Chairs of this Philadelphia-Chippendale pattern were produced by the thousands between 1770 and 1800. This utilitarian framework accepts all the fancier variations as well—pierced ladders, open splats, curved front rails, even ball-and-claw feet—without much change in angles or joinery. Landon's reproduction, finish hardly dry, is the one at left.

Making the Chippendale Chair

The way to a chair is to mind your flats and squares

by Eugene E. Landon

Chippendale chairs come in a profusion of designs: ladder-backs, Gothic backs, pretzel backs, some with ball-and-claw feet, some with intricate carving and detailing. The list could go on and on. Yet there's really only one Chippendale chair, because all the variations hang on a common framework. If you can master the chair in this article—it's not really difficult—you should be able to see your way clear to building any of the others. This particular design can be found in *The Philadelphia and Chair-Maker's Book of Prices,* second edition, 1795 (no copy of the first edition has yet been found).

The apparent problem in building a chair is that the seat is trapezoidal and the back posts not only curve, they splay out from the floor upward. This means that most of the chair's mortise-and-tenon joints are not at 90°. To compound the situation, it would seem that all those curves must make it very difficult to cut and fit shoulder joints. Well, the problems look a lot worse than they are. In making this chair we will start with the back posts, then cut each subsequent part to fit in a logical order.

I should say at the outset that you will need some common handtools to build this chair. If you are mostly a machine woodworker, you may never have been taught the virtues of handtools. I remember visiting a woodworking shop at a nearby school. I could hardly believe it, but there wasn't a marking gauge in sight, let alone a mortising gauge. I wouldn't know how to work without gauges, yet they are forgotten tools. You see them for sale in junk shops, garage sales, anywhere there's useless clutter. If you think about it for a moment, there must be *millions* of them out there. It makes you suspect that they might have been used for something, doesn't it?

I could make this chair very easily without electricity, but I could not make it at all without a bevel gauge, my marking gauges, a few sharp chisels, a plane or two, some scrapers, and some rasps and files. If you shy away from such tools, you are not alone, yet trying to duplicate their functions with a machine can be frustrating. For this project at least, I think I can show you that handtools are the right way to go.

The key angle—In building this chair, you would start by scaling up the templates shown on the next page. But if you were reproducing an existing chair in your own shop, you'd begin by determining what I call the chair's key angle—the angle at which the back seat rail meets the back posts, as shown in the photo below. This angle is the same as that at which the chair's back posts meet the crest rail. If you get this angle wrong, the posts will be out of line and no amount of measuring and gauging from the original will make the chair right—you may still end up with a chair, but you will be playing catch-up all the way.

As long as you have this key angle in your mind's eye, let's examine the main misconception most people have about a Chippendale chair, namely that it is composed of a series of continuous curves. It is not. At every place where a mortise-and-tenon joint comes together there is a planed flat, so that the tenon shoulder lines can be straight. There are short flats where each ladder joins the balloon-shape of the back, and longer flats for the side seat rails. There is even a flat low on the back leg for the side stretcher. The secret to making a chair is to be conscious of these flats, to shape them square to the members, then to fair the adjoining curves to meet them.

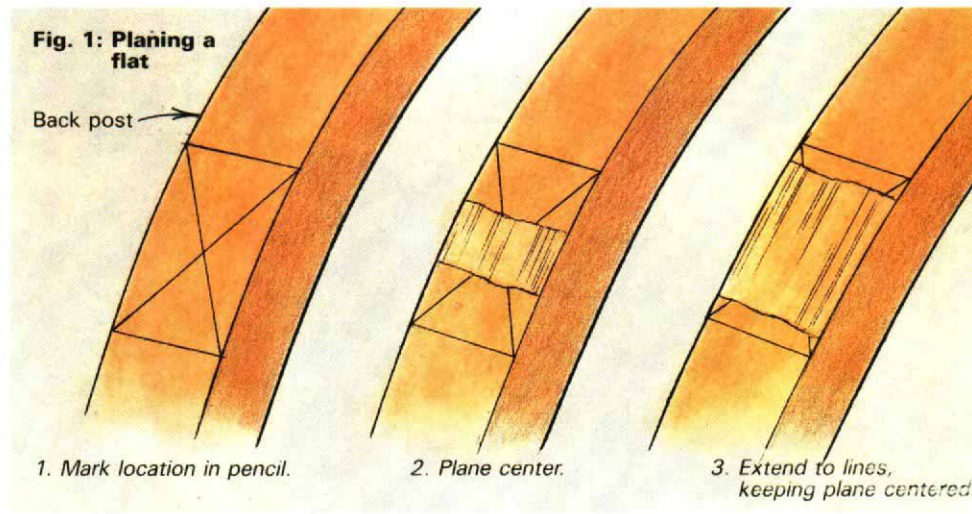
Begin with the back posts—The templates in figure 2 were scribed directly off the old chair in the photographs. The side-view template should be laid on the stock, traced, then bandsawn. Two back posts can be bandsawn from a piece of wood 37 in. long, 6 in. wide and 1¾ in. thick. Rough out the side view of the top tenon at this time, but don't saw too tightly to the lines—we'll saw and chisel this tenon to final size later.

