Measuring Antiques

Educated guesses fill in the gaps

by Dick Burrows

In colonial times, furniture making was both a highly refined art and a farmhouse necessity. In the larger coastal cities craftsmen, trained in rigid European apprenticeships, produced stunning pieces for the wealthy and status-conscious. Meanwhile, numerous country craftsmen were turning native lumber into practical, yet elegant, family furnishings. Ironically, the best examples of both styles have become classics, creating a seemingly insatiable demand for historical and construction notes on vintage pieces.

Since few cabinetmakers managed to preserve their construction drawings or to take notes, you usually must rely on the furniture itself to show how the old guys did it. Museums and private collections abound with fine 17th- to 19th-century pieces, and are, in effect, living libraries of plans. Carlyle Lynch, cabinetmaker and retired teacher, has devoted years to measuring furniture at places like Old Sturbridge Village in Massachusetts, Old Salem and the Museum of Early Southern Decorative Arts (MESDA) in North Carolina. Although I've never been an aficionado of the old ways, I found Lynch's enthusiasm for period furniture infectious.

While he insists that there are no magic tricks to measuring furniture, there's more to it than poking around with a ruler. Before you can do it right, you need to learn how boards were surfaced, how joints were cut and how furniture was built in the days when hand tools were the *only* tools. Otherwise, you'll never grasp what's hidden by veneers, moldings and thick layers of yellowed finishes.

Analyzing antiques is part detective work, some guesswork and much careful measurement. Lynch finds a 6-in, sliding rule good for measuring small pieces like drawers and as a caliper to gauge thicknesses. The 16-drawer mahogany case he's examining is one of the jewels hidden in Duncan Phyfe's tool chest.

Surprisingly, if your skills at reassuring nervous owners are as good as Lynch's, you can examine many pieces. As you trace the delicate carvings with your fingertips and examine centuries-old joints for telltale marking lines and tool marks, the maker and his art come alive. For me, that was the best part of working with Lynch when he measured Duncan Phyfe's personal tool box (the results are shown in the drawing on page 54) at the New York Historical Society and two pieces at MESDA. Before you begin work, make sure the owners of the piece clearly understand what you want to do and how you plan to do it. Some old pieces may be too fragile to be moved or handled much. One owner might let you remove and trace an escutcheon, while another will ask you to leave for just suggesting you want to remove any hardware.

To avoid missing any vital details, Lynch works systematically. He starts with overall dimensions, measuring each major component in turn—sides, top, back, front—then works down to each joint, curve and angle, carving, molding and turning. He sketches each piece, measures it, then marks the measurements on his sketch. Then he remeasures it, By measuring everything twice, you ensure accuracy and the odds are you won't overlook an important detail twice.

When we measured the toolbox used by Phyfe when he was the darling of trendy New York in the early 19th century, Lynch began with a general appraisal of the large, dovetailed pine chest. The chest is painted brown and is as drab as Phyfe's furniture is elegant, although the box's interior is a woodworker's delight of chisels with pewter ferrules, finely set planes and exquisitely shaped saw handles. After removing some of the tools and the chest's sliding inner cabinet, Lynch made one rough, box-like sketch showing the front and side view and another showing the top view. He prefers to make freehand perspective drawings to record his measurements, but any sketch will do as long as you can decipher your notes and match the right measurements to the right part. Lynch strives to be accurate to within $\frac{1}{32}$ in.

He began measuring on the right side. Holding a *zig-zag* carpenter's rule on the outside of the chest, he measured the depth and height of the end. Then he determined how the side was fastened to the top, bottom, front and back, and noted these details on his sketch. Since the box corners are dovetailed, he measured the pins to find the thickness of the back and front pieces. By inserting the rule inside the chest along the same end, he obtained the inside dimension of the end and verified that it, plus the width of the front and back pieces, equaled the outside

Lynch prefers a folding carpenter's rule, left, because it won't snap back as a steel tape might. Holding his bevel gauge handle parallel to the chest corner, he angles its tongue to match the dovetails, above. He records the angle with a protractor. For something as irregular as this tavern table leg, he uses a simple pen holder to trace contours. The Plexiglas edge of the wooden upright is set directly over the angled pen. As you run the plastic along the piece, the pen records the contour on paper on the instrument's base.

dimension. He also measured the interior height of the box and located the chest bottom on his drawing. Then he made notes of the size, shape and location of hinges, pulls and handles. All the joints were visible and easily identified, but larger carcases can be more complex.

