

Paneled Doors and Walls

Colonial workmen relied on the right planes

by Norman L. Vandal

The earliest architectural application of bevel-edged paneling is found in wide-board wainscot, which covers or actually constructs the interior walls of our oldest houses. When applied to the interior surface of exterior walls, this wainscot was nailed horizontally to the vertical studs or planking which structurally supplemented the posts. Since the braced frame integrated with the chimney mass could support a second story, interior walls were never load-bearing, and in fact were structurally unnecessary. To divide chambers, and to provide a finished surface in both rooms, early housewrights used wide boards joined at the edges and fastened to floor and ceiling beams. These walls were from 1 in. to 1½ in. thick, the same dimension as the boards.

The conventional tongue-and-groove joint with the addition of a decorative bead was sometimes used to join such wainscot, but a beveled edge set into a groove on the adjoining panel appears to have been most common. For constant thickness and to make a wall with both surfaces in the same plane, the boards were beveled on both sides, resulting in a decorative feature visible on both sides of the wall. Feather-edged paneling is another name for such a wall treatment.

Panels joined by a simple tongue and groove had the undesirable habit of showing shrinkage as the two butted edges pulled apart. Feather-edged panels, having no distinct dividing line when viewed face-on, belied movement with the seasons, an important reason to use this type of joint. The beveled-edge joint was also used to construct interior and exterior plank doors. Wide boards were joined in the aforementioned manner and held together by clinch-nailed battens. Exterior doors were made of double-layered boards, the inside layer being horizontal and clinch-nailed through the vertical exterior layer. Original doors of this type are quite rare, time and weather having taken their toll.

In work dating from late in the 17th century we see many

(Text continued on page 86)

The paneled wall comes with its own vocabulary—one not found in modern dictionaries. Here are working definitions:

Fielding (or raising)—Sawing or planing a shoulder and a beveled edge all around a rectangular panel. The untouched center field thereby becomes raised.

Mullion—Vertical member within a framework. Also called a muntin, especially in windows.

Rail—Horizontal sticks of wood forming the top and bottom of a frame, to hold a panel. Rails are tenoned at both ends.

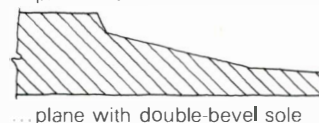
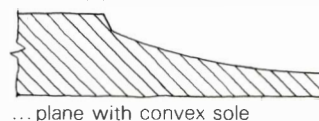
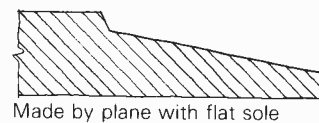
Stile—Vertical sticks of wood forming the outside edges of a frame that holds a panel. Stiles are mortised at both ends.

Frame—The rails and stiles, grooved on their inner edges, and assembled around a panel.

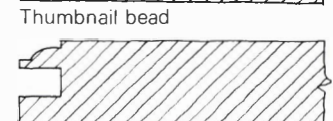
Stick—A long, narrow piece of wood suitable for making into rails and stiles. The process of planing a molding into the edge of a stick is called sticking, and so is the result. Such a molding is said to be stuck (as opposed to a separate molding nailed or glued in place).

Spring—The angle at which a plane is held to the stock.

Panel profiles



Rail and Stile profiles



18th-century fireplace wall in a Massachusetts house, restored by author.



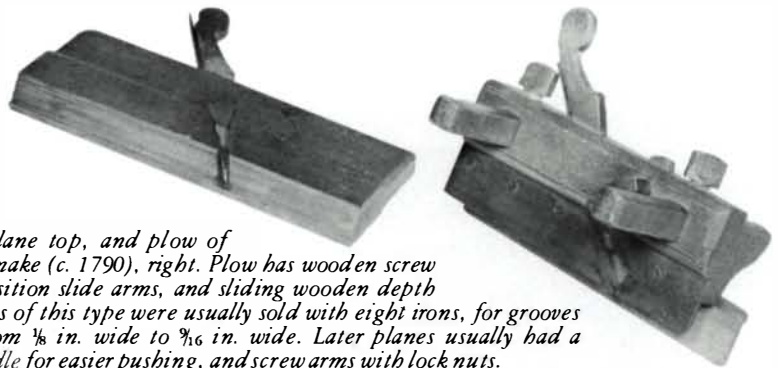
Kitchen was built and installed by author, during restoration of an 18th-century house.



