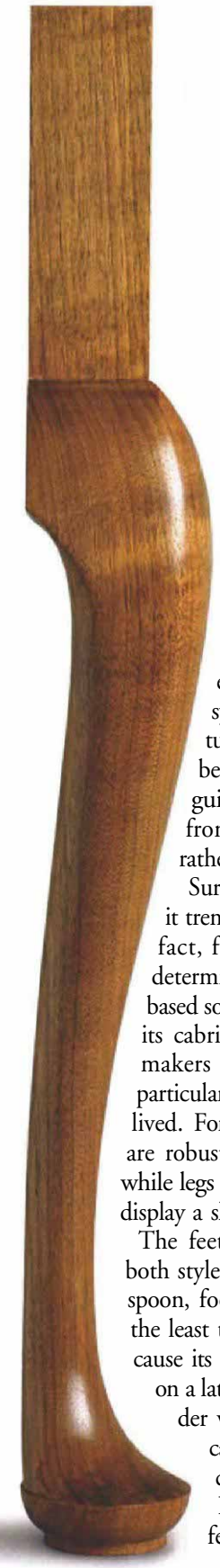
Shaping Cabriole Legs

Careful layout helps make graceful legs with smooth curves



BY LONNIE BIRD

During the 18th century, cabriole legs were integrated into every form of furniture-chairs, casework, tables and even beds. Today, nothing symbolizes 18th-century furniture more; the cabriole leg has become the icon that distinguishes furniture of this period from all other styles. It is also rather simple to make.

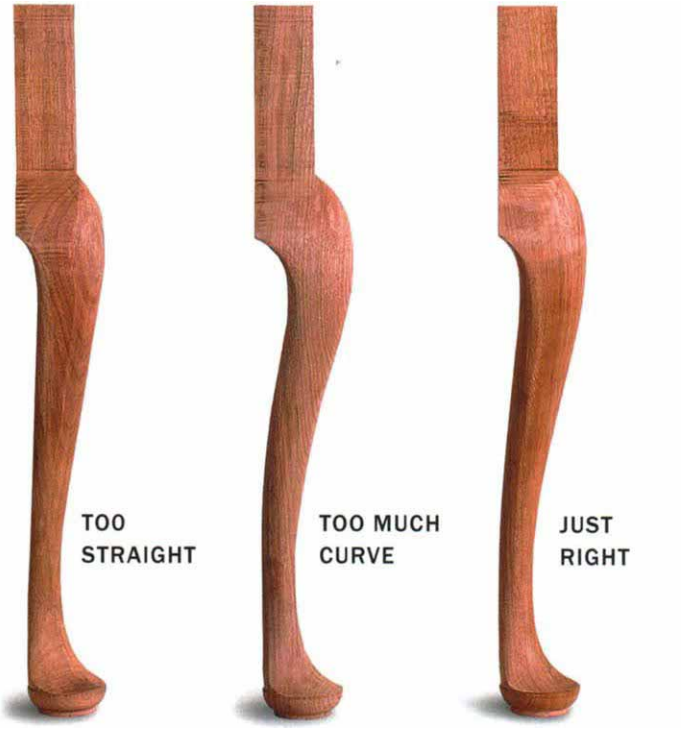
Surprisingly, cabriole legs exhibit tremendous variation in form. In fact, furniture historians can often determine the origin of an antique based solely on the form and detail of its cabriole legs. Regional furniture makers sculpted legs with features particular to the region in which they lived. For example, Pennsylvania legs are robust with a pronounced curve, while legs of New England origin often display a slender, subtle curve.

The feet of period legs also vary in both style and execution. The pad, or spoon, foot is most common. It's also the least time-consuming to make because its circular form is easily turned on a lathe. The slipper foot is a slender version of the pad foot. Because it's elongated, it must be carved rather than turned. Pennsylvania furniture often features the unique trifid, or three-toed, foot with a relief-carved stocking that begins at the toes and terminates midway up the ankle. Like many elements of 18th-century furniture, trifid feet can vary tremendously, from ill-formed to beautifully refined—differences that most likely illustrate the skill and training of the craftsman who carved them.

