A Choice of Three Bookcases

Spend a day,

a weekend

or a week—
it's up to you

BY PHILIP C. LOWE

When customers arrive at my shop inquiring about having a piece of furniture made, it's part of my job to ascertain what quality of furniture they're looking for and to translate their desires into a dollar amount that will equal the time and materials needed to complete the piece. We all know that more time spent equals more dollars. The quicker the joinery and construction and the cheaper the materials, the less expensive the piece, and vice versa. The woodworker working in his or her home shop faces this same dilemma. Regardless of your skill level, you must decide how much time and materials are worth putting into a piece.

Imagine three scenarios. In scenario one, your floors are piled high with books, you need a handful of bookcases, and you need them in a hurry. It's pretty hard to justify building bookcases that are going to take two weeks a piece to complete. But in a day, you can knock together a sturdy bookcase with premilled pine from the lumberyard and simple dado construction.

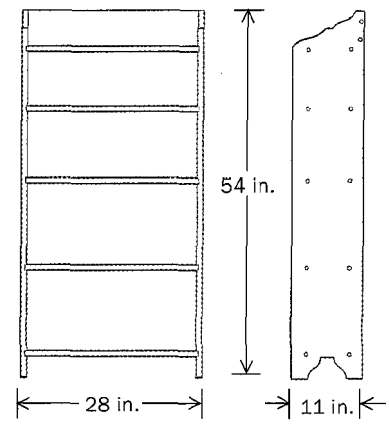
In scenario two, you want something more substantial than a pine case, but you don't have the time or the money for a solid hardwood piece. In this instance, a bookcase made from hardwood plywood with solid wood facings is the ticket.

In scenario three, you have only a few books to house, no time constraints, and a pile of mahogany left over from another project. In this instance, it makes sense to build a fine, hardwood bookcase with adjustable shelves, dovetail joinery, a face frame and curvaceous ogee bracket feet.

I'll show you how to make all three bookcases, and I'll leave it up to you to decide which case is the right one for your time, budget and circumstance.

A quick case

If you have a tablesaw with a dado blade, a quick bookcase is as close as your local lumberyard and a day's work. At the yard, purchase 1-in. by 12-in. D select pine, which is the most expensive but has the fewest knots. Make sure the boards are relatively free of cup, bow, twist and crook and that the thickness of the boards is consistent. When you mill the boards back at the shop, cut the shelf pieces ¼ in.



The right bookcase is a matter of circumstance. *The author regularly makes decisions about how much time and materials to put into a piece.*

narrower than the sides to accommodate the back.

Locating the shelves on each side piece is crucial. To make sure the dadoes line up properly, stack the side pieces on top of each other and mark each shelf location on the edge of both boards. At the tablesaw, install a dado blade of a width corresponding to the thickness of the shelves. Add paperboard shims (or even playing cards) to the dado set if its width needs to be increased just slightly. A sample cut will help ensure the fit. Cut the dadoes ¼ in. deep or one-third the thickness of the board (see the photo on p. 94).

Change to a 5/16-in. dado blade and rabbet the rear edge of each side to accept the back. I like to draw the decorative shapes at the top and bottom of the side pieces with a compass or by grabbing a can, cup or anything round that will form the shapes. Cut the shapes with a jigsaw and clean them up with a file or drum sander. Sand all of the parts before joining them.

