



# Planecraft

*A new look at one of our oldest tools*

By Ian Kirby

What if I offered you a new woodworking tool that's capable of accuracy within a thousandth of an inch? Not only that, while most tools have only one function, this amazing cordless device handles three important tasks:

- it can bring any piece of wood to precise dimensions,
- it can remove twists and other distortions, and
- it can prepare a surface for finishing.

Wouldn't you rush to pay \$200 to be the first kid on your block to own this remarkable new tool?

By now you probably realize that I've been describing an ordinary hand plane, which to me is still the key to woodworking success. Though machines have changed the way we use the plane, it remains the most precise and accurate tool woodworkers have.

Before machines, woodworkers relied on special-purpose planes for almost everything. Today we can turn to jointers, thickness planers, shapers, and routers for the hard work of flattening, dimensioning, and shaping. We still rely on the plane to remove machine marks and to bring parts into perfect alignment, in .001-inch steps. The plane remains the only tool we have that can reliably deliver this degree of accuracy. It's a bonus that it can flatten a surface of almost any size, such as your workbench, and in most situations it also will create the best surface for finishing.

Over the years many manufacturers have made planes, but the two mass-market survivors are Stanley Tools in the U.S. and Record in England. Stanley recently stopped

**Brace your right index finger on the frog. Trap the front handle between your fingers. This grip gives you control and downward pressure.**



production of planes, leaving Record to fill the breach. Along with the high volume manufacturers there have always been a number of high-end, Rolls-Royce type makers. In England it was Norris, and today in the United States it's Lie-Nielsen. Lie-Nielsen recently has reissued the Stanley Bedrock version of both the 07, which is 22 inches long, and the 9-inch 04-1/2, which are the only two sizes I use.

### Driving the Plane

Planing wood is a whole-body exercise. Whether you are planing a face, an edge, or end grain, the grip, stance and body position are similar. Before you start, lubricate the operation by rubbing a little paraffin wax into the sole.

