Making the Rule Joint

With hand tools, the process is as important as the product

by Alasdair G.B. Wallace

While inspecting repairs being made to the roof of his village church, the vicar was puzzled to see that an old woodcarver was putting the finishing touches to an elaborately carved angel's face. To the question of why such beauty should be located where nobody would ever see it, the craftsman replied that both he and God knew it was there. I recently was reminded of this story when a customer requested that I sign a butternut chest I had made. It occurred to me that whatever task we undertake, the finished product is in itself the quintessence of the craftman's signature.

In this age of mass production, personal signature has become the exception rather than the rule. The development and improvement of the tools of mass production have lessened the need for skills. Haste has become our byword, convenience our creed. The product has become more important than the process, and in the transition, something of inestimable value has been lost.

Unlike steel or plastic, no two pieces of wood are identical. Species, age, moisture content, cut, grain configuration, knot placement all contribute to the character of each piece and demand individual treatment. The proliferation of plywoods, chipboard and cheap veneers and the abhorrence of faults, knots and unusual grain pattern by those involved in mass production have almost obscured the diversity and beauty of this warm, venerable and versatile medium.

At Rendcomb College in England, my passion for manual processes stemmed from necessity. There were no power tools. A visionary headmaster, when questioned by a student about purchasing a table saw for the workshop, replied that ripping by hand was good for the soul. I still remember many hours of pumping a treadle lathe and hand-planing ¾-in. oak for ¼-in. panels. The sense of pride and accomplishment in the finished product was directly related to the time and effort expended in completing the task.

I continue in the manual tradition today because for me the process continues to be of greater importance than the product. Today's machinist will argue that leaving no traces of the saw, planer and shaper attests to his mastery of the tools and the care with which they were programmed. This is true. But machines, whether television or router, destroy the sensations of wonder, joy and accomplishment. The table saw's wail, the sander's whine, the router's scream deny a subtler, finer music and remove the woodworker from the personality of his medium. To submit to the machine denies the sensuous process so essential to the woodshop, and the work shows no trace of the craftsman, his tools, his labor. Wood is not homogeneous. Why then use a machine that by its very nature seeks to create a uniform product? Beauty lies in diversity, not uniformity. Hear the varying song of the plane as it skims oak, walnut or pine, the crunch of the chisel's edge cutting to the dovetail's line. Savor the perfumes of the crosscut in cherry, maple and elm.

It is important to realize at the outset that the mass-produced product and the handcrafted product do not compete in the same marketplace. Whereas the mass-produced product frequently assumes its market either ignorant or indifferent in terms of design and function—the short-range goal manifest in the stapled-drawer syndrome—the handcrafted product usually assumes a market aware and appreciative of form, function and signature. The onus is on today's craftsmen to educate the public, to demonstrate the superiority of their products. The creations of today's finest artists, such as David Brown, James Purdey, James Krenov (see page 44), will continue to be prized for their design excellence and for the personal signature they incorporate in an age of anonymous machines.

Two arguments will be posed by those who advocate machines to the exclusion of manual processes. The first is that the machine, once programmed, is labor-economical. One worker operating one or several machines will outperform one manual worker in quantity and uniformity of product. If efficiency is measured solely in these terms, the argument is irrefutable. The human price of such economy, however, exacts a terrible toll.

Equally pervasive is the argument that a relatively unskilled worker can, with the flick of a switch, in-

Wallace's Jacobean table, of oak, open and closed.

Photos: Alasdair G.B. Wallace

itiate a series of complex operations that result in a sophisticated product. This ease is, however, anathema to craftsmanship. The craftsman's skill is acquired through lengthy apprenticeship, exposure to many aspects of the art and hours of exacting labor. Practice may not make perfect, but it probably does result in continued development, both personal and functional.

When deciding whether to purchase hand tools, machines or a combination, the craftsman should bear in mind that anything that can be produced by machine can also be produced by hand. Space is probably of greater concern to the amateur than to the professional. The home workshop simply cannot accommodate all the larger machines—table saw, radial-arm saw, drill press, planer, jointer, lathe, band saw. For most amateurs, table saw and lathe commonly take preference, together with a selection of smaller power tools such as drill, sander or router. Krenov's observation that there is little point in ripping up the rough stock by hand and doing a vast amount of preparatory work with much effort is well taken. His apprenticeship served, he prefers to devote his skills to delicate detail imparted by hand. This is the essence of the craftsman—the judicious use of a few carefully selected machines to rough out the work. Elizabethan craftsmen of necessity employed the same principle: The pit sawyers supplied the boards; the craftsmen smoothed them, shaped them and signed them with their hands.

