



## A small shop with big ideas

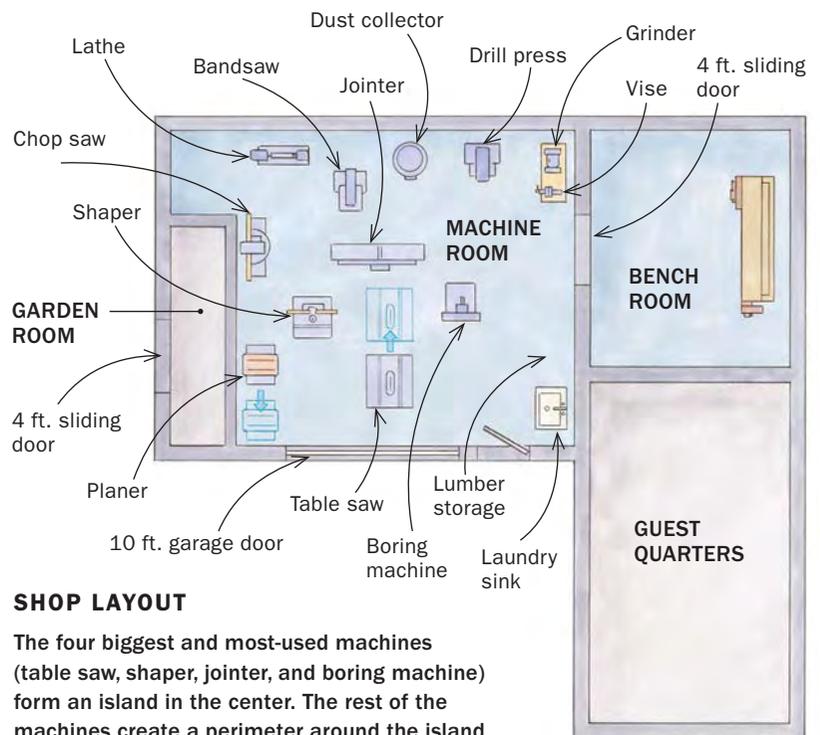
BY DAVID WELTER

After 30 years working at the College of the Redwoods, when the time came to build a shop of my own, I drew upon details in the shop designed for James Krenov's Fine Woodworking program. Most salient were a cathedral ceiling, windows high on the wall, skylights, and separate machine and bench rooms. I wanted lots of light, more than enough electrical outlets, and good enough storage space. In the end, I have gotten everything I could want and more—even a place to display my collection of eggbeater drills, a wonderful example of a simple machine.

Mine is not a large shop; the machine room is 360 sq. ft., and the bench room is 154 sq. ft. And my layout will not meet the needs of all. But whatever the size of your shop, its efficiency will be enhanced if motion and effort are minimized, and options maximized.

### A hand-me-down bench

When Jim Krenov came to the conclusion that he could no longer work in his home shop, he called me, saying "someone's got to take this stuff away before I hurt



### SHOP LAYOUT

The four biggest and most-used machines (table saw, shaper, jointer, and boring machine) form an island in the center. The rest of the machines create a perimeter around the island.

# At the bench

The epicenter of Welter's shop is the bench room, and its centerpiece is James Krenov's old bench. Heat and light radiate from the space. The walking surface is soft and user friendly. Insulated-and-glass pocket doors separate it from the machine room, keeping sound and dust out. Welter's collection of eggbeater drills lines the wall above the bench.



**Big enough.** Just over 150 sq. ft. with high ceilings and lots of windows, the bench room has enough space for a large bench, storage cabinets, lots of light, and open floor space for gluing up larger pieces and working on pieces in progress. The floors are gentle on the body, poured concrete with multiple layers of plywood on top and vinyl flooring tops it off.

myself. Will you use the bench? I don't want it to be a museum piece." I was dumbfounded, both at the thought of the end of a great career and the fact that I would be the recipient.

I intended to use the bench unmodified. But I had trouble surfacing my work on it, and I found that the benchtop was crowned across its width and sagging along its length. I figured that if I was to keep my promise to use the bench, Jim would forgive me for flattening it. After I did so, evidence of his many years of use remained visible on the edges and the vises.