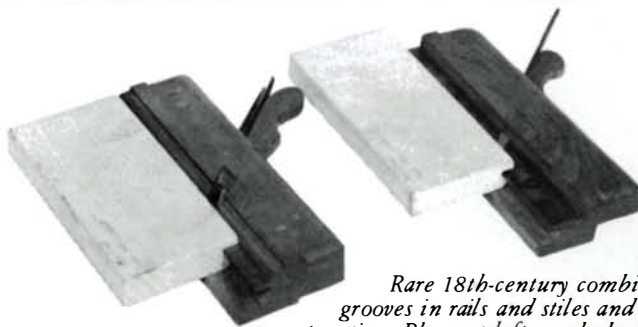
Three panel-raising planes, circa 1800. Left, raising jack made by J. Butler of Philadelphia, has adjustable fence and depth stops, and nicker cutter ahead of skewed iron. This prevents tear-out when working across the grain. Plane at center was made by A. Smith of Rehoboth, Mass.; right was made by S. Kimball. All three planes are 14 in. long, and range from 2 1/4 in. wide to 3 1/4 in. wide.



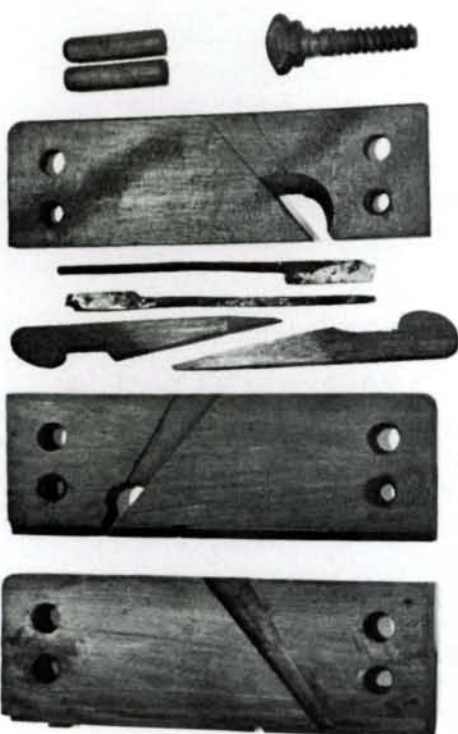
Planes in use. Top, the A. Smith plane from previous photo; bottom, English panel plane, 3 in. wide by 8 in. long, has adjustable fences on sole and side for width and depth control.



Molding plane top, and plow of unknown make (c. 1790), right. Plow has wooden screw locks to position slide arms, and sliding wooden depth stop. Planes of this type were usually sold with eight irons, for grooves ranging from 1/8 in. wide to 3/16 in. wide. Later planes usually had a closed handle for easier pushing, and screw arms with lock nuts.

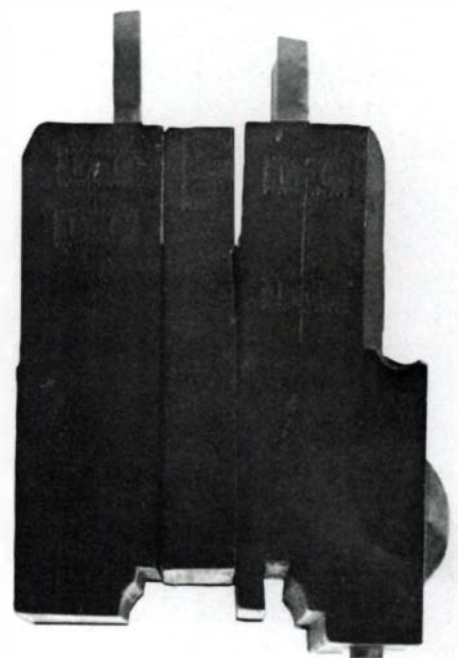


Rare 18th-century combination planes, which cut grooves in rails and stiles and molded the edge in one operation. Plane at left, made by J. Woods, has two irons; plane at right, maker unknown, has a single iron.



