

Fig. 1: Foliage pattern

Cabriole Knees

The tools help design the carving

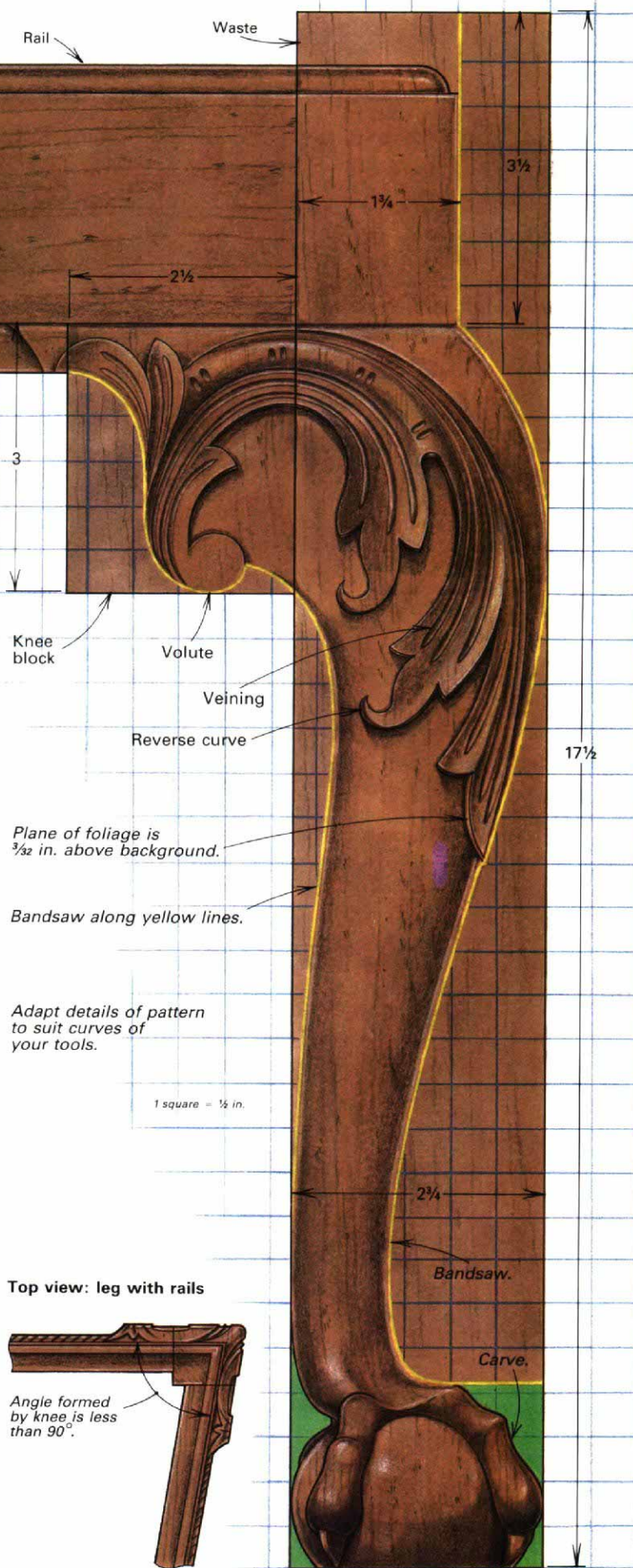
by Mack Headley

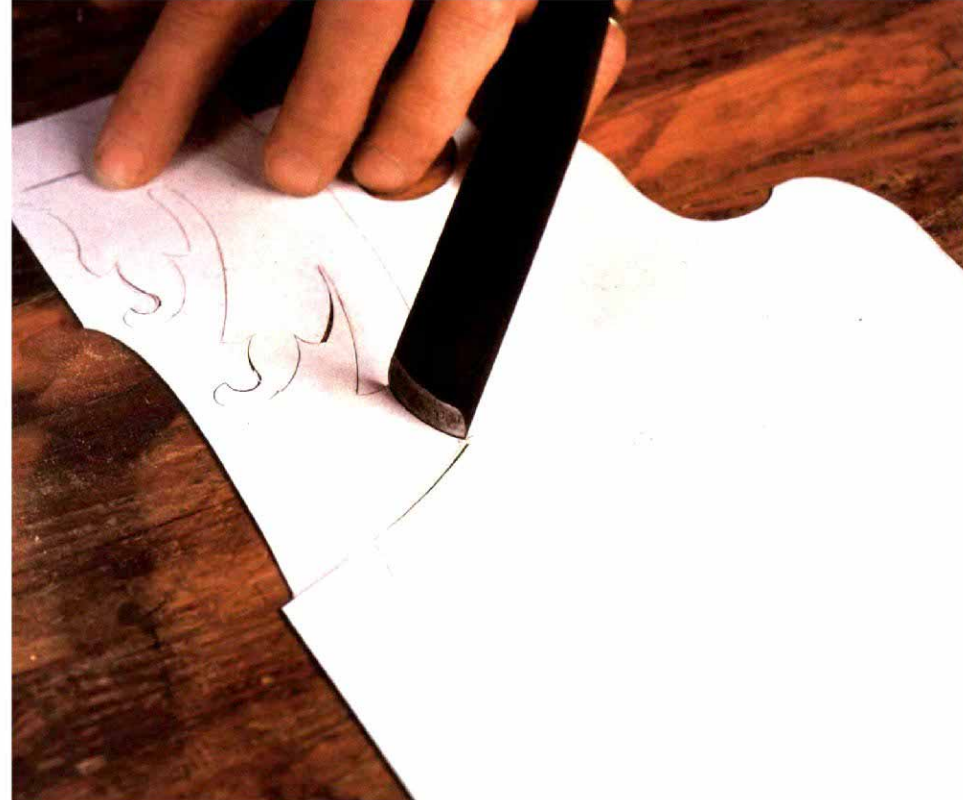
The leaf pattern on the cabriole leg shown here is an adaptation of one found on a chair from the 1740s. At that time in the United States, as well as in England, there was general agreement about what constituted good furniture design. And in the 18th century, good design was almost always based on the styles and forms of classical antiquity. But even within the confines of these traditions, an individual carver could elaborate or simplify the specific details, depending on his own notion of the kind of carving that was appropriate for a certain piece.

Today it's not easy for us to fully understand the depth of classical education and taste in the 18th century, and it's difficult for us to embrace the sensibility of the cabinetmakers (and their clients) of that time. Yet the surviving works of the period, as seen in museums and in the excellent books depicting such collections, can serve as a pattern book for any carver. Even if you don't want to duplicate the 18th-century work, these collections offer a repository of design styles. And, a close study of these works gives us a glimpse of the techniques used by these early carvers, who had to meet demanding standards, yet still work efficiently enough to make a living. For example, the shapes and sizes of the tools available to the carver played a large role in determining the design and the speed with which the piece could be carved.

The original of the carving that I will discuss here is an example of a strong, uncomplicated design, with the bold reflective surfaces and flowing lines that would have been expected on carved leafage. Its carver was an economical and experienced workman with high standards, who knew how to maximize the carving's three-dimensional look despite the limitation of having to work with relatively shallow cuts on the shaped surfaces.

Before going on to the details of foliage work, it's worth noting





Left, a template is made by cutting the outlines with the tools that will be used for the carving. Right, a line of stop cuts, to prevent chipping, is made around the penciled template out-



line in the same manner as the template itself is cut. Here, the background is being leveled down in a series of cuts to full depth. Stop cuts are deepened as necessary.

that a knee carving such as the one shown in figure 1 need not be restricted to chairs: It would work well on a tea table and could be adapted to the long, curved knees of a tripod table. In all these cases, the majority of the curves in the leg flow along the level of the carving's background. Thus all curves appear to be continuous beneath the foliage, and the widest part of the knee below the carving is thinner than it would be on an uncarved leg. There is plenty of bulk in this area to ensure a strong leg, however, and the curve can be gently shaped to blend into an ankle about the same thickness as the ankle on an uncarved leg.