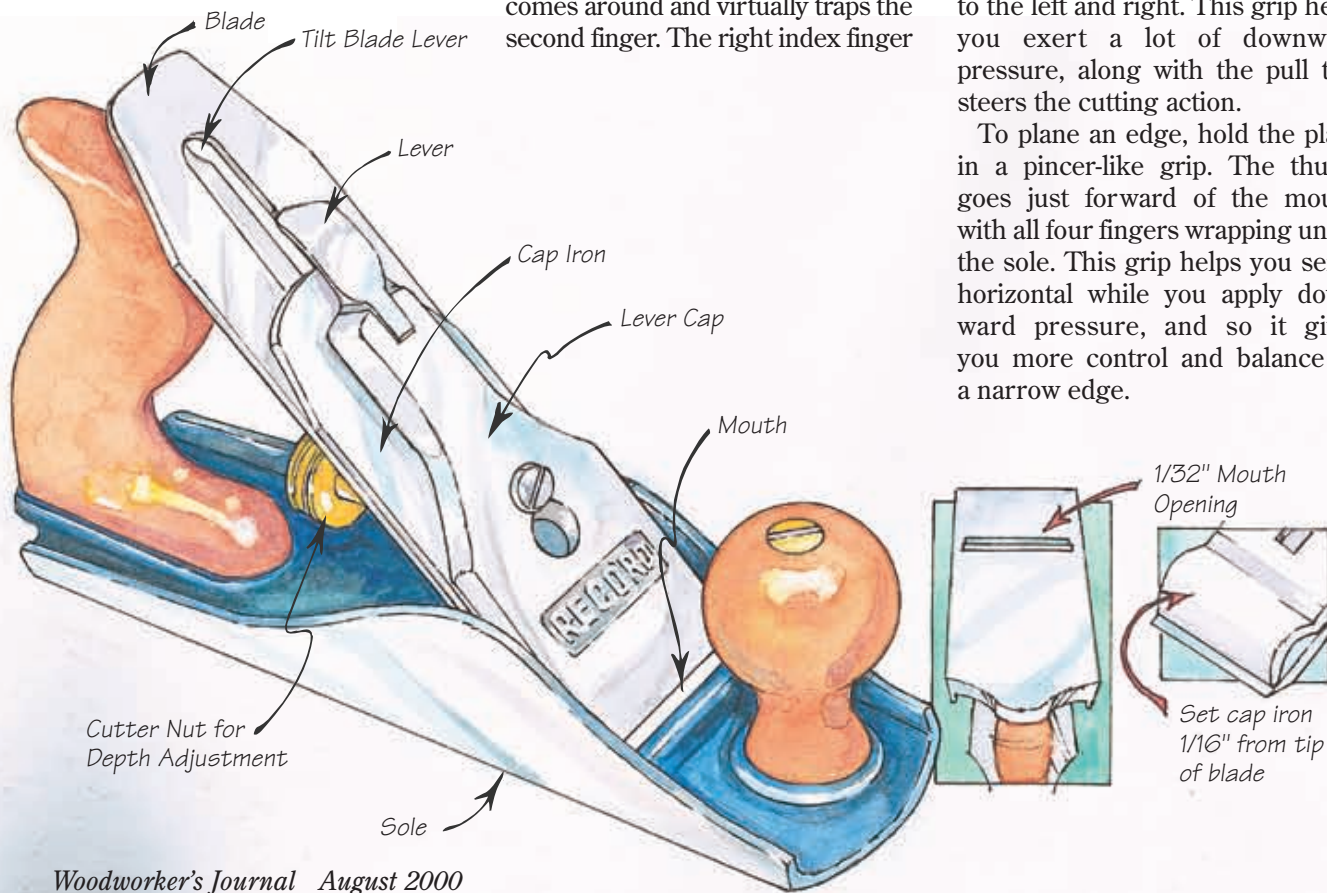
### The Hand Grips

The right hand grips the rear handle. It applies downward pressure and transmits the push that comes from your legs and body. The right thumb comes around and virtually traps the second finger. The right index finger

doesn't wrap around the blade assembly; it tucks down into the casting of the frog. This grip creates a lot of control tension between the index and little fingers. If you wrap your index finger around the blade assembly, sooner or later you will move it.

The left hand grip varies according to whether you are planing a face or an edge. On a wide board, press down on the top of the front knob with the palm of the hand and curl two fingers under it to the left and right. This grip helps you exert a lot of downward pressure, along with the pull that steers the cutting action.

To plane an edge, hold the plane in a pincer-like grip. The thumb goes just forward of the mouth, with all four fingers wrapping under the sole. This grip helps you sense horizontal while you apply downward pressure, and so it gives you more control and balance on a narrow edge.



## Stance and Motion

The plane gets its power from your feet, which should be placed a comfortable walking pace apart. Keep your wrist, lower arm and upper arm in one line, and direct the push from your shoulder. As the cut proceeds, shift your weight from your rear foot forward, and unwind until your body has rolled over your ankles. Your more powerful lower body thus will propel the plane about 42 inches. Continue the cut by unfolding your upper body and arms, to push onward another 18 inches, more or less. This 60 inches is about the limit you can cut without traveling or walking the plane. To plane a long board you have to travel in a smooth and unhurried way. Slide your rear foot up to the front foot, then slide your front foot forward. Don't try to cross your feet.

## Planing a Face

To plane a piece of wood flat, you have to put it on a flat and solid surface and hold it against the push of the plane. Normally the solid surface is your bench, which, if you haven't done it yet, should be your first major planing project. If the

bench surface has a hollow, the force of planing will press the workpiece into the hollow. The deflection might be only a few thousandths of an inch, but it will deflect. If there's a hump, the workpiece will swivel on it, out of control. The bench acts as a jig – if it's not flat, the workpiece can't become flat either.

The link between bench, plane, workpiece, and workman is very important. That's why it's best to push the workpiece against a simple bench stop. The first virtue of its simplicity is that you can quickly pick up the workpiece and check it for flat or square, put it back, and carry on. The second virtue is the constant feedback this setup delivers. Poor planing technique will skid, slew or tip the workpiece, you'll know it right away, and you can correct your technique.

The two alternative holding methods, holding the workpiece in a vise or trapping it between an end-vise and a dog, are not as good, for three reasons:

- You lose the feedback.
- Clamping pressure can distort the wood.
- The work surface won't be flat.



To plane a narrow edge, grip the toe of the plane between your thumb and fingers. By touching the workpiece, your fingers act as a fence. Look down into the plane to monitor the progress of the cut.

An end vise, even if flat and level when closed, will sag when opened. And wood trapped by its edges in the vise is not supported at all, so deflection is certain.