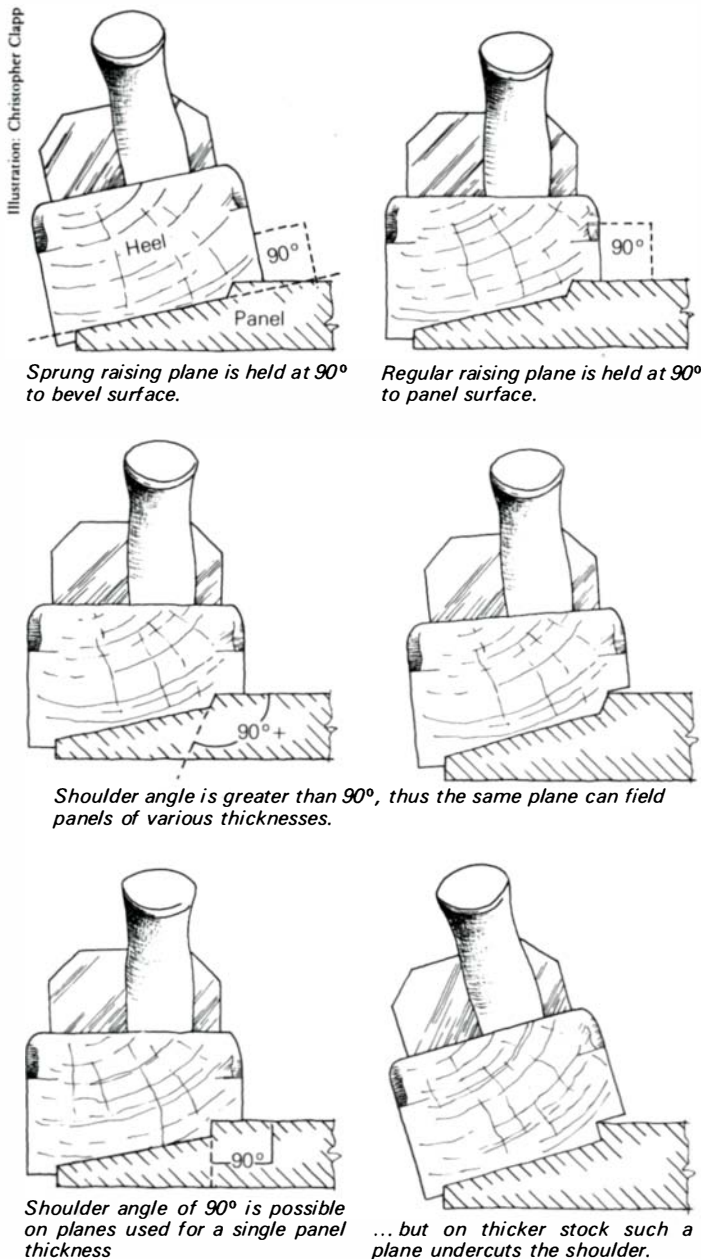
A rare, three-part molding plane made by Isaac Field of Providence, R.I., between 1828 and 1857 should have a third iron, missing when the plane was found, fitted to the central section. When first discovered at auction, all three parts were held together with a wooden screw. The plane parts did not fit together well, and a little experimentation revealed that they were never meant to—the main body (right in the end view) was fastened to one or the other parts. Attached to the central section, the plane simultaneously plows a groove for paneling and sticks the molding on one face of rails and stiles. With the central piece removed and the two outside bodies attached together, the plane at once plows the groove and sticks the molding on both sides of rails and stiles, for doors with panels fielded on both sides. The groove is 1/4 in. wide and 3/8 in. deep, the moldings are both 3/8 in. thick. Plane from the collection of W. B. Steere, No. Kingstown, R.I.

EDITOR'S NOTE: The panel planes shown here are from the collection of Kenneth D. Roberts, who has written and published the book, *Wooden Planes in 19th Century America*. He has also written extensively on the history of clockmaking, and publishes facsimile editions of old tool catalogs. For more information, write Roberts at Box 151, Fitzwilliam, N.H. 03447.



more raised-panel doors. A framework of mortised-and-tenoned rails and stiles formed the structure that housed the panels, which were beveled like the feather-edged boards. A groove was plowed into the framework's interior edges, into which the panels were fitted. On feather-edged boards a bevel was planed only upon edges running with the grain, whereas for raised panels, a bevel was also cut across the grain on the top and bottom edges. Many of the earliest doors had two wide panels, one above the other divided by a center rail. Later, four panels, two above two, became most common. The grain of the door panels always ran vertically, and the outside stiles, or vertical frame members, extended the full length of the door. Panels were never fastened, and were allowed to expand and contract freely yet invisibly.