Of equal concern to most craftsmen is cost. As an amateur I cannot realistically contemplate the cost of a multiplicity of machines that would enable me to perform tasks I can already perform by hand. To submit to the machine would deny me the joy of creating with my hands, and would largely negate the sense of accomplishment. In R.L. Stevenson's words, "to travel hopefully is a better thing than to arrive, and the true success is to labor."

Hence my preference for hand tools. Using my grandfather's Stanley 45 and wooden molding planes, I become part of and continue a tradition as my hands impart to each tool a deeper, richer flesh-print. I select a hand-forged chisel bearing the faint initials H.W. on its worn maple handle. It fits the hand. As I use it, I relish the vision of history, and part of H.W. lives on in me and the works of my hands.

The small oak Jacobean double-dropleaf table shown on the previous page is a recent expression of this manual process. My decision to use rule joints between the tabletop and the leaves is in keeping with the Jacobean tradition. The rule joint satisfies aesthetically for several reasons. In neither the open nor the closed position is the hinge knuckle visible. The decorative character of the open joint enhances the finished product. The closed joint is strong—downward pressure on the open leaf is transmitted to the central tabletop, effectively tightening the joint rather than relying solely on the hinge and screws, as would be the case in butt joints.

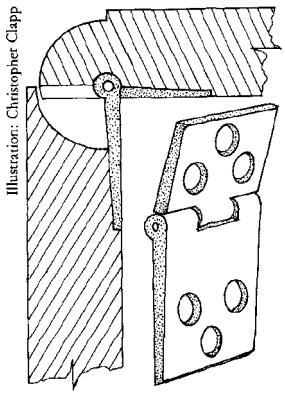
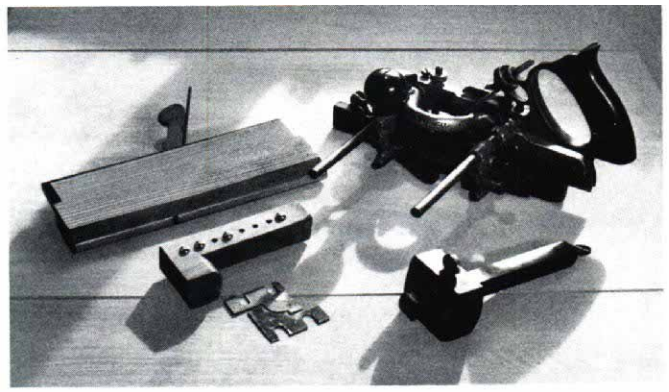


Illustration: Christopher Clapp

The rule joint takes its name from the brass-bound, boxwood rule that until recently graced every carpenter's tool chest. The drawing shows how the rule joint operates. If you think of the rule joint as two concentric circles with the center of the hinge pin as their center, you can see that the radius of the leaf arc is very slightly larger than that of the top. In laying out the joint, however, it is more practical to assume a common radius and sand to a perfect fit prior to finishing.



Tools for making rule joints include (clockwise from top) molding plane, Stanley 45, marking gauge and scratch header with matched cutters. Wallace also uses a rabbet plane, not shown.

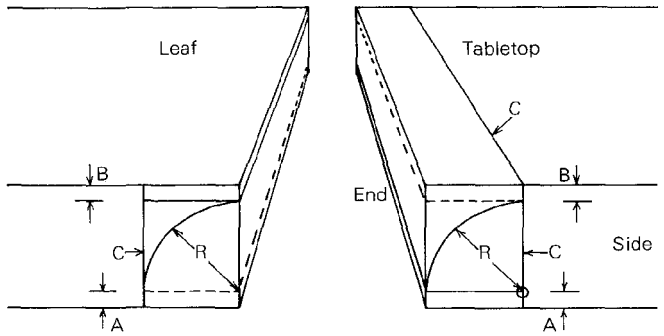


Illustration: Alasdair G.B. Wallace

To work the joint you'll need a multiplane or rabbet plane, a small round molding plane or a gouge, and a homemade scratch header with matched cutters. (See *Fine Woodworking,* Summer '78, page 60.) The concave and convex cutters must match precisely, or the finished joint will bind or gap.

