Hand Planes for Trim Carpentry

Tuned and adjusted right, these planes will save time and improve your work

by Scott Wynn

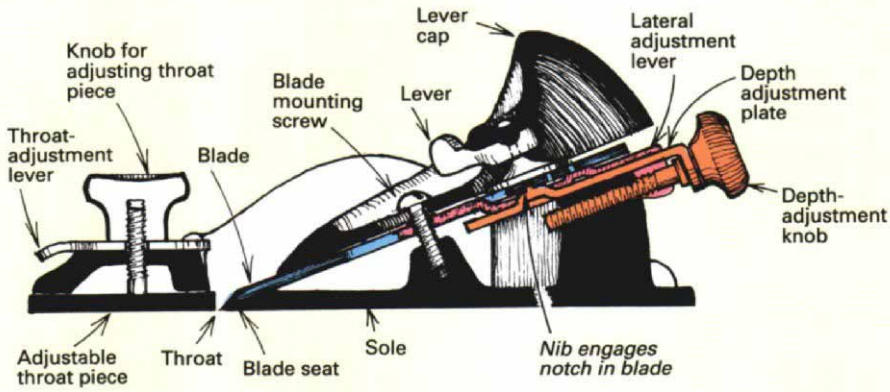
More than 100 different wood and metal hand planes are described in R. A. Salaman's *book Dictionary of Woodworking Tools: c. 1700-1970* (published by The Taunton Press, Inc.). Store-bought or handmade, many of these clever devices were once indispensable to builders. Before the advent of power planes and routers, a carpenter's repertoire might include assorted bench planes for preparing and smoothing wood stock; molding planes for shaping everything from stair nosings to door casings; and various contraptions for plowing dadoes, grooves and rabbets. A specialized carpenter might even own a compass plane for cutting convex or concave curves and a "galloping jack" plane for smoothing floorboards.

Nowadays, most of these planes are prized more by museum curators and tool collectors than by carpenters. But some types remain as vital on the job site as ever. As an architect/builder who specializes in trim carpentry, I use several kinds, primarily for fitting wood trim or casework against previously installed work, or wherever the use of a power plane or a router is impractical. My favorites are the block plane, the shoulder plane and the butt mortise plane. I also use an assortment of specialty planes (I made some myself) for cutting roundovers and chamfers.

Hand planes are available from woodworker's suppliers, mail-order tool outfits and some hardware stores and lumberyards. But don't expect planes to make smooth cuts straight out of the box. Properly tuned and adjusted, though, they'll cut wood like butter and sing while they work.

Metal block planes. The low-angle block plane (right) excels at shearing end grain. The high-angle block plane (below) is designed for general work. Both are designed for one-handed use.

Block-plane anatomy



The block plane—The typical metal block plane (drawing right) features an adjustable blade housed in a 6-in. to 7-in. long metal body. Mounted bevel-side up, the blade is clamped by a lever cap in two areas; against either one or two milled plateaus or a lateral adjustment lever at the top end of the blade, and against a narrow angled seat at the bottom end. The seat is directly behind the throat (the opening in the sole of the plane through which the blade projects). Depth of cut is controlled by turning a knurled nut or knob at the back of the plane.

Unlike its larger siblings—the jointer plane, the jack plane and the smoothing plane—the block plane is designed for one-handed use and will fit into most tool pouches. These attributes make it the plane of choice for most carpenters. I use mine for trimming miters, fine-tuning the fit of passage doors and flush-mounted cabinet doors, cleaning up jigsaw cuts, fitting cabinets to walls, flush-trimming screw plugs, planing door jambs flush with adjacent walls before installing casings and plenty of other routine tasks.

The planes that most carpenters are familiar with are the Stanley No. 12-020 and No. 12-060 (photo above) and the Record No. 09½ and No. 060½, though similar tools are made by other manufacturers (I own Stanleys). The 12-020 and the 09½ bed the blade at about 20°. The other two bed it at 12°. A low-angle plane is best for planing softwoods, hogging off wood and shearing end grain; a higher-angle plane cuts hardwoods with less tearout. Both types, however, perform so well when properly tuned that it's hard to tell the difference between them except under the most demanding circumstances.

All four of these planes have an adjustable throat, an important feature for preventing tearout—especially when making exceptionally fine cuts. Some block planes don't have an adjustable throat: Don't bother with them.

Body work—For a block plane to work right, its sole must be flat, its blade properly bedded, and the front edge of its throat must be smooth and parallel to the blade's cutting edge. The blade must be sharpened, with its back flat and free of imperfections (for more on sharpening, see sidebar p. 84).

