

More on Mortising

And joining table legs to aprons

by Frank Klausz

There are hundreds of variations on the mortise-and-tenon joint and many different ways to make them. The method and the tools I learned to use as an apprentice in Hungary are different from the English way described by Ian Kirby in the March '79 issue of this magazine. Without saying my way is better I will tell you how I make a kitchen table with mortise-and-tenon joints, out of 3x3 poplar legs with 5/4 pine for the 4-in. apron and for the top.

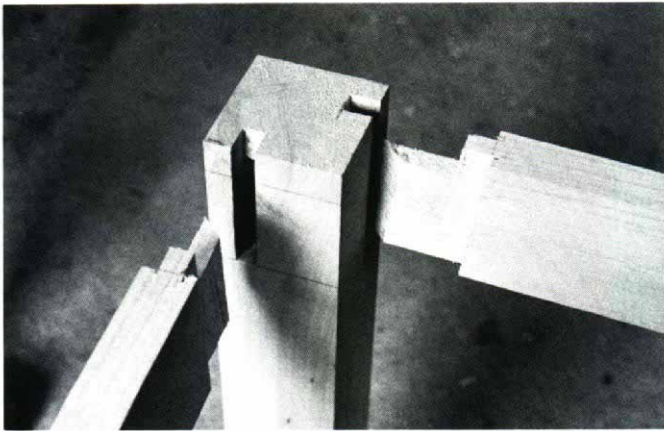
I disagree with Kirby on the following points: 1) the shape of the mortising chisel; 2) the method of sawing the tenon cheeks; and 3) how to mark out and cut the tenon shoulders.

1) Kirby corrects his chisels so the sides are parallel and square with the back. For me a chisel with parallel sides is a car without a steering wheel. The sides of my chisels are tapered 1° toward the front face as shown in fig. 2. This is better because you can twist it against wild grain to keep the mortise straight. The chisel back has to be straight, the edge sharp and the handle large and square with rounded corners and rounded top, so it can take a beating. The partially square handle is easier to steer and sight up—you can get a good solid grip. To make such a handle I turn it oversize, mount the chisel, then plane the flats.

I have three or four different makes of chisels, old ones, including a German 1/2-in. stamped D-FLIR Franc Wertheim, a French 3/8-in. stamped Peugeot Freres Agier Pondu, and a Hungarian blacksmith's made from an old file. These chisels were made with tapered sides purposely to do mortising. Besides being able to steer them, the sides rub less, and the clearance helps in levering out the chips.

2) Kirby uses a backsaw for sawing the cheeks of the tenon and he changes the position of the wood several times. I use a bowsaw 30 in. long with 5 1/2 teeth to the inch, a common rip-saw. I don't move the wood; I keep it straight upright in the vise at a comfortable height so I can occasionally check the mortise-gauge line on both sides. Start cutting the corner farther away from you, then come straight back across the end grain and down. Let the saw do the work, don't push it too hard. A beginner should practice with scrap wood, marking the whole length and sawing as far as the wood will allow. You end up with 10 or 20 inches of tenon.

3) Kirby makes the shoulder line with a knife, then saws 1/16 in. away from it for final paring to the line with a chisel. This method requires a master craftsman and extremely sharp tools, and I beg the beginner to stay away from it. I use a sharp, soft pencil to mark the shoulders. Then I use a bowsaw 23 in. long with 10 teeth to the inch. For a table apron I saw right on the pencil line on the inside of the apron and leave half the line on the outside for a perfect, invisible joint where it shows. If you're making a frame or a door, you have to cut both sides the same, either removing both lines, or leaving half of them. Either way, you avoid the unnecessary and difficult step of chiseling the shoulder.



The completed joint before assembly. Tenon ends are sawn at 45° so they almost meet in the leg mortise.

Making a kitchen table—Start by cutting and planing the legs to size, ready for laying out the joints. Mark the outside corners and line up the legs on the bench. Measure the depth of the apron and mark that distance across all four legs with a square and the sharp, soft pencil. Mark a second line the actual height of the mortise, leaving at the top of each leg an area for the haunch at least one quarter but less than one third of the apron's total width. Turn the legs and mark the other inside of all four legs with the same mortise and haunch lines (fig. 1). The haunch is very important; it keeps the apron from twisting. If this were not a table but a frame where the pieces were all the same size, or if it were small and delicate, it would also be important to leave an extra length of wood beyond the mortise, called the horn. This keeps the wood from splitting during mortising and gluing up.