Because the dimensions of the joint are determined in part by hinge size, you must obtain the special table hinges required prior to layout. These hinges have leaves of unequal size and are countersunk on the side opposite the knuckle. They are available from Period Furniture Hardware Co., Inc., 123 Charles St., Boston, Mass. 02114, or from Ball and Ball, 463 W. Lincoln Highway, Exton, Pa. 19341, as well as major woodworking supply houses.

Once the top and leaves have been planed to thickness, work on the joint may commence. There are two reasons for leaving the top and leaves oversize at this stage. Construction of each joint reduces the usable width of the finished top by a measurement equal to the radius of the curve. This is critical if a round or oval top is planned. It is also easier to scribe the joint on square stock and work a decorative edge molding after completion of the rule joint.

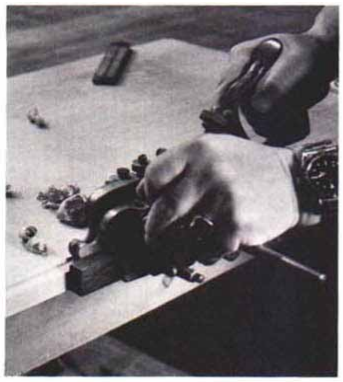
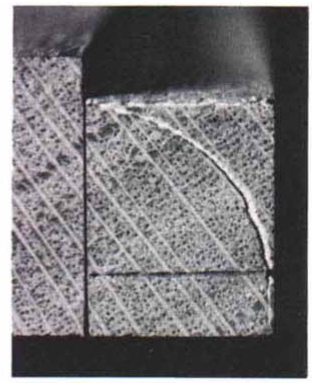
First, true and square the adjoining edges. All measurements in laying out the joint are taken from these edges and precision here will largely determine the nicety of the final fit.

The drawing above illustrates layout procedure. Distanced is the thickness of hinge to pin center. The lower edges of both tabletop and leaf are scribed to this measurement on sides and ends. Distance *B* is the depth of the top fillet and is variable, but probably should be no less than 3/16 in. The up-

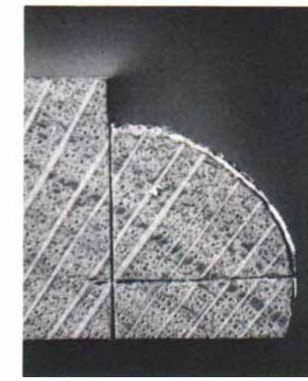
per edges of both tabletop and leaf are scribed to this measurement, again on sides and ends. *R,* the radius of the curve, is the distance between the top line *of A* and the baseline of *B.* The top of the table and the sides of table and leaf are scribed to this measurement (line *C).* Line *C* is also scribed on the underside of the leaf and on the underside of the tabletop in the hinge area (several inches in from the sides) to help center the pin later. The dotted scribe lines on the drawing may be superfluous if you've already tested the setting of the plane's depth gauge and fence on scrap, but I continue out of habit to use them as safety checks. The point at which *A* and *C* intersect gives the hinge center projected to the side of the tabletop. A divider or compass centered at this point facilitates scribing the curve on the sides of top and leaves.

I find it easier to work the tabletop first and test-fit the leaves to it. Small adjustments are thus made in the leaf arc, the concealed section of the joint. The center top portion always retains its true cylindrical section. Use either the Stanley 45 or a rabbet plane to remove fillet *B* on the tabletop quickly and efficiently. Remove most, but not all, of the waste. The bulk of the remaining waste outside the scribed curve is then removed from the radius with a rabbet plane. The scratch header completes the shaping, leaving a surface that will require little if any sanding.

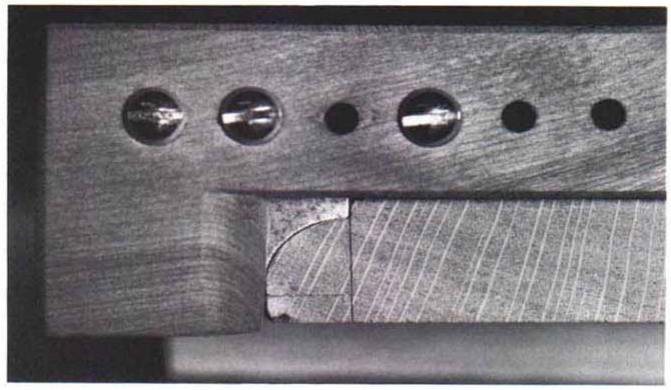
The leaf joint is worked in a similar fashion. The Stanley 45 or the rabbet plane is set to measurement *A,* the hinge thickness, and this material is removed. Most of the material inside the scribed curve can be removed with a rabbet plane, but be careful to remain within scribe lines *A* and *B.* On the resulting chamfer, use a molding plane to clean up to just