Lynch takes most of his measurements with his carpenter's rule (photo above, left) or a small 6-in. wood-and-brass sliding rule. Both easily extend across or into a carcase, and they can't snap back and scratch a piece the way a metal tape measure can. Metal tapes are handy, however, if you have to flex a rule into a very tight corner. In addition to the two rules, his measuring kit, which is compact enough to fit into a regular briefcase, includes a flashlight and an angled mirror (much like an oversized dentist's mirror) for peering into dark corners; several soft pencils; 10-in. dividers and several sizes of calipers; metal contour gauge; a Plexiglas contour tracer (photo above, right); plumb bob for measuring chair angles; a clipboard with note paper and tracing paper; bevel gauge and protractor; small screwdriver; a thin, flexible palette knife for probing inside joints; and a large sheet of cardboard (mat board or backing board) to protect a piece if you want to turn it on its side.

When he was a beginner, Lynch also brought a detailed checklist of crucial measurements. He would prepare the list at home, based on his cabinetmaking work and studies of period furniture, then fill it in step-by-step when he saw the piece. Now he's experienced enough to rely on a mental checklist, but the written version is good training for neophytes. *

Forgetting a significant dimension can be a problem if the piece is miles from your home, or is sold to owners who don't want a stranger poking through their furniture. Sometimes Lynch can entice an owner to check a dimension or refresh his memory about certain details, but a better memory check comes from his camera. He always photographs the overall piece and its details with 1000 ASA daylight color film.

Whenever possible, he also backs up his measurements by tracing details or making a rubbing of distinctive features, like dovetails. For example, you can use your clipboard to hold paper upside down over the top of a carcase and trace the corner. Or, you could put the board under a leg and trace the shape of a ball-and-claw foot. Mark the measurements on each tracing.

To make a rubbing, put a piece of paper over the object, then use the side of a soft lead pencil to rub over the paper (soft pencils are better than pens for all your work—a pen might smudge or leave a permanent stain). Rubbings are ideal backgrounds for sketching-in details or recording measurements. On the Phyfe chest, Lynch made rubbings of the dovetails, then gauged the angles of the pins and tails with his bevel gauge and protractor. A bevel gauge is good for measuring most angles, but for something like a sloping chair back, he uses a plumb bob. You can, for example, plot the angle of the back by dropping the plumb line from the highest center point of the back, then measuring the distances between the bob's vertical line and the back of the seat rail.

To record the shape of the tool chest's hand-forged handles, Lynch cut two long notches into a sheet of paper so it would slide over the handles and lie flat on the metal backing plate, then made another rubbing. Next, he sketched in the details of the handle and added measurements. Sometimes he unscrews smaller hinges, escutcheons and other hardware, then traces them, but that's not always permitted.

After measuring the back, front, bottom and top in the same meticulous way he did the sides, he concentrated on the chest's special features, like the saw rack fastened to the inside of the lid and the removable set of drawers that fits inside the chest. Since the saw case couldn't be removed from the lid, he had to probe with the saw blades and a bevel gauge tongue to determine the construction of the case. He inserted the probe as far as he could, then measured the penetration. By comparing this measurement with the outside dimensions, he figured the thickness of the walls and the location of interior partitions.