Undoubtedly the most familiar design is the claw-and-ball foot, which first emerged in the mid-18th century and quickly became popular as a sign of status and wealth. A careful examination of antique furniture shows that the claw-and-ball foot reflects regional differences more so than any other style of foot. Newport furniture styles, for example, have feet with long talons that are often undercut; the feet of

WHAT MAKES A WELL-PROPORTIONED LEG?

It is easy to make cabriole legs that are poorly proportioned. When making templates and shaping legs, be sure that your curves never develop into flat areas or appear overstated. After the curves on the template have been refined and established, make a practice leg and double-check your proportions, before it's too late.

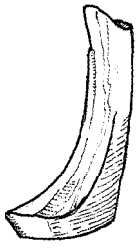


Drawings: Graham Blackburn

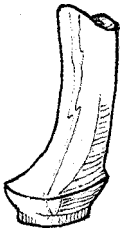
New York pieces are square and boxlike; Philadelphia claw-and-ball feet appear tense and powerful. Additionally, a closer study reveals numerous variations of the carving within a specific region. No doubt this is a reflection of the skill and interpretation of individual carvers.

18TH-CENTURY FEET

Trifid foot



Slipper foot

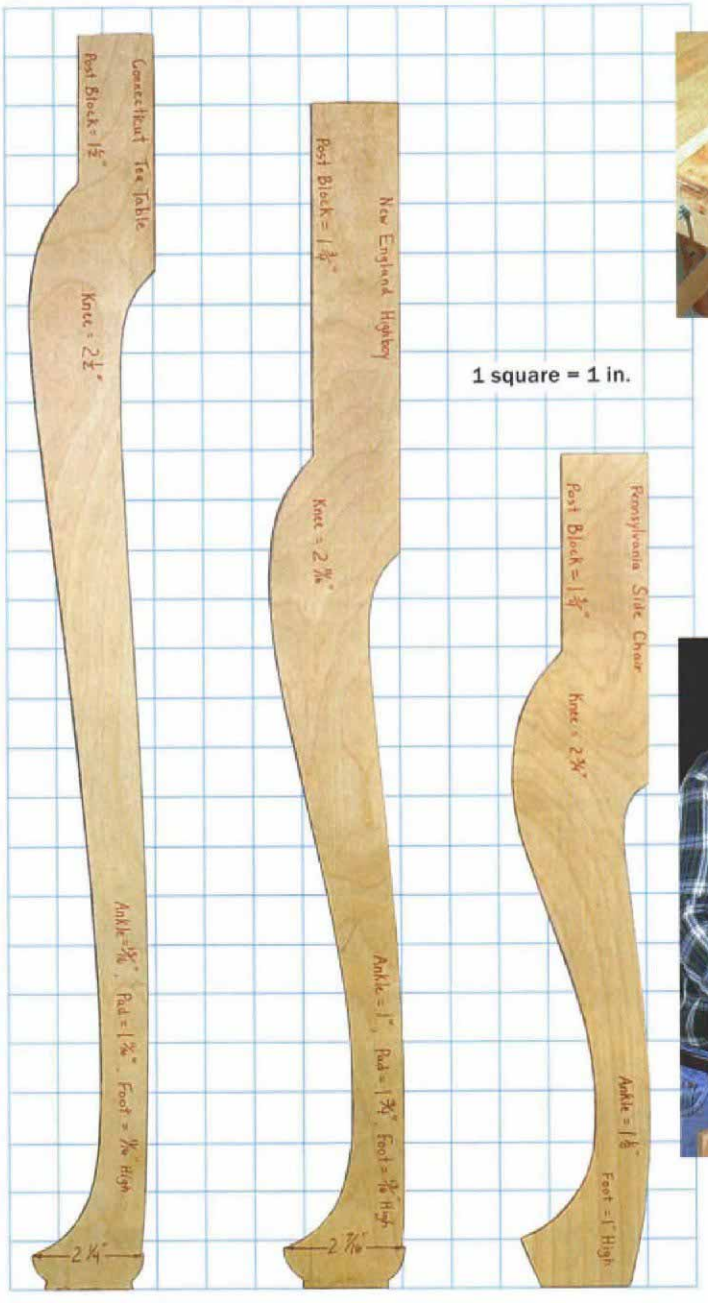


Pad foot

Even though the compound curve of a cabriole leg can appear difficult to make, in reality making a cabriole leg is quite easy. That's because the curve is bandsawed on the stock on two adjacent surfaces. After sawing, the curve is smoothed and refined with hand tools.

