

Cabriole Legs

Hand-shaped, without a lathe

by Philip C. Lowe

Cabriole legs, all characterized by the cyma or S-curve, have taken various styles. The cabriole seems to have evolved from the ancient practice of shaping the legs of furniture after those of beasts, and so in Egyptian furniture you see cabriole legs ending in rather literal animal feet. The Chinese favored more abstract renditions. Chippendale, who borrowed many of his ideas from the Chinese, popularized the ball-and-claw foot, along with carved acanthus leaves decorating the knee. To my eye, the sparest, most pleasing form of the cabriole is the Queen Anne, which terminates in a spoon foot, also called a dub or dutch foot.

The leg involves methodical shaping with hand tools. Traditionally, slipper and trifold feet were also hand-shaped. The spoon foot, however, was usually lathe-turned. But there are those who don't have a lathe, and even for those who do, the lathe has a disadvantage: it necessitates carrying the circular perimeter of the foot all the way around, which interrupts the flow of the line down the back of the ankle. Here is how to design, lay out, cut and shape a Queen Anne cabriole, with bandsaw (or bowsaw), spokeshave, rasp and file.

Consider first the rough thickness of the lumber you will use. Solid lumber is best, as laminate lines will interrupt the wood's figure and look offensive when the leg is cut. The most suitable thicknesses for cabriole legs are $10/4$, $12/4$ and $16/4$, depending on the length of the leg and the size of the piece of furniture it will support. I always figure the working thickness of rough stock, after it is planed, to be $1/4$ in. less than it is nominally. For a typical chair or low table, $12/4$ stock, which will yield $2\frac{3}{4}$ in. of working thickness, is suitable.

You'll need a full-size drawing of the leg, including the post block, knee, transition piece (also called the knee block), ankle, and foot, which is made up of the toe and pad (figure 1, facing page). On a piece of paper, draw a rectangle the length of the leg and $1/4$ in. smaller than the rough thickness of your stock. Within this rectangle draw the post block first, its length equal to the width of the rail it will join, or, if the leg adjoins a case, the width of the front, back or end. The width of the post block depends on the thickness of the tenons it will receive, as well as on the desired curvature of the knee. For $12/4$ stock, a $1\frac{3}{4}$ -in. square post block is common, readily accommodating $1/4$ -in. thick tenons in $3/4$ -in. thick stock.

After laying out the post block, draw the pad and foot. The pad diameter should be about half the width of the blank. Its thickness, from $1/4$ in. to $3/8$ in., depends partly on the



thickness of the carpet you expect your piece to stand on. The pad's function is to separate the lines of the leg from the floor. The height of the toe depends on the size of the leg, but on a chair or table leg it's usually $\frac{3}{4}$ in. to 1 in. from the floor. Sketch in the curves up to the ankle, whose diameter should be about two-fifths the thickness of the leg blank. This narrowest part of the leg should fall at about three times the height of the toe. Next develop the knee, sketching a curve that meets the bottom corner of the post block at about a 45° angle; if it is more horizontal than that, it creates an awkward shelf at the top of the knee. Aim for a tangency point with the outside of the blank a distance from the post block about three times the height of the toe.

Connect the knee to the ankle with a relatively straight line. It is important that you understate any curve here because your drawing is in only one plane, and when the blank is cut in two planes, the curve will be exaggerated. Draw the line of the back of the leg, leading all the way up into the transition piece. Keep this line relatively straight also, and see that the leg thickens gradually and proportionally to the toe, ankle and knee already drawn. The final curve into the transition piece should be relatively tight. If you regard the points of tangency at the knee, ankle and toe, you may be surprised at how much control you have in creating a pleasing shape. Keep in mind, however, that this is only a two-dimensional shape, and its final test will be in a solid piece of wood seen from eye level as part of a whole piece of furniture. Restraint at this stage promises a more pleasing leg in the end.

Next, make a permanent wooden pattern from your drawing. Tape the drawing onto a piece of $\frac{1}{8}$ -in. plywood, and with a large pin epoxied into a $\frac{1}{4}$ -in. dowel, stipple the outline of the leg onto the plywood, poking through the drawing at $\frac{1}{8}$ -in. to $\frac{1}{4}$ -in. intervals. Connect the markings on the plywood with a pencil. Repeat this procedure for the transition piece, then cut out both patterns and file their curves smooth.

Prepare the stock next, starting with pieces 2 in. longer than the sum of the two transition pieces (laid out above the post block) plus the leg. Usually the grain of the transition piece runs vertically, like that of the leg. Rip the stock to width at least the dimension of your rough thickness. Joint one face of the blank, either on the jointer or with a hand plane, and then joint an edge square to it. Thickness-plane the blank $\frac{1}{8}$ in. larger than the finished dimension, and put the blank aside for a day or so, to give it time to warp in response to any stresses milling may have introduced.

