Preparation of Stock

The essential first step is obtaining a true face side

by Ian Kirby

A face side and a face edge are true reference surfaces from which accurate measurements may be taken. Proper preparation of a face side and from it a face edge are essential preparatory steps in woodworking. If this part of the job is not done correctly, one is bound to get into serious difficulties in all subsequent operations.

Preparing a face side that is flat in width, flat in length and out of winding is analogous to pegging out the site on which a house is to be built. If this first step is taken lightly and not accurately carried out, the errors compound at every building stage. No amount of connivance will prevent difficulties from arising at every turn. Yet of all the processes in woodworking, preparation of stock is often woefully done and frequently receives only perfunctory attention. Basic woodworking books do cover the process, and it seems strange to me that in teaching, the case for it must be constantly restated. I find that even quite experienced woodworkers need to be reminded of the procedures to follow. Preparation is so elementary that people seem to treat it with contempt, saving their energies for more interesting operations.

General approach

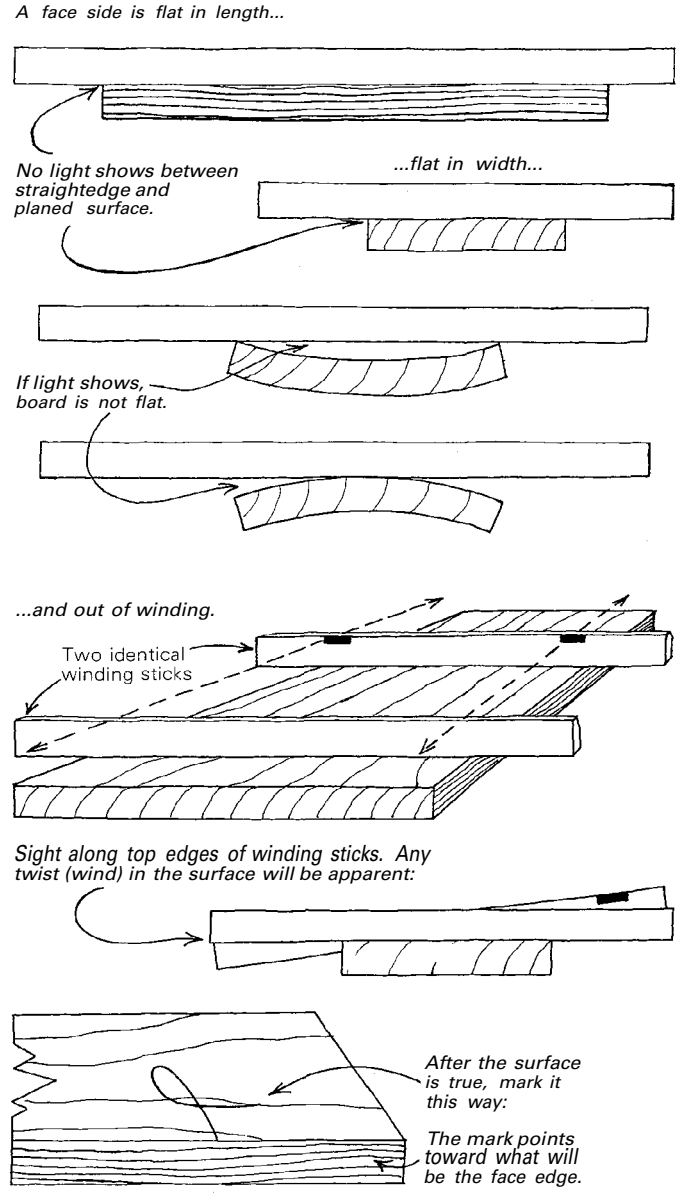
I shall discuss the general principles and requirements of preparation before going on to the specifics of obtaining true reference faces. It's always unwise to approach woodworking procedures in an ad-hoc manner because in the main there is a sequential logic to them. Preparation is no exception.

For any one job it is best to convert and prepare all of the stock at the same time, whenever it is possible to do so. This usually saves material, time and effort, and reduces the risk of making mistakes. It also ensures that all pieces to be finished to the same dimension are machined (if you are using machines) at the same setting.