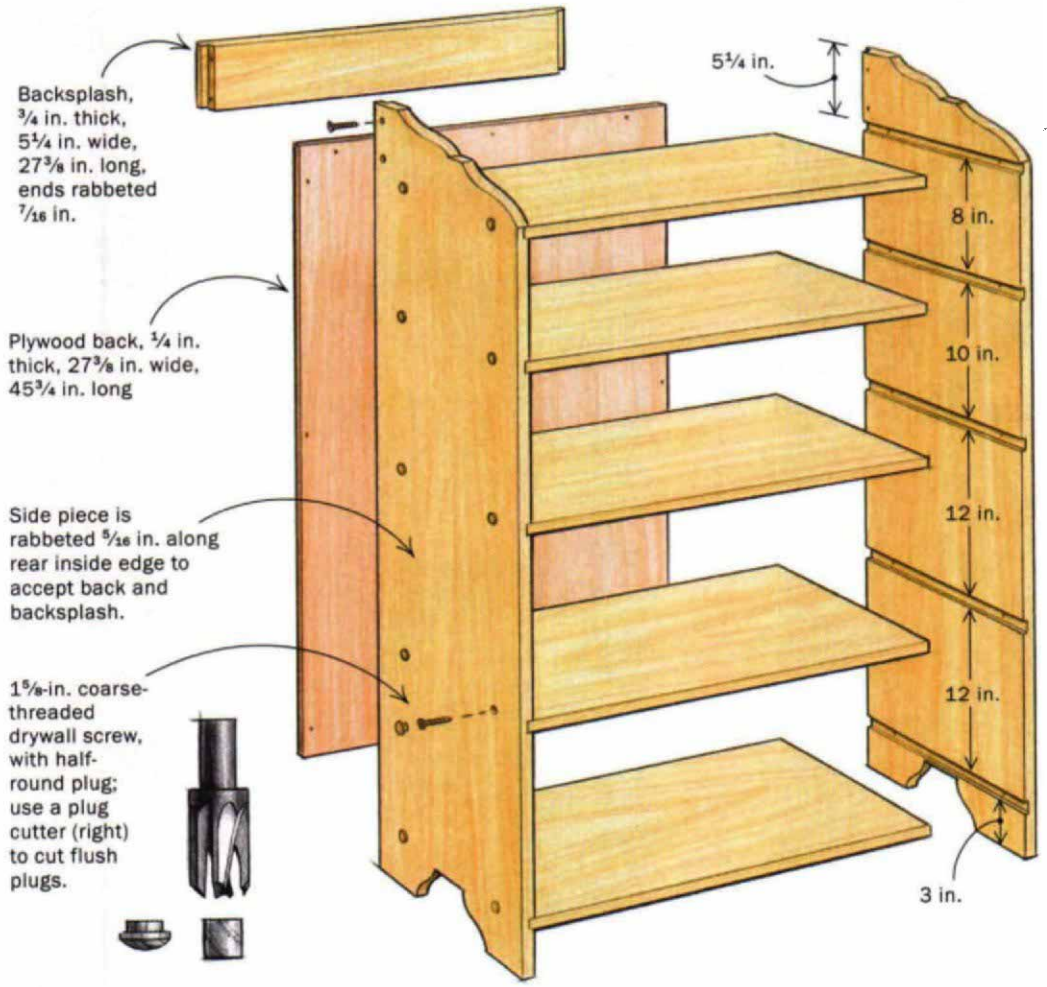
To assemble the case, run a bead of glue in each dado, set the shelves in place, drill pilot holes with countersinks and drive in 1⅝-in. coarse-threaded drywall screws. Screwing the back into position will square the case as the glue dries.

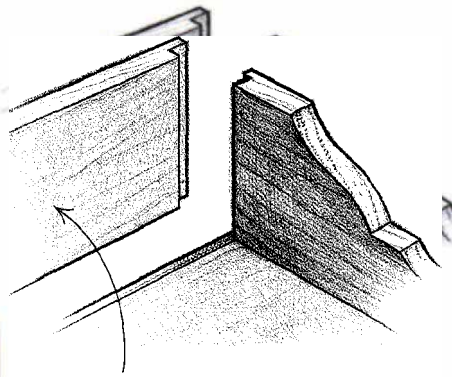
Finally, glue and screw a rabbeted backsplash above the back (see the top right drawing on p. 94). After a final

Photos: this page: Boyd Hagen; all others: Marc Vassallo

ONE-DAY BOOKCASE

Books piling up on the floor? Build this bookcase from 1x pine in a day using a tablesaw and jigsaw.





Rabbeted backsplash hides top edge of plywood back and joins cleanly to side piece.