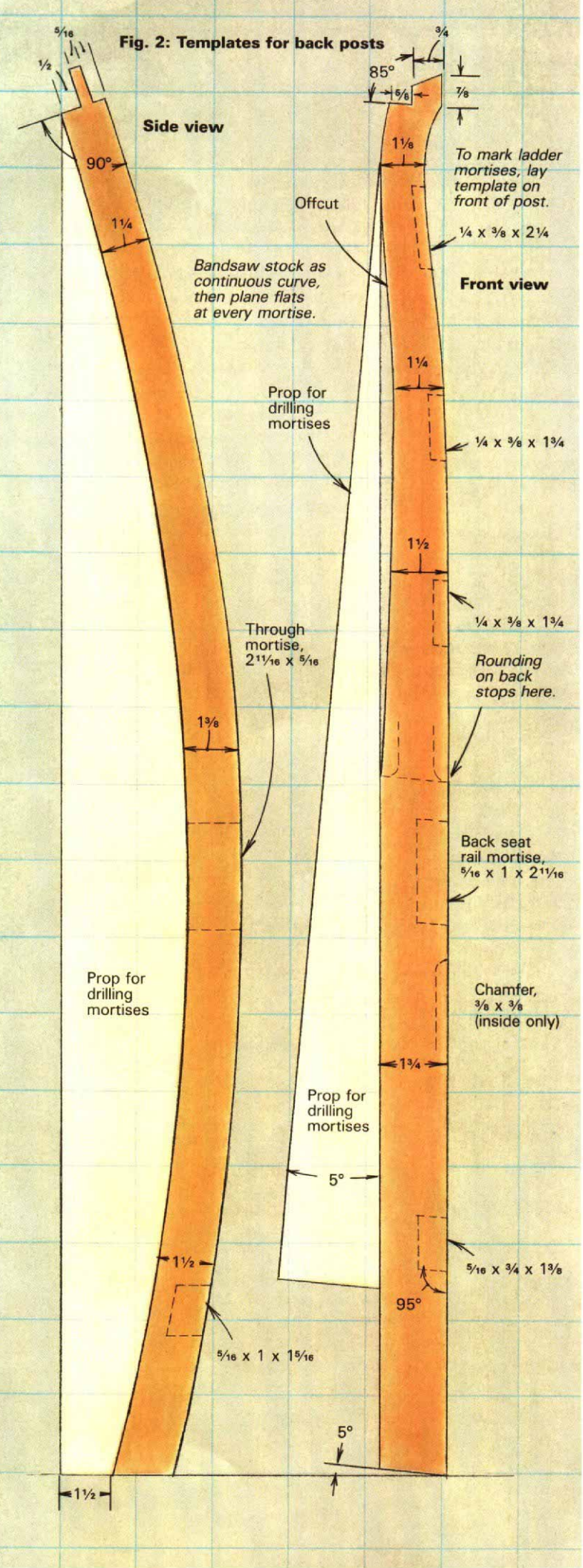
Mark the location of the flats for the side seat rails and stretchers, then plane them square. The trick for planing a true flat is shown in the sketch below. Next, use a series of three or four files, from a rough half-round rasp to about an 8-in. smooth file, to remove the remaining bandsaw marks, both front and back. Drawfiling gives the most precision—with the handle of the file in your right hand and the toe of the file in your left, push the file away from you along the work as if you were holding a roll ing pin. If your strokes are long, the scratch pattern will give a clear indication of where the high spots are. Chamfers can be stopped using a ½-in.-dia. rat-tail file to achieve the curve.

Files and rasps are precision tools. A coarse rasp may look as if it is butchering the wood, but it is safe to use to remove wood quickly because the scratches are all of uniform depth. The next file in the series replaces the coarse scratch with finer ones, and so on, until the surface is smooth. The whole job should take but a couple of minutes, just remember not to file into the flat spots. At this point, the curve should look continuous; it will look even more so when the chair is together.