Preparation includes or at least begins with the selection of timber for the job, if only because knowing what one has to achieve from a piece of wood has a lot to do with which piece one chooses. However, selection could be considered a topic in its own right and I won't try to deal with it here. Nonetheless, the two procedures overlap when deciding whether to cut all the pieces directly to the sizes specified in the cutting list, or whether to make it a multi-stage operation by preparing larger pieces from which the correct number of smaller pieces will later be taken. This depends very much upon the available stock, and it is worth spending some time deciding how best to proceed. For machining it's usually best to work with larger rather than smaller pieces of wood. Not only is time saved, but best use is made of the length of the machine bed. Thus one maximizes the possibility of achieving flatness, since flatness is, in part, a function of the length of the machine bed. On the other hand, the wood may be so long that it is difficult to handle, or the plank may be badly sprung, cupped or twisted. Machining out these defects will require many passes and waste a lot of material, and in such cases it pays to cut the plank into more manageable lengths first.

In preparing a piece of wood, whether it is a long plank which will be cut apart later or a single piece to be finished to a specific size, you have to assume that none of its six faces is an accurate reference surface. The first thing to do is to prepare a side which is flat in length, flat in width and out of winding.

The tools for testing these three characteristics are a long



straightedge and a pair of winding sticks. When a side of the board is flat and out of winding, it is marked and henceforth referred to as the *face side.* It is a reference surface from which further measurements are made. If it is not accurate, measurement can not be accurate.

Whether you choose to prepare one side in preference to the other on the basis of whether it will be exposed and visually important or for reasons connected to its role in construction is inconsequential to the primary fact that there has to be a face side. However, in many situations one does have to consider whether to put the face side on the inside or outside. The decision need not be too confusing. For instance, drawer parts should have their face sides inside, and the members of a carcase generally also have their face sides inside. This way, you retain an accurate reference surface no matter what you later do to the outside. Decide which side will be the face side by thinking ahead to the consequences of having this reference on the inside or on the outside. Since the outside surfaces of any job will be cleaned up by hand-planing or sanding, or perhaps by carving, the face side will be lost if it is the outside.

Do not, however, confuse the face side with the best-looking side. Frequently the two will be on opposite sides of the board. Also, the mark that is used to designate a face side is a clear statement that the side has been prepared and is flat in length, flat in width and out of winding. Never put a face mark on a board as a statement of intent. It is an after-the-fact mark.

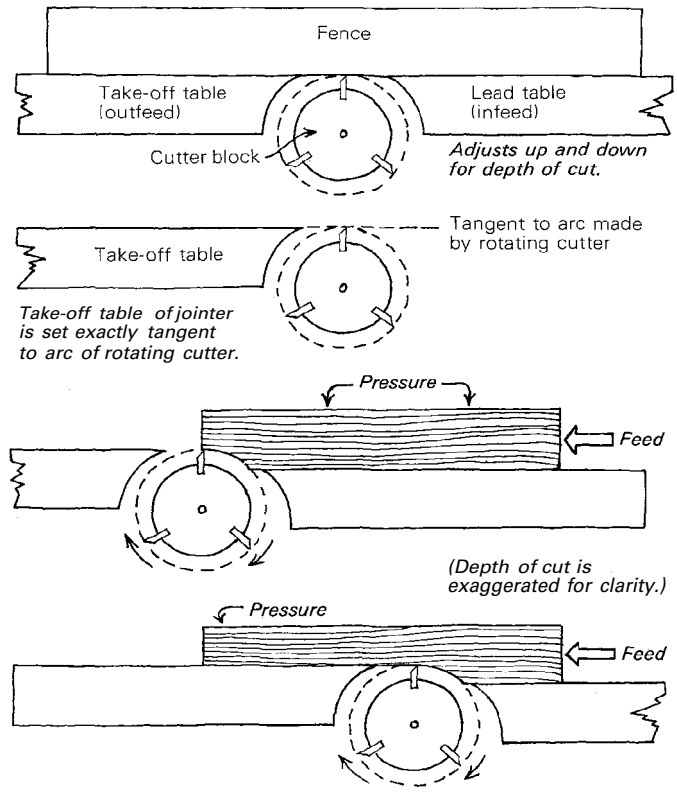
The face side provides the reference surface from which a face edge can now be produced. The face edge bears the same three characteristics as the face side, plus a fourth: It is at 90° to the face side. All further measuring and marking can spring from these two reference surfaces, and most of the woodworker's marking-out tools are designed to rely on them. The marking gauge, for example, is used to mark lines on the wood parallel to either face side or face edge to indicate width and thickness. Because it gauges directly from these established reference surfaces, it is only as accurate as they are.