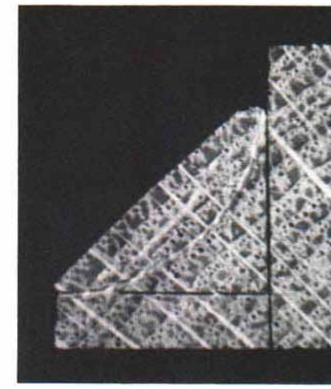
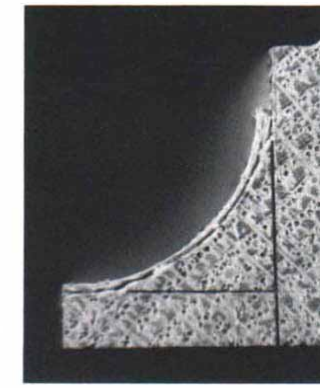
Wallace uses his grandfather's Stanley 45 to remove the fillet from the tabletop, left. A rabbet plane works just as well. At right, the fillet is cut to just shy of the scribed line.

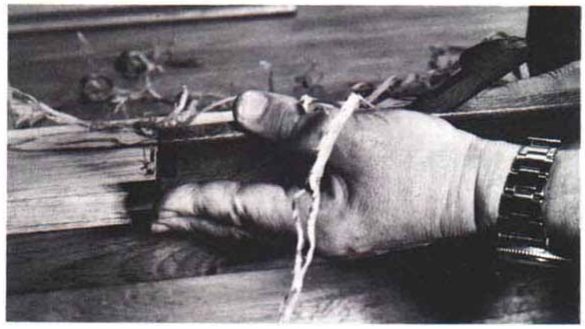
A series of passes with the rabbet plane wastes the bulk of the curve. The open side of this plane allows the iron to cut right to the shoulder of the fillet. At right is an end view of the roughed curve.



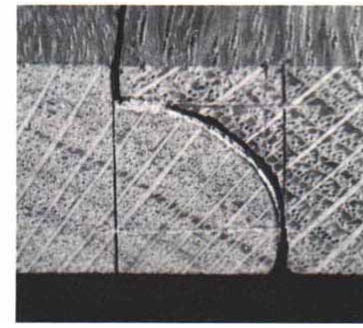
The curve is shaped to the scribed lines with a scratch header and requires no further finishing. An alternative to scratch header and matched cutters is a matched pair of sanding blocks carved to the precise curve.

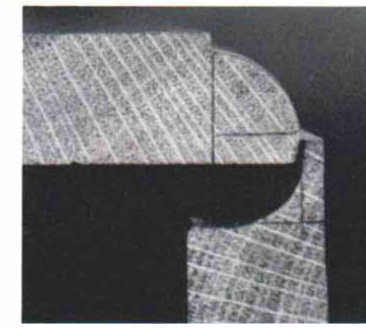
The joint for the leaf is worked much like the joint for the top. The rabbet plane, used to remove the bulk of the material, yields the chamfer, left. The molding plane or the scratch header cleans up to the line, right.



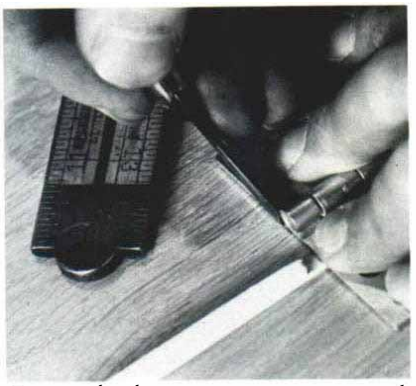
When cleaning up to the line, work the first groove into the chamfer by using your fingers as a fence.

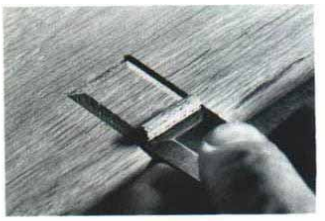


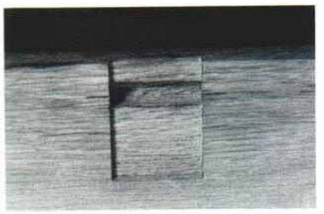
Test-fitting the joint. When closed, leaf and top should form a flat plane.



The assembled top. Hinge is invisible when leaves are up or down.