The file marks are best removed with a scraper *(FWW* #58). It

The slope of the shoulders on the back seat rail is a key angle—it determines the splay of the back posts, and thus affects the sizes of all the other parts in the back.





is not necessary to scrape the upper parts of the post at this time—the front surface will be molded with a scratch stock, and the rear surface will be rasped round after the front-view curves have been bandsawn. The main reason for filing the curves on the upper posts is to be sure they are continuous and even down their centerlines. The lower parts of the posts will remain square from now on; therefore, scrape the front and back faces, then plane the lower legs inside and out. Take care here—these will be the final surfaces on the finished chair.

Chisel tips—Now is a good time to shape the top tenon, taking the sizes from figure 2. Saw, then pare the tenon shoulders to the correct angle (set with a bevel gauge), and adjust its thickness to ⅝ in., a step easily done with calipers as a gauge and the proverbial "sharp chisel," a term that can use some explanation.

There is really only one trick to using a chisel—its back must be absolutely flat, and polished as smooth as the bevel. When this is the case, you can lay a chisel down flat on the work, bevel up, and pare high spots away without risk of digging in. If you find the wood tearing because of contrary grain, simply pare in from the side of the tenon, cross grain, instead of from the end. When cutting shoulders, press the chisel into the knife line, overlapping the cuts along the full length of the joint, then pare off the chips to establish a slight ledge. With the ledge as a backup behind the chisel, heavier cuts can be taken without danger of the chisel "backing up" and damaging the shoulder line. You can form a perfect square shoulder this way, but in fact, all the joints in this chair are undercut, as shown in figure 4.

If your chisels seem sharp but won't pare flat, it is because the back is rounded. The rounding may be so slight that you can barely see it, but such a tool rides up over the fibers you want to cut, just as the raised tip on a ski rides up over snow.

When the post tenon is sized, clamp the front-view template to the front of the leg and pencil the curves. You can bandsaw the front profile by supporting the post on the offcut from the stock, just as you would to bandsaw any three dimensional object.

With this done, mark and shape the flats for the ladders. The best approach is to clamp the two legs side-by-side in the vise for marking, to ensure that the flats will align.

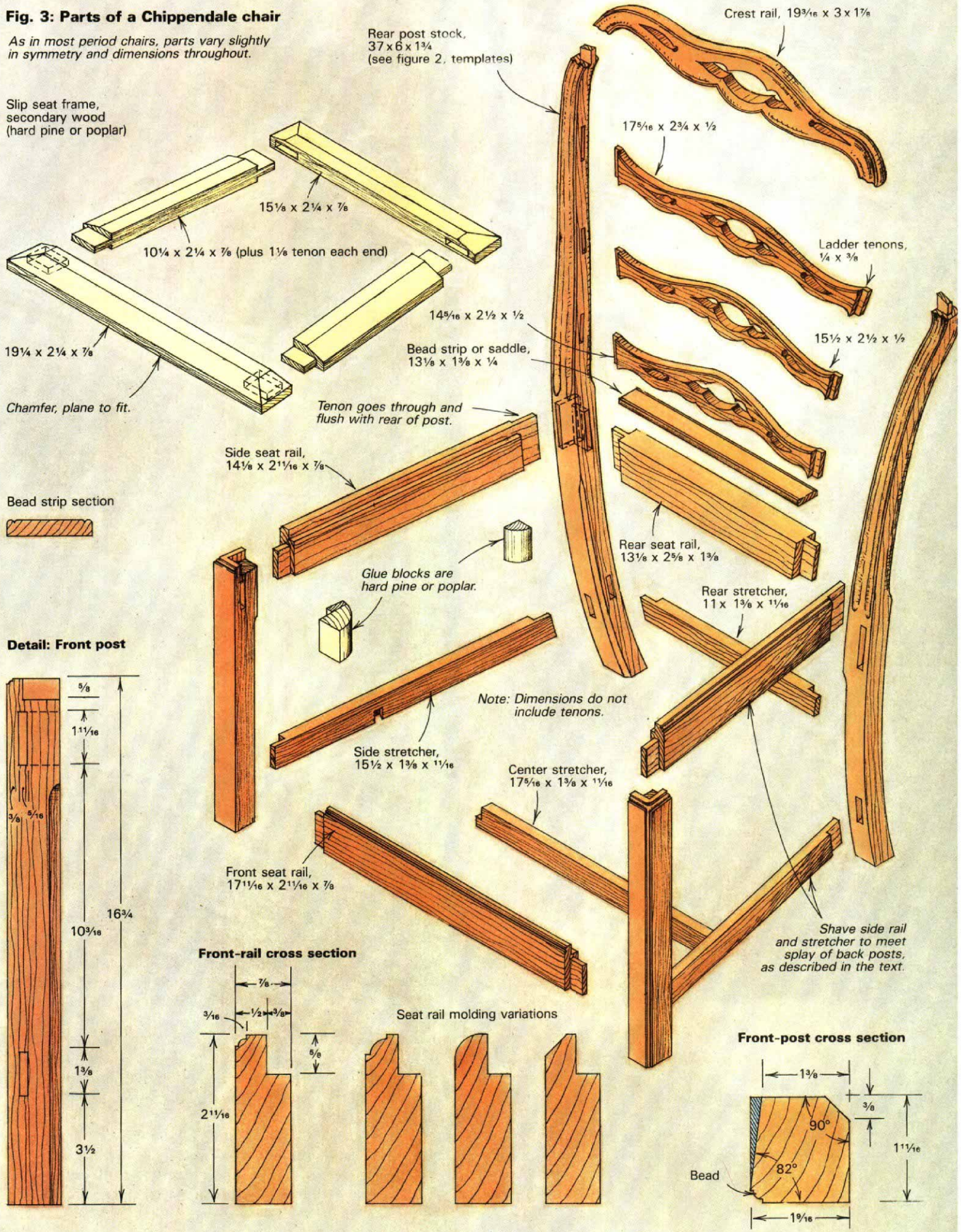
Laying out mortises—Scribe mortises with a mortise marking gauge and/or knife, then use the drill press with a slightly undersized bit to remove most of the waste. Relieving the wood this way reduces the chance of splitting. Finally, pare to the knife lines with a chisel.