## These floors were made for walkin'

A wooden floor was another feature I desired. It would be easier on the feet and dropped tools and would allow me to rout wiring and ductwork where needed. However, I had to consider the utility of the building. The next owner might wish to use the machine room as a garage, so I decided the shop would be built on a concrete slab. The machine room would stay as concrete. The surface of the concrete poured in the bench room is lower than in the machine room, and the difference is made up with two layers of floating  $\frac{3}{4}$ -in. tongue-and-groove plywood, screwed together, a layer of  $\frac{1}{4}$ -in. birch plywood, and vinyl flooring.



**Accessible plane rack.** A slanted rack right by the bench makes it easy to reach frequently used planes and return them after use.



**Bench upgrades.** Trough covers, level with the bench's surface, provide easy-access storage. Long ago, James Krenov installed holders for rasps and files on the front of the bench (below). It's easy to see the one you want and grab it.



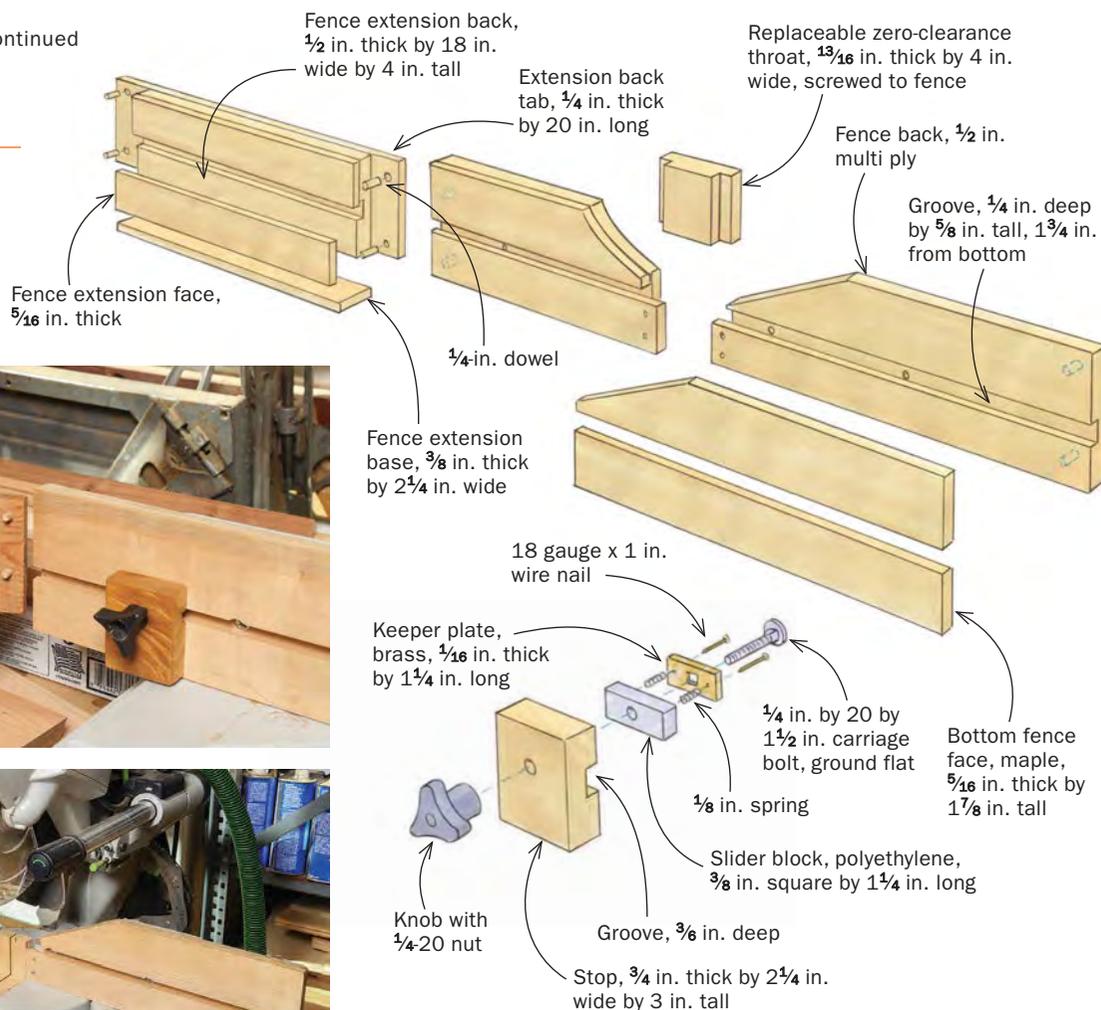
**Custom tool boxes.** Welter makes custom boxes for hand tools that are special or seldom used. He tailors the size of the box and the cradles inside to the specific tool, and stores the boxes on a shelf.

