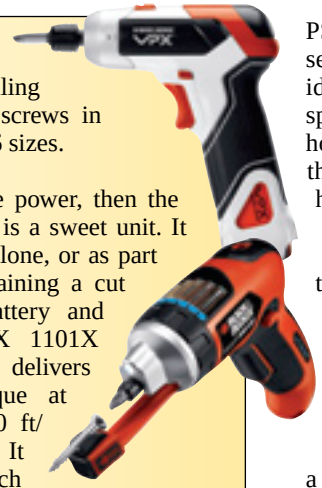
The Featherweights

Maybe you don't need the power of a compact drill driver, or you want something less expensive to drill the occasional hole and drive the odd screw. There are a whole host of *super compact* or *featherweight* drill drivers on the market. Typically in the 4V to 7V range, and under 2 pounds, they are primarily geared to the homeowner or DIYer. We think they also make excellent first power tools for youngsters. As well, people with disabilities or the elderly will appreciate their light weight, small size, and generally uncomplicated design.

We recently looked at two new units from Black and Decker, both featuring lithium-ion batteries and ¼" hex mounts. At the low power end is the LI4000 Smart Driver. This 3.6V drill delivers 45 ft/lbs of torque, features a six position clutch, an LED light, and a unique retractable screw holder with a magnetic tip. The lithium-ion battery is housed in the handle, and holds a charge for up to 18 months (obviously depending on how much it's used). We especially liked it for setting screws one-handed. At only $39.99, and with a two year warranty, it's a great 'screw setter' to have around the shop, particularly for drilling holes and driving screws in the smaller #4 to #6 sizes.



If you need more power, then the B&D VPX 1101X is a sweet unit. It can be purchased alone, or as part of a package containing a cut saw, flashlight, battery and charger. The VPX 1101X is rated at 7V and delivers 40 ft/lbs of torque at 195 RPM and 140 ft/lbs at 625 RPM. It doesn't have a clutch or LED light, but it does come with a nifty storage case and a ten piece drill and bit set. It's very well balanced and a comfortable drill to use, feeling lighter than its stated 2.6 lbs. While B&D markets the VPX1101X as a cordless screwdriver, we found that it did a commendable job of drilling and driving all but the largest and longest screws into the hardest of woods. The housing is not as durable as on the 12V compact drivers units we looked at, but at $64.99, and with a two year warranty, this is a good buy.

Top: B&D VPX1101X
Bottom: B&D LI4000 Smart Driver

	Ryobi HJP001K	Ridgid R82007	Milwaukee 2401-22	Bosch PS30-2A
Price	$99	$129	$149	$179
RPM	0-550	0-575	0-500	0-400, 0-1100
Torque (in/lbs)	90	120	100	220
Clutch	none	17+1	14+1	20+1
⅜" chuck or ¼" hex mount	⅜	⅜	¼	⅜
Spindle lock		✔		✔
Work light		✔	✔	✔
Weight (lbs)	1.8	1.5	2	2.4
Warranty (yrs)	2	3	5	3
Included	2 batteries, fast charger, soft case	2 batteries, fast charger, soft case	2 batteries, fast charger, insert bit, soft case	2 batteries, fast charger, soft case
Website	ryobitools.com	ridgid.com	milwaukeetool.com	bosch.com

Note: Bosch also has a 12V 1.4" hex mount drill/driver, the PS20-2A.

PS30 offers two speed ranges, a low speed setting that offers higher torque, which is ideal for driving fasteners, and a higher speed setting that is better for drilling holes. For long-term job site durability the Milwaukee 2401-22 features a gear housing made of metal.

When using these sub compact drivers to install hardware, one of the most valuable features we have grown to appreciate is an LED worklight to clearly illuminate the area you will be driving the screw into. This may sound trivial, but even in a well-lit shop, the inside back corner of a cabinet can still be a pretty dark place. Only the Ryobi lacks an LED light. The light on the Bosche and Milwaukee is more focused than on the Ridgid. We also like the spindle lock on the Bosch and Ridgid. It makes for easier and faster tightening of the chuck. The Ryobi has a convenient magnetic bit storage slot on the top of the battery housing, while the Milwaukee features a nice feature – a built in battery fuel gauge that displays run time, giving you a 'heads up' before the battery runs out.