Gauges and chisels are extremely precise "partners" in handtool woodworking. To explain, let me begin with a couple of definitions: The familiar marking gauge has a sharp pin that scratches a single line—the pin can be set and locked a certain distance from the fence. A mortising gauge is similar to a marking gauge, but it has two pins that can be locked various distances apart to scribe parallel lines. The distance the pins are set apart represents the width of not only the mortise, but also the width of the tenon that will fit it. The distance the pins are set from the fence represents the distance the joint is from the face of the work. If you always run the fence along the outside faces when scribing, the two pieces will align perfectly when the joint comes together. Why? Because the final cuts are made to the line by starting the edge of a chisel directly in the scribe mark. This halves each scribe line down the middle, with a built-in precision that would require painstaking setup time on a machine.

The man who made this chair some 200 years ago set his mor-

Fig. 3: Parts of a Chippendale chair

As in most period chairs, parts vary slightly in symmetry and dimensions throughout.



Drawing: Lou Bassler

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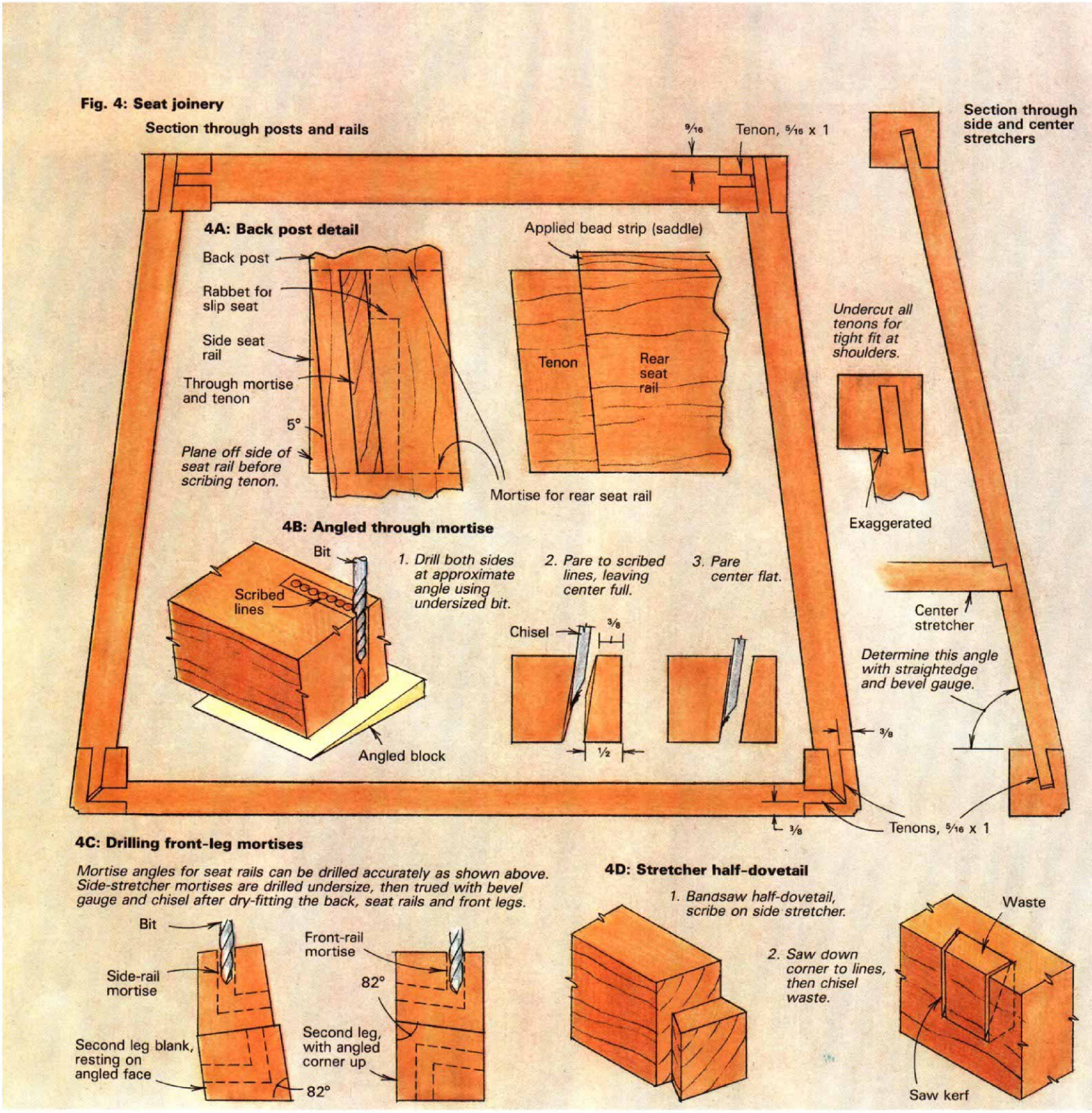


tising gauge to scribe two lines 5/16 in. apart, then he left it there. Every mortise in the chair is 5/16 in. wide, except those for the ladders. He probably had another gauge, set at 1/4 in., for them. On complex jobs, I've had as many as six or seven gauges working, each pre-set to a specific critical dimension.

Sizes and locations of the required mortises are shown on the templates, with details of their angles in figure 4. The one that looks trickiest is the through mortise for the side seat rail. This through mortise is a Philadelphia hallmark, and I expect that it caught on for two reasons: First, to the chair buyer, it looks strong. Second, chairmakers like it because it is actually easier to cut than a blind mortise—figure 4B shows the strategy: Drill in from both sides with the work supported on angled blocks, using a