Woodworkers have long debated the wisdom of flattening plane soles. Some argue that planes come flat enough from the factory, but I think a few minutes spent flattening a plane sole can improve performance significantly. Block-plane soles don't *really* have to be flat along their entire length. What matters most is that three areas of the sole contact a flat surface: the throat and both ends. If the throat area is relieved even slightly, the plane performance will be diminished.

Before flattening the sole, retract the blade but don't remove it. This way the plane body is stressed as it would be in use. I flatten the sole by rubbing it on a dry sheet of 600-grit wet-or-dry sandpaper laid on plate glass, being very careful not to rock the plane in the process. You can also use a saw table or a jointer bed instead of glass if you're sure they're flat (they usually aren't). The high areas of the sole will develop a dull, gray color that's easily distinguishable from the low spots. When the throat area and both ends of the sole turn this color, you're done. If at first the throat doesn't touch the sandpaper, I switch to 220-grit sandpaper to speed up the process, then to 320-grit, 400-grit and finally 600-grit paper once the throat makes contact. Finally, I smooth the edges of the sole with a file to remove any burrs or imperfections.

Next, inspect the blade seat to make sure that no burrs or bumps remain from incomplete milling. High spots can be leveled by removing the adjustable throat piece from the plane and flattening the bumps carefully with a fine file. If you don't see any bumps, don't touch the seat: You'll have a tough time restoring it if you mess it up.

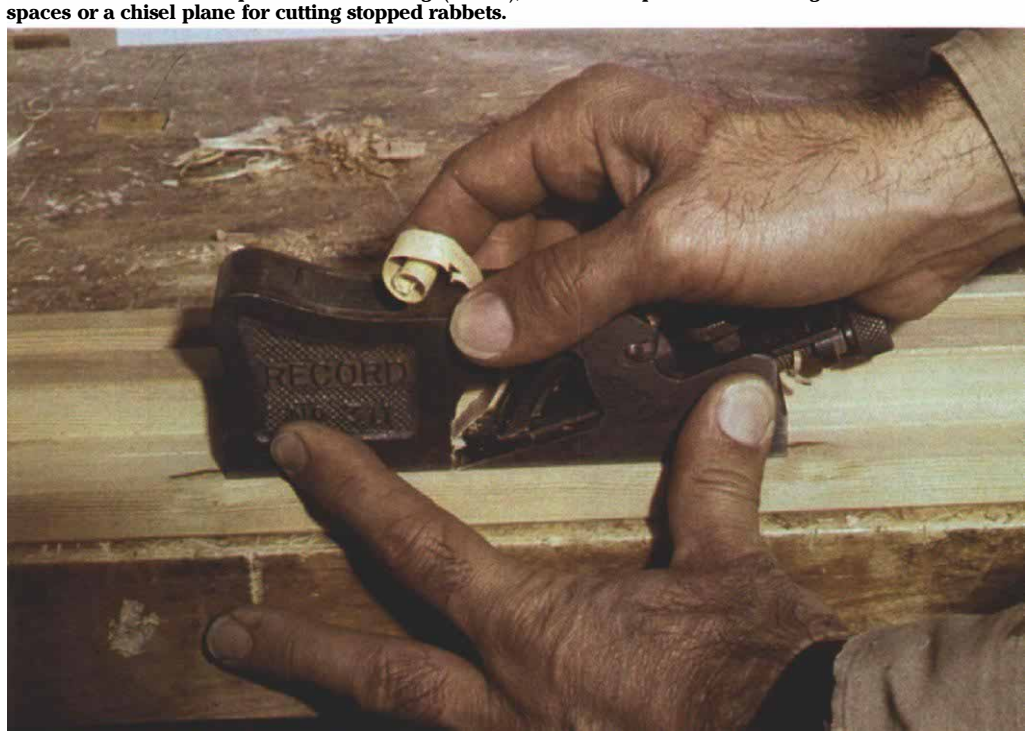
Now mount the blade (and the throat piece if you've removed it) in the plane, sight down the sole and adjust the blade so that it protrudes 1/32 in. or so, with the cutting edge parallel to the sole. Then adjust the throat piece so that it almost touches the cutting edge of the blade. Hold the plane up to a light and sight through the throat to make sure that the cutting edge is parallel to the edge of the throat piece. If it isn't, or if the edge of the throat piece isn't smooth and sharp-edged, remove the throat piece and file it where necessary. The throat edge must be straight and sharp. Do not round the edge of the throat piece, or the edge won't bear effectively on the workpiece to help prevent tearout.