Until we had examined the mahogany drawers in the small cabinet, we had underestimated Phyfe's pride. In most of the chest, the dovetails are fairly large and evenly spaced, but Phyfe had glued 3 in. of solid mahogany to the pine, and dovetails there were tiny and close together. We guessed initially that Phyfe used

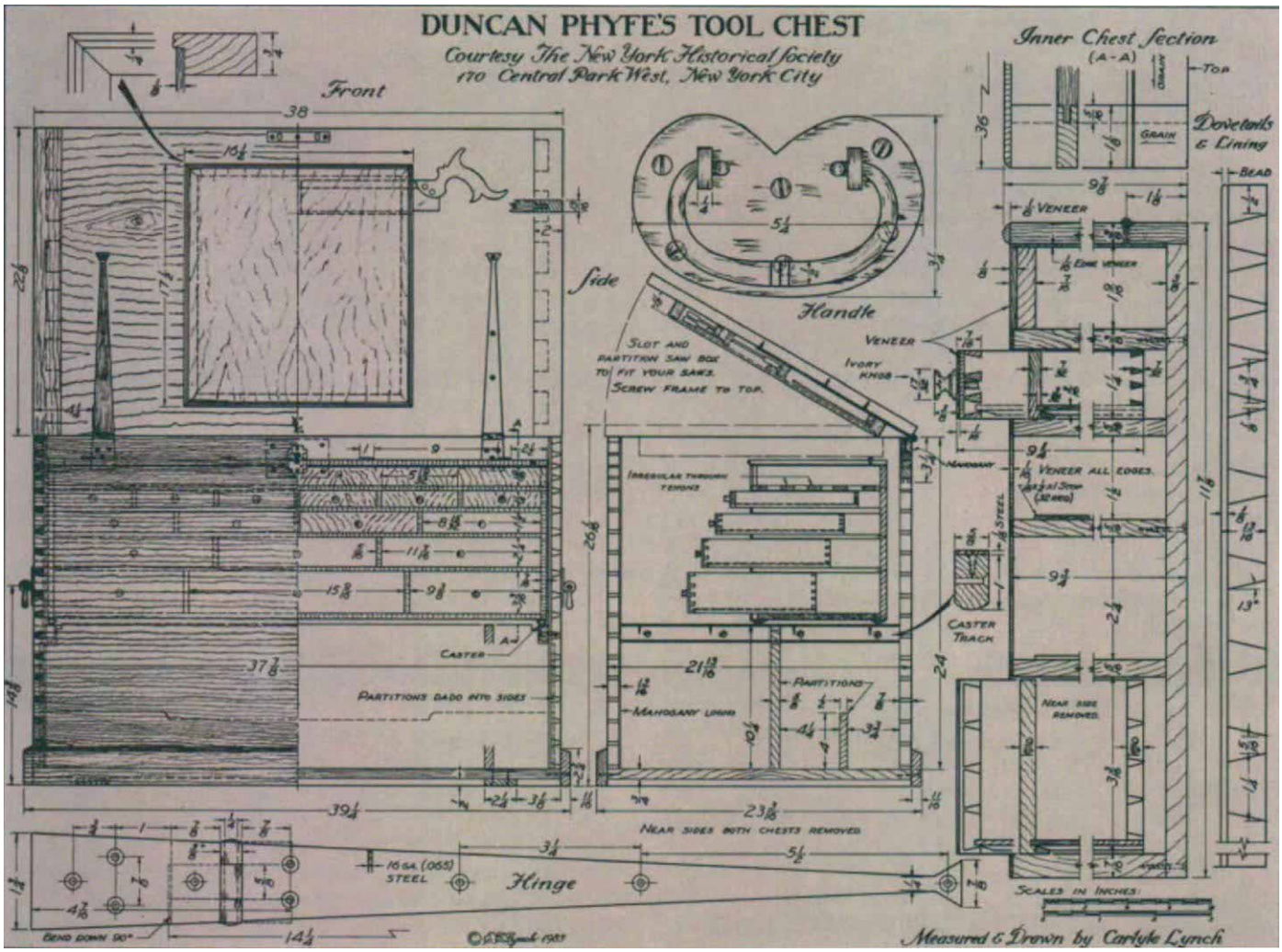
the mahogany to strengthen the hinges, then cut fine dovetails in the stronger hardwood and larger ones in the weaker pine.