Set the mortise gauge spurs to the width of the chisel, in my example, $\frac{1}{2}$ in. Draw on the leg the thickness of the apron, $\frac{3}{4}$ in., setting it in from the edge $\frac{1}{4}$ in. Then move the fence on the mortise gauge so the spurs are in the center of the apron lines and mark the mortise. This sets the apron in from the outside of the leg. If you want a Parsons table, which has legs flush with its apron, you draw the apron outline flush with the outside face of the leg and set the gauge fence to center the mortise in that apron outline.

Find a good solid spot on the bench and clamp the wood down, ready for chiseling. Here my method is similar to Kirby's, except I would also chop out for the haunch. Start from the completed mortise and go toward the end of the wood, chopping straight down but not too deep. Then come in on the line from the end. If you are a beginner and the inside of the mortise seems too rough, you could smooth it out with a patternmaker's rasp, Nicholson No. 50. Make sure you don't round any edges.

Now to saw the tenons. Put the four apron pieces on the bench, mark the good side (the outside, which will show) and the bottom edge, and square the shoulder lines all around. Make neat, skinny pencil lines. Mark the haunch and from the actual width of the mortise, reset the mortise gauge and mark the tenon in the center of the apron ends (fig. 3). Also mark a scrap for a try piece. Put the try piece upright in the vise, saw in from the far corner then saw all the way down. Saw the shoulders, then try it in the mortise to see how snug or loose it is. The important fit is the width, not the thickness. How snug should it be? My father taught me, if you use

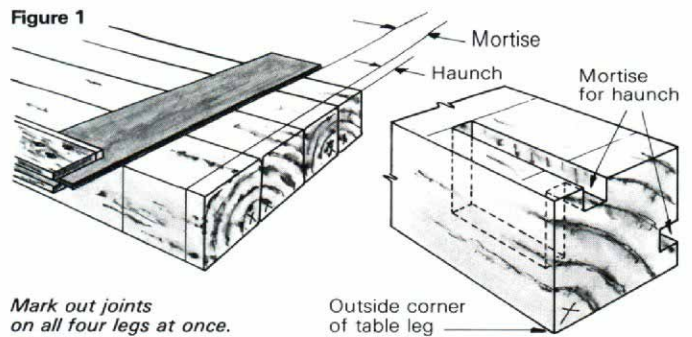


Figure 2
Chopping mortise for haunched tenon

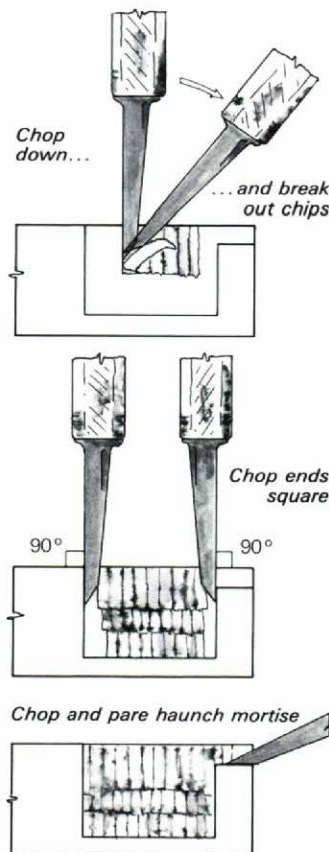
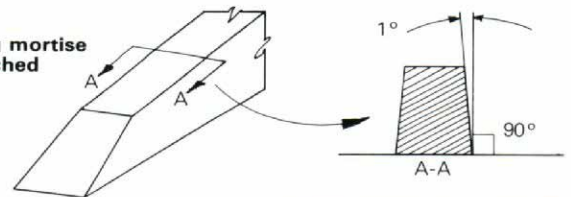
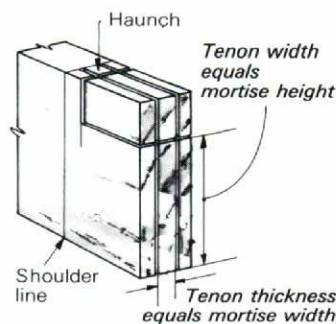
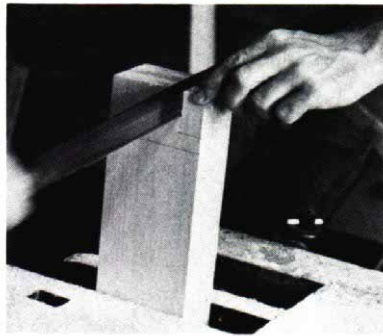
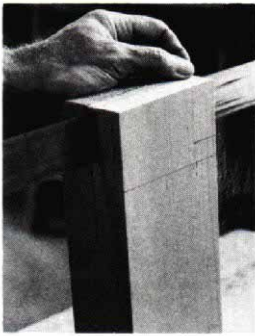
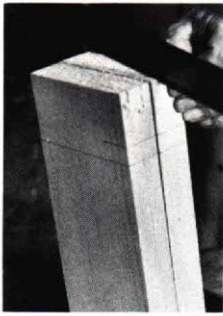


