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WORKSPACE

A workshop need not be large and fancy. I've always preferred small spaces for myself because they're easier to keep neat and clean, and I feel more comfortable in them. Large bare surfaces that aren't required have a way of collecting things that don't belong on them. There's a natural tendency to let things go, and I've been in several big shops where the workmen were working on violins in their laps because there was no open space on the bench in front of them! Consequently, in my own shops I've stressed closed storage over surface, and when open space has been necessary, as much as possible it's been dedicated space, set up for the intended task. Small sets of enclosed shelves for pieces of work in process, rather than just laying them out on available open territory are an example. This is safer than leaving things out in the open, anyway.

Big power tools don't have much of a place in violin making, not because of tradition, but because of the scale of the work. Most professional makers use a band saw and drill press, and the methods I use require them, but even those tools aren't absolutely necessary.

Beyond that, access to a table saw is sometimes handy (the only time I use it in the course of violin making is sawing out ribs from blocks of wood), but a jointer or planer, or other common woodshop large power tools will find little or no use. I use my drill press for only three things which can easily be done by hand, and a bow saw, or even a coping saw, can substitute for almost everything the band saw does. An electric hand drill is useful, more in the shop than directly on violins, and I inlay purfling using a flex-shaft router, but doing that by hand is not particularly difficult, and not a particularly onerous task. If possible, it's best to have a separate room for the big power tools, to keep the dust they generate out of your working space, as well as help maintain a quiet, neat atmosphere around the bench.

What is most necessary is a good firm bench with a real full-sized woodworker's vise, and lighting. It doesn't need to be large—just four or five feet long, and wide enough for a cello to fit comfortably. The easiest way to make a bench is to glue together two two-by-four foot sheets of 3/4" particle board (clamp them together for gluing with yellow carpenter's glue by screwing them together with 1-1/4" drywall screws), and on top of that, a sheet of 1/4" tempered Masonite or dressy plywood (glued to the particle board with stacks of boxes, etc., as clamps). This should be fastened directly to a wall on at

least one edge, which will negate the need to make a heavy or sturdy base, and it can be supported by two legs in front. A normal height for a bench top is about 34-1/2 inches—the height to the knob on your wrist when your arm is at your side is a good guide. Solid wood edging dresses things up, and if you make the front piece easily removable, you will be able to use it as a backstop for drilling, cutting, etc, and then easily replace it when it's too mangled to use. Since most of the wear is in the center of the front, I use a separate short piece in front of the edging so that I don't have to replace long unworn stretches when the middle is ruined.

If something with more class suits your taste, a maple butcherblock countertop is inexpensive and well suited to benchtops. My benchtop is a two by five foot section of this, supported on two base cabinets I made myself, with shallow drawers that are suited to small tools. My bench top is bolted to the wall behind and is solid as a rock, even though it's not fastened to the base cabinets, which are only screwed to the floor with a couple of screws to keep them from sliding around.

Mount the vise towards the front of the right end, and screw (not glue) on the replaceable front edging of oak or maple (this will get chopped up in the course of normal use and will have to be replaced every couple of years; a careful workman won't cut the top of the bench, nor spill anything on it, but I don't know anyone like that). The vise will not only be used for holding wood, but is also used for holding a number of special jigs and tools. I clamp my bending iron in it, the jig I use to hold tops and backs while working on them, my graduation punch, and my fingerboard jig. In addition, I have a small iron shop vise mounted on a 6-inch cube of wood which I clamp in the bench vise when I want to use it.

The woodworking vise should be shimmed downwards so the the metal jaw that attaches to be bench is very slightly below bench level—say, two millimeters or so. Both jaws should be faced with hardwood, and this can come up to bench level—after they're in place, just close the vise and plane them level. If your vise doesn't tilt the jaws inwards at the top, you can plane the wood facings slightly tapered, so that the top edge closes first. This will give a better grip on flat pieces of wood, because as you tighten the vise more and more, more of the jaws will grip. If you start with the two faces flat to each other, the top edge will progressively open under the clamping force, and all of the clamping will be at the bottom of the wood.

Think of the bench vise as a universal mounting place for anything, and give yourself lots of room to work around it. It's mounted on the right end of the bench so that you can add stops down the length of the bench in line with the elevating stop in the vise. If you are left-handed and use gouges in your left hand, consider putting the vise at your left. This will give you more access to work all around what's in the vise, around the corner and behind and will put you in the right relationship to long pieces you may be planing on the top of the bench, against the bench stops (they're more stable than planing towards the

vise itself).

The final touch to my bench is a two-by-two bar that crosses the open space (fastened at each end to the sides of my base cabinets) under the bench where my feet go. This bar is located beneath the bench top exactly the distance that when I place the ball of my right foot on the bar and raise my heel a bit, my knee is pressed against the underside of the benchtop. If I lower my heel, I can slide in a rough top or back, or anything else, and clamp it to the underside of the top with my knee, with the part I want to work on projecting out in front from under the edge of the top. I use this as a quick clamp for a number of tasks.