drill considerably undersized. Then chisel to the lines on both sides, leaving the center of the joint to be pared out as the last step. With this method, an 18th-century cabinetmaker could simply eyeball the approximate drilling angle, as it was the final chisel cuts that would true it up. My drill press, therefore, is the equivalent of a brace-and-bit, not of a modern machine tool, which would call for elaborate angle jigs to cut directly to the line. It would be absurd to claim that a drill press is a handtool, but that's the spirit in which I use it.

Making an angled blind mortise is more difficult, but in this chair the drill press begins the correct angles and they can be pared remarkably true by simply angling the workpiece in the vise, as shown in figure 6, so that you are chopping perpendicu-

lar—any last adjustments can be made when the pieces are dry-fit together. As an aid for drilling and paring, the splay angle of the legs can be scribed on the front surface of the leg with a bevel gauge. Don't scribe the rear of the leg, or the marks will show in the finished chair.

Figure 4C shows strategies for ensuring the correct angles in the front-leg mortises. If you choose to, you can devise similar fail-safe tricks for the bottom mortise in the rear posts—which turns out to be the only mortise in the chair that's difficult to line up. I generally eyeball it using a bevel gauge to indicate the angle in top view, and positioning the post in the vise so that the side-view angle can be chopped perpendicular.

One piece at a time—The rear seat rail, as mentioned earlier, is the keystone that establishes the critical angles in the chair. Consider this lowly piece of wood for a moment. It is merely a length of mahogany with a tenon on each end. The shoulder lines are scribed with an X-Acto knife and a bevel gauge, roughed out with the bandsaw (by tilting the workpiece), then pared to the scribed lines with a chisel. This is *not* a difficult piece to make, nor, considered one at a time, are any of the rest of the pieces of the chair. Each may have its minor peculiarities, but I'll show you how to deal with them as we proceed.