It is usual to mark and cut to width first, because less energy is involved in removing the material than if it were thicknessed first. Whether the board is planed to width or sawn first and then planed depends on the work involved. A good rule of thumb is that if there is enough wood to take a saw kerf and leave a small amount of falling board besides, then it is worth sawing first. If not, plane directly to the line. The same is true when cutting the board to thickness. Having now four of the six faces flat, out of winding and at 90° to each other, it remains only to cut to length.

Machining the face side

The machine used to produce the face side is the jointer or surface planer. It consists of two horizontal flat tables which are adjustable in height, separated by a revolving cutter block. The lead table (infeed) is in front of the cutter block, and the take-off table (outfeed) is behind it. The take-off table is accurately set so that its surface is perfectly tangential to the arc made by the rotating cutter. Thus when the wood passes over the cutter, it meets the take-off surface with no further deflection up or down. The table is set at this height when the blades are set in the cutter block, and it remains undisturbed thereafter. The lead table, on the other hand, determines the depth of cut and is constantly being adjusted for this purpose.

Surface planer



Mechanical feeds do exist but in the main the wood is offered to the machine by hand. It is held down firmly on the lead table and moved toward the cutter. At this point the wood has no reference surface, so the lead table is acting only as a carriage. Since the take-off table is set exactly tangential to the arc of the cutter, the cut surface will coincide with its surface. It is vitally important that this contact be established and maintained throughout the cut. Thus as soon as the leading edge of the wood passes the cutter, the operator shifts his hand to the take-off table and presses downward to maintain the contact, while no further downward pressure need be applied to the wood still on the lead table. Otherwise, the wood is liable to pivot or rock about the cutter and lift from the take-off table.

So long as the take-off table is set properly and the contact maintained between it and the newly cut surface, this surface will have all three properties of a face side, although it usually requires more than one pass to achieve. But provided the wood is not too badly sprung or twisted, two fairly light cuts will usually do. Two or three light cuts usually give a better result than one heavy cut, though the feed speed is of course also important in surface quality.

If the take-off table is set too low, the wood drops as it leaves the lead table and the cutters snip off the trailing edge of the board. If the take-off table is set too high, the wood tilts as it feeds and the cut is deeper at the leading edge, producing a taper.

Many shops lack a large jointer and attempt to achieve true reference surfaces with the thickness planer alone. But a thickness planer operates by pressing an already flat surface

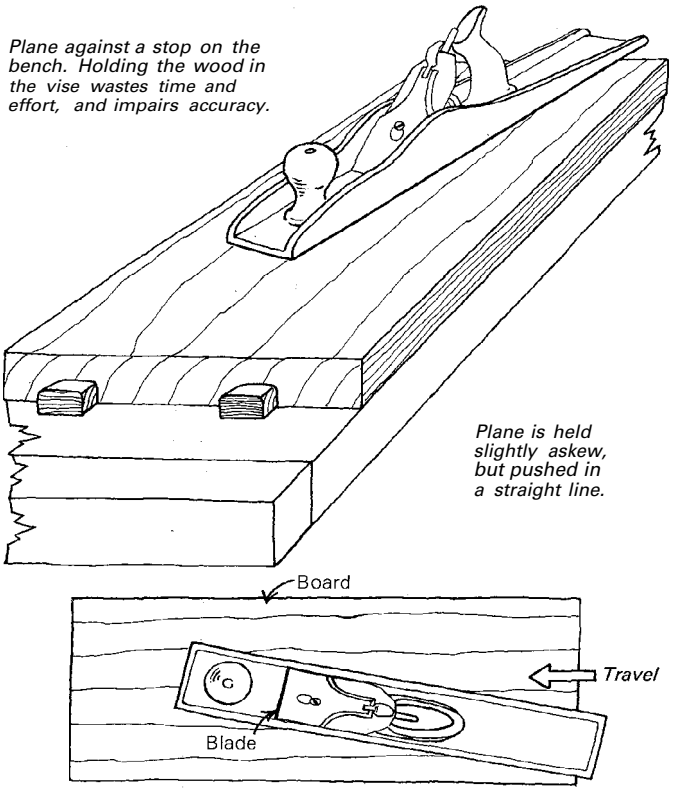
against its lower bed, to cut the top surface parallel to it. Its feed rollers apply enough pressure to straighten cup and warp out of a board. The board straightens as soon as it leaves the machine. Thus while it will produce a smooth surface, it cannot produce a flat surface unless the board is already flat on one side. It is better to hand-plane the face side and then thickness than to attempt to produce a face side with the thickness planer alone.