The actual knee-carving process can be broken down into five steps. The same steps can be applied to other types of carving as well. First, a full-leg template is cut, and the design is marked out. Second, another template or pattern for the carving is made and transferred to the leg. I cut the templates and patterns with my carving tools to ensure that these tools can form all the shapes in the design. I have a fairly good selection of tools in my kit, as discussed below, so this isn't generally a limitation; actually, the tools are a great aid in controlling both the design layout and its execution. The third step is to cut vertical stop cuts on the leg around the perimeter of the design and carve out the background areas. Fourth, the main shapes of the leaves are incised and the surfaces carved smooth. Fifth, the veining and other detailing is cut.

Drawing foliage with tools—In the initial planning stages, it is important to envision the effect you wish your carving to have. Drawing is the best way to define these shapes, thus reducing the chance of careless blunders or dead ends during the actual carving. Drawing skills are also important to the carver, because it can be difficult to fit templates and patterns around curved surfaces. Usually the pattern can be used to establish the main lines, but the details must be drawn directly on the wood.

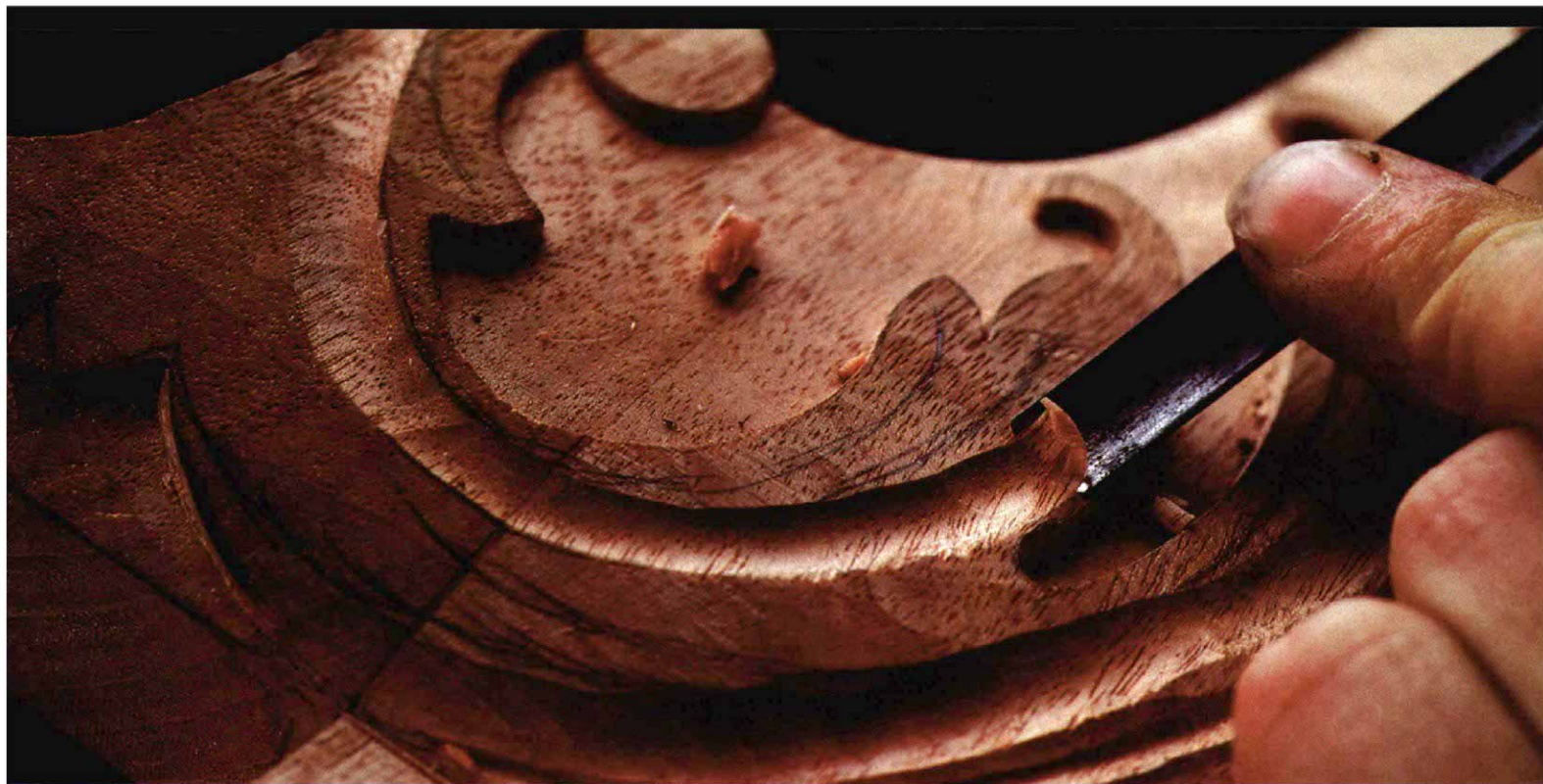
The flow of the foliage should complement the curves of the knee, as outlined on the full-leg template, which is used to draw the lines for bandsawing the blank. The first step, therefore, is to

