Carving a Scallop Shell

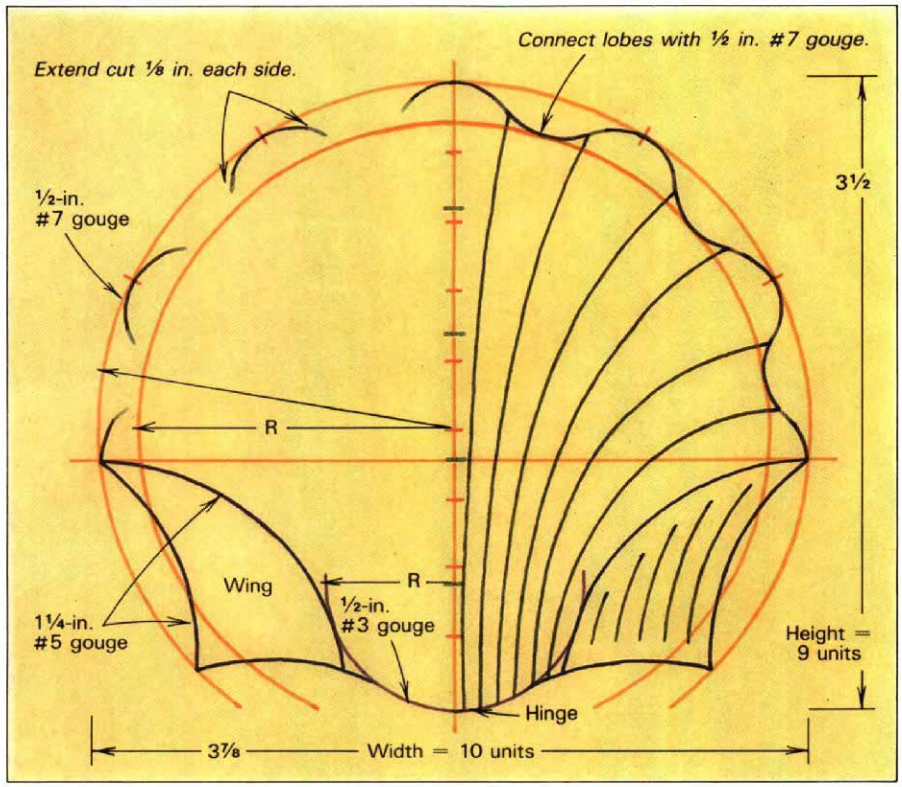
Gouge's sweep determines the curves

by Mack Headley, Jr.

Fig. 1: Laying out the shell

A. Divide height into 9 units (red) and draw arcs to define lobes and wing corners. Divide height into 5 units (blue), draw arc to define hinge and line to locate outer rays.

B. Outline perimeter with imprint of gouges shown.



C. Sketch in lines to define convex and concave rays. Save for reference. Make concave rays slightly narrower than convex rays.

The shell was a very popular detail on English and Colonial furniture throughout the 18th century. Carved on drawer fronts, knees of cabriole legs, and the crest and seat rails of chairs, the shell was appreciated as more than just decoration. The study of nature was fashionable at the time and artisans attempted to analyze, and capture in their designs, the symmetry and proportion they found in natural forms. Classicism was also in vogue, so symbolic meanings (the Greek goddess Aphrodite arose from the sea on a scallop shell) would have added a dimension to its popularity which is hard for us to appreciate today. Yet the shell's appeal as a decorative detail endures.

In this article, I'll go through the step-by-step development of a shell. This particular shell is a style common on Pennsylvania furniture. I've chosen to carve an applied shell—one that will be glued onto a flat surface. You can apply the carving techniques to carve shells directly on drawer fronts or crest rails.