The front rail is vertical and the rear leg splays. Because of this, the outer face of the side rail must be "twisted" to conform to the splay of the leg. The reflection in the photo, top right, shows that the rail is simply tapered on the diagonal to the necessary angle at the rear. Here's how to twist the rail:

According to the dimensions in figure 4, measure and scribe the twist angle on the endgrain at the back end of the rail Blank. It wouldn't hurt to scribe the taper line along the bottom of the rail as well. A plane can then remove the wood down to the lines. Here is an example of another woodworking "partnership," that of a plane and a scribed line: As soon as the plane iron has cut down as far as the scribed line, the indented line appears as a feathery shimmer at the edges of the work, warning you that you have gone almost as far as you must—you don't have to keep looking at the edges of the work to see where you are.

Once the faces of the side rails have been planed to shape, laying out the tenons is straightforward. The rear tenon is angled, as shown in the photo at right, but because it is scribed with the mortising gauge against the tapered outside face, it is scribed, in effect, just like any other tenon—square. I simply tilt the piece to bandsaw near the lines. The chisel does the rest.

The side rails (and the front rail) will be rabbeted on their inner edges to contain the slip seat. You could do this now. I usually use an old wooden rabbet plane for the job, but on this chair I used my Stanley 45, for the sole reason that a lot of you guys out there might want to show this paragraph to your wives and say: "See, honey, I really *did* need to buy that tool!" Of course, this cut is a perfect excuse to use a tablesaw.

The seat rail edges and front leg, in this chair, were beaded with a molding plane. This beading is optional, because in similar period chairs it might have been a chamfer or a plain round. I'd rather see these alternatives on a reproduction than see a molding generated by a stock router bit.

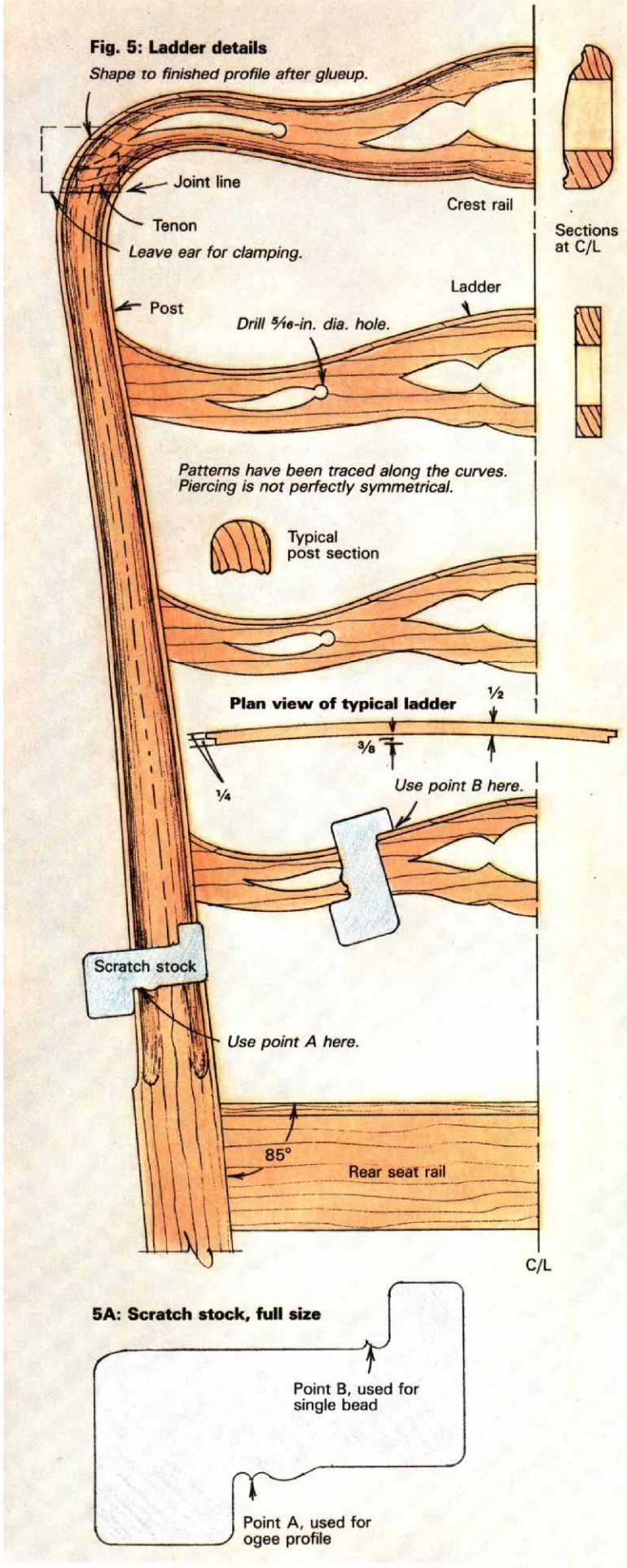
The top of the front leg posts must also be rabbeted so the seat will fit, but this step is done with mallet and chisel after the chair is assembled. Notice that the glue blocks are large enough to support the corners of the seat, doing double-duty, as it were.