DADOED SHELVES

To avoid having too much of the side pieces overhanging the tablesaw top when cross-dadoing, work from each end toward the center.

sanding and the easing of all the sharp edges, the case is ready for a coat of paint.

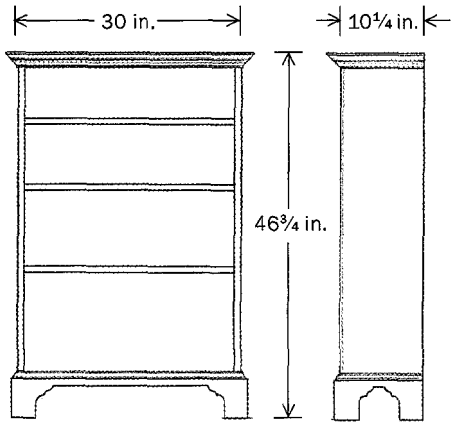
A better bookcase in a weekend

If you can spare a weekend to build a hardwood plywood bookcase with adjustable shelves, then you'll end up with a piece that's more gratifying and versatile than a bookcase made of simple 1x pine. Preparing a scale drawing—with full-sized details of the dadoes, rabbets, facings and moldings—and selecting the right materials will help the process move along smoothly and efficiently.

A good-quality sheet of hardwood plywood won't be cheap—the curly maple sheet I used cost about $200—but you'll only need one sheet. To determine the overall size of the bookcase, divide the 4-ft. by 8-ft. sheet of plywood lengthwise four times, taking into account the saw kerf. That means the case can be 10 in. deep, plus the thickness of the facings. To figure the height and width of the case, determine the number of parts you can get from the four 96-in. lengths. You'll need only a couple of pieces of solid wood, for the facings and the base.

A tablesaw with a fine combination blade works well for cutting the parts from the sheet of plywood, leaving edges with very few saw marks. Rough-cut the solid lumber to length and joint the pieces on one surface. The parts for the base should be planed to their finished thicknesses, but the parts that will become the facings should be planed only to within 1/16 in. of their finished thicknesses. The facings are left thicker than the plywood so they can be scraped to the same thickness after they are glued to the edges. When gluing the facings to the front edges of the sides and shelves, bar clamps and a large batten will help you apply even pressure along the length. Once the glue has cured, cut away any extra length to even the facings up with the ends of the plywood pieces. Note that the wider facings applied to the top have mitered front corners.

With a marking gauge set to the thickness of the plywood, scribe lines across the side pieces to locate the rabbets for the carcase



top. Scribe with a heavy hand so that the gauge will cut through the face veneer and help prevent chipout as the rabbets are cut. Also, scribe lines across the side panels to locate the dado for the bottom piece of the carcase. Because plywood doesn't measure exactly ¾ in., add an auxiliary fence and cut into its face or shim the dado set to match the actual thickness of the panels. Once you've cut rabbets and dadoes across the side panels for the top and bottom pieces, cut dadoes from top to bottom for the metal shelf standards and then rabbets along the rear inside edges for the back.