If I were faced with the financial problem of having to choose between buying a wider jointer or a thickness planer, I would probably prefer the jointer because you simply must be able to produce a true reference surface from a rough board. One solution, however, would be to use a European combination machine. These have one cutter block and two tables, a jointer on top and a thickness planer below. Wadkin makes several such machines, as do the Swiss Inca and Italian Combinato lines.

Hand-planing the face side

The long jointer plane is also known as a trying plane or sometimes as a fore plane, which probably comes from the word "before"—it is the tool used before anything else. There is a similarity between the jointer machine and the jointer plane in that both have a long, true surface. In both cases this long surface is the reason they are able to produce a flat surface on the wood. The trying plane is usually 22 in. long, enough for most work.

Also, while there is no difference in level between the toe and heel of the plane's sole, as there is between the lead and take-off tables of the machine, the toe and heel part do play a similar role to the machine tables. The toe and the surface in front of the plane iron act as the initial register, but the part behind the blade is most important in imparting flatness because it is guided by the improved surface of the wood. So it is vital to maintain pressure on the rear end of the plane to ensure contact and provide progressive flatness at each stroke. Since there is no difference between the two surfaces, the inherent tendency to lift from the surface of the wood is much less apparent than with the machine.

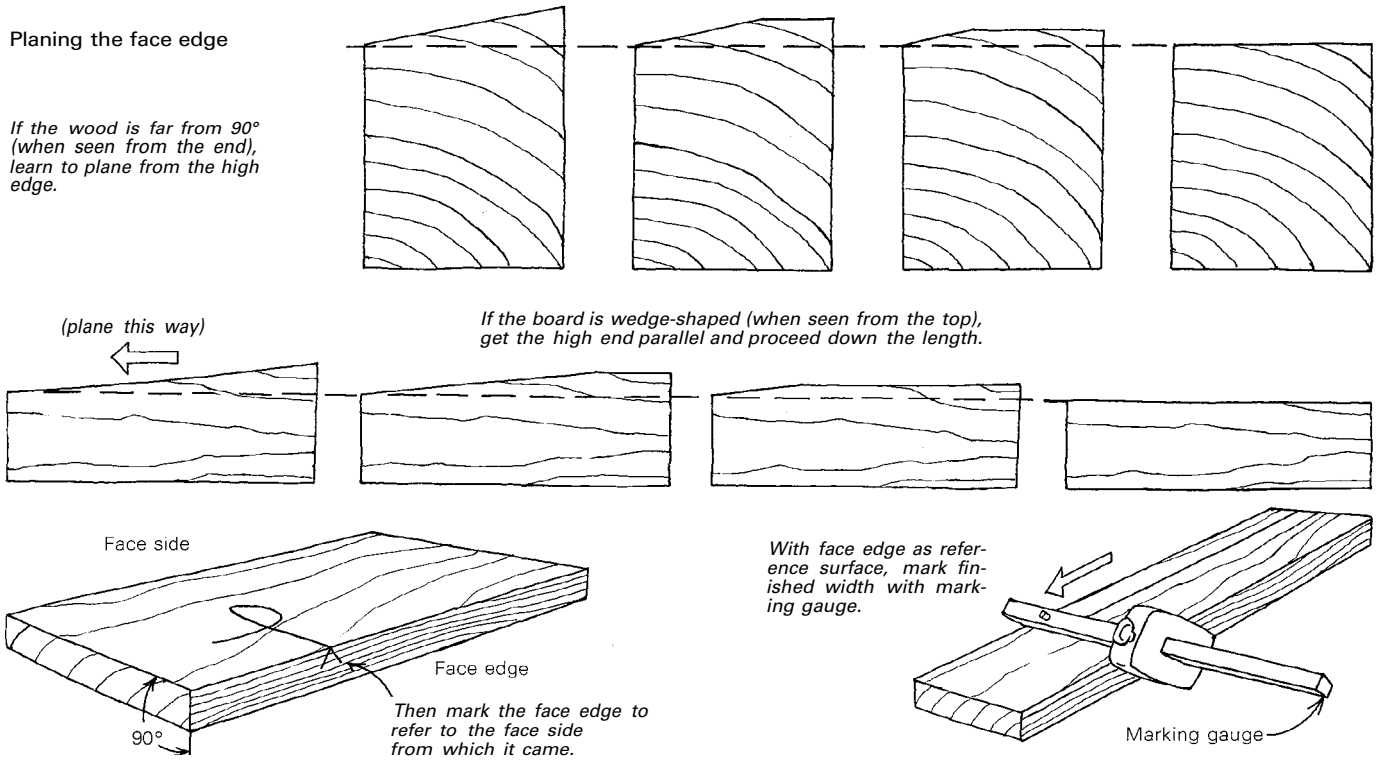


The piece of wood to be planed should, if it is of manageable proportions in terms of width and thickness and not too badly warped, be placed on the surface of the bench against a bench stop. A less good way to plane wood is to hold it in the vise. If there is a degree of spring or twist, the pressure of the vise will probably rectify it, thereby giving a false indication of the real state of the wood when being planed. On release the wood of course returns to its misaligned state. Apart from this, the time involved in mounting the work in the vise, releasing it and changing body position to do so each time the work is checked is much greater than the time it takes to lift the wood from the bench, check it and put it down again. Further, working against the bench stop obliges one to operate the plane properly and provides tactile feedback information that one would not get if the work were in the vise. For instance, if the thrust of the plane is not directly along the axis of the wood or is not being applied horizontally, the wood will react by either toppling over or skewing round on itself. Learners will avoid forming bad habits if they plane woods on the bench in this way. The assumption here, of course, is that the bench is accurate. The surface on which one planes must be horizontal. It must be a "face side" in itself and have all the properties of a face side. A piece of wood with much of one's weight being pressed on it through the plane will easily deflect a few thousandths of an inch. If the surface it is on is hollow, it will be planed hollow. A fine shaving is only about .0015 in. thick, and there is little room for error. When a lot of wood has to be removed, sharpen the plane and move its frog back to open the mouth and take deeper cuts with each pass.