After examining the case's 16 solid mahogany drawers with their turned ivory pulls, we changed our minds. The drawers had delicate dovetails, with pins tapering to less than 1/16 in. Even on something as mundane as a tool box, Phyfe apparently couldn't resist showing off his skill and added the dovetails for a decorative effect. Of course, that's just a guess, but guessing is part of the fun—it's almost a game that the original makers encourage. Those old guys prided themselves on having all kinds of tricks, many of them unknown to us, and it often seems as if they intentionally left false trails to befuddle those who followed.

While Lynch measures each piece in the same way that he did the tool chest, large carcases are more difficult because of their complex joints, moldings, veneer and decorative carvings. When we measured a Chippendale four-drawer chest at MESDA, for example, we couldn't figure out how the top was attached to the base. We suspected the sides were slip dovetailed to the top, a common technique in Charleston, S.C., where this piece was built, but we couldn't verify it. The joint was invisible, stopped before reaching the top's front edge and hidden at the rear by the case back. Lynch tried to insert a thin knife into the joint, hoping to feel a tenon, nail or dovetail, but the joint was too tight. We couldn't find any sign of a telltale pencil, knife or marking-gauge line that might indicate the kind of joint the maker cut. In cases like this, the owners of the piece may be valuable resources, if they have ever repaired the piece or obtained letters or order forms pertaining to it. We learned that the top had been repaired and a sliding dovetail noted. If you can't find any clues from the owners, you can check other contemporary pieces and come up with an educated guess.

The chest held another mystery. On the dust shelf under the top drawer we found a dovetail groove—its only purpose seemed to be to confuse us. Again, we put ourselves in the old cabinetmaker's boots. In the days before electric thickness planers, we probably wouldn't throw out a surfaced piece either, just because of a miscut groove in a part that wouldn't show. But you wonder if that's the real explanation.

Lynch used several sizes of calipers to measure the width of molding and the thickness of the sides. Since the stiles made it impossible to measure the sides directly, he put his folded carpenter's rule behind the stile against the side and used large calipers to measure both the side and ruler. After measuring the caliper opening, he subtracted the width of the rule to get the thickness of the piece. He used 10-in. dividers to straddle small corner blocks where his ruler wouldn't fit, then measured the distance between points. To record molding profiles, he used a finger-type contour gauge, which looks like a band holding hundreds of tiny, sliding metal strips. When the gauge is gently pushed straight down over the molding cross section, the con-



Compiling a materials list

by Jeff O'Hearn

One of the best ways to begin most cabinetry jobs is to invest a little time in studying your construction drawings and compiling a materials list. By sizing each part before you begin work, you'll save time and lumber because you'll be able to cut everything at once. Preparing these lists improves your mind's eye, too—you'll become more adept at dissecting furniture, analyzing joinery and visualizing assembly procedures.

Even though materials lists are fussy, time-consuming work, I've always found they are worth the trouble unless the work is curvilinear or involves many angles in its layout. Your best bet here is to make a full-size drawing on the floor to verify the dimensions, then build directly from the drawing.

For rectilinear work a clearly drawn elevation or front view is a good starting point for developing materials lists, but the most important drawings arc the sections drawings, which are imaginery slices through the elevation. You can do most of your figuring with two section drawings—a vertical section showing the front and back faces, and a horizontal section showing what the object looks like from above or below. Drawings of complex pieces may have separate sections wherever the overall profile of the interior parts change.

Organize your materials list in a chart like the one shown above, right. Start anywhere, choose a part, give it a name and call it number one. Is it a vertical or horizontal part? Your vertical section drawing will 'cut through' a part which is on a horizontal plane, and vice versa. For example, you can see the bottom panel of a cabinet in a vertical section. Generally, dimensions are listed in the order thickness/width/length. It's up to you whether you call the depth of the bottom panel the length or the width on your chart.