The stretchers are miniature versions of the seat rails and should prove no problem, but note that the side stretcher's angle

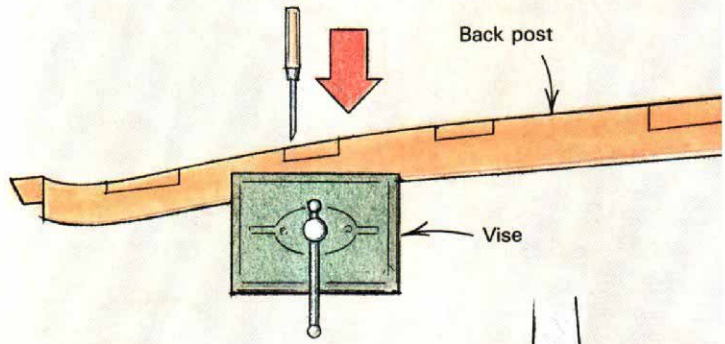
Top, the reflection on the side seat rail highlights the strategy for 'twisting' it to meet the splayed rear post—the surface is planed down along the diagonal. In normal lighting, the rail looks flat, with the twist more easily felt than seen. Lower photo shows the rear tenons on the rails (scribed marks darkened for clarity).

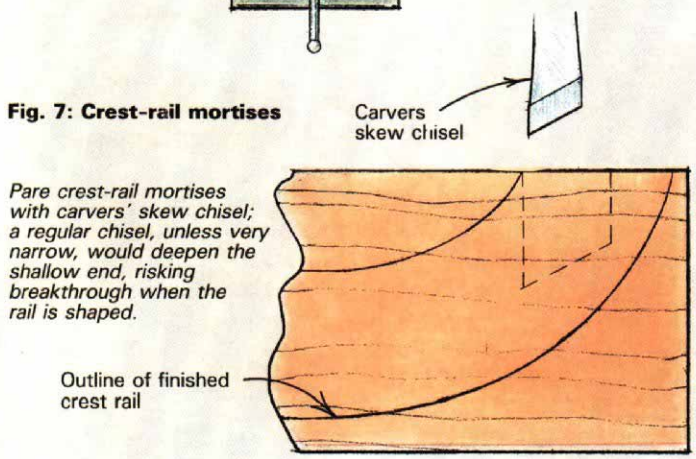
is more acute than the seat rail's. Notice, also, that they have only one shoulder on the tenons, so that the mortises can be wide, yet remain away from the face of the legs. This is typical chairmakers' strategy, keeping things strong. The single-shouldered tenon also shows up in chairs with a vertical splat, in case you would like one instead of the ladders, but the single tenon at the bottom of the splat must have its shoulder at the rear, while the tenon at the top has its shoulder at the front—otherwise there's no place to cut the mortises. Vertical splats are slipped into place after the rest of the back has been glued up. The saddle, which holds the splat at the bottom, is an applied piece, just as is the decorative bead in our chair. The saddle is glued atop the rear seat rail to secure the splat, which floats freely in its mortises both top and bottom—if you glue a splat it may split.

The center stretcher is fitted after the chair has been glued up—bandsaw the half-dovetail as shown in figure 4D, removing the saw marks with a chisel. Scribe the shape onto the bottom of the stretchers, then begin the sockets by handsawing down the



Drawing: Lou Bassler





lines as far as you can go. Next, chisel out the waste. If you have never made a half-blind dovetail this way, you may be surprised at how easy it is.

The crest rail—The mortises in this rail are as large as they can be without breaking through the top. Lay out the mortises and the profile of the rail on a piece of squared stock, then relieve the mortises on the drill press, being very careful not to drill too deep at the shallow end. Pare them as shown in figure 7.