Lastly, if you plan to use the plane with a miter-shooting board (see sidebar, p. 82), use a square to check that the sides of the plane body are relatively flat and are perpendicular to the sole. (If you plan to buy a new plane, check it for square in the store first so that you don't get stuck with a lemon). Carefully file off any high spots on both sides. Now the plane is ready for action.

Using the block plane—To use the block plane, mount the blade bevel up in the body and clamp down the lever cap, making sure that the lever cap's adjusting screw is tight enough to prevent the blade from being pushed around easily (but no tighter or you risk damaging the plane). Next, set the depth of cut and the throat opening according to the work you are doing. Flip the plane over, sight down the sole and adjust the plane so that the entire cutting edge appears at the throat as a black hairline. Now hold up the plane to a light source and adjust the throat piece so that the throat opening (the distance between the throat piece and the blade) is about 1/32 in. for planing hardwoods or 3/64 in. for planing softwoods. To combat tearout, the throat opening should be no wider than the thickness of the shaving. Test your settings by taking a few shavings from a wood scrap. For fine work, the shavings should be straight or rippled and thin enough to read through. If the throat jams, the opening is too narrow or the blade is set too deep. Adjust the plane and try again, repeating the process until you get the shavings you want.

The rabbet plane. **The Stanley No. 12-078 rabbet plane has two blade seats for regular rabbeting (above) or bullnose work. It comes with a cutting spur for cross-grain work, an adjustable fence and a depth gauge. Photo by Vivian Olson.**

The 3-in-1 plane. **The interchangeable nosepieces of the Record No. 311 "3-in-1" plane allow it to be used as a shoulder plane for rabbeting (below), a bullnose plane for working in confined spaces or a chisel plane for cutting stopped rabbets.**



The Japanese block plane. **Designed for maximum control, the author's Japanese block plane features a laminated-steel blade that holds an edge longer than western blades do.**