draw the leg template full-size and then draw the foliage upon it to establish the general form and flow of the leaves. The foliage pattern generally begins with the somewhat tedious copying of carved foliage depicted in 18th-century design books. Copying is easier if you lay out the designs on grids of various proportions, yet the leaves must still retain the flow and appear correctly balanced. As a general principle, lines and veins should emanate from a logical point of origin, such as the main stem of the leaf, and flow smoothly, fanning out to their full spread with a balanced progression and then reducing toward the tips.

The shapes I use in drawing the foliage conform to the sweeps of various gouges in my kit. I rely on a few broad gouges of related sweeps to help establish the broad shapes, a few narrower gouges whose curves flow comfortably into the wider ones and several smaller tools for detailing. My basic kit includes 12mm and 30mm #3 sweep gouges; $\frac{7}{16}$ -, $\frac{1}{2}$ -, $\frac{3}{4}$ -, 1- and $1\frac{1}{4}$ -in. #5 gouges; $\frac{1}{4}$ - and $\frac{1}{2}$ -in. #7 gouges; a $\frac{1}{8}$ -in. #8 veiner and a $\frac{3}{16}$ -in. #9 gouge. Flat chisels of various widths, as well as a scraper or two, are handy for smoothing background areas and working in tight spots. If a line doesn't exactly conform to a gouge's sweep, or if I want to expand or contract a curve, I can roll the gouge around the curve like a wheel, steering it as I go. Working *with* a set of tools rather than *against* it is, along with sharpness, a key element in successful carving.

Rounding the leg—After bandsawing the basic leg shape, I round the surfaces with a spokeshave to bring out the flow of the leg. Shaping the leg below the area to be carved provides a reference surface to work from in shaping the foliage area, which must be proud of the main line of the leg. With cabriole legs, the carving should blend with both the leg's vertical curve and its horizontal plane.

The point of the knee begins flat at its junction with the upper post of the leg, and wood is gradually removed in a broad, convex curve. Hold a crisp line down the top two-thirds of the area to be



The main elements of the individual leaves are separated with a gouge whose curvature matches the desired profile. Because of the curves of the pattern, at times, one half of the

cut may be with the grain while the other half is against it. The solution is to take light cuts on the side that is cutting well, changing direction as necessary.

carved, then make a transition to a $\frac{1}{8}$ -in. half-round for the lower third. You want the foliage area to stand about $\frac{1}{8}$ in. above the leg surface at the tip of the lowest central leaf. The fullest point of the knee is lowered $\frac{1}{8}$ in. on each face in a gradual convex curve beginning at a point about two-thirds of the leg width back from the front of the knee. Extra wood must be left for carving the foliage at the top of the leg, where it meets the post, and for carving the volute at the back of the leg. The leg at its widest point, including the projection of the carved area, should be in proportion to the chair or other piece of furniture supported by the leg.