No.	Pcs.	Part	T	W	L	Material	Machining
1	1	Drawer bottom	3/16	8 29/32	15 3/16	Mahogany	3/32-in. by 3/32-in. rabbet with bevel at 3 edges.
2	2	Drawer sides	9/16	3 1/8	9 1/16	Mahogany	Blind dovetails 1/8-in. from front. Through dovetails at back. Dado for 1.
3	1	Drawer front	3/8	3 1/8	15 9/16	Mahogany	Blind dovetails at both ends. Mahogany veneer, 1/16-in. thick. Dovetail for 1
4	1	Drawer back	9/32	2 15/16	15 9/16	Mahogany	Through dovetails at both ends

since the width of the part and the width of the cabinet may be different directions, but there are rules of thumb. If the part is wood or has a face veneer, the length is always in the intended direction of the grain. For a plastic-laminated or painted panel, the length is the larger dimension.

To determine the length of part number one, first visualize the plane of the part, subtract the thicknesses or widths of adjacent parts from the appropriate overall dimension, then add the distance that any joinery extends into the adjacent parts. For example, in the Phyfe tool chest, facing page, the drawer bottoms in the inner cabinet section are shown extending under the drawer backs, and, with a 3/32-in, tongue, into the 7/16-in. thick drawer fronts. The drawers are 9¼ in. deep, so the width of all the drawer bottoms is 9¼ in. minus the 7/16-in. thickness of the drawer front and its veneer facing plus 3/32 in. for the tongue. This gives you a total width of 8 29/32 in.

The drawer bottoms similarly fit into both drawer sides, so the length of the middle bottom (largest) drawer is 15 9/16 minus the thickness of the two drawer sides (2 in, by 9/32 in.) plus the tongues extending into the sides (2 in. by 3/32 in.). The total works out to 15 3/16 in. In the machining column, note any joints and edge moldings. The notes should help to clarify the differences between the material list dimensions and the part's final fitting sizes.

Continue with the tool chest's bottom middle drawer and check each of the dimensions, remembering that the process is little more than examining all of the drawings information, and then subtracting thickness and adding joinery distances from the largest relevant dimension.

Proceed in this fashion with each part. When I think that I sized every part, I go back to the drawing and label each part with the number I've assigned to it on the materials list. To distinguish the labels from actual measurements, I circle each one and draw an arrow to the part indicated. If the same part appears in several sections of the drawing, I label it each time. Finally, I go over the drawing again to make sure each part has a circled-number label.

One last tip: Go back through the completed list with someone else. It's easy to make an error or two. □

Jeff O'Hearn is a project engineer for Art Woodworking in Cincinnati and makes sculpture in his basement workshop.

---

tour of the molding will push the metal strips up different distances. When the gauge completely engulfs the molding, the metal strips will mirror the molding shape.

To record carvings, like the shell on the leg of a Queen Anne dressing table, we used a rubber-based impression material called Coe Flex (Coe Laboratories, Inc., Chicago, Ill. 60658), which is available from many dental supply houses. The material and its catalyst come in toothpaste-type tubes. Mix the two together according to the package directions and trowel the frosting-like stuff over the carving. After it dries (time depends on temperature and humidity), you can peel it off and end up with a mask-like replica of the carving, which can be used to cast a plaster-of-paris model. Exact reproduction is important—no two carvings are alike so you want to preserve each piece's individuality

Measuring the Phyfe chest took Lynch about five hours. No matter how meticulously he has analyzed the piece, questions linger. "The main problem is: Should I draw it as it is now or as I suspect the maker would have liked it to be if he were working under ideal conditions' I record it as it is, but tell what I think might make it better. Sometimes, though, you can't tell what joinery is involved. You just have to take an educated guess." □

Carlyle Lynch, a designer, cabinetmaker and retired teacher, lives in Broadway, Va. His drawings appear regularly in Fine Woodworking *and are available from Garrett Wade, Lee Valley Tools Ltd. and Woodcraft Supply.*