When you have all the leg blanks milled, consider their grain orientation relative to one another. For visual compatibility, either the quarter grain or the flatsawn grain of each blank should face front. Mark the inside corner of each blank, and hand-plane the inside surfaces, removing mill marks and making sure that the surfaces are square to one another. Finish thickness-planing the blanks: plane the outside surfaces parallel to the inside. Crosscut the blanks to their finished length, saving the offcuts for the transition pieces.

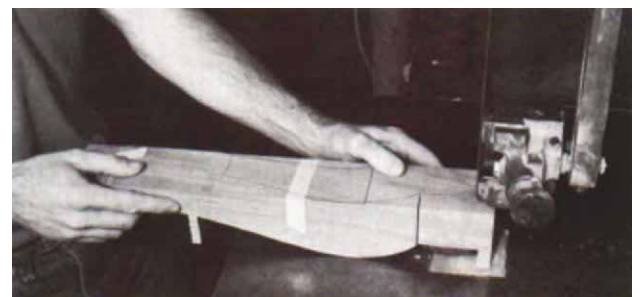
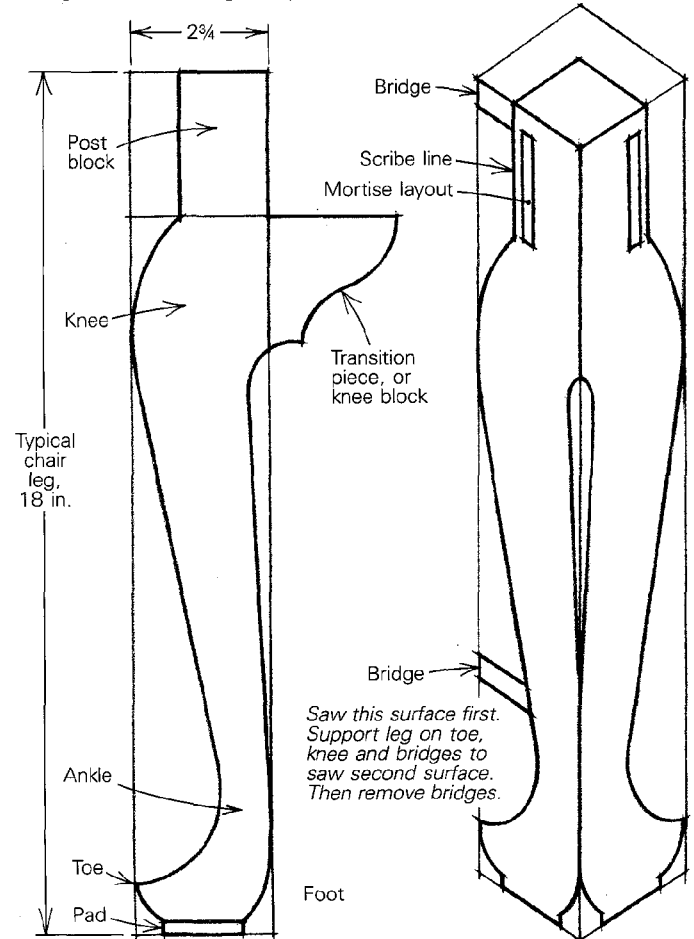
To begin layout, set a marking gauge to the width of the post block, and scribe this width on the two inside surfaces (figure 2). Trace the outline of the leg below the post block. To keep the stock from rocking through the second bandsaw cuts, I include in the layout of the leg a pair of bridges—one at the top of the post, the other between the knee and toe. You could also tape the waste from the first cuts back on the stock before making the second cuts, but I find the bridges

easier and more stable. Scribe the position of the mortises on the post block, and cut the mortises while the blank is still square; it's easier to hold square stock.

Now, using a $\frac{1}{4}$ -in. blade, bandsaw the leg: Cut relief kerfs for the bridges first, then saw the post block, staying $\frac{1}{16}$ in. away from the scribe line. The post will be planed later, after it is attached to the rail. Saw the curve from knee to ankle, leaving the bridge between. Sawing right on the line will minimize spokeshaving later. Next, define the pad, cutting straight in from the bottom of the blank first, then sawing the curves at the bottom of the foot to meet these relief cuts. Finish sawing the back curve, and save both back-curve scraps. These have the pattern lines for the cut on the adjacent face and should be tacked or taped back in place to saw