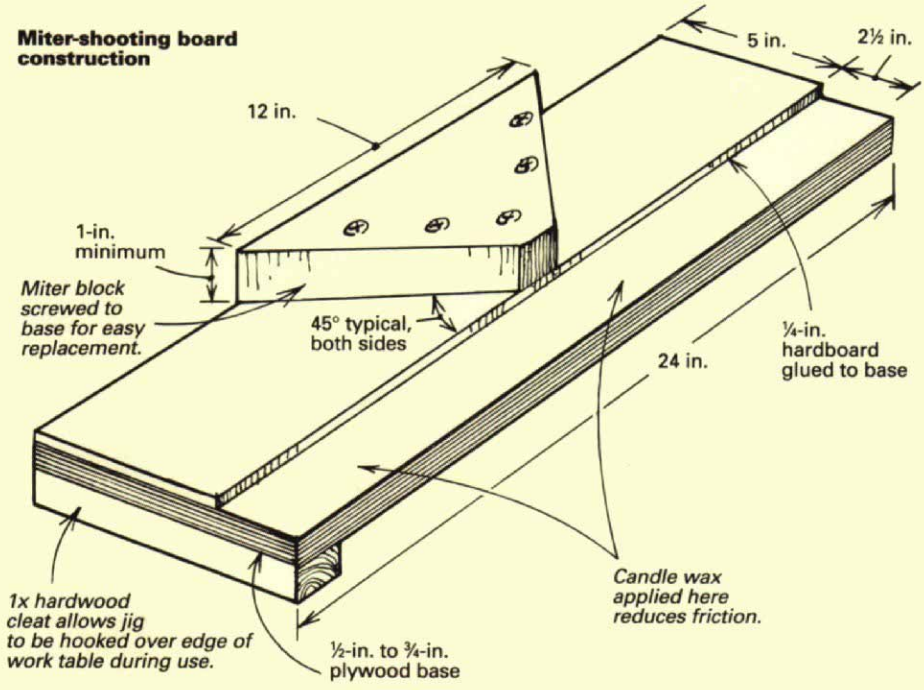
Making a miter-shooting board

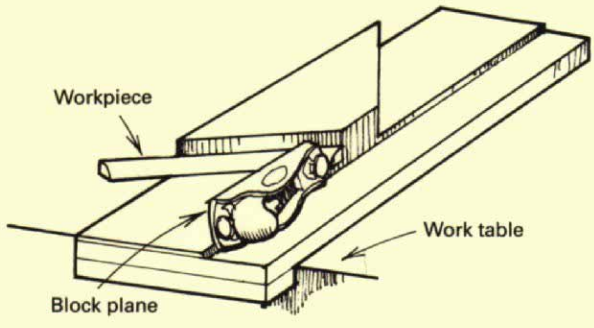
Trimming small, short pieces of wood with a power miter saw is dangerous. A hand miter box won't trim less than a saw kerfs width (if that), and I'm not ready to buy a miter trimmer, a pricey tool that resembles a paper cutter. The solution to this dilemma is very old: the miter-shooting board, also known as a bench hook (drawings below). It's cheap, portable, safe and is less likely than expensive tools to walk away when your back is turned. Better yet, it can be used with a block plane, which lives in most carpenters' and cabinetmakers' tool kits.

I made my shooting board from scraps. The shooting edge should be made out of a durable material (such as ¼-in. tempered hardboard) glued to a ½-in. to ¾-in. thick plywood base. The miter block should be made out of a 1-in. thick composite material, such as particleboard or medium-density fiberboard (cross-grain movement of a solid-wood block would affect its accuracy). I cut the miter block using a power miter saw, then screw it to the base so that the block can be easily replaced if it's damaged or worn. A hardwood cleat is glued to the base so that the shooting board can be hooked over the edge of a worktable during use. I also rub a little candle wax to reduce friction where the plane will contact the board.

Before using the board, make sure your plane's sides are square to the sole. If not, file the sides until they are (mine only needed a touch-up in a few spots). Make sure the blade is sharp, and set it for a very fine cut with the throat open wide (tearout isn't a factor when planing across the grain). Then lay the plane on its side on the shooting board, making sure that it rests flat against the base of the jig and the shooting edge. Move the plane to engage the workpiece and then, with one firm stroke, remove a continuous shaving. Don't rock the plane during the stroke. Also, don't get a running start and crash into the piece, and don't chop at it. If you have to chop, either your blade is set too deep or it needs to be sharpened.

I usually take the board right to the area I'm working on so that I don't have to walk around after every stroke or two to check the fit. Also, with a little practice, you can tilt either end of the workpiece off the miter block to trim the piece for out-of-square conditions. —*S. W.*





The miter-shooting board is used in tandem with a hand plane for fine-tuning miters.

Block planes will also hog off wood. To do this, open the throat about ⅛ in. wide to prevent overheating of the throat piece and the blade. Adjust the blade downward incremently until you get shavings of the desired thickness.

To preserve the cutting edge, don't bang it against the workpiece when beginning a cut, and don't drag the plane backwards along the work surface between strokes. Also, I always set down my planes on their sides, not on their soles.

The Japanese plane—Despite their versatility, my metal block planes have one drawback: limited durability of the cutting edge. Nowadays, there are high-quality aftermarket blades available that hold an edge longer than my stock blades do. One company, Hock Handmade Knives (16650 Mitchell Creek Dr., Fort Bragg, Calif. 95437), offers handmade, high-carbon-steel replacement blades for under $20.