## Chopsaw is vital

Welter uses his chopsaw to make critical final crosscuts. He invested in a quality machine, a Festool sliding compound miter saw, and decked it out with a shopmade fence.



**Stationary fence with extension.** An auxiliary fence with a replaceable zero-clearance throat piece and a groove for an adjustable stop are the foundation for straight, square, repeatable cuts, without tearout. The removable extension fence locks onto either end of the stationary fence via dowels. It also has a ledge on the bottom to support the workpiece at the same height as the saw's table.



### Light and heat

Though the temperature only occasionally gets below freezing on the idyllic Mendocino Coast, I overinsulated the walls, ceilings, and floors. An 80,000 BTU gas-fired heater in the bench room provides all of the heat for the building. Once the shop space is warmed, it stays warmed. Even with the heat off overnight, the shop is significantly warmer than the outside temperature in the morning. The insulation has its impact also on the warmest days of late summer, when the relative coolness of the shop is welcoming. Keeping heat in the bench room and dust in the machine room are reasons I decided to separate those areas. A custom made 4-ft.-wide insulated-and-glass pocket door divides the two rooms.

Natural light is key in my shop. I installed awning windows, opening inward at the top, on the east wall of the machine room and the south wall of the bench room. The bench room's west wall, with the garage door, had limited potential for light, so I placed skylights on the west ceiling. The bench room has a skylight in its south-facing roof. A tall east-facing sliding window adds interior bench room light. I've spent many hours in the shop without turning on overhead lights.

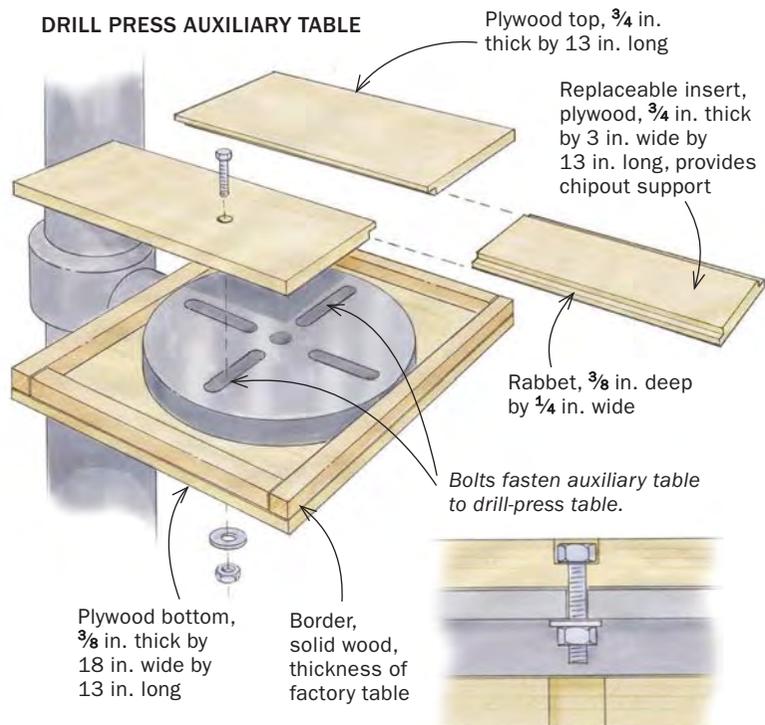
### Electric overload

In my conversations with others about their shops, no one said they had too many electrical outlets. Though I had planned equipment placement with scaled footprints of the machines,

# Drill-press table

Whether you have a benchtop drill press or a floor-standing model, building Welter's auxiliary table is an immediate upgrade. Welter has a radial drill press, so he designed the zero-clearance insert to slide front to back. On a standard drill press, the insert could slide side to side.