In contrast, designing and drawing a leg with balance, proportion and a graceful, flowing curve can be quite a challenge. A visit to a major museum will reveal numerous outstanding examples of cabriole legs, but in fact, many antiques have cabriole legs with disproportionate feet, ankles or knees. Other legs simply lack a refined, fluid curve. For these reasons it's important to study the best examples when looking for inspiration and direction.

DIFFERENT TEMPLATES FOR DIFFERENT LEGS



The author draws all curves by hand on ¼-in. plywood, then cuts out the shape using a bandsaw. He smooths high and rough spots with rasps and files until he achieves a clean, flowing curve.

Establish the general proportions

Begin by establishing the parameters of the knee, foot, ankle and post block. Generally speaking, the width of most knees are within a range of 2½ in. to 2⅞ in. It's most important to size the knee so that it's proportionate to the piece of furniture on which it will be used.

The foot is proportional to the knee (or sometimes slightly smaller). Ankles typically range in size from ⅞ in. on a slender leg of a tea table to 1⅛ in. on a tall chest. The pad of the foot is 3⁄16 in. to 5⁄16 in. high, and the height of the entire foot is ⅝ in. to ⅞ in.

Remember that these are guidelines for a pad foot. Trifid and claw-and-ball feet are larger and heavier than pad feet, and consequently they require a heavier ankle to appear proportionally correct. The post block is typically ¾ in. to 1 in. smaller than the knee. Sizing the post block is critical; if it's too small, the knee will appear swollen. If the post block is too large, the knee may have a weak appearance.

It is very helpful to study good examples of cabriole legs from the numerous books available on period-furniture collections. Study photographs that have been taken "straight on"; isometric views can mislead you into thinking that the leg is heavier than it actually is.

The finest leg examples have smooth, continuously flowing lines that lead your eye from the post block to the foot without irregularities. It's best to avoid examples with stiff, straight lines. The lines, including

Photos, this page (left three) and facing page (left and bottom): Michael Pekovich

those on long, slender legs, should always curve, even if subtly.

Make a template

When designing a cabriole leg, begin by drawing a full-sized template for tracing onto the leg stock. I use ¼-in. birch veneer plywood for making these templates because the plywood is stiff and the light color and smooth texture make a suitable surface for drawing.

Once the dimensions for the foot, ankle, knee and post block have been established, concentrate on drawing the curves that define the front and back of the leg. These curves are the most essential to a successful cabriole leg.

The post block intersects the knee at an angle of approximately 45°. From there the line travels in a convex curve through the knee. Below the knee is a transition point, where the line curves inward to become concave. A cabriole leg appears most graceful when the transition point is located just below the knee. A leg with a low transition point tends to appear awkward and less refined.

The line at the back of the leg begins at a point behind the knee. It somewhat follows the line at the front of the leg, although the curve is less pronounced. As the lines flow downward, they converge at the ankle, then quickly broaden at the top of the foot.

When sketching the curves I find it helpful to sight down the line to examine the transition point and check for smoothness of the curve.

When you're satisfied with the drawing, bandsaw the template exactly to the line and smooth the edges with a file. Then model the leg on a piece of inexpensive stock, such as poplar. This allows you to view the design as a three-dimensional form. After viewing the model, I often make further refinements, first to the leg and then to the template.

Experience has taught me not to make quick decisions when judging the model. In fact, I usually stand it on the bench and leave it there for a few days while working on other projects. Occasionally I stop and view it from various angles. Sometimes I make two models, with minor variations in the size of the foot or ankle, and stand them side by side for comparison.