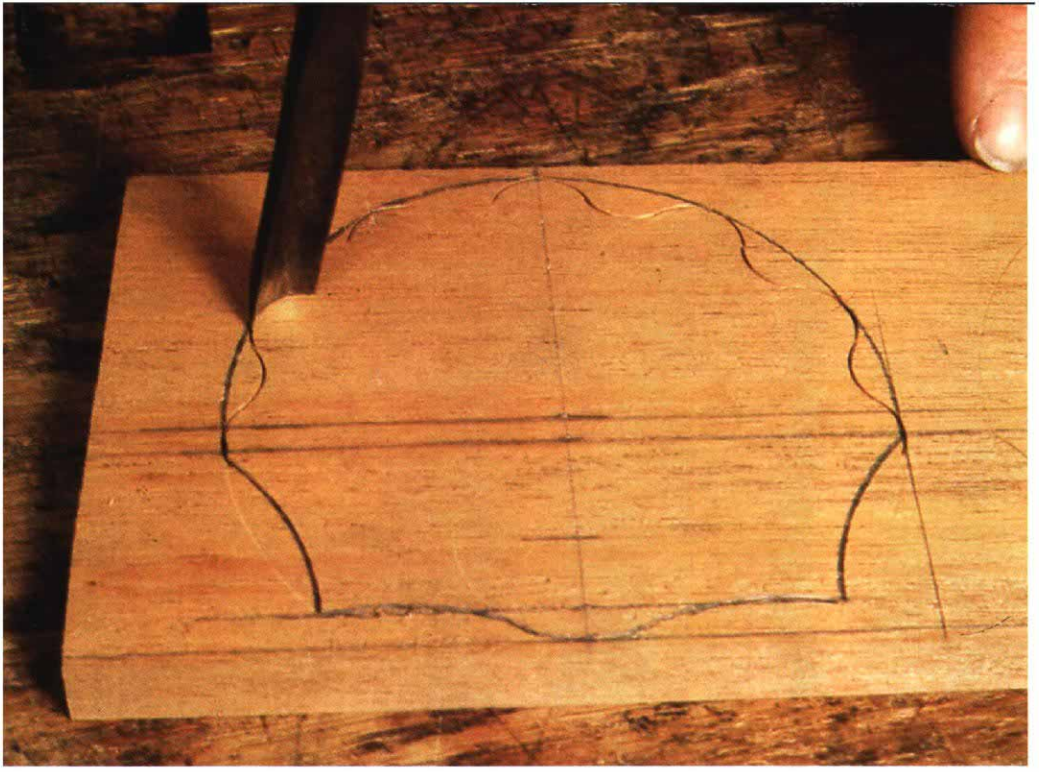
Carving gouges are made in various widths and curvatures. The curvature, or sweep, is designated by a number from 1 to 11. The higher the number, the more pronounced the curve. Curves are carved by selecting gouges with the appropriate curvature and transferring their shapes to the wood.

Make a full-size drawing of the shell on paper or wood, following the layout shown above. The perimeter is defined by the imprints of the gouges shown. These same tools will later be used to carve the shell. The sweep numbers given correspond to my gouges. Because sweeps are not standardized, however, you may find that your gouge doesn't exactly match the curve in the drawing. In that case, choose another gouge to get the right shape.

This shell measures 3½ in. high and 3⅞ in. wide, based on proportions of 9 units high by 10 units wide. By using these proportions, you can scale the shell up or down to suit your needs. The lines between the rays are drawn freehand, pivoting off the knuckle of the little finger to control the curve. Save the final drawing as a reference for laying out the rays on the carving.

Mack Headley, Jr. is master cabinetmaker at Colonial Williamsburg, Va. A videotape of Headley carving the shell in this article is available from Taunton Press.

Drawings: Lee Hov

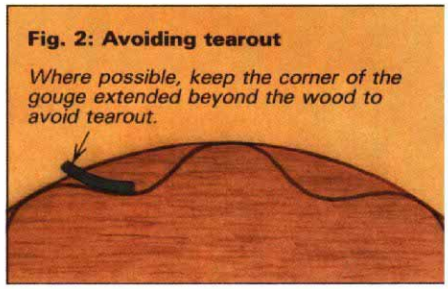


1 With dividers, lay out the perimeter of the shell on the back side of a ⅝-in.-thick board, as shown in the photo at left. For a beginner, it might be more comfortable to start with a paper pattern traced from your drawing, although I'm inclined to stay away from paper patterns because of the bloated character caused by the thickness of a pencil line. Outline the perimeter with the gouge imprints shown.