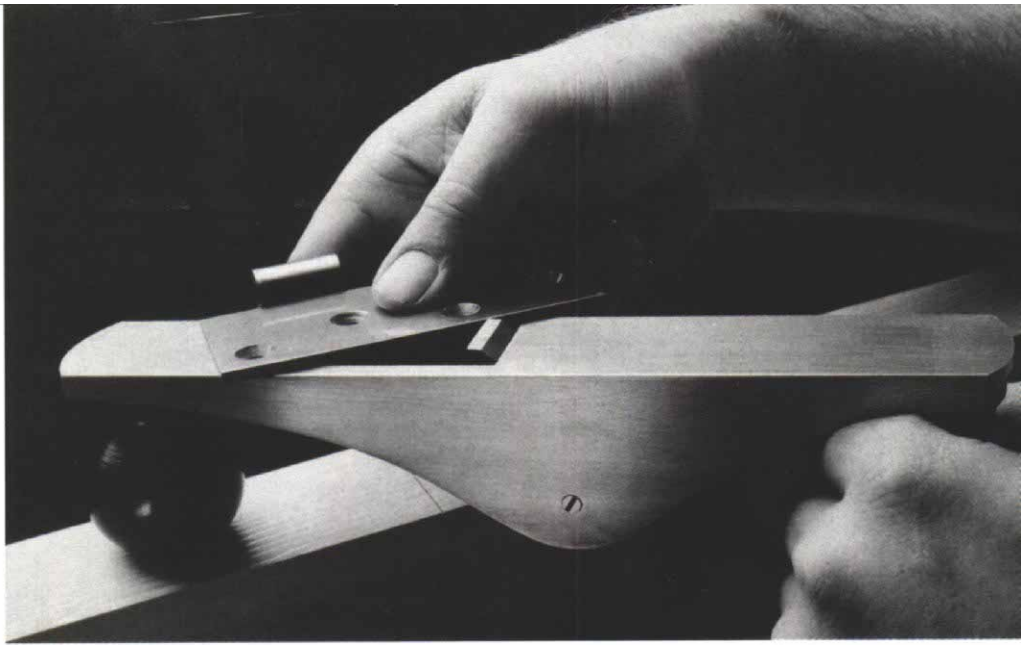
Nevertheless, 16 years ago while searching for an alternative to my quick-dulling metal block planes, I bought a small Japanese plane (bottom photo, p. 81). Designed to be pulled instead of pushed, this plane has a 1¾-in. wide, laminated-steel blade wedged with a laminated-steel chipbreaker into a 7¼-in. long wood body (roughly the same length as my metal block planes). Though I often use my Stanley planes, I actually prefer using my Japanese plane on the job site. That's because it's lighter (I think of this every time I lift my toolbox), it fits comfortably into my small hands and my hip pocket, and it's surprisingly durable, having survived even a 35-ft. fall off a scaffold. Conversely, a short drop to a hard surface can crack an iron casting, usually at the throat, which renders the plane useless. I've also found that the plane's pull stroke gives me more control than the usual push stroke does (though I prefer pushing the plane when hogging off a lot of wood).

But the biggest reason I like the Japanese plane is edge durability. The secret to this durability is the marriage of a thin, extremely hard layer of high-carbon steel to a thick, strong layer of soft steel. The hard steel provides the cutting edge; the soft steel supports it. The cutting edge on my Japanese plane has actually shaved the very tops off nails (though the nail usually wins). I can use the plane all day, sharpen it that night and be ready for the next day,

Like their metal counterparts, Japanese planes must be tuned before use. The principles are similar—the blade must be sharpened and bedded properly, and the bottom must be flat—but the execution is a bit trickier. One excellent source of information on conditioning these planes is *Japanese Woodworking Tools: Their Tradition, Spirit and Use* by Toshio Odate (published by The Taunton Press, Inc.). Another wellspring of information on tuning and using hand planes, including Japanese ones, is *The Best of Fine Woodworking: Bench Tools* (also published by The Taunton Press, Inc.).

Japanese planes like mine cost about $45, comparable to the cost of metal block planes. They're available from a number of suppliers, including Hida Tool and Hardware Company, Inc. (1333 San Pablo Ave., Berkeley, Calif. 94702; 800-443-

Drawings: Scott Wynn



Butt mortise planes. **Author Scott Wynn's butt mortise plane (photo above left) cuts level mortises for hinge leaves and other flush-mounted hardware. Lie-Nielsen Toolworks makes the more common metal version (photo above right). Right photo courtesy of manufacturer.**

5512) and The Japan Woodworker (1731 Clement Ave., Alameda, Calif. 94501; 800-537-7820).

The shoulder plane—Block planes are the workhorses of trim carpentry, but a few other planes are worth having. I carry a shoulder plane for trimming rabbets because, although I rarely use it, sometimes nothing else will do. This is especially true when fitting new work to old. Rabbets are easily cut with a router or a table saw. But all too often new work is plumb or square, and the old work is not, so the rabbet needs a custom taper. This is easily accomplished using a shoulder plane.

My shoulder plane is an old Record No. 311 "3-in-1" plane (middle photo, p. 81). The 3-in-1 designation refers to three configurations accomplished through the use of interchangeable nosepieces. This allows me to install a long nose for shooting straight rabbets, a short nose for bullnose work in restricted areas, or to remove the nose altogether for chisel-planing to the end of stopped rabbets (rabbets that dead-end).

The 3-in-1 plane has become expensive since I bought mine and now costs about $150 (Clifton makes a similarly priced model). If I had to choose an alternative, I'd pick a Record No. 778 or a Stanley No. 12-078 rabbet plane (top photo, p. 81), which sells for about $65 to $75. Though it doesn't have a chisel-plane mode, it has a bullnose mode and a standard rabbeting mode. It also has a cross-grain cutting spur, a depth gauge and an adjustable fence, making it probably more versatile than the 3-in-1 plane. However, it's too large to fit easily into a toolbox, and it usually takes two hands to use, requiring the use of some clamping system to hold down the work.