Diagonal grain is best for legs. *By orienting the end-grain patterns along the diagonal of the blank, you are left with straight grain on each face.*

Choose leg stock wisely

Once you're satisfied with the model, select stock and begin working on the legs. Avoid using glued-up stock; the opposing grain, color and gluelines distract from the completed leg. In fact, stock selection can play a major role in the overall success of

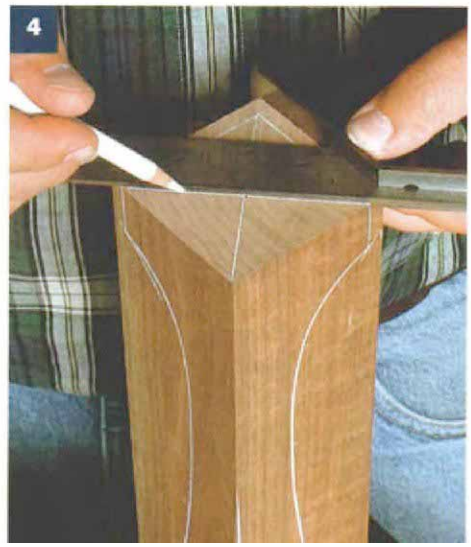
LAYING OUT STOCK

1 Lay out the leg. *With the template held in place, draw out the pattern on adjacent faces of the leg.*

2. Transfer the pad width. *Use a square set to the widest point of the pad.*

3. Mark out the leg at both ends. *Transfer the pad dimension to both the top and bottom of the blank.*

4. New centers are off center. *Use the square to locate the centers of the pad width, not the center of the blank.*



the leg. If the annual rings on the end of the stock run from front to back, the grain on the face of the stock will complement the curves of the leg. Rings that run side to side compete visually with the leg contours. For the greatest strength, especially at the ankle, use only straight-grained stock.

The next step is to joint two adjacent faces of the stock 90° in relationship to each other. Then plane the stock to a thickness that allows room for tracing the template. Finally, cut the leg stock 1 in. longer than the final length. The extra length provides room for the drive center of the lathe.

Transfer the layout and bandsaw the stock

After milling the leg stock to size, trace the template back-to-back onto two adjacent faces. If the length of the leg exceeds the top of your bandsaw, leave a square section above the ankle to support the leg when you bandsaw the adjacent face. (I call this area the support block.) Also, leave the top of the post block square to position the drive center of the lathe.

Leave the foot square, too. Remember, the foot is circular and can be shaped easily on the lathe; leaving it square facilitates the turning process.

When sawing the first face, save the offcut at the back of the leg because it has the drawing for the second face. It can be repositioned with masking tape.

Before bandsawing, mount the appropriate blade on your bandsaw. For a typical cabriole leg, a ¼-in., 4- or 6-pitch, regular-tooth blade works well. The narrow width easily follows the tight turn at the ankle, and the tooth pattern cuts cleanly.

Begin by sawing the short, straight cuts at the intersection of the post and support blocks. This way you can saw the curve without trapping the blade at the end of the cut. Next, start at the foot and saw the curves of the leg. If you follow the layout lines precisely, you'll avoid extra handwork later. As you reach the end of the curve, reduce the feed pressure and ease into the corner to avoid overshooting the intersection and ruining the post block. Tape the offcut at the back of the leg into position and saw the second face. Afterward, saw off the support block.