On one side of a door, the inside edges of the rails and stiles were often given a decorative molding, mitered at the intersecting corners and forming a frame surrounding the raised panels. This treatment became the rule for most doors, despite the complications it caused in the making of the joints. Some doors were molded on both sides, but these are as scarce as they would have been difficult to make.



Near the end of the 17th century, wainscot on the surfaces of fireplace walls was replaced with sections of raised paneling joined in the same manner as the doors. An exception was the occasional use of an ungrooved framework of rails and stiles with rabbeted edges, on which bolection-type moldings were applied to house the raised panels. In all but rare examples, the decorative molding on the rails and stiles apparently was considered a necessary element of style. The back surfaces of raised-panel walls were never finished off unless they divided chambers and were visible in both rooms.

Toward the middle 18th century, raised-panel walls were nearly always of great beauty and style. Proportions were refined and the joinery was exacting. Walls adjoining the fireplace walls were sometimes sheathed entirely with wainscot to a height of about 3 ft.—the level of the window sills—and finished off to the ceilings with plaster. Stairways and entrance halls were embellished with paneling conforming to the geometrics created by the angles of the stair stringers. Raised-panel walls were integrated with ornate cupboards and fluted pilasters supporting elaborately molded cornices.

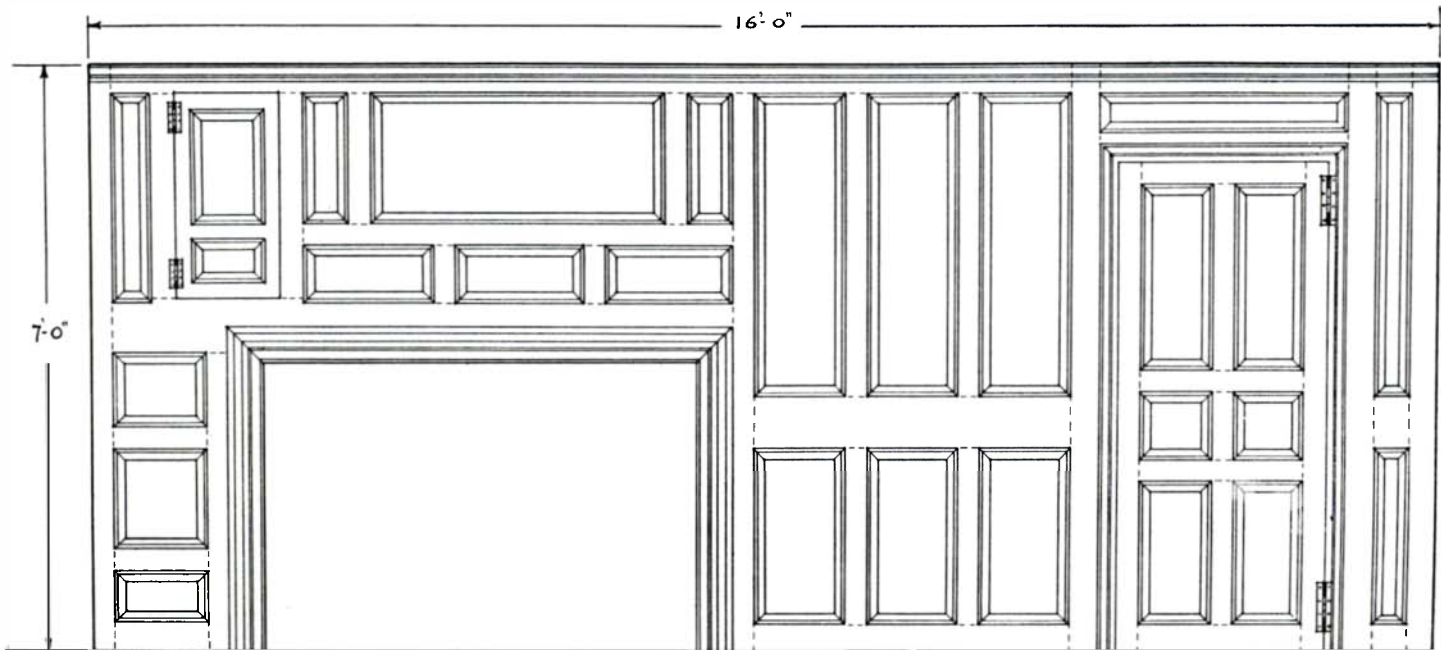
In the latter part of the Georgian period, the mantle with overmantle became the point of interest and portions of walls which were formerly paneled were now simply plastered. With the Federal period, raised paneling had all but disappeared. Even the overmantle was deleted as the fireplace surround became the focal point. Only the raised-panel door survived, its form and function being unsurpassed.