Leaf template—In addition to the customary whole-leg template used to trace the lines to be bandsawn, I recommend you make another template or pattern to transfer the carving design to the wood. The carver who made the original leg would have been so familiar with this design that he could work without a pattern. After all, even if he produced only one set of a dozen chairs of this pattern, the symmetry of each knee would have required him to repeat the leaf's sculpture and detail 24 times. If you don't have the dexterity developed through numerous repetitions of the same pattern, though, you'll find that a template will be invaluable in helping you avoid mistakes.

As previously discussed, you should cut out the template using your carving tools, as shown in the top, left photo on the facing page. If the pattern is based on a two-dimensional drawing, as appears to be the case with much 18th-century design, the pattern will have to be adjusted to account for the extra $\frac{3}{16}$ in. or so added by the curve from the protrusion of the knee to the leg post. This can be accounted for by transferring the major horizontal elements from the pattern to the frontal curve, then sketching in extended vertical lines to complete the outside shape. The shaping of the front of the leg removes any reference points for orienting a template, but you can line it up by eye.

After sketching in all the details, double-check the lines against your tools to be sure they still fit (see the top, right photo on the

facing page). When all is well, use hand pressure alone to outline the carving with the appropriate gouge shapes. The cuts should be perfectly vertical or slightly undercut. These stop cuts will allow the background to be carved away without chipping the border lines of the leaves. In tight corners, you can also make the stop cuts by smoothly slicing with the point of a knife. In the initial stages, don't worry about the surface of the background; concentrate on preserving the border of your leafage. After reaching the depth of the initial gouge cuts, make another series of stop cuts. To lower the background the full $\frac{3}{32}$ in. so the surface appears to flow into the line of the lower leg, you'll have to go around the whole design at least twice. Because of the knee's shape, changes in grain direction are inevitable. Work with or across the grain whenever possible. Keep tools sharp.