The next step is to saw out the blank on a bandsaw or with a coping saw. Saw slightly outside the gouged outline of the wings and hinge, and around the arc that defines the limits of the convex rays. It isn't necessary to saw in and out around the lobes because it's easier to remove this material with a gouge.

Lay out the perimeter of the shell on the back side of the board. Then outline the perimeter with gouge imprints (left).

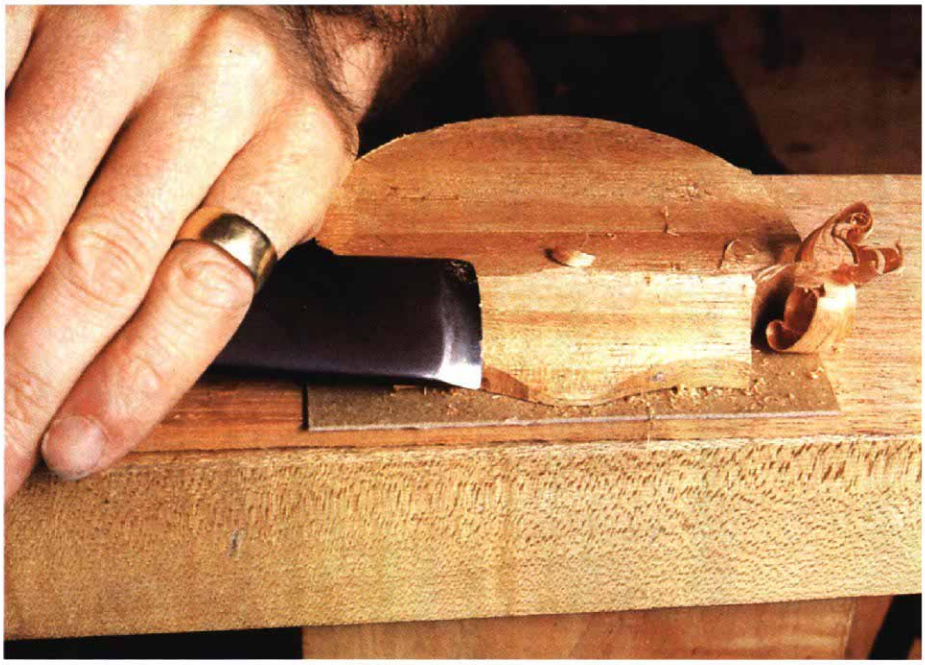
After sawing around the perimeter, cut to the imprint line with the appropriate gouge. Angle the tool so the bevel is vertical, then lean into the tool and push down with your weight. Cut down 3/16 in. and lever out the chip.



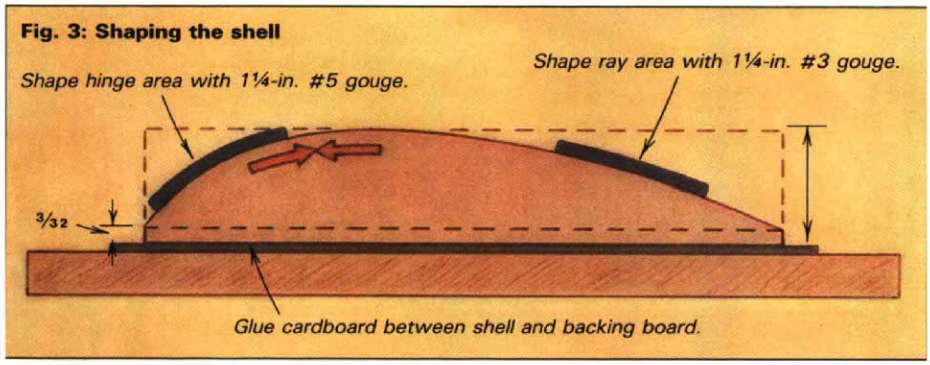
2 Next, with the appropriate gouge, cut right to the line. Angle the gouge so the bevel is vertical, and cut straight down 3/16 in. The force comes from the forearm and body. Lean into the tool and push down with your weight, as shown in the photo at left. Lever out the chip at the bottom of the cut. These bordering cuts establish the edge around the bottom of the shell, as shown in figure 3.