We tested these four drills in a variety of material – drilling holes for #6 and #8 screws in ¾" ply and 2" softwood and hardwood, and sinking 1" to 3" screws in pre-drilled holes. We also tried drilling 3" #8 screws straight through two layers of 2 x 4 fir. With its 220 in/lbs of torque, the Bosch was the all out top performer, but followed closely by the Milwaukee and Ridgid. The higher torque rating on the Bosch made for much easier setting of larger, longer screws, while the higher speed setting (up to 1100 RPM) gets the drilling and driving done more quickly. All three offer the same package of features (comfortable handle, LED light, clutch, variable speed, two batteries, fast charger). Whether you're a professional or a woodworking enthusiast, you'll likely be very satisfied with any of these three drills. For the DIYer or homeowner, the Ryobi is a good drill. It's a no frills, 'pick-up and use' unit, that costs under $100. While it lacks the power of the other units, it still delivers a punch.

You can drive screws by hand, but new advances in battery technology have made these powerful, compact drivers the choice of woodworkers and trades people alike. They provide ample power to get the job done in a lightweight, easy to handle package with a battery that not only lasts longer in use, but holds a charge longer when left on the shelf.

THE EDITORS

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BY MICHAEL KAMPEN

Ultimate Router Fence

Build this rock solid fence to handle any routing task with ease and accuracy.

This fence is designed to be used with my router table ("Router Work Station", Issue #47, Apr/May '07). It is meant to be securely clamped to the overhanging edges of the Veritas table top (item 05J20.01), leevalley.com, by means of a couple of C-clamps. If you use a different table, adjust the dimensions in the Materials List accordingly, and if there are slots in your top, add some slots to the base (part 'A') to facilitate clamping it to the top.

The fence features a 2 ½" dust collection fitting (E) and sacrificial fence sections (G) that can be closed up on the bit for more effective control and dust collection. To keep this project straight and square, I used ¾" Baltic birch plywood and created a solid joint along the two long edges using the Dowelmax jig, dowelmax.com. The rest of the joints are held with countersunk brass screws.

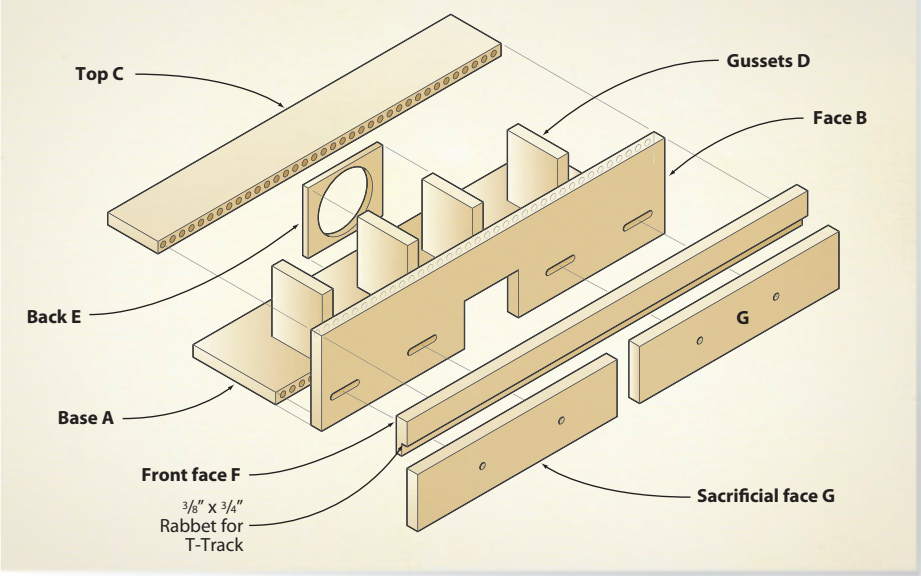

Illustration by: www.JamesProvost.com

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Making the Fence

• Begin by cutting the base (A), face (B) and top (C) to size. Be sure that they are perfectly square or your fence will have a slight curve or twist to it.

• Mark the center of the base and fence and then cut out the 3 ¾" x 2 ⅛" opening on the two pieces. Use a scroll saw or bandsaw for this. I sized this opening to accommodate the largest router bit I would likely use (a large horizontal panel raising set). You can make this opening larger or smaller to suit the largest bit you are likley to use.

• Use a dowelling jig to drill a series of holes along the two edges where the base, top and face pieces meet. Because of the bit cut-out, drill two groups of holes for each edge and index them from either end toward the middle. This might seem like overkill, but you want the fence to be as rigid as possible.

• Fit the pieces together and then cut the four gussets (D) to fit.

• Cut the back (E) of the chip collection box to size from some ⅜" plywood and mark the center of the piece. Draw a circle onto this to accommodate the opening of your dust collector pick-up and cut this out using a scroll saw. You could also use a hole saw on the drill press but be sure to secure your piece properly to prevent it from spinning as the hole is cut. I simply force fit my dust hose into the opening I cut in piece E. Alternately, you could attach an ABS dust port (item 03J61.01), leevalley.com, onto the back of piece E. If you opt to do this use ¾" ply for the back (E) rather than ⅜" material, as you don't want the screws to penetrate through the other side, where they might serve to trap wood chips.