Figure 3



Lay all four aprons on bench, square across for shoulder lines, then gauge mortise width on each apron.



Clamp a pair of aprons upright in the vise to saw the tenon cheeks. Start sawing on the end grain, at the far side, then lower the saw so it cuts straight across and down to the shoulder line. Move to the side and saw the haunches together.

your mallet to bang it together it is too tight, if you use your hat it is too loose, so find the middle way and push it together by hand. If your scrap piece is too tight, cut away the mortise-gauge mark; if it is too loose, leave the line on. Make another try piece until you get it right—practice makes the master.

Put one pair of aprons upright in the vise at a time, and saw down all four cheek lines—one apron steadies the other and it saves time. Move around and cut down the top of the apron to the haunch, both pieces at once. Now to cut the shoulders, take the wood out of the vise and put it on the bench. To hold the work I have a special stop, which can be made of any hardwood, cut to the dimensions shown in fig. 4. Cut the haunch and then the shoulders using the 10-tooth bowsaw or any fine saw. Saw right on the line on the inside of the piece, turn it over and saw to leave half the line on the outside, the side that will show. Finally, you cut the end of each tenon at 45° so they can almost meet inside the mortise. Try the joints together. A beginner can use the rasp to correct the tenon if the joints are too tight. A good joint is rough from the chisel and saw, which makes a good gluing surface.

Before gluing, clean all four sides of the leg with a smoothing plane, round off the corners tastefully and sand each side before you rotate the leg to the next. This saves work. Some craftsmen argue about corners. I say you want a crisp straight line, but fine woodworking has no sharp corners, especially the outside corner, which will get kicked and

Methods of an Old World Cabinetmaker

by Rick Mastelli

When you want to make utility dovetails for a toolchest, rough cabinet or bin, it's faster and easier to lay them out by eye and to saw rather than chisel the waste away. The heart of the procedure is an efficient routine, plus a bowsaw blade that looks like it's been run over by a train. For cabinetmaker Frank Klausz, it's no more trouble than nailing and at his shop in Bedminster, N.J., even the packing crates are dovetailed. It is a matter of pride: "It shows they come from a cabinetmaker." It is also a matter of experience and training: "In Hungary kitchen cabinets are dovetailed together. People take them along when they move, they must hold up."

Klausz's method is for rough work where the goal is a strong joint quickly made, not fineness. It is perfect when the work will be painted, for in that case he fills any gaps with a paste made of white glue and sawdust, pressed in with a flexible putty knife, and smoothed with a belt sander.

To demonstrate, Klausz crosscuts a length of pine 1x12. With a marking gauge set to the stock thickness, he scribes the tail board on its faces and edges, and the pin board only on its two faces. He will cut the pins first, but he does not lay them out beforehand—he judges the angles and spacing by eye. Accuracy comes from experience, but to know this can be done is to be inspired to try it: no ruler, no bevel gauge, no pencil. The pin board goes upright in the vise, the face that will be inside the box toward him. He picks up not a dovetail saw but a 23-in. bowsaw with a crosscut blade 2-in. wide. A

few quick strokes cut the half-pins near the left and right edges of the board, the two kerfs converging toward him. Each subsequent cut will be parallel to one or the other.



Frank Klausz.