Fitting the hinges is an exacting task. Scribe and chisel the hinge recess, then the hollow for the hinge knuckle.

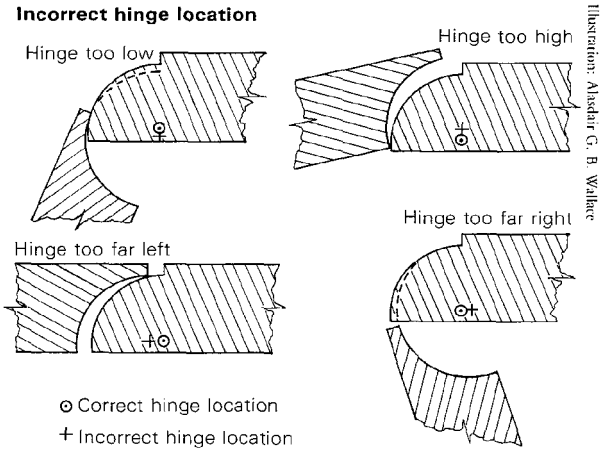


Illustration: Alasdair G. B. Wallace

within the radius. The novice may at first find it difficult to use his fingers as a fence when working the initial groove in the chamfer with the molding plane. Butting a board next to the chamfer as a guide will do the job but will not help you master the convenient traditional technique. Finally, clean up with the scratch header.

The leaf may now be offered to the tabletop for its initial test-fitting. Clamp the top to the bench edge with enough overhang so the leaf can operate. The leaf should glide evenly and smoothly over its mating surface and form, when in the closed position, a flat plane with the top. The precision with which the scratch-header cutters were matched becomes apparent during testing. Any roughness during the fitting may be alleviated by judicious sanding of the leaf joint. Shaped blocks to which medium-grit garnet paper has been glued are most effective.

Fitting the hinge is an equally exacting task. I find it easiest to clamp the leaf to the tabletop face-down in the closed position with a strip of paper between to maintain a slight margin as the hinges are screwed tight. Align the center of the hinge pin, knuckle up, on previously scribed line *C* on the underside of the tabletop, and scribe around the hinge with a sharp knife. Chisel out the recesses thus scribed for the hinge plate and the knuckle.

Once the hinges have been inset flush with the surface, which should automatically locate the pin center at the requisite depth, drill lead holes for each of two diagonally opposed screws closest to the knuckles. These two screws will be used to test the accuracy of the hinge location when the paper and clamps are removed. If you have been precise, you will have a perfect joint.

To test the joint, lightly clamp the tabletop face-up on the bench allowing the necessary overhang while at the same time supporting the leaf horizontally. Sighting along the joint edge while gently lowering the leaf will reveal any inaccuracies. If the joint binds or a gap appears, the hinge location is faulty. The drawings above, which have been exaggerated for clarity, identify the possible faults and their causes. To move the hinge laterally, lengthen the hinge recess at the appropriate end, plug and glue the initial test holes, and redrill for the new position. To move the hinge vertically, either shim the hinge or deepen the recess. Once the fit is satisfactory, the remaining screws should be carefully inserted prior to complete dissasembly for finishing.

Working the traditional rule joint offers a special satisfaction. Unlike the dovetail or mortise-and-tenon joint, both of which are static, rule and knuckle joints by their very action impart another dimension to the craftsman's art. They play an active, visible, functional role while at the same time contributing aesthetically to the whole. Evidence of the manual process—its diversity, its ingenuity, its minute irregularities and its failures—bespeaks the apprenticeship served and stands as a signature of personal creation. Look for these signs and, having found them, cherish them. In this age of machines they are increasingly rare. □

Alasdair Wallace, 43, of Lakefield, Ontario, teaches high-school English. Woodworking has been his consuming hobby for 12 years.

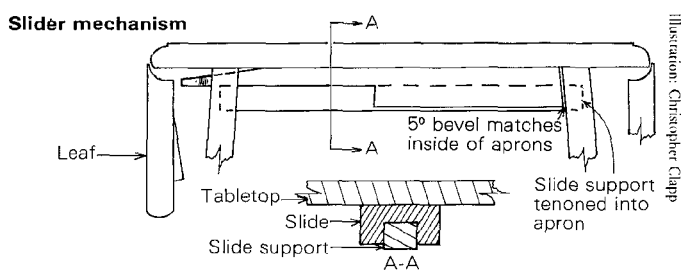


Illustration: Christopher Clapp