Shoulder planes are generally machined more accurately than most brands of block planes, so unless you're having performance problems I wouldn't attempt to tune them. Trying to level the sole on a shoulder plane may tilt the sole out of square with the sides, which is a hassle to correct. Likewise, unless the blade obviously does not sit flat, I wouldn't touch the blade seat.

Chamfering and rounding over. **The author's collection of chamfer planes and rounding-over planes includes from left to right: a Radi Plane, which cuts roundovers having radii ranging from 1/16 in. to 1/4 in.; a 1/8-in. radius rounding-over plane; a 1-in. radius rounding-over plane; and an adjustable chamfer plane.**

With these types of planes, it's especially important to sharpen the edge of the blade square with the sides because there is virtually no allowance for lateral adjustment of the blades to compensate for an out-of-square cutting edge. The blade should protrude 1/64 in. or slightly less from either side of the plane body. Otherwise the plane will slowly step out from the shoulder of the rabbet as you plane.

The butt mortise plane—The butt mortise plane is used to cut level mortises for letting in hardware, such as hinge leaves, strike plates and dead bolts. Costing $45, the metal version made by Lie-Nielsen Toolworks, Inc. (Route 1, Warren, Maine 04864; 207-273-2520) resembles a standard plane except that it has a handle at each end, and its throat is wide open (top right photo). I own a rather obscure German wood model (top left photo) that I bought for $10 at a closeout sale. Like a metal plane, its long throat lets the chips pass through and allows you to watch what you're doing. Given the rather rough nature of mortising, there is no need to tune these planes beyond sharpening the blade.

When using my plane, I first lay out the mortise by outlining it with a chisel, then I make successive cuts with the chisel to the approximate depth required. At this point, the chips would normally be cleared out and the mortise leveled with the chisel. But I use the mortising plane. The blade depth is set to the thickness of the hardware (top right photo) and then the plane is pushed over the chisel cuts, popping out the chips much like a router plane. Then the plane blade is passed over the whole mortise again to

remove any high spots. Lastly, the edges of the mortise are squared with the chisel.

The narrow body of this plane allows it to reach confined areas, such as mortises for hinges or strike plates in installed jambs with rabbeted stops. A router is certainly faster for production work, but if you have to cut a variety of mortises, hang a door in an existing opening or install a dead bolt in an existing door, the mortising plane will help speed things up.

Specialty planes—I carry other planes that can be time-savers (bottom photo, p. 83). I have an adjustable Japanese chamfer plane; a rounding-over tool called a Radi Plane (which cuts round-overs having radii ranging from 1/16 in. to 1/4 in.); a small Japanese-style, 1/8-in. radius, rounding-over plane that gives an exceptionally smooth finish; and a similar 1-in. radius rounding-over plane.

The chamfer plane allows me to match the chamfers that I machine in my shop on the edges of deck parts or trim, a boon if I need to produce an extra part on site. The Radi Plane and the small roundover plane duplicate the roundovers produced by some of my router bits, as well as those found on a variety of common moldings. The planes also allow me to match the slightly rounded edges typically found on flat stock. Like the chamfer plane, these planes allow me to avoid fussing with a router when I have to produce a simple edge detail or an extra piece of trim. The 1-in. roundover plane is pretty versatile in shaping a variety of radii that you might find on, say, stair nosings or door casings.

The Radi Plane costs about $22. Adjustable chamfer planes cost about $50. The rest are usually priced somewhere in between. □

Scott Wynn is an architect/contractor in San Francisco, Calif. He also designs and builds furniture. Photos and drawings by the author except where noted.

Sharpening plane blades

I know carpenters who hone their edge tools by rubbing them on two or three progressively finer sheets of soppy wet/dry sandpaper (ranging from 240 grit to 600 grit), taped or tacked to a scrap of plywood. I've heard of others who sharpen on their belt sanders. My sharpening system is more sophisticated than either of these methods, costs more and takes some time to master, but it produces a superb, long-lasting cutting edge that allows me to do top-of-the-line finish work.

Whatever sharpening system you use, I strongly discourage the use of honing guides. Feel the blade resting on its bevel and develop the body mechanics necessary to maintain that angle while sharpening. You may get frustrated at first, but you'll soon learn to get an adequate edge. As your woodworking skills improve, your sharpening skills will, too.