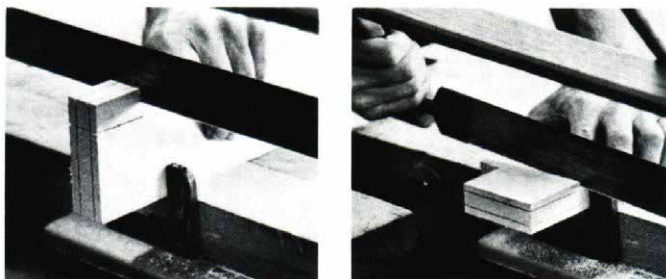
Klausz says the strongest joint has pins and tails of equal width, despite fine cabinetry's preference for slender pins with wide tails. Decide what you want, and make the third cut a tail's width away from the half-pin on the left, but parallel to the half-pin on the right. Now Klausz's saw divides the remaining space in half, or in thirds, or in half and half again, depending on how many pins he wants. Each of these cuts, always just to the gauged line on the faces of the board, is also parallel to the half-pin on the right. Next he places the saw between any two parallel cuts to divide the space into a pin and a tail, the tail being as wide as the single tail previously cut. The space to the left of this cut will be the width of a pin. But before sawing, he aligns the saw with the half-pin cut on the left, then he cuts all the remaining pin sides. Small inconsistencies in spacing or angle do not matter because the tail board will be laid out and sawn to match.

Now comes the trick. Instead of chiseling the waste, Klausz leaves the board upright in the vise and picks up what he calls a dovetail cutout saw. It's a 23-in. bowsaw whose $\frac{3}{8}$ -in. blade bends 90° in cross section, the line of the bend following a long diagonal from the tips of the first teeth to the top of the

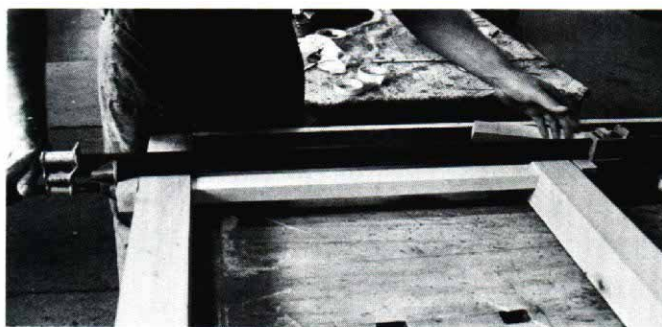
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knocked round anyway. Office and children's furniture should be rounded even more. Next clean the apron with a smoothing plane and sand. The table is ready for gluing.

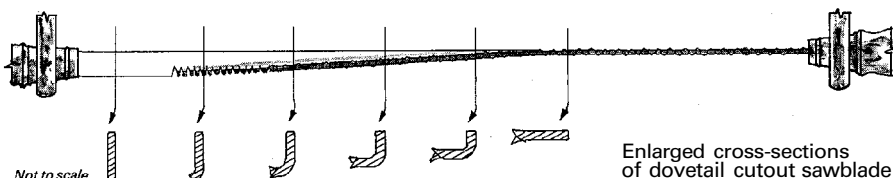
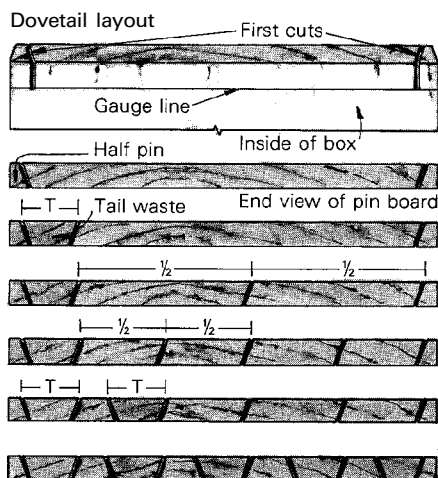
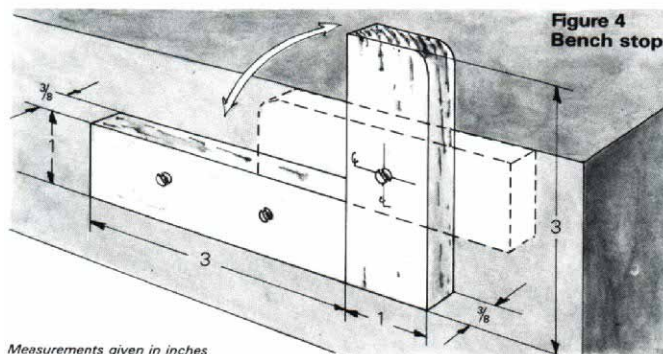
With the mortise-and-tenon joint it is important to put a thin, even coat of glue on the walls of the mortise but not to fill up the mortise. Most beginners use too much glue; on the other hand, most production lines use too little glue because they don't want to fuss with cleaning up afterward. On a big table it is easier to glue the two short ends in pairs, then glue the table together. Clamp with a bar or pipe clamp. Your scrap pieces from cutting off the shoulders are perfect blocks under the clamps so they don't mar the work. Make sure to check if it is square. The best method is to measure from corner to corner; it should be the same. □