Fig. 1: Cabriole leg design

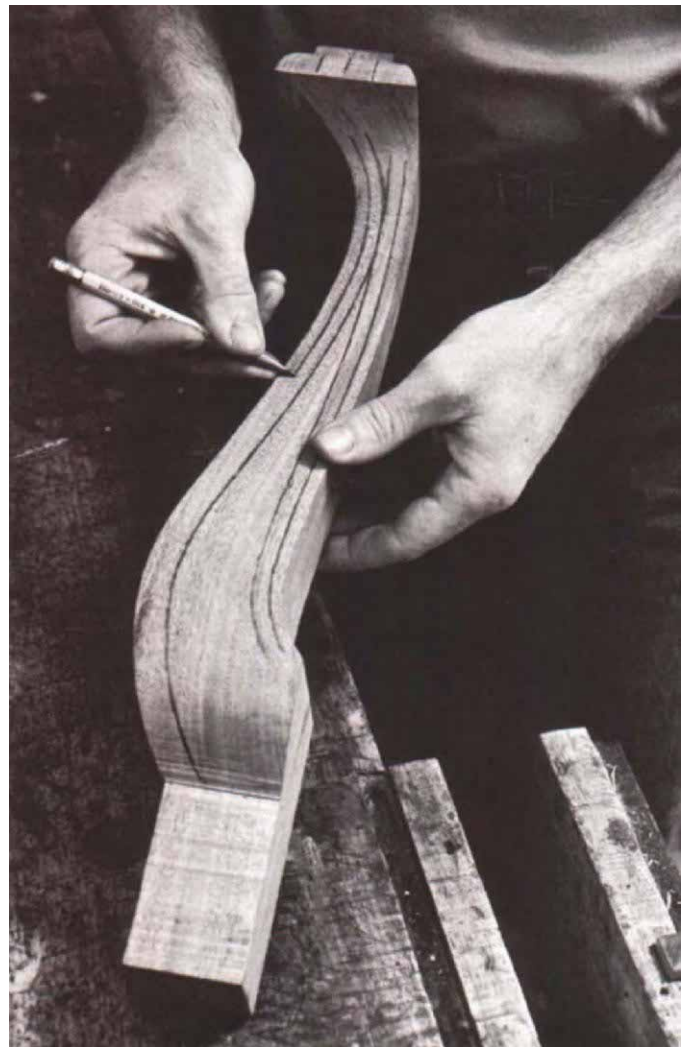
Fig. 2: Sawing layout



Bridges—one between the knee and toe, the other at the top of the post block—keep the stock from rocking through the second bandsaw cuts. Waste from the first cuts has been taped back in place, to provide layout lines for sawing on.



A pipe clamp mounted in the bench vise, above, makes an ideal holding arrangement for working the length of the leg. Here a spokeshave fairs the bandsawn curves, in preparation for the modeling layout.



To draw modeling lines, the square for the pad is compassed round, and the other four surfaces are divided into quarters, left. Then each leg surface is penciled with lines parallel to the leg edges, above: two inside lines begin at half the ankle thickness and two outside lines begin at one-quarter the ankle thickness.

it. After sawing this second surface, turn the blank back to the first sawing position and saw off the bridges.

The next job is to fair the leg with a spokeshave, removing all the bandsaw marks, bumps and hollows. It is important here that the leg be kept square in section; irregularities are more difficult to see and smooth once you begin rounding the leg. Where the curves are tight and the spokeshave will not reach, you can use a rasp or a file. The leg is now ready to be laid out for final shaping.

Begin laying out the bottom, locating the center of the pad by drawing two diagonal lines from the corners of the square that will contain the pad, and scribing with a compass the largest possible circle the square will contain. Divide each surface of the underside of the foot into four equal sections: first draw a line from the center of each side of the pad to the top edge of the foot, then halve the distance between these lines and the corners of the foot.

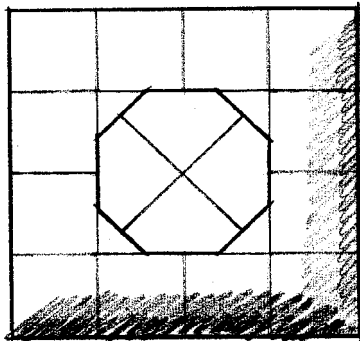
To lay out the guidelines for modeling the rest of the leg, position a pencil point at the center of the ankle, and using

your middle finger as a depth gauge running on the stock edge, draw lines from ankle to post block parallel to each edge of the leg. There will be a total of eight lines, two on each face. Reposition the pencil point halfway between these lines and the edges, and draw eight more longitudinal lines. Now the leg is ready to model.