• Use four dowels to temporarily assemble the base, fence and top. Mark the locations of the gussets and then locate the stopped slots to fasten the sacrificial faces to the front of the fence.

• Use a router jig ("Mortising Jig" Issue #56, Oct/Nov '08) or a router table to cut these slots into the fence.

• Glue the base, fence and top together using dowels and clamps. Be sure to check to see that it is square. Slide the gussets into place and then drill countersunk pilot holes and drive in some steel screws. When all of the steel screws have been driven in, back them out one at a time and replace them with brass screws. This is really an extra bit of precaution; I always use brass, rather than steel screws, in the vicinity of blades and bits.

• Cut the front face piece (F) and run a rabbet along the lower edge to accommodate the T-slot track. Mount the T-track in the rabbet. T-track is available from most hardware stores.

• Mill the piece for the sacrificial faces (G) and then cut it in half. Locate the two mounting holes and drill these on the drill press using a fence to keep them perfectly in-line. Begin by using a Forstner bit to drill a ¾" diameter hole, ¼" deep for the bolt head and then switch to a ¼" bit to complete the hole for the shaft. Optionally you can use a piece of ¾" melamine or phenolic plywood for the sacrificial face. They provide a much smoother surface than Baltic birch. I made a spare set of sacrificial fences as it's inevitable that they will become damaged over time.

• Turn the fence upside down on your work bench and use the top of the bench to align the front face piece with the top edge of the jig and then drive a few screws into it from the back. I'm assuming of course that your workbench top is flat; if not, cover it with a piece of plywood before assembling the router fence.

• Fasten the sacrificial faces to the fence using ¼" x 20 large head bolts and handles.

MATERIALS LIST
(All measurements in inches)

Part		Qty	T	W	L
A	Base	1	¾	5 ¾	23 ⅞
B	Face	1	¾	5 ¾	23 ⅞
C	Top	1	¾	3 ½	23 ⅞
D	Gussets	4	¾	3 3/16	4 ¼
E	Back	1	¾	4 ¼	5 3/16
F	Front face	1	¾	2 ¼	27 ⅞
G	Sacrificial faces	2	¾	3 7/16	13 ⅞

Using the Fence

To use this fence, simply clamp it to the surface of your router table with a couple of C clamps at the sides. Adjust the moveable sacrificial faces to close up on the bit and hook up a dust collector to the 2 ½" fitting on the back. The T-track on the front is used to hold feather boards, ("Featherboard", Issue #53, Apr/May '08) or end stops in place as required.

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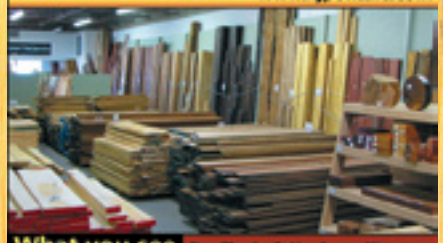
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woodchuckle BY DON WILKINSON