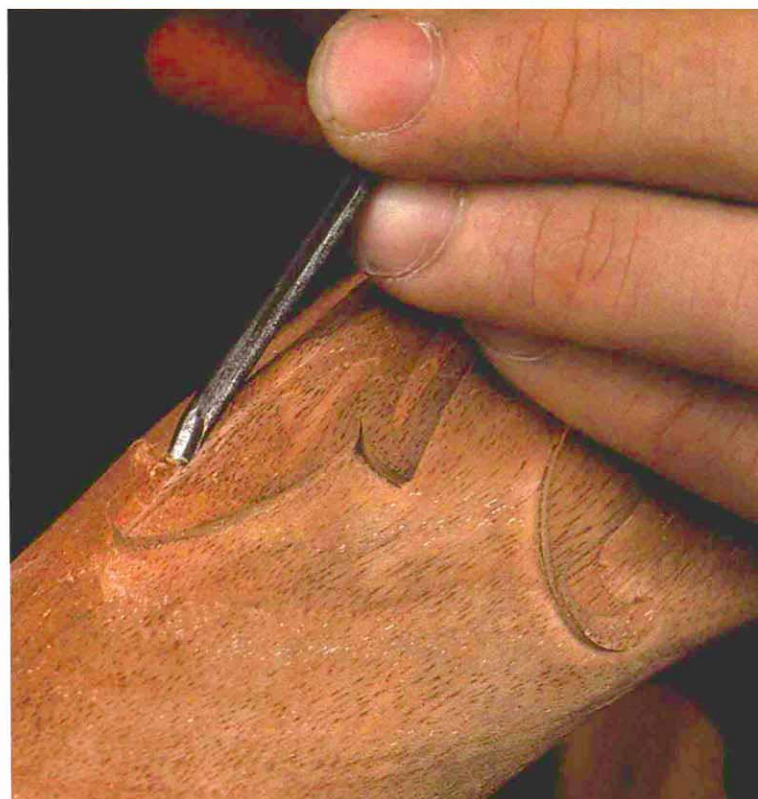
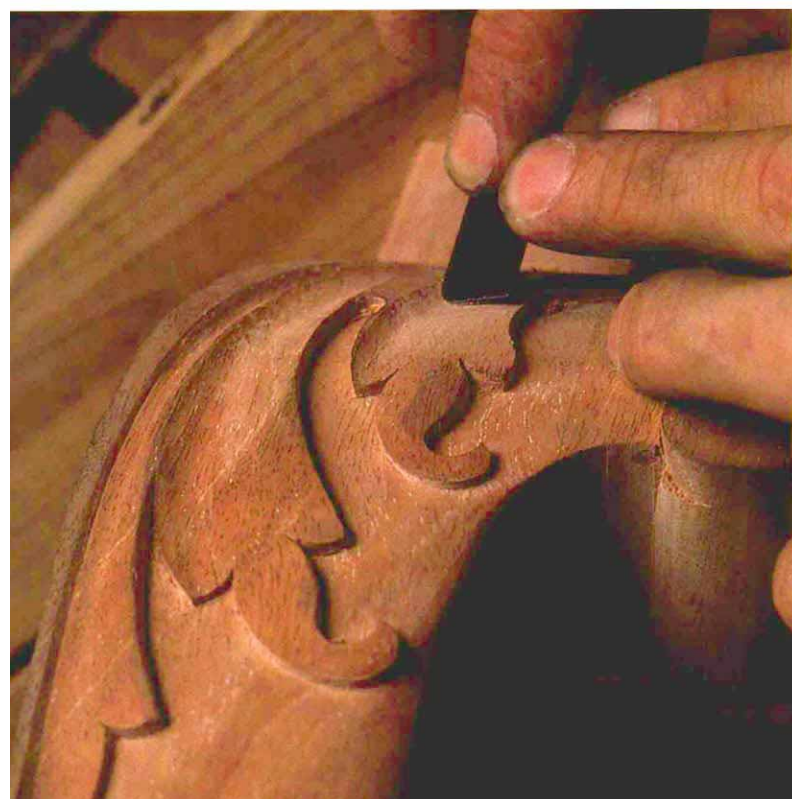
Prepare the final background using flat chisels of varying widths. The widest chisels possible, in a given area, will ensure the most uniform, even surface. Final smoothing of the background can be done with narrow cabinet scrapers. You should not be too finicky. Traditional carvers often left some chisel marks on background surfaces. In addition, a scraped surface is not as reflective as the surface left by a crisp chisel cut. You can minimize the chatter marks commonly seen on a scraped surface by making alternating diagonal passes with the tool. This technique will prevent you from accentuating the marks left by the previous pass.

Carving the leave—After the background has been carved to depth, sketch the main flow lines of the leaves, and use a gouge to bring out each leaf's overall contours, as shown in the photo above. To give the strongest impression of movement, make a deep concave cut in each leaf, along the outside of its arc from the volute, as shown above. While cutting these low areas on each of the three major leaves, preserve the full height of the leaf above the background at the extreme inner edge of each arc. Cutting to the full depth of your raised work at the peak of each arc, the concave cuts should diminish to half the raised depth as



Above, a wide gouge of proper sweep is the best tool for defining the knee shape, even when working in cramped areas such as here—the background at the top of the knee block. The light yet broad slices level such areas uniformly. Below left, the con-

toured flow of the leaf groups should be carefully smoothed (here with a scraper) before detail carving begins. Below right, a gouge, used bevel up, finishes up a diminishing curve that was begun by wider ones in the set.



the cuts end at the leaf tips and begin on the kneeblock. The concave cuts of the two leaves at the highest arc should diverge from a single cut at their beginning, at the top of the kneeblock, to two separate cuts for the center and lowest inside leaf.

