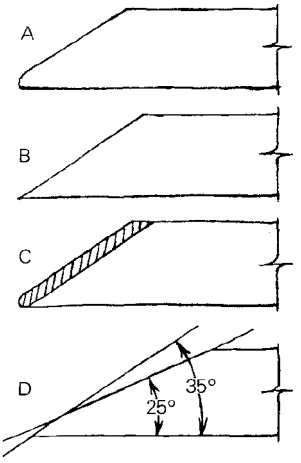
How to Sharpen

A keen edge makes all the difference

by Ian J. Kirby

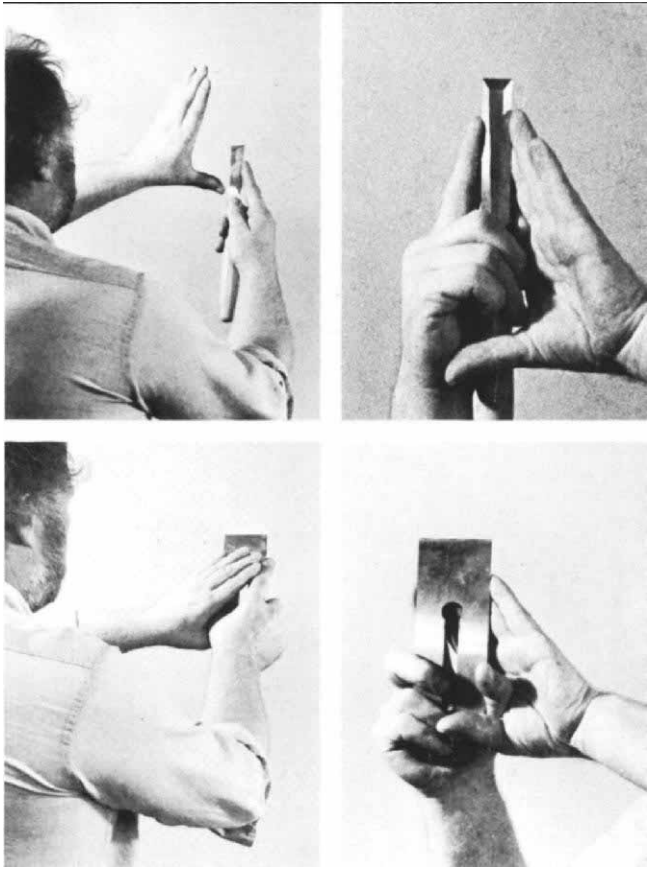
Putting the cutting edge on a chisel or plane iron causes confusion, doubt and fear in many beginning woodworkers. Yet once the tool's edge has been ground (to the appropriate angle and square to its long edges), sharpening takes only about one minute. A sharp tool is the difference between despair and delight—you need to sharpen often and without any fuss. After sharpening, a plane not only feels different as it cuts, it also sounds different—when it's blunt it cuts with a dull and heavy tone, but when it's sharp it sings.

What is it we have to do by sharpening? The diagram below shows a magnified section through a blade. The rounded edge at A is blunt; B, with the surfaces meeting at a straight line, is sharp. If we remove metal in the shaded area (C), we will have a sharp edge. But if we first grind the tool to a 25° angle and then sharpen to a 35° angle, we can accomplish the same thing more efficiently by removing a very tiny amount of metal (D). The grind can be hollow or flat; it matters little. What does matter is the 35° sharpening angle. The amount of metal we have to remove is measured in angstroms—at most, a few thousandths of an inch. In order to sharpen the blade, there is really very little work to do.



The important considerations in learning how to sharpen are how to hold the tool, how and where to stand, and how to use your body to move the tool over the stone. The photos at right give these answers. One of the things we have to achieve is controlled pressure across the cutting edge; the other necessary control is maintaining the constant angle between blade and stone. The grip shown in the photos provides both of these controls. With either chisel or plane iron, the index fingers of both hands are on top of the tool. Pressure can be exerted uniformly, or on one side of the blade or on the other side— whatever the tool requires. Angular control also comes from this two-hand grip, from the wrists, and subsequently from the shoulders, but the key to it is the thumb of the left hand. It acts as a fulcrum or back rest, and with the hand spread this way it is easy to keep the left thumb solidly locked in position. You find the angle in the first place by feeling for the grinding bevel, or by checking against a block of wood cut to 35°. Then, the left hand becomes a very sensitive jig.