A straightedge is used to check flatness in length and width. It is necessary to hold the wood and the straightedge up to the light to ensure that no light can be seen between the straightedge and the surface being tested. Don't despise checking the board by eye at any time without instruments. It would be foolish to claim that the eye can be developed to the point where measuring tools become redundant, but one should develop as keen an eye as possible—for one's own awareness if nothing else.

To check for winding, two accurately planed, equally dimensioned pieces of wood, known as winding sticks, are placed transversely at points along the length of the surface and sighted to read for parallelism throughout. The sticks need to be long enough to accentuate the degree of winding so it can easily be seen. The amount of twist can be gauged by the deflection of the sticks, and the remedy is to plane diagonally from the high corner at one end to the opposite high corner at the other end.

If the surface has interlocked or similarly awkward grain, set the plane mouth fine, the back iron close to the blade edge and keep the blade sharp, and it will be easy to plane diagonally or at right angles to the grain. Generally, the more dense the wood, the easier it is to plane across the grain. When the board is flat and out of winding, one should be able to take a clean, fine shaving from end to end all across the surface. When the surface is flat in length and width and



out of winding, the face-side mark is applied to it in a position to indicate which edge will become the face edge.

The face edge

Machining the face edge on the jointer is like preparing the face sides. Pressure must be applied to the take-off table in the same way, but now the face side also has to be kept firmly in contact with the fence. The fence must make a 90° angle with the jointer bed, and it's worth checking with a square every time the machine is used. Both downward and sideways pressure need to be maintained throughout the cut, and the procedure is that much more difficult to control.

When preparing the face edge on the bench with the jointer plane, the wood should be stood on its edge against the stop, for all the same reasons as before. This will not be possible when the board is somewhat wider than it is thick, and there will be no alternative but to put it in the vise. But be aware of the problems of distortion that this might cause, although the difficulty is less than with a face side. If the wood is far from being parallel it might be best to thickness the piece before preparing the face edge.

If the wood is severely angled from 90° on its edge, one must learn to hold the plane with its sole horizontal and to take material from the high edge. Some find it a help to shift the plane sideways so the high edge of the wood is cut by the center of the plane iron, but on no account tilt the plane away from horizontal in an effort to compensate. If the piece is wedge-shaped in length, the usual procedure is to get the high end parallel to the face edge and progressively to achieve parallelism down the length of the board as the width—or thickness for that matter—is reached.