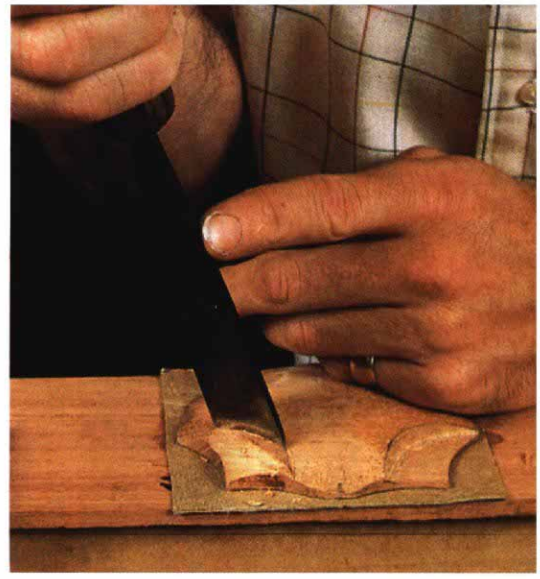
Remove the wood from the concave rays first. Be careful that the corners of the gouge don't get under the grain at points where the outline runs diagonally across the grain. The danger of tearout is greatest at the tip of the center ray, where the cut follows the grain, and least at the tips of the outer rays, where the cut is across the grain. Try to keep the corner of the gouge extended beyond the limits of the wood as much as possible, as shown in figure 2.

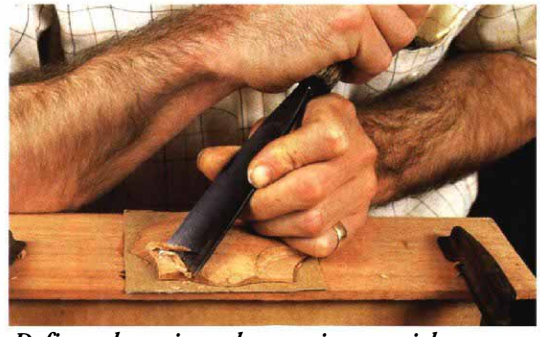
You can remove the wood at the side of the wings with little chance of tearout. If you have a lot of wood to remove or you are working with especially hard wood, shear across the grain diagonally with a skewed cut.



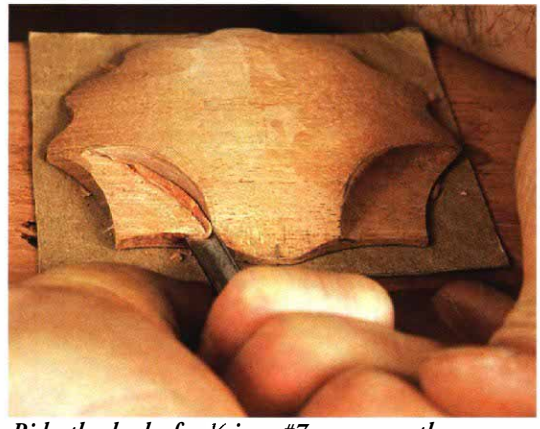
Sculpt the shell surface by transferring the shape of a 1¼-in. #5 gouge to the hinge area and a 1¼-in. #3 gouge to the ray area. The #5 cuts (top) follow the grain while the #3 cuts sweep from the center ray down to the wings on each side (above, left and right). The gouge should lie evenly on the finished surface.







Define the wings by cutting straight down with a 1¼-in. #5 gouge (top) and levering out the chip (above).



Ride the heel of a ¼-in. #7 gouge on the shoulder left by the #5 gouge to create a radius at the bottom of the shoulder.

3 After you've outlined the perimeter, glue the shell, layout facedown, to a board about 14 in. long, with a piece of cardboard in between. I use hide glue, but any water-soluble glue will work.