Panel-raising planes — Panels that were raised, or fielded, with raising planes exhibit two tell-tale characteristics. The shoulder of the beveled rabbet, where the feathered-edge meets the raised surface of the panel, is never perpendicular to the surface of the panel. Careful study of the soles and irons of planes will substantiate this fact.

Raising planes cut the shoulder and feathered the panel edge simultaneously. Because a single plane could be used to field panels of different thicknesses, the relationship between the angle of the bevel and the surface would have to vary. If the plane shoulder was designed to be at a right angle, on panels of heavy thickness the shoulder would be at an angle less than 90°, with obvious impractical consequences. Designing the plane to cut a shoulder bevel at greater than 90° avoids this problem. Of course the width of the groove also becomes a factor in the angle of the bevel.

Second, careful study reveals a convex sole on many planes, and a consequent concavity on the beveled edges of many panels. Not all planes have this feature, however, and it would be foolish to assume that panels with a flat bevel were not fielded with raising planes. On many planes, this convexity is actually a sole with two surfaces meeting at a shallow angle, its vertex where the panel would be fully seated within the groove of the rails and stiles. Planes of this sort, and those with a convex sole, have an advantage over the flat-soled type because the cabinetmaker can fit his panels to the groove with greater accuracy—the panel edge resembles a tongue more than a wedge.

Raising planes will seat themselves when the depth stop comes in contact with the panel surface, the cut being complete. However, the angle at which the plane is held to the stock will determine the thickness of the tapered edge. Scribing a line with a marking gauge and holding to it with the cut is one way to obtain consistent accuracy. A great many raising



Parlor paneling, Forbes or Barnes House, East Haven, Conn., from The Domestic Architecture of Connecticut by J. F. Kelly, Yale University Press, 1924 (Dover, 1963). The dotted lines, added by Vandal, indicate joints between rails, stiles and mullions.

planes were made sprung, that is, they had to be held perpendicular to the bevel surface and not to the surface of the panel. This allowed the planemaker to make a tighter throat on the plane, greatly improving the smoothness of the cut.

Panel-raising planes, regardless of basic type, always had their irons set on a skew. This facilitated cutting across the grain on the ends of the panels. Planes that have a spur cutter or nicker preceding the iron are at an advantage over those without, as they pre-cut the shoulder and eliminate tearing across the grain. Planes with an adjustable fence allow the user a greater variety in panel-edge widths, but do not function any differently than the fixed-fence variety.

I can vividly remember questioning a friend's purchase of a raising plane, thinking my own method of using fillester and block planes quite effective in fielding panels. Combining efforts on a project with this same friend gave me the opportunity to use his plane. Its effectiveness was unquestionable, a special tool performing a very specific function.