What kind of stone is best? The type of stone you use is a matter of preference. You really need only two stones, a medium and a fine, provided you have some other way of grinding the edge (and if not, a coarse stone and some elbow grease will do it). They can be either oilstones or waterstones, although it's unwise to have one of each. The function of the



For chisels or plane irons, the sharpening grip is the same. Grasp the blade in the right hand, far enough forward to plant the index finger atop the edge (above left). This hand holds the iron and provides both power and pressure. Then make an L of the left hand, place the fingers atop the blade, and the thumb underneath (above right). This hand holds the angle, and also provides controlled pressure. This grip thus allows you to maintain and control both angle and pressure. Most left-handers find they can adopt this grip without reversing hands. Stand with your feet apart, parallel to the edge of the sharpening bench but far enough away to throw your shoulders forward, knees flexed slightly (photo below). Lock your wrists to maintain the sharpening angle as you move the iron forward and back on the stone. A wooden angle block, shown on table, can be used to check your position.

The main difference between sharpening a chisel and a plane iron is the pressure applied to the tool. The hand position, as shown in the two photos at right, is basically the same, Bear down hard on the wide iron, varying the pressure from left to right every few strokes, to round the edge slightly. Maintain constant, light pressure on a narrow tool. Here, Kirby uses a Japanese waterstone, kept wet by squirts from a plant sprayer.

lubricant is to keep the edge of the tool cool, to smooth the sharpening action, and to float away metal and stone debris, thereby helping to prevent plugging or glazing of the stone's abrasive surface. If you have oilstones, the type of oil is also a matter of preference. A light machine oil such as 3-in-1 is good. Motor oil cut with kerosene is popular, and straight kerosene is suitable on a fine stone.

The bench or shelf on which you keep your sharpening stones is a vital element of the workshop. It should be sturdy and built for the job. The surface should be easy to clean—Formica is ideal. There should be a cover over the whole thing or else covers for the individual stones, to protect them from dust, which clogs them and destroys their cutting action. Choose a bench height to suit your own body—34 in. is a good place to start. The stones should be mounted with their long ends at right angles to the front of the bench, and held firmly in place between small blocks fastened to the bench. When planning the bench, don't forget that you need about 10 in. to the right of each stone to clear the tool handle when backing off. Keeping stones in a toolbox is not good practice because sharpening is too important and too frequent an operation to be hindered by having to dig them out and set up some temporary work station. It's also bad to spill dirty water or oil on your workbench.

How much pressure to exert? The pressure varies with the blade you are sharpening—the wider the iron, the more pressure. With a 2⅝-in. plane iron, apply almost as much pressure as you can deliver, while still being able to move. With a ¼-in. chisel, apply very little pressure. The ¼-in. chisel is probably the most difficult tool to sharpen while retaining the right-angularity of the edge, and the usual fault is too much pressure. With narrow tools, you must take care to move around on the surface of the stone as you sharpen, to keep from wearing a groove in it. Some people avoid this problem by turning the stone on its edge.

Should the tool be held askew to the long edges of the stone? If the blade is narrower than the stone, you should keep the edge at right angles to the edge of the stone and to its direction of travel. In this way you will have to consider and practice a uniform grip and stance, and you will be more likely to get uniform results. Wear on the stone will be more even, and sharpening time will be minimized. When sharpening a plane iron that is wider than the stone, it's common to sharpen aslant, so the whole edge is on the stone. However, because plane irons are usually sharpened with a very slight curve, more pressure is exerted on the left side of the iron for a half-dozen strokes, then on the right for a half-dozen strokes.

How long a stroke do I take? Learn to use the whole length of the stone, reversing direction an inch or so from each end. This keeps the stone flatter and speeds the process along. Maintain the pressure in both directions, forward and back.

How do I know when to stop? If you visualize what you arc trying to do, you'll realize that once you've removed the face of metal that includes the rounded portion, then the edge is sharp. However, you can't know when this has been achieved, so you go a bit beyond. The effect is that the unsupported metal at the very tip of the edge collapses and bends over—a burr or wire edge forms. When you can feel the burr by running your thumb off the flat side (back) of the blade, it's time to stop. Now, turn the blade over flat on the stone and remove the burr by "backing off." No matter what, keep the back of the tool flat on the stone. If you lift the tool to an angle to remove the burr, you've changed the sharpening angle. Correcting the fault wastes both time and metal.