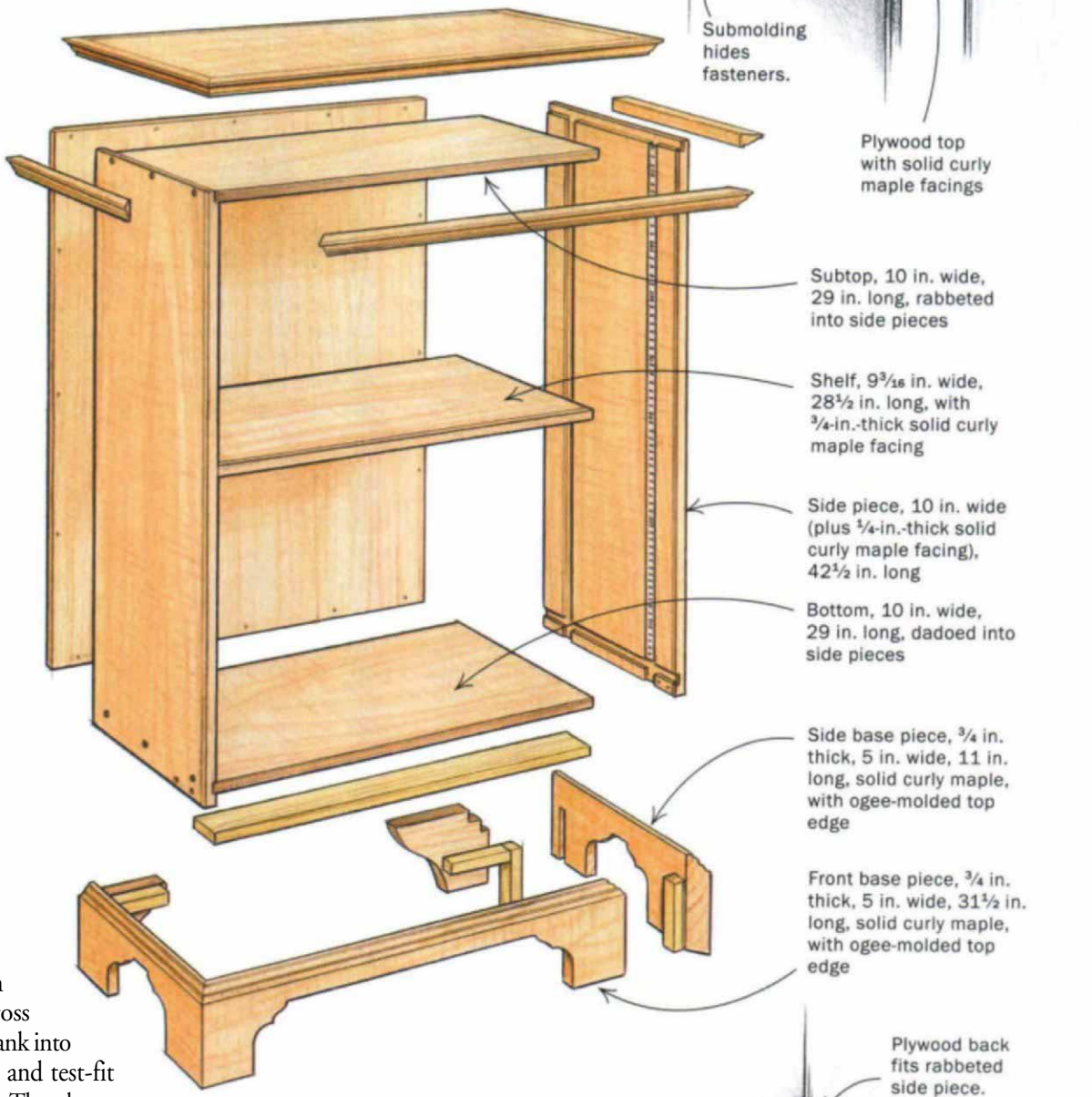
The construction of the carcase, prior to adding the molded top and base, is similar to that of the one-day case, in that dado and screw construction is used, as well as a rabbeted back. Before the top and bottom are glued and screwed to the ends, sand the visual surfaces to their finished state. Now the assembly can take place. Use 1⅝-in. coarse-threaded drywall screws, countersunk to keep the heads of the screws below the surface. The screws will be covered by the moldings.

For the base, mold one long blank before cutting the pieces to length, which makes for fewer passes across the router. Cut the molded blank into three pieces, miter the ends and test-fit the joints at the front corners. Then lay out the curves of the bracket feet. I made a plunge cut on the tablesaw for the straight section of the front base piece and cut out the curves on the bandsaw (see the photos on p. 96). Because the rear of the base has such short grain (see the drawing at right), cut a stop dado and install a bracket to help prevent the foot from breaking off if kicked. Glue the base to the bottom of the carcase and then rub glue blocks into the inside corner of the joints to add strength.