The checks for flatness are the same as before, but it is also necessary to check for right-angularity between the face side and the prepared edge all the way along its length. This is done with a try square. When the four characteristics have all been achieved, the face edge is marked as the side was marked, this time in such a way as to indicate the face side from which it springs.

Width and thickness

The next thing is to use the face side and edge as reference surfaces from which to mark and cut to width and thickness, usually to width first. The first operation may be to saw, either with circular saw or handsaw, to within planing distance of the final dimension. One should aim to saw as near to the line as possible without touching it.

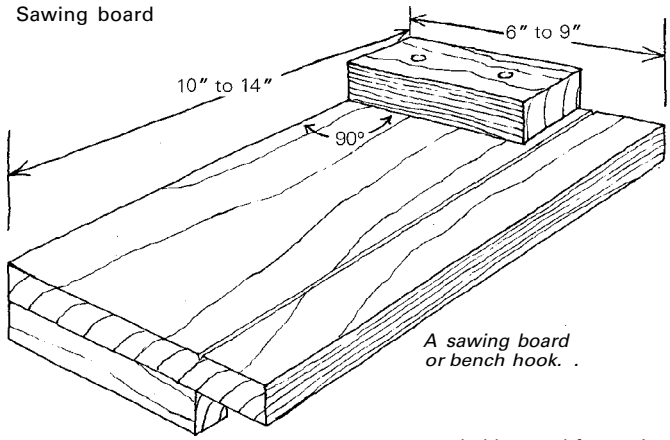
The subsequent planing by machine would be done with a thickness planer and is usually a one or two-pass operation requiring only that the thicknesser be set to the given dimension, the wood fed in and collected at the other end. It is important, however, to do all pieces that are to finish at that dimension at the one setting.

Just as it is not possible to produce a face side with a thickness planer, it is also impossible to plane to width or thickness on a jointer. The necessary accuracy comes from an already established reference surface, and the jointer is not designed to work from a reference surface. There is no guarantee that parallelism will result. There are commercial attachments for jointers to convert them to a form of thicknesser, but they have limited capacity and my inclination is away from them.

Getting to width and thickness by bench methods involves gauging all around with the marking gauge and planing to the line with the jointer plane. As before, work with the wood on the bench and not in the vise.

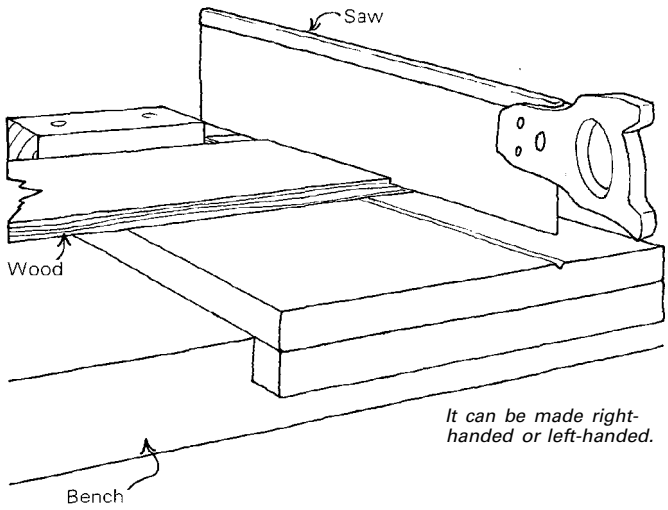
Length

Getting the material to length is a two-part process. One end is squared off first, either with a radial-arm saw, a traveling-



A sawing board or bench hook. .

... holds wood for cutting squarely to length with hacksaw.



It can be made right-handed or left-handed.

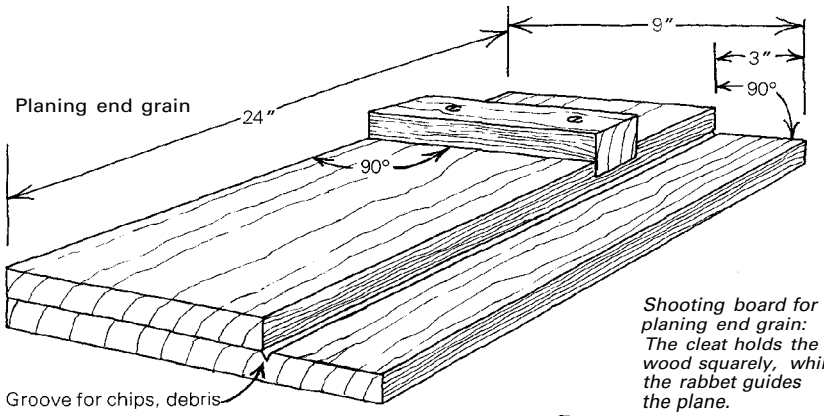
bed dimension saw, or by hand. In the latter case the wood is quite deeply knifed all around, using a try square and working off the face side or face edge. Then saw with a hacksaw, holding the work on a sawing board, or with a panel saw and sawhorses if it is a large piece. The length is then measured from this end face and marked with knife and square. The excess is cut in the same way as the other end, either from the marks made, or directly by use of stops on the machine saws.