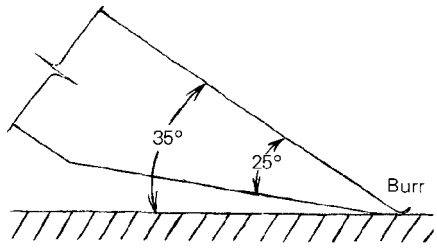
Backing off should be done only on the fine stone. The sequence of events, if all goes well, is this: Sharpen on a medium stone at a 35° angle until you just detect the burr, go to the fine stone and sharpen at 35° until you have polished out the scratches left by the medium stone, turn the blade over and back off. Don't back off on the medium stone before going to the fine stone, it's an unnecessary step. The back of the chisel or plane iron should touch only your finest stone.

There is no need to raise a huge burr, although it's possible to sharpen to the point where, as you back off, a visible wire of metal detaches itself. This may look impressive but actually you've removed about five sharpenings worth of metal, shortening the life of the grinding angle. You should expect to get 20 or 25 sharpenings between grindings, the first taking the fewest strokes, the second a few more, and so on.

What if, after backing off, the burr is now on the beveled (face) side? It frequently happens that way, and you simply turn the tool over, take a few light strokes, then back off again. You must persevere until, when running the thumb off either side of the blade, no burr can be felt.

How do I know the blade is sharp? There are two simple ways. A 10-power or 15-power hand-lens should be part of every woodworker's tool kit. A look through the lens at this stage is dramatic. What you thought to be a smooth surface turns out to be something like the surface of a worn phonograph record. With x 15 magnification you'll be able to see

Sharpen at a 35° angle (right) until you detect a burr. Turn the tool over and back off on a fine stone. When backing off, the iron must lie flat on the stone (as shown at left and above). Use the fingers of both hands to press it down evenly.



whether the edge is a clear intersection between the sharpening angle and the back side of the blade. The other way to check is to feel that there is no burr on either side of the blade, then to offer the tool very carefully and gently to your thumbnail, as shown in the photograph below. The lower the angle you can achieve between thumbnail and sharpened edge, the sharper it is. This may seem dangerous but it has plenty of historic precedent: Silversmiths and engravers use the method to check the edge on gravers, and metal-lathe operators frequently employ it too. If you're still uneasy about pointing a sharp edge at your cuticle, set your thumbnail vertically on the bench and approach from the knuckle side.

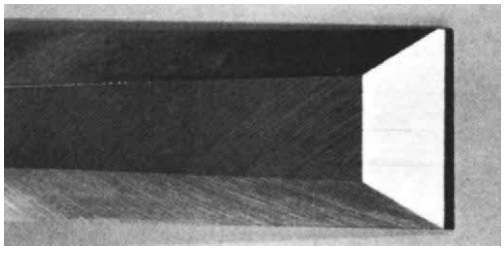
If you are shopping for stones, I'd suggest a medium India (a man-made stone) from a reputable firm like Norton or Carborundum. For the fine stone, a soft or hard Arkansas *(FWW #12,* Sept. '78, p. 68-71). It's best if both stones are the same size and not too small—9 in. by 2½ in. is ample. If a large Arkansas is too expensive, get the largest you can afford. These two stones will last the rest of your life.

Japanese waterstones are gaining popularity. Although the edge produced by an Arkansas oilstone has long been a standard of sharpness, I find the waterstone to be even better—another level of quality that's really quite extraordinary. Japanese waterstones come with instructions for care and maintenance; they're used the same way as oilstones, and again, a medium and a fine stone are all you require.

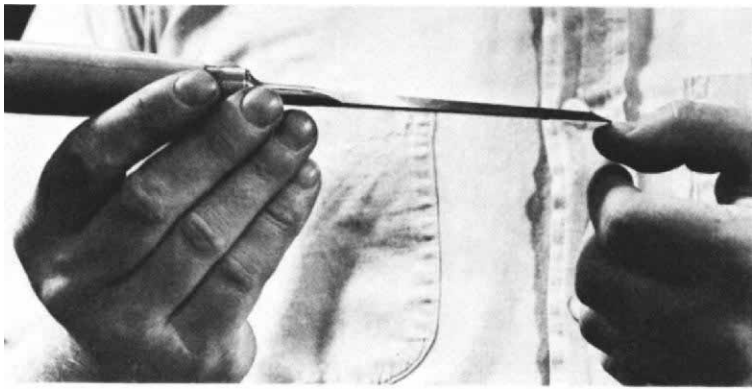
Whatever the stone, unless it's kept flat in its length and its width, it's of little use. To check, clean and dry the stone by pressing it into a paper towel, then hold it to the light against a straightedge, just as you would check a piece of wood. If the length shows a hollow of 1/32 in. or more, or if you see any hollowing in the width, it's time to flatten.