## DRILL PRESS AUXILIARY TABLE



I knew there might be some shuffling. To my contractor's consternation, I requested 110-volt outlets every couple of feet, alternating them between 16 in. and 48 in. off the floor. In places that might some day be bench areas, high outlets are four-ganged. Spare 220-volt outlets are scattered around. Before pouring the concrete, we ran wiring for a 220-volt and two 110-volt boxes near the center of the machine room floor.

## Create a layout that leaves options

Rather than putting every machine against a wall, I have an island of four machines near the center of the shop. The placement of outlets in the floor has allowed me to change island machine locations three times in as many years.

My bandsaw gets used more than any other machine. Since every bandsawn surface must be trued, I want the jointer nearby. After jointing and rough cutting, the planer comes into use; it is handy for those machines to be close together.

I'd thought of getting a SawStop table saw, but it would take up a significant footprint. The most critical cuts in my work are crosscuts; I think those can be done most accurately with a sliding compound miter saw, so I invested in a quality machine. And I mounted the solid 8-in. vintage table saw I'd been using for 35 years onto a mobile base. I've been satisfied with the flexibility that afforded.

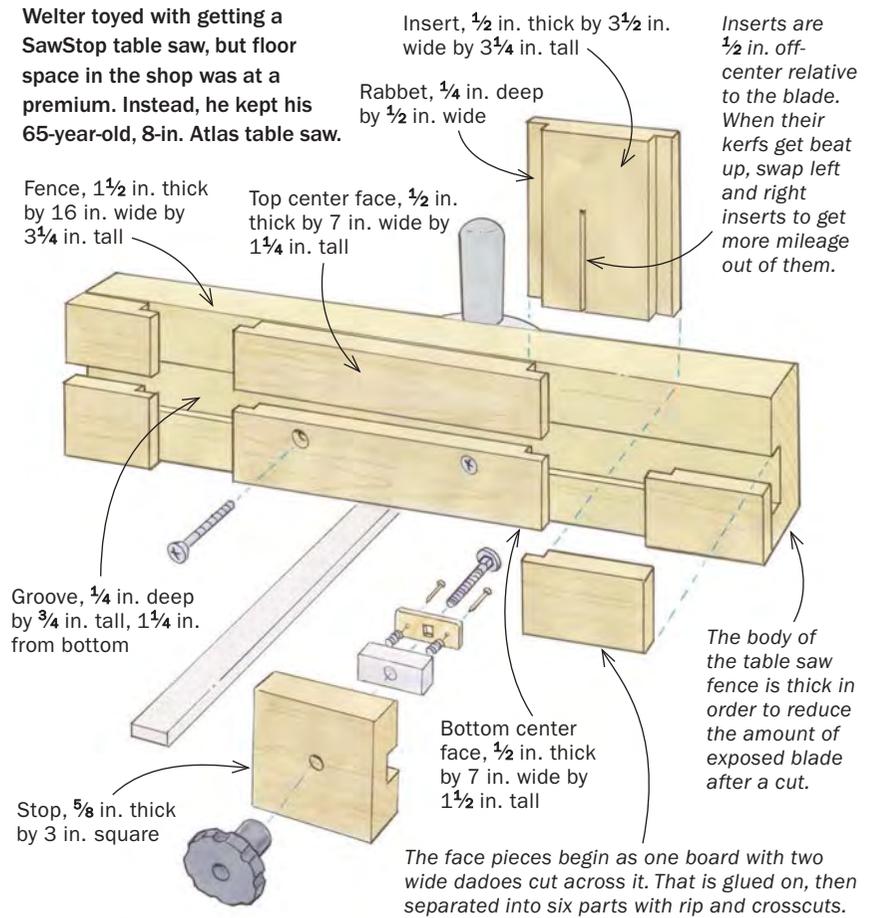
A central dust collection system with yards of quick-fit ducting was a fantasy that went by the boards. I came to the financially

**Surround the factory table.** Welter built an auxiliary table that wraps around the drill-press table. This means he always has a flat surface to clamp to underneath. When the insert under the drill bits gets chewed up, he can slide it out and put in a new one rather than replacing the entire table (top photo). Welter also built a two-tier accessory table (above) that straddles the drill press's column; it is easily moved if greater depth is needed.