Using a router, shape the molding around the top piece into the extra-wide

TWO-DAY BOOKCASE

If you have a weekend, build this case from a single sheet of plywood, and dress it up with solid wood moldings, facings and base.



METAL SHELF STANDARDS

Numbers on the standards help align slots for the brackets (right).

Drawings: Bob La Pointe

CONSTRUCTION OF THE BASE

A plunge cut is the surest way to cut a straight line between the curves at either end. First raise the tablesaw blade ana mark the fence at the blade's farthest point. Retract the blade and position the base piece to the mark. Clamp a stop to the fence to avoid kickback. Now, carefully raise the blade through the base piece (left), then push the base piece across the blade. Finish by cutting out the curves at the bandsaw (middle). Glue and clamp the front and side base pieces to the carcase at the same time (right). Add brackets at the rear and glue blocks to the inside corners.

facings that have been applied. The narrow submolding, which will be applied just below the molded top piece, should be shaped onto a wider board from which a narrow strip can be sawed off. I shaped the edge molding on the base and the top submolding with the same ogee bit (when applied, the submolding is turned upside down). The molded edge on the top piece itself is a cove and quarter round, run with the quarter round to the top.

When molding a top with solid facings, it's best to make the first cut across the left side, beginning at the front corner and working toward the rear. Make the second cut across the front, beginning at the right corner, and then the third cut across the right side, working from the rear to the front. This progression of cuts helps eliminate tearout at the corners.

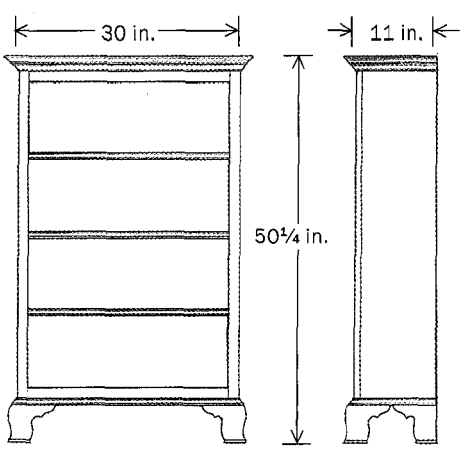
Take your time for a real fine bookcase

Building an heirloom bookcase requires greater effort than building one that's dadoed and screwed together, but the result is, well, an heirloom. Making a drawing of this bookcase is crucial. A scaled layout with full-sized details and a stock list will eliminate guesswork.

Dovetail joints are solid, and a face frame adds substance—Locking the carcase together with dovetail joints makes for a solid foundation onto which to attach the top, back, shelves and ogee bracket feet. I chose to use lapped dovetails at the top of the carcase and housed, tapered half dovetails at the bottom.

The lapped dovetails leave a smooth surface onto which to glue the top molding; a through-dovetail, by contrast, has end grain that can interfere when you glue on the moldings. Using two narrower pieces at the top rather than one full-width piece saves stock and requires fewer dovetails.

Housed, tapered dovetails make sense at the bottom because a piece with lapped dovetails would have to be 1½ in. thick to enable the base to be applied—a waste of expensive stock. The taper allows the half dovetail to fit easily into its housing, without weakening the joint. By selecting both types of dovetail joints, you can make the length of the tails the same; thus, each of the three top and bottom pieces can be cut to the same length.



To make a housed, tapered half dovetail, start by cutting the housing itself into the side pieces. Two steps are required (see the top photos on p. 98): First, router-cut a full dovetail dado, then taper one side of the dado with a tablesaw.