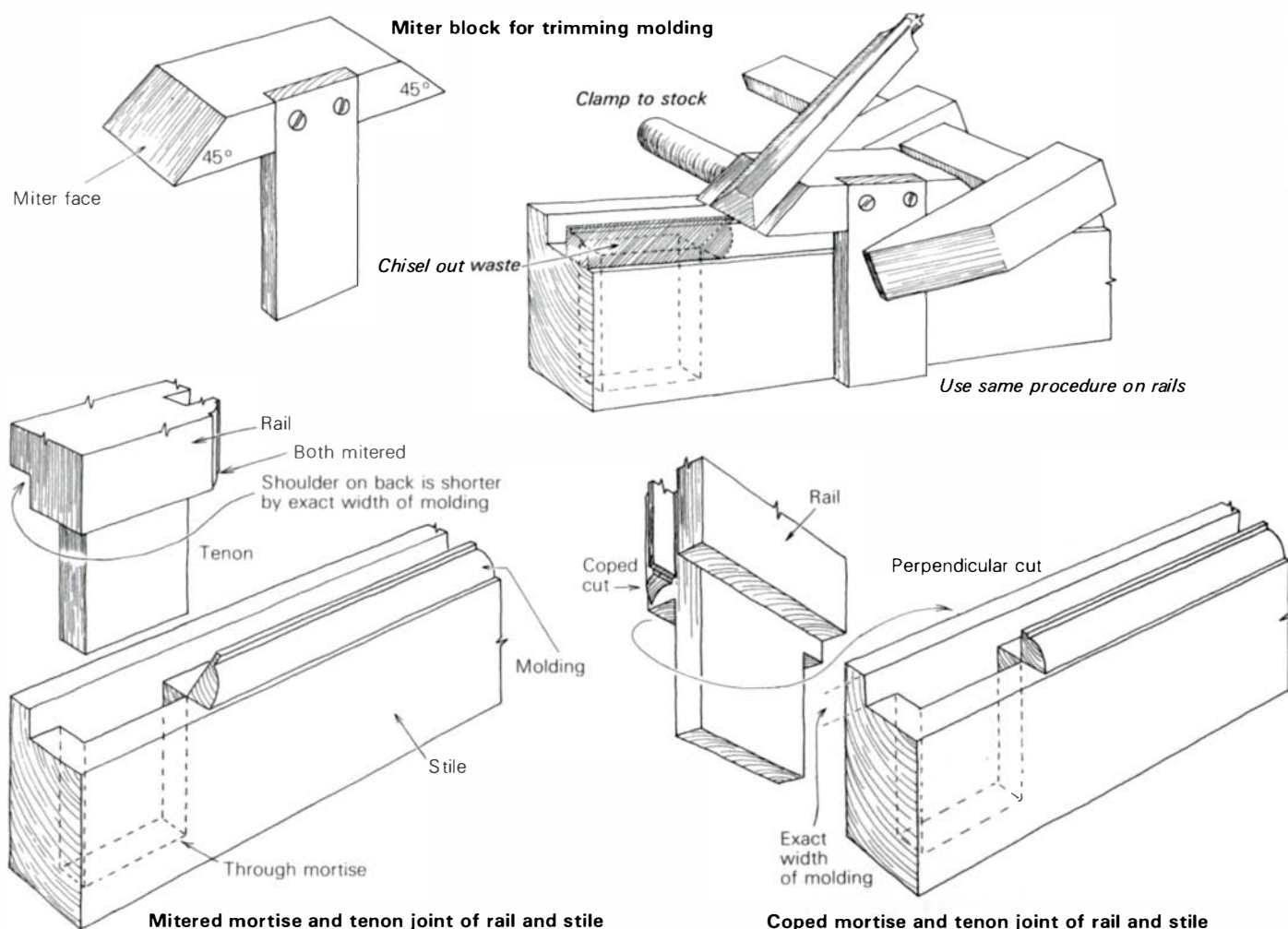
The thickness of the edge of the panel could only be determined from the actual width and depth of the groove plowed into the rails and stiles. For this reason frame stock was probably gotten out first, then the panels made to fit the dimensions of the preassembled rails and stiles. Stock for the frames was grooved with either the conventional adjustable plow plane or with a plane similar to the groove plane in a set of match planes. After the frame stock was grooved or plowed, if a molding was to be used, it was now stuck with the proper plane. The grooving and molding combination plane eliminated this second step, as it could cut the molding along with the groove. The scarcity of this plane indicates that a two-step procedure using the plow and molding planes was most common. The 18th-century molding plane shown on page 85 (second box from top), has an ovolo bead configuration found on a number of Federal-period doors.

The molding was stuck upon the entire edge for the full length of the stock. The excess where the rails and stiles meet was later removed in the mitering and mortising process. Tenons were cut only upon the rails, and were of a length allowing them to pass through the mortises in the stiles.