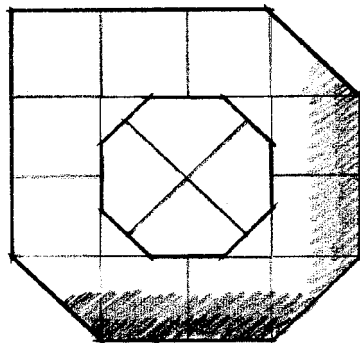
Mount the leg bottom up in a vise, and saw the waste away from the pad square to leave a regular octagonal shape (figure 3A, facing page). Similarly, cut the corners off the toe square, but leave the corner at the back of the leg, thus forming only three-quarters of an octagon (figure 3B). Now use a rasp to round the outline of the pad and the foot (figure 3C). Check the shape of the foot periodically by looking down from the knee to see that it is situated symmetrically in relation to the rest of the leg. When the outline is round, use the rasp to fair the underside of the foot, from its perimeter to the perimeter of the pad.

Modeling the rest of the leg requires attention to holding it. As the surfaces become more curved, a bench vise becomes

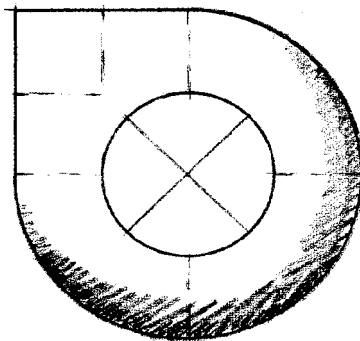
Fig. 3: Modeling the foot, bottom views



A. Saw corners off pad square to form regular octagon.



B. Saw three of the four corners off foot square.



C. Round outline of pad and foot with a rasp.

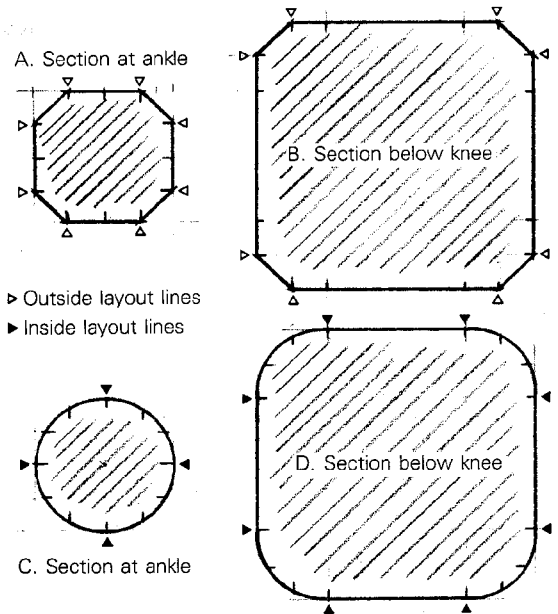


The steps for shaping the underside of the leg yield a round pad and a rounded foot.



A rasp chamfers the corners of the lee to the outside layout lines, then rounds the leg to the inside layout lines, as detailed in figure 4.

Fig. 4: Stages in modeling the leg



more frustrating. I clamp the blank lengthwise in a pipe or bar damp and mount the damp in my bench vise. This affords access to most of the leg's surfaces, and the blank is easy to reposition. Use a rasp to chamfer all four corners to the outside layout lines, from the ankle to the knee. This yields an irregularly octagonal section of varying proportion, depending on where it is along the length of the leg (figures 4A and 4B). The flat should taper to nothing at the foot and at the curve toward the transition piece. Next rasp the ankle round (figure 4C). Continue rounding the rest of the leg to the inside layout lines. The shape will become a square with rounded corners as you approach the knee (figure 4D). Flare the foot's top and back, to form a smooth-spreading curve.

When the leg is fair, remove the rasp marks with a file, followed by a cabinet scraper. Then sand the leg, except for the surfaces that will be blended into adjoining members.

The leg can now be joined to its aprons or case sides, after which the outside faces of the post block are planed flush, and the transition blocks are shaped and applied. Assuming

the rest of the furniture piece is assembled, crosscut the transition block into the two blanks and orient each so that its grain (quarter or face) corresponds to the grain of the leg surface it will become part of. Plane the edge and end of the transition block for a close fit against the leg and the adjoining member (apron or case side). Position the pattern on the block and draw on it the shape of the transition piece. Bandsaw the piece, and glue it to the leg and adjoining member. A sharp, wide bench chisel then shapes the transition piece to the contour of the knee, and the areas that have not been sanded are sanded. □

Phil Lowe operates a cabinet shop in Beverly, Mass., and teaches cabinetmaking at North Bennet Street Industrial School in Boston. For more on cabriole legs, their history and other techniques for making them, see FWW #10, pp. 55-59, and #18, pp. 76-83. If you're looking to buy already made cabriole legs, contact Fallsview Studios, 165 Fairview Ave., High Falls, N.Y. 12440.