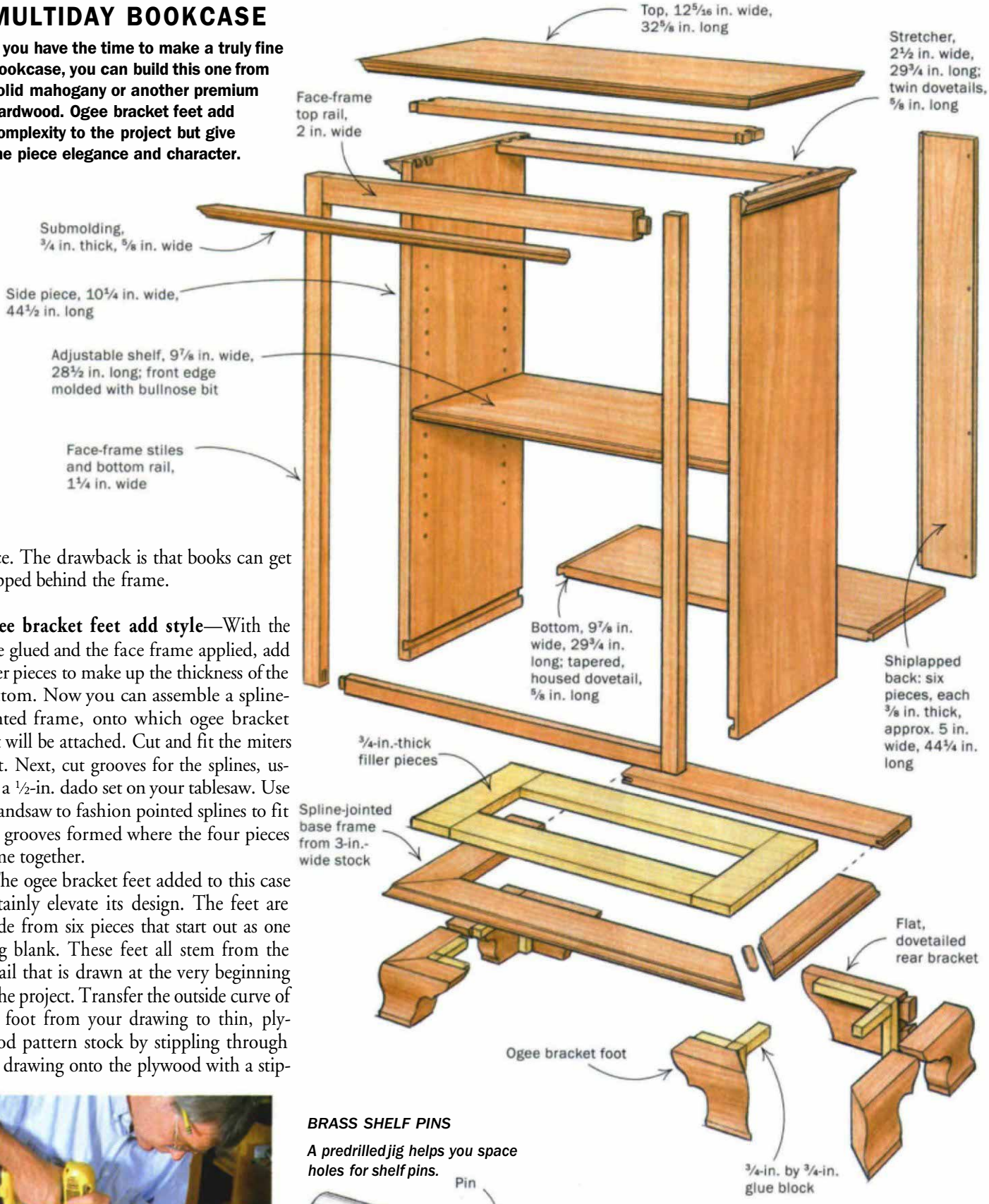
Cut the tails onto the bottom piece back at the router. With the bit remaining at the same height as it was for cutting the housing, reposition the fence to cut a half dovetail onto one edge of the bottom piece. You'll need to run the bottom piece vertically against the fence.

Use a rabbet plane to taper the half dovetail on the bottom piece to fit the tapered housing on the side piece. Secure a fence across the flat side of the bottom piece, in line with the shoulder of the dovetail. With the rabbet plane against the fence, carefully plane a taper, starting at zero at one end and working down to ⅛ in. at the other end. Keep testing the dovetail in position until it fits snug in the housing. Before gluing up the frame, drill holes in the side pieces for brass shelf pins; space the holes using a predrilled board as a jig.