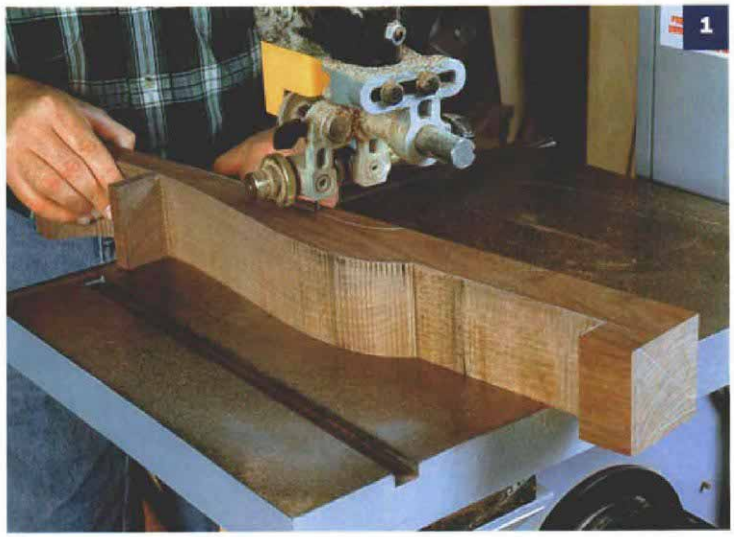
Turn the foot on the lathe

Before mounting the leg in the lathe, you'll have to locate the centers precisely on the ends of the stock. If the foot is the same size as the leg blank, you can simply mark diagonal lines on each end. However, the foot diameter typically is slightly smaller than the knee, and the foot is positioned so that it lies toward the front of the leg, which gives the leg a more pronounced curve. To find the center, lay out a square on each end of the leg that corresponds to the foot diameter, then mark diagonal lines within the square.

To avoid striking the drive center with a turning tool, mount the leg in the lathe with the foot at the tailstock. Then position the tool rest and turn the leg by hand to check that it clears the rest.

Begin by rounding the foot with a gouge. Be careful not to spoil the curve of the leg by cutting into the ankle when turning. Then make a shallow V with a skew at the top of the foot. This provides a clear line to work toward later when shaping the leg. Turn the pad to diameter with a parting tool and gauge it with a spring caliper. Finally, shape the contour of the foot. I use a ⅜-in. gouge and roll the foot contour as I

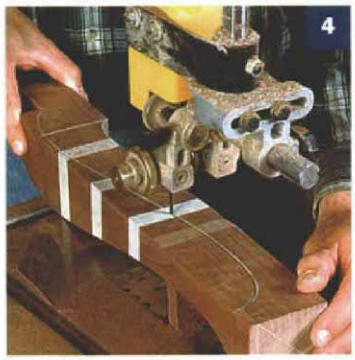
BANDSAWING THE BASIC SHAPE



1. Bandsaw the leg. *Begin by cutting to the line on parallel faces of the leg, making sure to leave a full-width bridge on the outside face.*

2. Save the offcut. *After bandsawing the inside face, be sure not to throw away the offcut.*

3. Tape it up. *Reposition the offcut and use masking tape to secure it in place.*



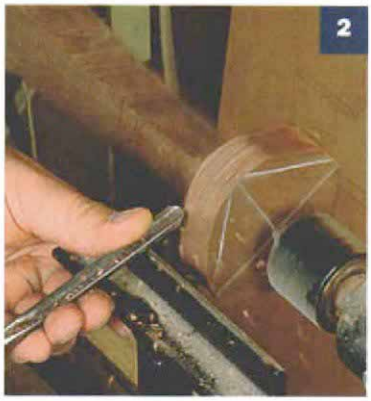
4. Bridge fends support. *The bridge helps guide the cut as you finish the leg.*

5. The last cut. *When the leg has been cut to shape, trim away the bridge.*

Photos, except where noted: Matthew Teague

1. *Blank is mounted off-center.* *Position the leg in the lathe using the pad centers you drew out earlier.*

TURNING THE PAD



2. Forming the pad. *A gouge rounds the pad at its widest dimension. Check frequently with calipers until you reach final width.*

3. Establish a line at the top of the pad. *Draw a pencil mark at the top of the pad, then use a skew chisel to cut a shallow line at that height.*

4. Round from the bottom up. *Working up from the bottom of the pad, use a gouge to ease the transition from the top.*

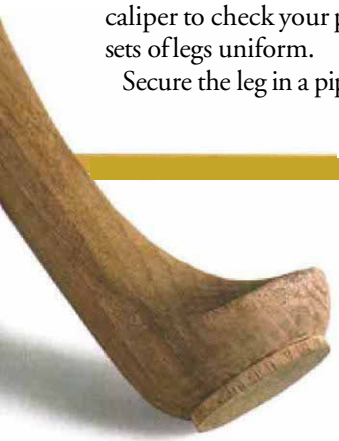
would when turning a bead. The foot contour begins at the V and ends at the pad. Before removing the leg from the lathe, sand it lightly.