Flattening a waterstone is simple. Place a piece of plate glass about 20 in. square on a flat surface. On it put a piece of 220-grit wet/dry sandpaper. Flood the paper and the stone with water, and grind the stone on the paper using as much of the paper's area as you can. Wash the stone and paper often by dipping them into a bucket of water, and dry the stone before you check it with a straightedge.

To flatten an oilstone, use a different piece of plate glass in a similar way. Sprinkle about ¼ cup of 80-grit carborundum powder (available from lapidary shops) onto the center of the glass, and pour about ¼ cup of water into the grit. Grind the stone in a circular motion, using as much of the glass area as



At left, the sharp edge. Find out how sharp by gently offering the blade to your thumbnail, below. The lower the angle at which it will catch, the sharper it is. At right, the sharpening bench in Kirby's shop is sturdy and easy to clean.



you can. Keep heavy pressure on the stone as you grind. It's easiest to flatten your coarser stone first, while the grit is cutting fastest; a fine Arkansas can take a long time to flatten, especially if it's been allowed to become much hollowed. To check the stone, scrape off the grit slurry, wash the stone, dry by pressing into a paper towel and test with a straightedge. After flattening a dozen stones, you'll probably notice the glass becoming hollow. Get a new piece of glass.

Problem tools. The spokeshave is awkward to sharpen because of its short blade. You can do it by holding it in your fingers but a better way is to make a wooden block about 5 in. by 2 in. by ¾ in. Saw a kerf in the end so that the spokeshave blade can be inserted about an inch into the block. You'll be able to exert ample pressure and still keep good control.

Carving tools can be sorted into three types: flat chisels, gouges and veining tools. Flat chisels are sharpened like bench chisels but on both sides. Thus to keep the same 35° angle you'd have to shoot for 17° 30' on each side, practically impossible. Since carving is such a variable process, just sharpen on one side until a burr is raised and then sharpen from the other side. A carving chisel usually has to be sharpened more often than a bench chisel.

The carving gouge is held the same way as a bench chisel but people often move it in a figure eight across the stone, rolling it as they go, to sharpen each part of the edge. A disadvantage of this method is that wear in the center of the stone is double, and it's soon hollowed. I find it better to work in a straight line along one edge of the stone, or with the stone turned up on edge, rolling the gouge to reach its whole edge. Once a burr has been raised on the inside, you'll need a slipstone to deal with it. Slipstones are usually small and handheld, not mounted. They're made in a variety of shapes, from flat like a miniature oilstone to cylindrical to conical with a conical hollow on the back side. The conical sort is most common, but cylinders are more useful, although you'll need a variety of cylinders to fit a variety of gouges. Most carvers collect them over the years, the same way they collect gouges. Choose a slip of smaller radius than the gouge, and work it flat on the inside face of the gouge to remove the burr.

An in-cannel gouge is a special problem calling for a cylindrical stone of its exact radius. Brace the butt of the gouge on the bench and work the slip in and out, rotating it at the same time, and maintaining the 35° angle with the tool's back. Then backing off can be done on a normal flat stone.

V-tools and veiners are similar to flat chisels, and most of the trouble comes on the inside, where the two faces meet. First sharpen both outside faces on a flat stone in the usual way, but then to remove the burr from the inside you'll need a stone shaped to an angle that will reach the bottom of the V. Usually a small slip can be ground to the necessary angle.

Many carvers avoid the problem by buffing their tools on a cloth wheel charged with rouge or tripoli. This will produce an extremely sharp edge, but it's haphazard and offers little control of angle. It's also difficult to shape a wheel so it will fit inside a gouge or V-tool. This lack of control usually does not matter to the carver, but the cabinetmaker needs precise angular control and an absolutely flat back, and for these reasons I advise against buffing. It's cheaper, easier and better to learn how to sharpen on flat stones.

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