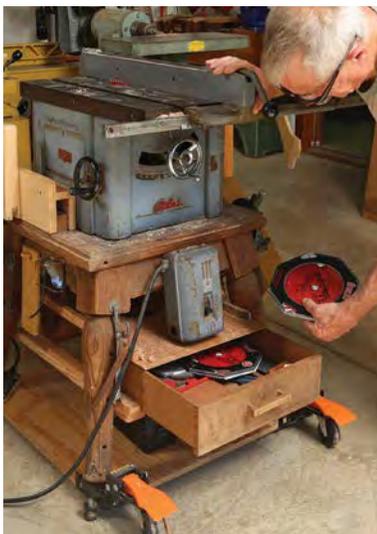


## A vintage table saw makes do

Welter toyed with getting a SawStop table saw, but floor space in the shop was at a premium. Instead, he kept his 65-year-old, 8-in. Atlas table saw.



**A mobile base with storage.** Welter mounted his vintage 8-in. Atlas saw to a shopmade mobile base. A drawer underneath the saw holds blades, wrenches, and push sticks. A plywood enclosure is added on to the back to aid in dust collection. And the shopmade fence attaches to the miter gauge.



**Versatile auxiliary fence.** The shopmade add-on to the saw's miter gauge prevents tearout by backing up the cut with a replaceable insert. It also has an easily adjustable stop. A simple ramp held against the fence aids in crosscutting angles.

## Max out your router or shaper table

Bit storage, dust collection, and a fence that would make any router table or shaper a higher functioning machine.



**Dust be gone.** The shopmade fence has—you guessed it—a replaceable, zero-clearance insert. It makes for safer and cleaner cuts and also helps control dust and shavings, which pass into a shopmade dust hood. The dust hose plugs into a port in the back of the hood.

### Keep your bits close.

A bit rack on the router table keeps you from having to walk across the shop for bits. Drill the holes completely through, then drive nails into the board so one crosses each hole near its bottom. The nail supports the bit but lets dust and shavings fall through instead of collecting at the bottom of the hole.



sound conclusion that combined with the portable extractor I've had for some time, I could bear moving a hose between machines from a smaller wall-mounted cyclone.

To accommodate various wall-hung items, all of the interior walls in the bench room and two in the machine room are sheathed in ½-in. plywood. A short machine room wall has 12-in.-wide nailers between the studs, centered at 5 ft. high.

As to lumber storage, most of my large planks are stored vertically. I store timber 4 ft. long and shorter in my loft area.