## Narrow Workpieces

When the wood is narrower than the plane blade, each pass removes a full shaving. To plane evenly, be sure the edge is set parallel to the plane sole. Set it by sighting the blade against the sole and moving the adjusting lever. Check it by examining the shaving.

## Planing is a whole body experience



The plane gets its power from your legs and feet. You can plane about 5 feet of wood without having to travel.



Begin the stroke with all your weight on your rear foot (left), then transfer your weight as you propel the plane forward (above).



To complete the stroke, unfold your arms to their maximum extension. Note that the feet remain a pace apart and do not move.

## He's in fine fettle

Whether you buy old or new, it's almost certain that you will have some work on every plane – clean it up, modify it, tweak it or adjust it. The old term for these activities is “fettling,” and it's the source of the expression “he's in fine fettle,” for someone at the top of his game. The good news is that it's a rare old plane that can't be renovated to perform well. The bad news is that new planes need fettling as much as old ones.

### General Cleanup

Disassemble, wash, remove the rust (I use Scotchbrite™), then go over edges and ends with a file to remove burrs, nicks and sharp corners. A burr on the edge of the sole will plow a groove in the work, so file a tiny chamfer on the long edges. To keep the toe and heel from gouging the work when cleaning up frames and subassemblies, file a more substantial chamfer there, one about 1/8-inch wide. Wipe all the metal with an oily rag, and put a drop of oil on the moving parts.

### Blade Control

To operate the plane you need two controls: a blade-advancing mechanism for depth of cut and a left-right tilt for making the cutting edge parallel to the sole. The mechanisms in older planes offer more positive control than the folded metal parts in new ones. Old or new, make sure the controls work, and if they don't, find what's missing, bent, or clogged and put it right.

### Frog and Mouth Adjustments

The frog is the mass of metal that supports the blade. The slot in the sole is called the mouth. There has to be enough of an opening for the shaving to pass through. Whether it ever needs any more adjusting (“opening” or “stopping down”) than that is debatable. The fact that the

frog in metal planes is an adjustable part is the outcome of manufacturing convenience, not a woodworking requirement. Making the frog removable solves a casting problem – otherwise, the body casting would distort as it cooled and shrank. It's also easier to machine the frog as a separate part. It's not, however, a necessity – Norris planes, among the best ever made, have fixed frogs.

These days, since we all prepare wood with machines, hogging off thick shavings isn't called for, so there's little need to adjust the mouth. Make sure the frog supports the blade, set the mouth for an opening of about 1/32 inch, and leave it there. The quality of the planed surface comes much more from the sharpness of the blade than from the width of the mouth opening.

### Flattening the Sole

The sole of the plane has to be reasonably flat. However, flattening is a major operation, so don't do it just because you've been told you should. Clean up, sharpen and adjust the plane, then try it on wood. Most planes will work quite well, and if so, leave the sole alone.

If you decide you must flatten, there's no need to make an expensive fetish of it. Get a piece of 1/4-inch or thicker plate glass and wet two sheets of 220-grit wet-dry sandpaper onto it. Apply working tension by assembling the plane and mounting a blade, but retract the blade so it's not involved in the flattening. Then work the plane on the sandpaper in a circular motion, using plenty of water for lubrication. To check your progress, wipe the metal and look at it. Once you get contact at the mouth, toe, and heel of the sole, stop and polish up on a finer grade of paper. There's no need to achieve perfect flatness from one end to the other.



File a substantial chamfer on the toe and heel of the plane.



Old-style blade controls (left) are more robust than the stamped metal ones in recent planes.



The bedrock style frog (above) firmly and ingeniously connects the blade assembly to the body. A regular frog is not as massive and does not seat as firmly.



Adjust the frog to support the blade securely. The mouth opening should be set to 1/32".

## Wide Workpieces

When the wood is wider than the plane blade, the tool's geometry helps you work uniformly across the surface. If you were to plane in exactly the same line, you would get two shavings, maybe a thin third, then nothing. That's because the plane quickly bottoms and rides on the narrow web of metal alongside its mouth. To take advantage of this self-jigging property, begin at one edge of the board with the plane hanging over, so it takes a shaving three-quarters the width of the blade. For the next stroke, move the overhang just onto the wood. Go across the board systematically, moving about one-quarter of the plane's width for each stroke. If you were to attack the wood in a random pattern, half the time you wouldn't get a shaving, but more importantly, you would have no idea where wood had been removed or still needed to be removed.