Along the length of the bench a few holes should be drilled for bench dogs. The setback of these should match the location of the dog in the loose jaw of the vise, and the distance between them should be less than the adjustment range of the vise by at least an inch or two. Before drilling the holes, install the vise, and decide on the material for the dogs, and buy or make the dogs. I use round metal ones sold by tool suppliers. These have a spring in their sides to hold them in the hole rather than slipping through, but something similar can be made of wood, if necessary. Don't use the type pop-up bench stop that fits into a pocket carved into the bench—it won't be strong enough. This series of bench holes permits you to clamp pieces of wood as long as the bench plus the vise extension. I also have a wood plug that I use as a stop sometimes when carving plates on my benchtop instead of in my special plate holder—for violas and small instruments, for instance.

Choose the location for your bench carefully. In each shop I've set up, I've spent an hour or two just sitting in the room imagining various layouts, trying to think out just the right space for everything, and I haven't had to move a single thing later. The bench should be convenient to tool storage and have enough clear space around the vise to work at a bit more than arm's length, but a window is not a necessity. Since a lot of wood chips will be generated, the immediate area around the bench should be easy to keep clean, which precludes having a lot of loose stuff around the bench at lower levels on open shelving or on the floor.

If you want to go overboard with your bench, I recommend Taunton Press' book, *The Workbench*. The benches in it are inspiring and, for violin makers, unnecessary, but you can glean lots of great ideas there from seeing what others have done regarding the bench problem.

Many makers prefer to work near a small window, or with a desk lamp because seeing shadows and contours is very necessary: too much light, or light from multiple directions, is actually a disadvantage. In my shop I have two swing arm drafting table lights mounted near opposite back corners so I can place them exactly as I wish, and my window shades

are closed almost all the time. You can screw the lamps' mounting blocks right to the top of your bench wherever you want them, but make sure they're not so close to the back that you can't swing the lamps around when they're partially collapsed. You may eventually find that you'd like a few other temporary light locations, and quick mounting locations can be had by drilling holes in the bench for the lights, but you'll find that this is not really a good long term solution for permanent lights, for various reasons.

I've always found it nice to have a shelf behind the back of my bench for some things I regularly use—handy, but out of the way: varnish and glue, notebooks, my small CD player, a gram balance, and similar things (including a whole host of things that get used once a year, wood chips, dust, unlabeled half-filled anonymous bottles with forgotten contents, and general mess). Many of my long, thin tools—spatulas, brushes, reamers, rules, my soundpost setters, etc.—are stored there in cups and jars. Formerly, I made this shelf as a skirt on the back of my bench, about a foot deep. In view of the mess that collected there, in the current version this skirt is deep enough for only one row of containers to hold my most-used tools, and now I've got closed cabinets from Ikea above the back of my bench, high enough not to interfere with anything on the bench.

Other accessories will come to mind as you need them—cabinets and drawers for tools and supplies; a broom and dustpan, and bench brush; a high shop chair. I have the drawers in my bench for storage, but small tools can be put in a machinist's chest, in shallow drawers nearby, or hung on the wall—this aspect is so personal, I won't try to make a recommendation.

For many years, when I had a large bench with more top space in someone else's shop, I used a metal machinist's chest, and it was ideal. Another shop was so narrow that I had pegboard on the wall behind me, and even when seated it was easy to turn around and pick something off the wall. If you have to share your space with family, though, you might want to put your tools away, rather than leaving them out in sight, to discourage having them used to open paint cans, etc. The fewer things left out in the open, the easier it is to clean, too. Be aware, if you like wood chests, that their drawers are shallower inside than the metal variety, more drawers are too shallow, and space utilization is inefficient. All of my tools fit in a 20" metal chest, but they would not fit in a 20" wood one. Kennedy makes nice metal chests, and they're not too expensive for their utility.

I commented above on the lack of need for a window. Though restorers value neutral north lighting, especially for color work and retouching, many violin makers choose to work with little or no window light. Some like one nearby window with the shade only opened a bit at the bottom. The reason for this is the difficulty of seeing contours in things like violin arching when there is too much directionless light. You wouldn't think of it, but carving a scroll is very difficult because it's all a bright uniform color. Directional light helps a lot. For some of this work, the best light is a single desk lamp,

brought close to the bench surface, so its light skims the work from the side.

Also, the position of a window is important. Directly behind the bench, in front of you, is not a problem, but a window on the side should be carefully chosen so that the workman's dominant hand doesn't shade what he's working on (usually that means the window should be on the left for a right-handed person). The most difficult space to work in is a room with a lot of windows on all sides, with lots of bright light, and no shadows. Conveniently for many, a modern, dry basement is technically ideal on many counts, especially lighting and climate control, if you can stand the darkness and isolation and make the surroundings friendly enough.