***Sharpening stones*—When it comes to producing a sharp, durable cutting edge with a minimum of effort, sharpening stones beat sandpaper every time. The selection of sharpening stones on the market is overwhelming. Oilstones have for generations been the mainstay in the West. Recently developed ceramic and diamond stones promise to combine many of the attributes of other types of stones with few of the drawbacks. For serious sharpening, though, I use Japanese water stones. Though they wear faster than other types of stones and must be flattened frequently, they cut very fast and produce an incomparable cutting edge.**

Both synthetic and natural water stones are available. Synthetic water stones are less expensive and less fragile than natural water stones, but good-quality natural stones produce sharper and longer-lasting edges than the synthetic ones do. I use synthetic 1200-grit and 6000-grit water stones to sharpen American and European plane blades. For Japanese blades, I use the 1200-grit stone, an intermediate natural stone called an "Aoto Toishi" (or blue stone) and a deluxe 8000-grit synthetic finishing stone. On the job site, I use a diamond stone to touch up all my blades so that I don't have to deal with water.

Whatever stones you use, buy the best that you can afford. This is especially important for finishing stones, where price does equal quality. My water stones range in price from about $15 for the course stones to $50 for the fine ones. My fine-grit diamond stone cost $56. Most fine-woodworking suppliers carry a full line of sharpening equipment, including Japanese water stones. I got mine from The Japan Woodworker and Hida Tools (see addresses in text).

***Grinders*—Though you can get by without a grinder, if you use edge tools a lot you'll eventually want one. The two most common types are the bench grinder and the water-stone grinder. Bench grinders work okay, but you have to be very careful with them or they'll overheat the blade and draw its temper, destroying the blade's ability to hold a cutting edge. Bench grinders also hollow-grind the cutting edge, which leaves less metal on the blade than a flat bevel does for supporting the cutting edge. Japanese blades need a flat bevel because their hard, brittle steel at the edge requires the support of the softer, shock-absorbing steel laminated to it. However, any cutting edge subjected to hard use will benefit from a flat bevel.**

The water-stone grinder (photo below) overcomes all of the shortcomings of the bench grinder. Water-cooled, it never overheats the blade. And because the revolving water stone is flat, you don't end up with a hollow grind. The water-stone grinder is ideal for beveling nicked or damaged blades. Its only drawback is that the rotating water stone wears out of flat quickly, requiring frequent trueing (I do this using my diamond stone). Water-stone grinders cost up to $300, but the ones I've seen will handle everything from chisels to planer knives.

The water-stone grinder. **Water-stone grinders hone chipped blades quickly. An attached reservoir continuously dribbles water onto the rotating stone to eliminate the risk of overheating the blade.**

***The work area*—Successful sharpening also depends on the nature of the tool-sharpening station itself. If you sharpen at a workbench, the stone should be 4 in. to 5 in. below your belly button. Unfortunately, the typical 3-ft. high bench is much too high for the average person. If the stone is too high, your wrist and elbows will be overly bent, and you'll have trouble maintaining a constant bevel on a blade. Also, your arms will do all the work without any help from your body weight.**

I was taught to sharpen on the floor. Kneeling on a pad is pretty comfortable and often brings respite to a back tired from standing for long periods. The floor may be your only alternative on the job site, anyway. If you sharpen on the floor, elevate the stones about 6 in. Mine sit on a homemade redwood water trough (bottom photos, facing page), but yon can also use a scrap of 6x6.

Whatever surface you work on, mount stops on it so that the stones don't move around during use, or use one of the manufactured systems that hold and store stones. You can keep synthetic water stones in a lidded plastic tub filled with water so that they'll be ready to go. Don't, however, store natural water stones in water or they'll disintegrate. They also may crack when frozen, even if they're dry.

***Flattening the back*—The first step in sharpening a new blade is to flatten and polish the back. Don't worry about polishing the entire back, however, just at minimum a narrow flat along the cutting edge (top left photo, facing page). I usually accomplish**

this using a steel lapping plate and silicon-carbide abrasive powders.

To use a lapping plate, pour ¼ teaspoon of 220-grit abrasive powder oil the center of the plate and moisten the powder with a few drops of water (photo 1 below). Lay the blade backside down on the plate, perpendicular to the length of the steel, and rub the blade back and forth. Try to work all of the powder, including the piles that form at each end of the plate. The powder will eventually get very dry and fine, and the high spots on the back of the blade will start to get shiny (as opposed to the dull gray finish elsewhere). Continue rubbing until all of the silicon carbide is a fine paste (you may have to add a few drops of water now and then) and the back has a mirror polish along the entire cutting edge. Maintain even pressure at all times, and be careful not to lift the blade and round the edge. Backing up the blade with a stick helps (photo 2 below).