To trap a wide workpiece, make a simple L-shaped bracket. The short arm goes into the vise, the long arm bears against the bench stop, and the free end can be clamped to the bench (below).



On wide work, overlap your strokes by about 1/4 of the plane's width. To practice, draw marker or chalk lines on the workpiece.



## Planing an Edge

The edges of most furniture parts can be planed on the bench top, against a stop. A rail that is 3 inches wide and 3/4-inch thick, for example, is stable when stood on edge; if it falls over, you're not centered over it, or else you're pressing sideways instead of down and forward. You will quickly become adept at the technique and the ease of lifting the workpiece to check your progress. To square an

edge, center the plane over the material you need to remove and observe the shaving as it comes off the workpiece. You can trap a long or wide plank in the vise, but be sure to support the free end, or it will deflect.

## Planing End Grain

Today the chop saw and carbide saw blade take care of most end grain cuts. The bench plane thus becomes an alternative for special situations. The size of the workpiece determines whether to hold it upright in the vise or lay it flat on a shooting board.

The shooting board allows you to use your heaviest plane to make a smooth and controlled cut. However, don't attempt to plane end grain until you have established a face side and edge. You need these reference surfaces to check your progress.

To plane end grain in the vise, you need a sharp and finely set blade, a plane with heft, and a deep knife line squared all around the workpiece. I prefer the 07 jointer because it is heavy enough to make a smooth cut. People commonly attack end grain with a block plane, but that tool is too small to grasp easily and too light to tackle anything but a very tiny area. The deep knife line will prevent splintering at the far end of the cut.

### Planing Across the Grain

The technique for flattening wide surfaces and for taming difficult grain is the same: plane across the grain. Whether you want to flatten your workbench or smooth an ornery piece of sapele, you will need a straightedge and winding



A shooting board gives you a clear view of the cut as you progress toward the knife line.

An end grain shooting board has a stop to trap the work and a ledge where the plane rides. The secret is the plane's heft, allowing you to power across the hardest wood. Scribe a knife line all around the workpiece. It prevents splintering and shows you where to stop.



Difficult figure, like this interesting walnut knot and feather, is easy to plane cross-grain.

sticks to check your progress and a bench brush to get rid of the debris. Begin with the blade set coarse and work straight across the grain, or at an angle of up to 40 degrees from straight across. Check the surface frequently, get it flat quickly, then begin to refine it. Keep a sharp blade in the plane, and remove ever-finer shavings until you get a down-like fuzz. Now a once-over with 220 or finer sandpaper will leave a great surface ready to finish.

*Ian Kirby is a master woodworker, designer and wood scientist. Ian is one of the true masters of the British Arts & Crafts tradition. Look for his continuing series on woodworking design in upcoming issues of Woodworkers Journal.*

## How many planes does a woodworker need?



Two planes do it all: Record's 04-1/2 smoother (left) and Lie-Nielsen's 07 bedrock jointer.

Name	Number	Length	Width
Smooth.....03.....	varies.....	.2"	
Smooth.....04.....	10"	.2"	
Smooth.....04-1/2.....	10"	.2 <sup>3</sup> / <sub>8</sub> "	
Jack.....05.....	14"	.2"	
Fore.....06.....	18"	.2"	
Trying.....07.....	22"	.2 <sup>3</sup> / <sub>8</sub> "	
Trying.....08.....	24"	.2 <sup>1</sup> / <sub>2</sub> "	

In my life as a furniture maker, I've only ever seen the need for two bench planes: an 04-1/2 and an 07.

These lengths suit all occasions and can solve almost any furniture-making problem.

Sharpening convenience is the reason for choosing the 04-1/2 smoother over the 04. Its wide blade matches the one in the 07, allowing me to keep about 20 identical blades that fit either tool. I can swap dull blades for sharp ones without interruption. Then I have one big sharpening session, using the grinder and stone setup

described in my book, *Sharpening with Waterstones*.

Although not a strict industry standard, the length and width

of a bench plane is indicated by a number cast into the body (see chart). Longer planes are heavier, but the underlying point is the length of wood that can be made flat. It's not an exact science, but you can flatten an edge that's about three times the length of your plane. Thus with an 07, which is 22 inches long, you can straighten a six foot edge. It's much more difficult to create flatness than to retain it once established.