### Minimize steps, maximize efficiency

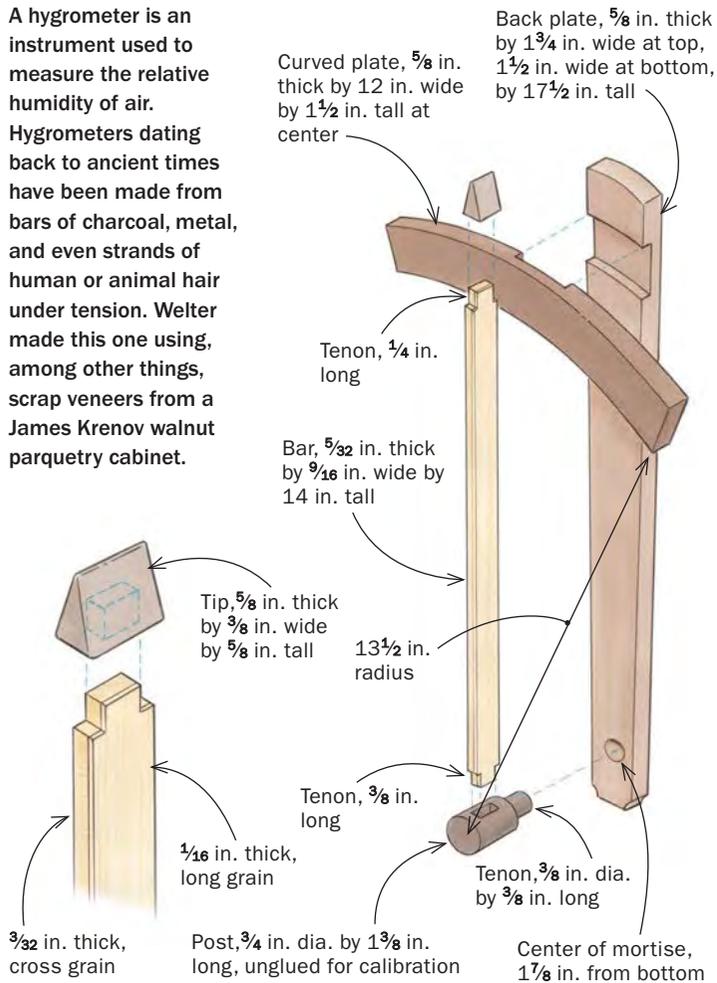
The principle of minimizing steps suggests you keep most-used items within reach in the areas where they are most needed. A shelf above my bench has a plane-adjusting hammer, small squares, an awl, a knife, a couple of

screwdrivers, a tape measure, and a folding rule. A variety of planes occupy a rack near the opposite end of the bench. Hand clamps hang on an adjacent wall. A tool cabinet contains less-used tools, and there is also a commercially made mechanic's rolling tool chest.

Drill bits are mounted in a rack on the wall next to the drill press, and a rack for router bits is attached to the shaper table. The rack holes are slightly bigger than the bits. With the rack's shelves mounted at 20°, the bits tilt forward, more visible and easier to grab. I hang spare wrenches near each machine, so I don't have to remember to put a wrench back into the toolbox or look for a missing tool. (I don't know anybody who claims their memory has improved with age.) I hang a few dedicated small clamps by the drill press and bandsaw, and I have a bench brush hanging on either end of the machine room.

## Homemade hygrometer

A hygrometer is an instrument used to measure the relative humidity of air. Hygrometers dating back to ancient times have been made from bars of charcoal, metal, and even strands of human or animal hair under tension. Welter made this one using, among other things, scrap veneers from a James Krenov walnut parquetry cabinet.



**1:37 p.m.** At this time, the dehumidifier was turned off and the shop doors opened. The increments of the scale are arbitrary. The joints are about  $\frac{1}{2}$  in. apart. The post is not glued in place, which allows calibration when compared to a real instrument. The cross-grained, flatsawn element of the pointer should be of a wood that reacts dramatically to moisture changes. The thinner element of the pointer is long-grained, which won't change much with moisture differences; the cross-grained piece can react wildly.



**3:44 p.m. and 7:22 p.m.** If you've ever doubted the humidity of the Mendocino Coast, the proof is in this hygrometer. Since turning off the dehumidifier, you can see the needle steadily moving toward the hygrometer's maximum humidity reading.

### Minimize maintenance, maximize output

Another way to maximize the efficiency of your shop is to minimize maintenance. The most basic form of maintenance is keeping the shop clean. I keep the floor open by hanging accessories on the wall and storing parts on shelves. Mounting some equipment on wheels is a necessity in a small shop, and that mobility also facilitates sweeping.

My sharpening area is a dedicated stainless-steel-topped surface located under the sliding window. As with a pair of shelves across the way, the surface is supported with brackets rather than legs, freeing floor space to make sweeping easier.

### The all-important humidity calculator

Once I had my new shop all set up, I had a little free time. With not much else going on, I goofed around making a hygrometer, its needle made with air-dried holly. Not a requirement in every shop, but fun to make. □

David Welter is enjoying retirement in his California shop.