The face frame is of simple mortise-and-tenon construction. The top rail should be wider than the other pieces because a portion of it will be covered by the submolding below the top. A face frame gives the bookcase front a substantial appear-

MULTIDAY BOOKCASE

If you have the time to make a truly fine bookcase, you can build this one from solid mahogany or another premium hardwood. Ogee bracket feet add complexity to the project but give the piece elegance and character.



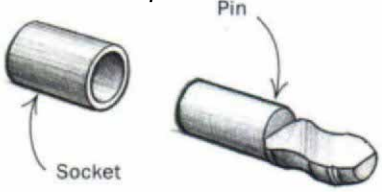
ance. The drawback is that books can get trapped behind the frame.

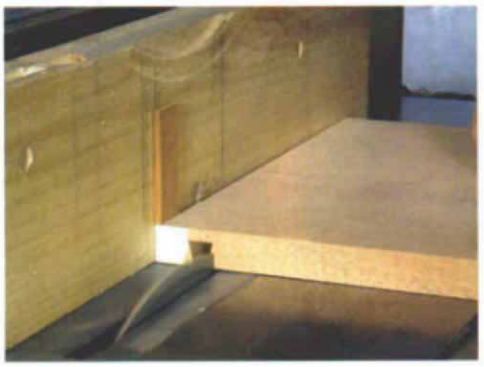
Ogee bracket feet add style—With the case glued and the face frame applied, add filler pieces to make up the thickness of the bottom. Now you can assemble a spline-jointed frame, onto which ogee bracket feet will be attached. Cut and fit the miters first. Next, cut grooves for the splines, using a ½-in. dado set on your tablesaw. Use a bandsaw to fashion pointed splines to fit the grooves formed where the four pieces come together.

The ogee bracket feet added to this case certainly elevate its design. The feet are made from six pieces that start out as one long blank. These feet all stem from the detail that is drawn at the very beginning of the project. Transfer the outside curve of the foot from your drawing to thin, plywood pattern stock by stippling through the drawing onto the plywood with a stip-

BRASS SHELF PINS

A predrilled jig helps you space holes for shelf pins.



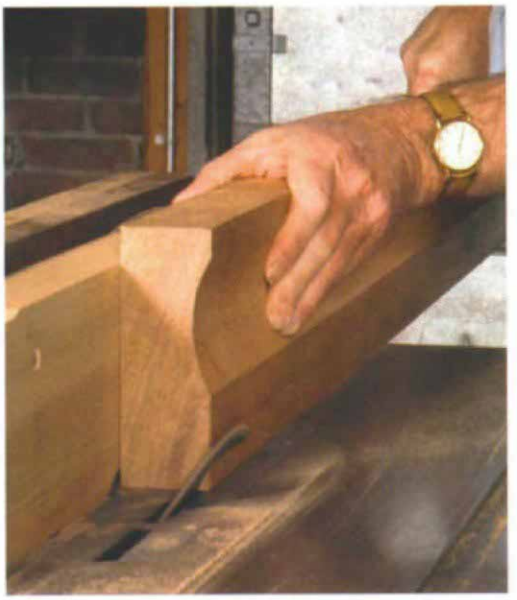


TAPERING A HOUSED HALF DOVETAIL

First router-cut a 5/8-in. dovetail dado **across** *the side piece, then taper the dado. A 1/8-in.-thick, 3/8-in.-wide spacer taped to the end of the side piece allows you to taper one wall of the dovetail dado by running it across a tablesaw blade. Wax the tabletop and fence to avoid kickback.*

Cut a half dovetail into the bottom face of the shelf piece, then taper the top face. With a board clamped to the bottom piece as a guide, plane a taper from zero at one end to 1/8 in. at the other.

A tapered, housed half dovetail is easier to fit than a straight one. Properly sized, the tapered half dovetail will still lock tightly in its housing.