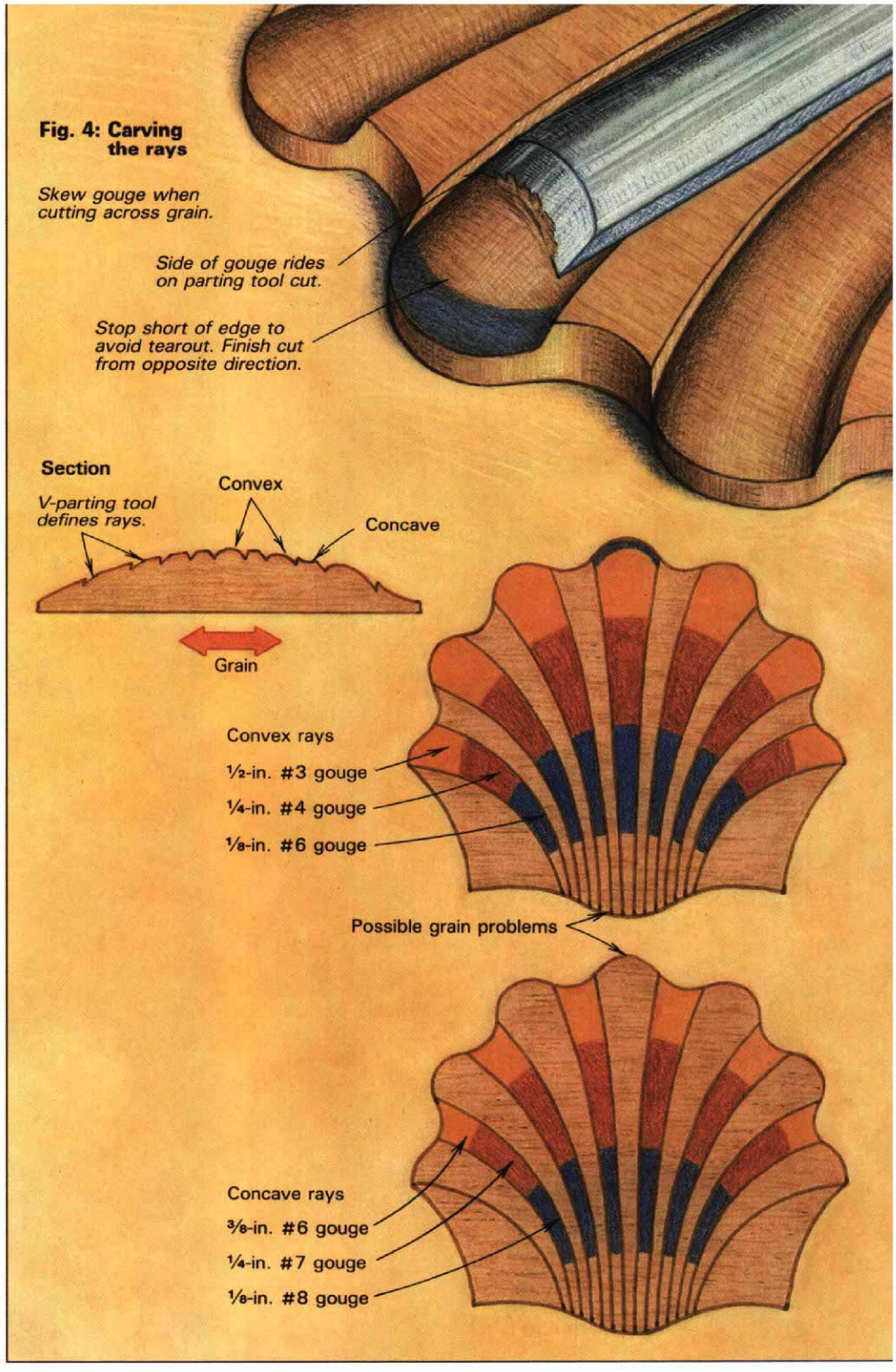
The next step is to sculpt the surface of the shell. The curvature at the hinge area is formed by a 1¼-in. #5 gouge, cutting with the grain as shown in the top photo. When the #5 gouge lies evenly over the hinge portion, shape the flatter portion of the shell with a 1¼-in. #3 gouge.