Challenging changes in grain occur as the concave cuts move from the top of the knee downward. Regardless of which direction the cuts are made, half of the gouge cuts will be against the grain because of the way the pattern's curve meets the grain direction. A sharp tool will minimize the tearout, but it'll probably be necessary to cut from both directions to get a smooth surface. Skewing the tool slightly will also produce a cleaner cut, because the tool can slice instead of wedge into the wood. In any case, the juncture of the two cuts should meet at the low point of the curve. The veining of the leaves will later help remove any awkward transitions.

A broad, convex gouge cut should run from the full-raised height on the inside arc of each leaf to meet the bottom of the concave cut, with a clean transition between the two curves. The broad convex surface will catch light on a broad plane, while the quick convex curve will either reflect a fine line of light or throw a deep shadow, depending on the direction of the lighting. Throughout the process, the carver should strive for fluid gouge cuts, which produce the brightest, clearest and most continuous reflective surfaces. The best surface can be achieved by matching the gouge to the desired curve. Use the widest gouges possible at all times, as shown in the photo at left. The cut of a single gouge can be extended by cutting while holding the gouge on the diagonal, which will narrow the width of the cut and increase the arc of the curve.

The eye of the volute should be shaped as shown with a broad convex curve. Individual gouge cuts are also made to give the tip of the two internal leaves the impression of flipping back on themselves. This is accomplished by a concave cut on the inside of each leaf's hooked bottom with the continuation of the leaf's major broad convex curve preserved at the leaf's very tip. The shaping of the lowest lobe of the volute should be a continuation of the convex arc that runs around the innermost arc. The two small leaves at

the top of the kneeblock should be relieved with medium-sweep concave cuts that terminate $\frac{1}{8}$ in. to $\frac{1}{16}$ in. short of the leaves' uppermost points, preserving the full background depth.

Make sure the contoured surface is as smooth as possible. Although the detail carving to come will cut much of this surface away, enough of it will remain to define the overall flow. If you try to smooth this later, the carving may end up looking uncertain.

When the flow of the leaves has been established, the veining and other details can be cut in, as shown in figure 1 on p. 57 and in the two middle photos below. The veins should emerge from the volute and slowly separate as they move toward the end of the leaves. The sculptural effect of the leaves turning to the outside of their arc and flipping under at their tips can be reinforced by holding the major weight of the veining high on the arc of the leaves. The veins should end just short of the tip of each leaf, with the central vein of the two major central leaves just entering the leaf-tip area. This lowest central vein is flanked by a slightly higher vein on the outside of the arc and by the highest vein on the inside arc. The arrangement of the inside and outside lobes of the leaves again emphasizes the impression of movement.

Finishing up—Sandpaper isn't much help in producing even, reflective surfaces and crisp outlines and shadows. Sanding will usually round off the transition of details and give an amorphous and doughy character to the work. Until you've had enough practice in sharpening and tool use to cut the wood cleanly with gouges alone, you can blend any slight surface irregularities with cabinet scrapers. Fine files, rifflers or shaped-hardwood burnishers are also useful for polishing carved surfaces. The broad surfaces of carvings on exposed knees and the backs of chairs have usually worn from use, producing a level of polish probably not given, but likely anticipated, by their original carvers. □

Mack Headley is a master cabinetmaker at Colonial Williamsburg in Virginia. He wrote about shell carving in FWW #61.

Below left, veining is cut into the contoured surface with an appropriate gouge. The same concerns regarding grain direction apply as with larger tools. Below right, strong side lighting on the finished knee shows not only the crispness of

light and shadow possible in low-relief carving, but also the general planes and curves that underlie the detailing. Defining and smoothing these shapes was done before any of the fine-detail carving began.