OGEE BRACKET FEET REVEALED

Multifaceted ogee bracket feet begin as one long blank. First mark the outside curve of the foot onto the end of the blank. To shape the concave curve, pass the blank diagonally across a tablesaw blade (top left), cutting just 1/16 in. with each pass. To shape the **convex curve, set the** *blade at an angle and make successive rip cuts (top middle). At the bench, shape and smooth the curves, first with a plane, then with a scraper (top right) and finally with sandpaper. Now cut the long blank into short lengths. Miter-cut the ends as necessary and cut the inside curve of the ogee feet at the bandsaw (bottom left). Glue up each foot from two pieces and then glue the feet to the base (bottom right).*

pling tool. The plywood pattern can be cut out with a jigsaw. Use this pattern to transfer the ogee profile onto the two ends of the long blank. Now this shape needs to be cut into the surface. I like to do this with a series of cuts on the tablesaw, followed by a final shaping with a handplane and a scraper (see the bottom photos on the facing page).

Begin by cutting the concave portion of the ogee shape. I achieve this by raising the sawblade to the height of the concave curve and then positioning the blank diagonally until the tablesaw blade fills the curve. Clamp a straightedge to the table, parallel to the piece. Now lower the blade until it projects just 1/16 in. above the table and pass the blank across the blade. Here, there is a safety issue. Angle the fence from the front left to the rear right of the saw table. As you push the piece across the sawblade, the rotation of the blade naturally pushes it against the fence. This will prevent any kickback from occurring. Raise the blade only 1/16 in. with each subsequent pass. A telltale sign of an aggressive cut is the sound of the blade cutting. If it starts to sing wildly, the cut is too deep or the pass across the blade is too rapid. Altering one or the other will solve the problem.

Once you've completed this series of cuts, remove the temporary fence and replace it with the regular fence. Angle the blade to 45° and set the fence so that the square corner at the top of the foot can be cut away by running the blank on its top edge. Then adjust the blade angle to 22½° and cut a second bevel, taking away the sharp corner of the angle you've already cut. Cut at this angle two more times, once with the blank lying flat on the table, profile down, and a second time with the fence moved to the left side of the blade and the blank run between the fence and the blade. For this final cut, raise the blade to remove the hard angle where the cove meets the round.

At the bench, plane the roundness of the ogee into the blank and scrape it free of sawmarks and facets left by the plane. Follow with a progression of sandings to achieve the final shape and smoothness.

Now that the blank has its finished shape, you can cut it into three lengths, each long enough for two halves of an ogee bracket foot. Each front foot is formed from two halves mitered together; the back feet each require a shaped half to be dovetailed to a flat rear bracket that has been shaped with a simple curve. Miter-cut four ends of the lengths for the front feet and leave two ends straight for the rear feet. Use a plywood pattern to draw the inside curve onto the lengths and cut out the shape on the bandsaw. Clean up the curves by rasping, filing and sanding. Gluing the feet together requires nothing more than a rub joint, if the miters are planed and fit correctly. Rub glue blocks into the inside corner of each ogee bracket foot to provide additional strength. You can then glue the feet to the mitered base frame.

Shiplapping allows solid boards to move. *A single screw placed near one edge of each board (at top and bottom) will enable each rabbeted board to hold down the board next to it, while allowing each board to move with seasonal changes.*

Shiplapped back allows for wood movement—Shiplapping is an excellent means of attaching solid boards to the back while allowing each board to move with seasonal changes in the weather. Determine the width of the boards for the back by dividing the width of the opening by the number of pieces you feel is suitable without having to glue up any pieces. It's best to do a full-sized layout to determine the sizes of the boards, keeping in mind that the rabbets will overlap. I settled on six boards for my bookcase. The theory is that each rabbeted board will hold down the board next to it, if you position two screws (one at the top and one at the bottom) near the edge (look closely at the photo above). Two screws will leave each board free to move. And if you've had books piled on the floor, the bookcase itself will provide you the same freedom. □

Philip C. Lowe designs, builds and restores fine furniture and teaches carving and woodworking at his waterfront shop in Beverly, Mass.