Keeping the thickness of the tenon the same as the width of the groove facilitated making the mortise, but was not always the rule. In building a door, for example, the rails and stiles could be cut to dimension, the stiles being the total height and the rails the total width. The outside stiles, extreme vertical members of a panel framework, extended unbroken for the unit's full height. The two extreme horizontal members, the rails, extended unbroken between the outside stiles into which they were tenoned. Within this framework various arrangements of panels and framework could be devised.

Making panels — In reproducing raised-panel work, there are five basic principles necessary for historical accuracy. First, the cabinetmaker must extend his tenons entirely through the outside stile stock. Second, he must observe the rail and stile relationships mentioned in the previous paragraph. The discontinuity is immediately apparent when a raised-panel door (which was designed to hang vertically) is recycled as an overmantle. Let the doors remain doors. Third, he should field his panels in a manner resembling those fielded with a raising plane. Panels may be gotten out with various types of power machinery, but the time could be better spent making a raising plane which could be used repeatedly. Fourth, he must fully house the tenons within the stiles, and not cut corners by making deep slots in the ends of the stiles to accept the tenons. Doors made with slip joints can be pulled apart from top to bottom and are inferior in their ability to control seasonal movement. Fifth, he must not misinterpret the relationship between the tenon, the groove and the miter at the intersection of the molded edges.

Since the molding is stuck on the inside edge for the entire length of the frame members, that portion of molding where the stiles join the rails must be removed, as shown in the drawing on the next page. The molding on the stile is first mitered with a sharp chisel guided by a pre-mitered block clamped to the stock. The waste beyond the miter cut is then chiseled off or sawn off with a fine backsaw, so that the shoulder of the rail can butt against a flat edge on the stile. The molding of the rail must be mitered to fit the molding of



the stile. Where the molding is not contoured, as on the backs of the rail and stile above, it needn't be mitered, and a simple butt joint suffices. Simply cut the rail shoulder so that the back face of the tenon is longer from end to shoulder than the front face, by the exact width of the molding.

Instead of the miter, a coped joint was most frequently used to join the moldings at the intersection of rail and stile. Here one molding is cut away so that its profile exactly and neatly fits over the adjoining molding. As with the miter, the joints on the reverse side of the door or wall unit are simply butted. When viewed face-on, the coped joint looks the same as the mitered joint, and it sometimes takes careful study to differentiate. The coped joint has one superior feature: It overcomes separation of the miter due to cross-grain shrinkage. The coped portion moves over the adjoining molding like a slip joint. If doors or walls are painted during humid weather, the coped joint becomes apparent in dry weather, when shrinkage draws the coped portion away from the line of paint and reveals an unpainted section of molding.

Only frame members having a tenon, generally the rails and center or mullion stiles, are coped. The moldings on the mortised members, generally the stiles and where the mullion stiles fit into the rails, are not coped. They are cut off square and perpendicular to the length of the stock, flush to the ends of the mortises.

The coping is done by first mitering the molding, as on the fully mitered joint. The actual cope cut is made with small carving gouges at a right angle to the face stock along the curved line created where the contour of the molding meets

the plane of the miter cut. This line represents the shape of a molding of the same configuration coming into the coped molding at 90°. It is important to note that in using either the coped or mitered joint, the moldings stuck upon the edges of all frame members must be consistent. The coped portion of molding should fit snugly over the adjoining molding when the tenon is fully seated.

The pin holes, having already been bored through the stiles, are now used to locate the drilling points on the rail tenons. These are bored slightly closer to the shoulder of the tenon, so that the joint will be drawn together when the framework is pegged during final assembly. Pins are riven or split out and then whittled to approximate roundness. A slight taper is helpful in drawing the joint, and can also be easily whittled. The irregularities in the pin are enough to hold it within a perfectly round hole, bored slightly smaller than the rough diameter of the pin. Splitting and shaping pins require little effort, and scrap stock can be used.

In this day of power machinery and sophisticated glues and laminates, the art of getting out a raised-panel door or section of wall in the old manner has been forgotten by those outside of a circle of traditional craftspeople, knowledgeable tool collectors and old-house enthusiasts. It is a tribute to these people that the panel-making trade persists, to a limited but increasing degree. □

Norm Vandal, 30, of Roxbury, Vt., builds and restores traditional houses during the summertime, and makes period furniture during the winter.