If the prepared piece of wood is later cut into pieces, care should be taken to see that all the pieces bear the face-side and face-edge marks. For although rectangularity has been achieved, one continues to use only face side and face edge as the reference surfaces throughout all subsequent work.

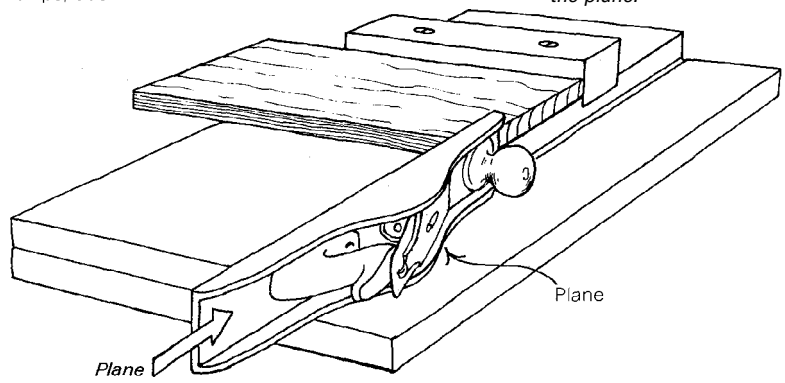
Beginners are often confused about leaving extra wood for cleaning up. In general, one doesn't leave any extra. The cleaning-up process should remove very little material. It should be what it is called—simply cleaning. The same rule applies when cutting to length, except in the case of legs or stiles that are to have mortises very near their ends. To avoid splitting the wood, a ¾-in. horn is left on the end of the stock, to be sawn off afterward. That ¾ in. is a necessary piece, so cut to the finished length plus ¾ in.

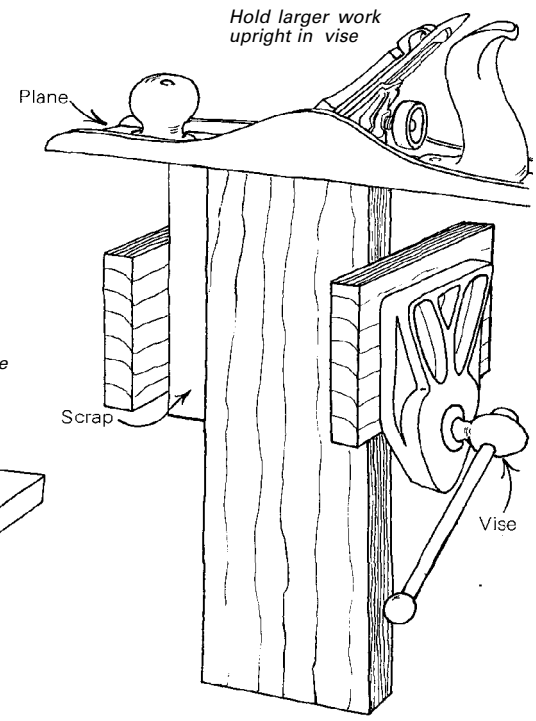
End grain on square stock is difficult to plane, and the usual shortcut is to finish it on a disc sander. Probably the best way is with a shooting board, which controls the plane while supporting the end tissue of the wood. On wider stock it is relatively easy to put the wood upright in the vise, arrange some form of scrap-wood end support and plane as though working on the edge. The plane must be sharp, and a little paraffin wax helps greatly; the feel of end grain being cleanly cut is gratifying. □

Ian Kirby, 46, teaches in his own school, Hoosuck Design and Woodworking, in North Adams, Mass.



Shooting board for planing end grain: The cleat holds the wood squarely, while the rabbet guides the plane.





The scrap prevents splintering at the end of the stroke.