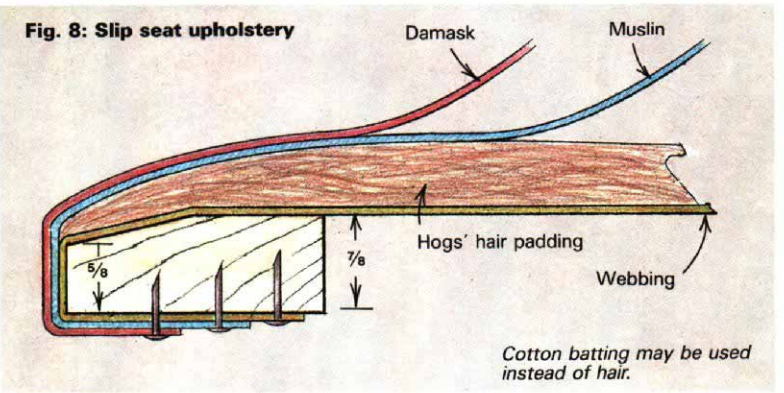
Cut the front and the top profile of the crest rail on the bandsaw, but leave a couple of "ears" at the ends for clamping, as shown in figure 5. I make the pierced decoration on the crest rail by drilling 5/16-in.-dia. holes straight through, then using a power scroll saw to cut the rest of the curves (you could use a saber saw or a hand fretsaw). The back of the crest rail is rounded with rasps, files and scrapers to the approximate cross section shown. It is not possible to show drawings and photos of all these compound curves, but as a guide I might say that the back of the crest rail looks as if it were blown up with a bicycle pump, with hardly a flat spot anywhere. The backs of the ladders are eased somewhat, but are basically flat.

The fronts are beaded with a scratch stock. The one I used was made by a local machine shop from steel about 3/32 in. thick, then tempered to 50Rc—about the same hardness as a planer blade. It is ground square, and can work in either direction without needing a burr (if you encounter contrary grain, just go the other way). One edge has the profile for the back-post molding, the other for the single bead around the edges of the ladders. A more elaborate version of the tool was shown in *FWW* #54, p. 73.

Sizes for the ladders, and their precise shoulder angles, can be taken off the back when it is dry-assembled, as I am shown doing in the top photo on the next page. The ladders are made in the

Terry Wild Studio

When sizing the ladders, above, a pair of clamps stabilizes the back posts. To pierce the back, left, first drill entrance holes for the scroll saw blade. The size of the drill bit used, in this case 5/16 in., conforms to the design.



same way as the crest rail, that is, they are marked out in the square, then shaped, pierced and beaded. Notice in figure 3 that the tenons have only one shoulder, located at the front.

Assembly—The back is glued up first and allowed to dry. The ladders, incidentally, are merely press-fit into place without glue. Then the rails, stretchers and front legs are glued and clamped to the back assembly. When this is dry, add the center stretcher, and fit the saddle (which is first beaded with the same scratch stock used on the ladders). Then cut the glue blocks to fit.

Make the slip seat as shown in the drawing, allowing a little room for the fabric—at least ⅛ in. on all sides. I prefer not to get involved with upholstery myself, as it would cut too much into my woodworking time, but there is nothing difficult about this seat. A cross section of the upholstery is shown in figure 8.

So, there's your chair, the first one, anyway. Now that you've got your confidence, my last piece of advice is to make them in batches from now on, the way they would have done it in the 18th century. You'll find that things go much faster. I'm not about to tell you how quickly I can make a set of six ladderback chairs—word might get out to my clients—so you'll have to find out for yourself. But I will tell you that 18th-century chair shops made a pretty good living, and there was a lot more competition then than there is now, that is, if you are talking about the real thing. It's a lot of trouble for a machine to duplicate the Chippendale look, so most factories don't really try—most of what you see as Chippendale these days is just mush. With handtools, though, the style is a piece of cake. □

Gene Landon makes furniture in Montoursville, Pa.

LETTERS

While I was laying out the mortises for the Chippendale chair *(FWW* #60), I discovered a mistake on p. 41. The measurements for the from post don't add up. The measurement from the tip of the side-stretcher mortise to the bottom of the side seat-rail mortise should probably be 9 3/16 —not 10 3/16, as in the article. Other than this, the plans work very well. I came up with another way to make the scratch stock. Using a chainsaw file, I cut the profile into a Stanley cabinet scraper.

—John Nathans, Three Forks, Mont.

EDITOR'S NOTE For the record, the correct dimension is 9 3/16 in.