Valentine's

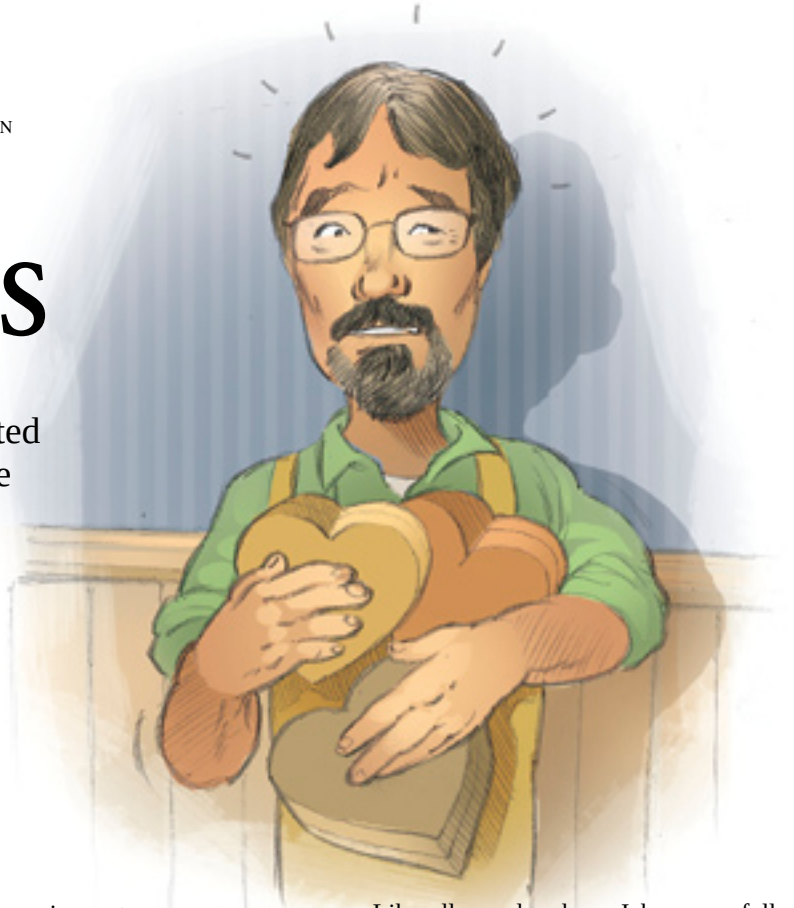

Illustration by: Mike Del Rizzo

By the time you receive this long anticipated issue of Canadian Woodworking, it will be February, the month of love when every woodworker's thoughts turn to one thing: "What an incredibly stupid holiday!"

But, because we've learned from the mistakes we made last year, we now know that our spouse (or significant other) has been eagerly awaiting whatever it is we will build for them. Never mind that we already spent a minor fortune on them at Christmas - it is clearly obvious that they didn't much appreciate the drill driver or other power tool gifts we've agonized over.

I learned early on in my marriage - after only twenty or thirty something years - that it wasn't wise to buy my loved one any type of tool for Christmas, birthdays, silver anniversaries or indeed, any other holiday or semi-important date. Even tools for the kitchen are under appreciated. However, almost anything you can make in your shop, if you can in any way claim to have made it specifically for your spouse, will be greatly appreciated and will reward you in any number of ways, foreseen and unforeseen.

Sometimes just the promise of something made with our own little hands can be enough. As mentioned in a previous article, I once foolishly promised my wife a Mission bed for Christmas. The first of many Christmas's rolled around and I put a lovely picture of such a bed in a big box and placed it under the tree. That gave me a reprieve for an entire year. She got her bed twenty-four years later, and I am sure she appreciates it even more for having waited so long.

The most important part however, isn't that my wife was promised a bed, but that because of the promise, I was able to buy a new mortiser, and a tenoning jig for my table saw, in order to build the bed. Plus I got all the benefits of a nice new bed to sleep in now that I am getting older and hurt in more places. We woodworkers must plan ahead, though twenty-four years might be a little too far ahead. To help us whenever these circumstances crop up - and they will with disturbing frequency - magazine publishers should make a point of printing any holiday issues well before each holiday rolls around.

If you've forgotten all about Valentine's Day this year, it may well be too late to make that special project, but here is a word of advice for next year: Keep every issue of any magazine that contains a holiday project. The night before a holiday or anniversary is no time to be madly leafing through a ten year supply of Canadian Woodworking (a shameless plug here) for some project to whip up overnight. I'm sure we have all spent many a night attempting to find and finish that last vital gift before the reckoning of the coming dawn. I know I certainly have! I have often wondered why the people in charge of holidays never give men an advanced warning.

One fine February I was happily working in my shop when my sister-in-law arrived to completely ruin my blissful ignorance by enquiring what I had bought my wife for Valentine's Day. Up to that point, I not only wasn't aware that Valentine's Day was imminent, but I also wasn't aware of any valid reason to care. I had managed to make it through many years of harmonious marriage without even once paying the day any attention. Why should I start now? (Although I seem to recall February as being a particularly cold and somewhat lonely month.)

Like all woodworkers, I have carefully hoarded every issue of every woodworking magazine ever published, or so it seems. Unfortunately, they are not arranged by month and many are missing covers, severally hampering a search for any Valentines issue. The saddest thing was that I had no idea what something Valentine-ish would look like, although I had a vague recollection from childhood of bunnies and hearts and baby chickens. I sometimes wonder how I ever found someone to marry me.

Eventually I had a 'EUREKA' moment when I opened a February issue of a magazine and found a lovely little, heart-shaped jewellery box that I knew I could whip up in no time. Seven hours later as the wall clock was announcing to the world that it was 2:00 a.m., I stumbled into the house with not just one, but three, beautifully and lovingly crafted and carved, heart-shaped jewellery boxes. One for my wife and one each for the girls. I had forgotten about the boy completely, although he likely wouldn't have wanted one anyway. The boxes were a huge hit and everyone "Oooh'ed and Aaah'ed" and exclaimed over and over how much time and care and effort I must have put into them. I declined to disavow them of their delusions.

DON WILKINSON
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