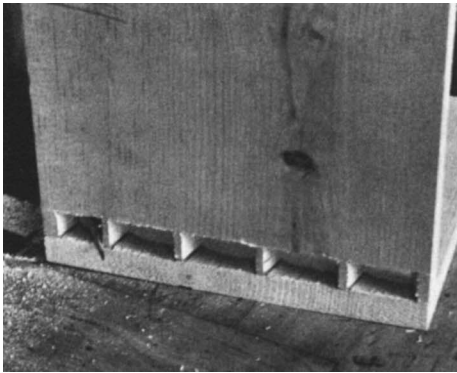
Simple bench stop, detailed at right, holds work for sawing haunch and tenon shoulders. Flip stop down to get it out of the way.



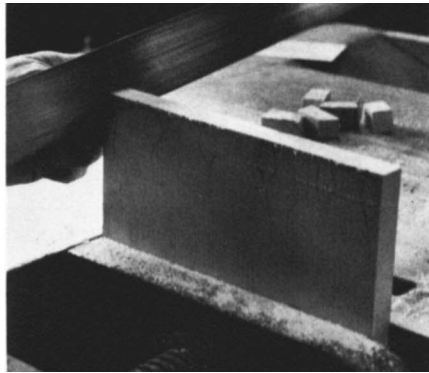
Glue legs and short aprons in pairs before gluing long aprons.



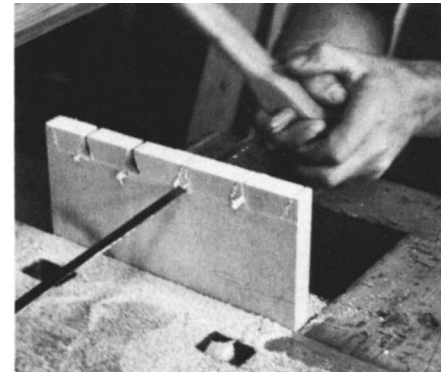
Left, Klausz saws the pin sides. He does not lay these out beforehand, but judges angle and spacing by eye, using the steps detailed at top left. Above, Klausz saws pin-board waste with the dovetail cutout saw. Its bent blade turns horizontally in the vertical kerf, then splits the gauged line that marks the bottom of the tail sockets.



Tail board is marked from pin board with a few flicks of the pencil, used here for the first and only time in the procedure.



Sawing tail sides. Klausz doesn't mark end grain with a pencil line perpendicular to the face, nor does he tilt the board in the vise.

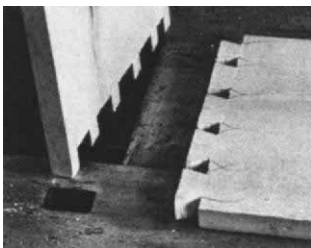


Dovetail cutout saw removes the waste; the splinters it raises can be filled with a white-glue-and-sawdust putty.

blade two-thirds the way back. The cross section of the last one-third is flat, at right-angles to the foremost part.

To use the cutout saw, Klausz drops the front of the blade, where there are no teeth, into the vertical kerf. He pushes sharply and the bent teeth cut sideways across the bottom of the socket between the pins. The first push threads the bend through the wood as the sawblade twists itself from vertical to horizontal. Subsequent strokes, using only the last one-third of the blade, split the gauged line and the waste pops out. In less time than it takes to describe, Klausz has completed the pin board. A saw like this is not available in America; Klausz brought his from Hungary, where it is a standard hardware item. The Germans have a hacksaw whose blade is similarly bent, for the same purpose. The English would use a coping saw, as I did when trying the method myself.

With the tail board flat on the bench, the surface that will be inside the box facing up, Klausz stands the newly cut pins in position and traces their outlines with a pencil. Then he puts the tail board upright in the vise, inside face toward him, and with his big saw splits the pencil lines just down to the gauge line. He does not stop to square any lines across the end grain; eye and hand can guide the saw well enough. The



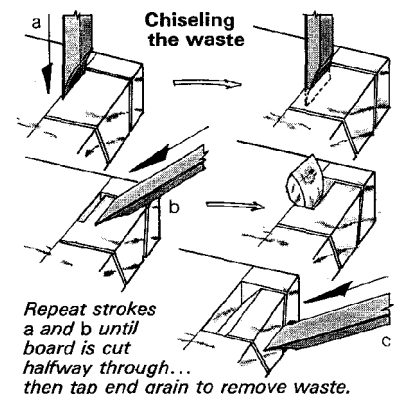
dovetail cutout saw again removes the waste between the tails, and he lops off the waste at the edges where the half-pins will fit. Now out of the vise and onto the bench to push the joint together. Six pins, five tails, in about three minutes.