Shape the leg

With the turning completed, focus on shaping the leg. Begin by removing slight irregularities in the surface from bandsawing; then remove the sharp corners and blend the surfaces. On a typical cabriole leg with a pad foot, the ankle is round but the remainder of the leg is square with rounded corners. Be careful not to remove wood too quickly, especially at the ankle. You can gauge the ankle with a spring caliper to check your progress and to keep sets of legs uniform.

Secure the leg in a pipe clamp and mount the pipe clamp in a vise. I shape the leg with a #49 Nicholson rasp, but you can also use a spokeshave. I prefer the rasp because it cuts quickly and will reach into the sharp curve at the ankle. As an added benefit, the rasp doesn't tear out difficult woods, such as curly maple. Hold the rasp askew so that it bridges any high spots and cuts them away. Remove the leg from the clamp occasionally and sight down the curve for dips or bumps. This first step will progress quickly if you followed the line precisely when bandsawing the leg.

Next, begin rounding the leg corners. To keep the corners uniform, you may find it helpful to chamfer each corner first, then round off the corners of the chamfer. Start with the front of the leg and shape the knee, moving upward toward the post block. Then shape downward from the knee toward the ankle. As you shape, continually alternate the surfaces of the rasp;



Carving the foot by hand

All 18th-century pad feet that I've examined are round, presumably because they were turned on a lathe. But even if you don't have a lathe, you can produce an attractive pad foot; you'll just need to be prepared to spend a little extra time at it.

When you bandsaw the leg blank, go ahead and bandsaw the foot outline as well. This will create a square pad foot that provides a guideline for shaping by hand. Next, locate the center of the foot by marking diagonal lines. Then draw the circumference of the pad with a compass or template.

To shape the foot, remove the four corners with a chisel and rasp. A carving gouge with a curvature to match the foot contour is also helpful in achieving a pleasing appearance. Finally, smooth and blend the surfaces with a file.

Templates help lay out the pad. Use a *circle template to position the circle at the bottom of the pad.*

SHAPING THE LEG

1. Spokeshave cleans up bandsaw tracks. *With the leg placed in a clamp and held in a vise, a spokeshave is used to smooth out any rough spots the bandsaw may have left.*

2. Rasping off the corners. *Begin shaping the leg by easing the corners with a rasp,*

3. Shape the top of the pad. *At the bottom of the leg, use a rasp to smooth the transition to the pad.*

4. Cut to the line. *When shaping the leg, make sure you don't round over the cup at the bottom, Use a chisel to build a small shoulder along the line cut at the lathe.*

use the flat surface for the convex areas of the leg, and the convex surface of the rasp for the concave curves of the leg.

To rasp away the corners of the leg, hold the rasp at a skewed angle and follow the leg contour. After shaping the front corner, progress to the back and finally the two side corners. Keep in mind that the corners at the sides of the leg remain sharp where they intersect the knee block. Use a chisel at the foot to blend the curves of the leg into the V cut you made at the lathe. Once you're satisfied with the shape of the leg, smooth it; first with a file, then with a card scraper. A bit of light sanding completes the process.

Remember that these are guidelines for a typical cabriole leg with a pad foot. Because all legs have intrinsic variations depending on their origin, you'll want to compare the leg you're shaping to a photograph of one you're reproducing. For example, not all legs have round ankles; a leg with a claw-and-ball foot typically has an ankle that is somewhat square, with rounded corners. If you take your time working out the pattern, shaping the legs goes smoothly and quickly. Learning to make cabriole legs opens you up to a whole new style of furniture. □

Lonnie Bird teaches furniture making at the University of Rio Grande in Ohio.

Lay out by eye. *The circle at the top of the foot is penciled in by eye.*

Establish a shoulder. *Use a carving gouge to establish the curve on one comer, then use a chisel to cut away the small shoulder at the bottom of the pad.*

Rasping a round pad. *Rasps and files help round the pad down to the bottom of the leg. Once the bottom has been shaped, sight down the leg and clean up the top profile.*