If the back of the blade is reasonably flat to begin with, I substitute a diamond stone, a 1200-grit water stone and a 6000-grit water stone for the lapping plate. The water stones must be dead flat, though. If a gray oval or large dot appears in the center of the stone while rubbing the blade on it, the stone needs flattening.

On the bevel—Now sharpen the bevel. Soak all but the finish water stones in advance until they stop bubbling (this takes just a few minutes). Sprinkle just enough water on the finish stones to create a slurry during sharpening.

To sharpen, grip the blade between the thumb and forefinger of the right hand (if you are right-handed), wrapping the other three fingers underneath the blade for support (photo 3 below). Holding the bevel flat on the 1200-grit water stone, press down on the edge of the blade with one or two fingers of the left hand and move the blade up and down the full length of the stone, gradually working from left to right and back as you stroke. Ideally, the cutting edge should be perpendicular to the length of the stone; in practice, it's easier to hold the edge diagonally. Keep the stone wet but not flooded. As you stroke, bend your arms and wrists to maintain the blade at the proper angle.

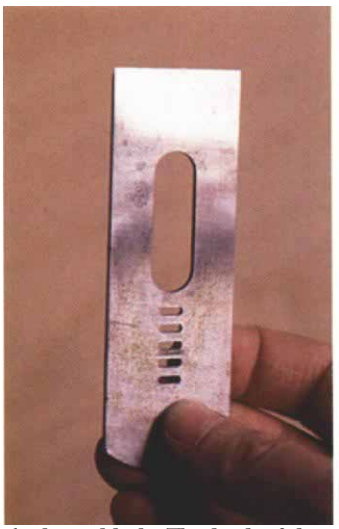
Check your progress by holding up the bevel to a light. The honed portion will be shinier than the unhoned portion. Also, check for a burr by brushing your finger away from the cutting edge. Once the bevel reflects light evenly (photo far right) and you can feel a burr along the entire width of the blade, move on to the blue stone (if you're using one) or to your finish stone. Don't exert as much pressure on these stones as you did on the 1200-grit stone; they polish more with the slurry formed than by direct contact with the stone. On the finish stone, back off (remove) the burr by laying the blade flat on the stone and rubbing it back and forth (photo 4 below). Then flip the blade over and polish the bevel. Alternate between the bevel and the back, shortening the number of strokes per turn until you finish with two or three light strokes on each side. There's no need to polish the edge further with a strop or a buffer.

A 30° bevel works best for most planing. This angle is easy to gauge: The length of the bevel is twice the thickness of the blade. If you're planing softwoods, a 25° bevel will cut cleaner and easier. Some people like to hone a secondary 5° microbevel on the cutting edge. I think this is self-defeating because the microbevel increases friction at the cutting edge and shortens its life. Besides, after the second or third sharpening, a microbevel becomes a macrobevel that requires nearly as much effort to sharpen as a full bevel.

Try to create a convex curve across the width of the blade while honing. This feathers the cut, eliminating steps or ridges across the surface. The curvature of the edge should be virtually indiscernable, equaling the thickness of the shaving you expect the plane to make. This way the blade will cut across its full width for maximum efficiency. An easy way to achieve curvature is by alternately applying pressure on one corner of the blade and then the other while sharpening.

While sharpening, check your water stones from time to time to make sure they're fiat. One way to flatten them is to rub them on wet 220-grit or 320-grit wet-or-dry sandpaper laid on a flat surface (such as plate glass laid on a jointer table so that the glass doesn't flex). This technique tends to glaze the stones, however, reducing the cutting action until the top particles are worn away. I prefer to flatten my water stones with a diamond stone; it's quick and doesn't glaze the surface.

Before using the water-stone grinder, I saturate it with water. I don't use the bevel guide on the grinder. Instead, I simply feel the bevel, grinding perpendicular to the edge and moving the blade from side to side to wear the water stone evenly. Be careful that the grinder doesn't grab the blade and throw it, particularly when you first set the blade down. I don't use this grinder to flatten the backs of blades because it grinds too fast and may gouge the blade. —*S. W.*



A sharp blade. The back of the well-tuned blade (above, left) is flat and polished along its entire cutting edge. The bevel (above, right) is honed to a mirror finish. Photos by Bruce Greenlaw.

1. Preparing a lapping plate.

2. Flattening the blade back.

3. Honing the bevel.

4. Backing off.