Where fine dovetails are called for, Klausz chisels the waste in the usual way (*Fine Woodworking*, Spring '76), but again with an economy of motion that makes chips fly. First he demonstrates sharpening; it is another matter of pride that he has taught his apprentices to sharpen their tools well enough to shave with. Indeed, watching him slide a chisel or plane iron over his three stones is like watching a barber strop a razor. The coarse, medium and fine stones are mounted on a single board, but stepped to provide clearance for tool handles. First, some oil—a mixture of three parts kerosene to one of machine oil, squeezed from a plastic bottle. Holding the chisel in his right hand, right index finger and left middle finger pressed to the back of the edge, he rocks the blade up and down to find the flat of the bevel. Wrist and forearms locked, he moves from the shoulders, rubbing the bevel in smooth, quick circles. With the merest pause, he flips the blade onto its back and draws it along the stone. Then he flips it again, reassumes the bevel angle, and draws it toward him again. Flip, draw, flip, draw, from back to bevel, over and over, occasionally pausing to test the edge with his thumb. When he's done, a half-minute later, he proves the edge by shaving a patch of forearm. A barber with lather could do no better. Klausz recalls that his father one evening returned from the local beerhouse having wagered he could shave using cold, soapless water and a plane iron sharpened by 15-year-old Frank. Father won the bet.

Klausz saws the sides of another set of pins and lays the board on the bench to demonstrate chopping the waste. He stands the chisel just ahead of the gauge line, bevel toward the end of the wood, and taps. The bevel, sinking into the wood, drives the back of the chisel up to the line. Starting



Klausz's three stones are mounted on one board, stepped from coarse to fine to provide clearance for the handle of the chisel or the held end of the plane iron.



right in the line would drive the edge too far back, causing a gap in the joint. Next he tilts the chisel away from him about 45° and shifts the edge halfway toward the end of the board. Tap, and a wedge of wood pops out. He alternates the upright with the tilted position until halfway through, takes a quick tap on the end grain to lift out the remaining waste, flips the board over and completes the job. Concentrating on the area in front of the gauge line where the waste is attached, and chiseling the end grain only once avoids wasted motion as well as torn grain at the bottom of the socket.

To round out an afternoon of demonstrations, Klausz lifts a 5-ft. frame saw from its hook over the archway that separates office from shop. The 4-in. wide blade from his father's shop in Hungary is newly mounted in a frame of pine and padauk. Klausz recalls that as boys he and his brother, John, spent Sunday afternoons on opposite ends of this saw, resawing. The brother, who now works in the furniture industry in Hungary, happens to be vacationing in America and today has been finishing repair jobs. Klausz stands a 4/4 piece of figured walnut, 10-in. wide, in his bench vise, and calls across the shop. "Come, John, for old time's sake." In a moment the old rhythms are back and the two men are sweating in unison. Two-thirds of the way down the walnut they stop to turn it end-for-end in the vise. A few more long strokes and it's done. Klausz displays the figured wood, now book-matched, and spots a small discrepancy on his brother's side of the line: "Look, you went off." They laugh.

When he came to this country eleven years ago, Klausz had already completed his training as a master cabinetmaker. Most of the people he knew—from school, at work—were skilled craftsmen; cabinetmaking has been his family's occupation for generations. Finding he was not learning much in the millwork and furniture shops where he first found work here, he decided seven years ago to go into business for himself. Now 38, he employs two apprentices, one journeyman, and takes on no new customers. Mainly he rebuilds and reproduces antiques, though he does construct original pieces too, usually in his favorite Queen Anne style. The big frame saw is not just for display; when a piece calls for hand-sawn lumber, he uses it. For Klausz the long tradition of Old World craftsmanship is still current. Its practiced routines—how to position the stock in the vise or on the bench, how to hold the tool and apply it to the wood, what to do first and what next—are the difference between skill and fumbling. It is not the magician or the superman who produces clean dovetail joints in deft moments, but the craftsman. □



Frank Klausz and brother John resaw 4/4 walnut board 'for old time's sake.'