With these cuts, your wood will begin to reveal itself. Unless your stuff has very even grain, you'll have to adjust your cuts to the direction of the grain. Begin the cuts with the 1¼-in. #3 gouge, working from the tip of the central ray out toward the outer rays at the wings. These cuts, sweeping diagonally across the grain, should work cleanly across the most distorted grain patterns. Blend the cuts from the #3 gouge into the curve from the #5 gouge. The surface is finished when the #3 gouge lies evenly over the surface of the shell up to the junction of the #5 curve.

4 Remove most of the extra wood at the wings with the 1¼-in. #5 gouge. With the tool held vertically, cut straight down to within ¼ in. of the back of the shell and lever out the chip. Then, ride a ¼-in. #7 gouge along the base of the vertical shoulder that you just cut, working from the hinge to the tip of the outer ray, to create a radius at the bottom of that vertical shoulder. Ride the heel of the gouge at a low angle against the shoulder and raise it until it begins to cut. Reduce the wing surface to a 3/32 in. thickness with a ½-in. #2 gouge.

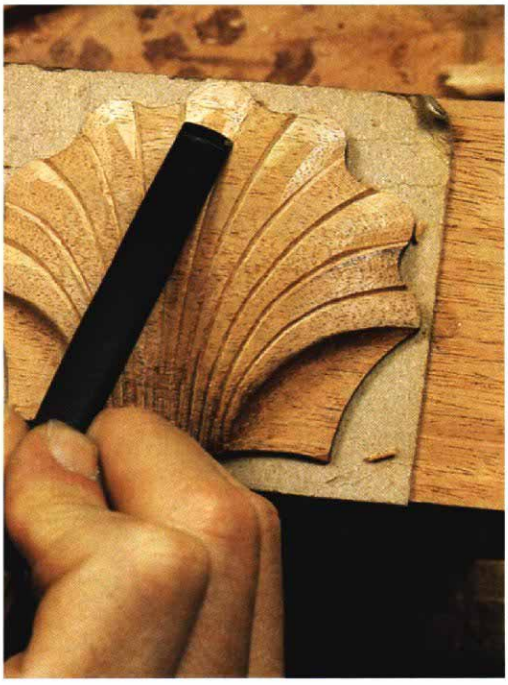
Pivot off your knuckle to control curves when drawing the rays (top). Define the rays with parting tool cuts (above). Adjust spacing by leaning the tool.

5 After the wing areas are completed, draw the rays on the sculpted surface of the shell. Follow your layout drawing and practice the technique of pivoting on your knuckle to control the curves. With a V-parting tool, make shallow cuts along these lines to separate the rays, working from the high center point of the shell toward the edges. This is an opportunity to read the grain of your wood, and to determine from which direction final cuts need to be made. The edge of the V bordering the concave rays will be saved, as shown in figure 4. Give special attention to the cuts that go across the grain diagonally. A very sharp V-parting tool will make these cuts with minimal tearout, but if tearout does occur, come in from the other direction and clean it up. The area of greatest difficulty will be at the hinge portion, where the cuts run straight across the grain, 3/32 in. apart. Be careful not to tear out the wood between these cuts. To prevent tearout at the edge, stop the cut just short of the edge and complete it from the other direction. You could also make a vertical cut with a straight chisel. After the shallow cuts are made, deepen them to a strong 1/16 in. at the rays, tapering to a strong 1/32 in. at the hinge. As you deepen these cuts, this is your last chance to adjust them sideways for good spacing and flowing curves.



6 The next step is to shape the areas between the parting tool cuts into convex and concave rays. Because the rays diminish in width from the tip to the hinge, several different gouges will be needed to shape the full length of each ray, as shown in figure 4. The transition areas, where the curve produced by one gouge meets the curve from another, will need to be blended to get a smooth, flowing line. Strive to produce a finished surface with your tool so there's little, if any, need to sand.

Begin with the convex rays, starting about 3/4 in. from the tip and working out toward the edge with a 1/2-in. #3 gouge. Be careful not to tear out the edge when you're cutting across the grain. Cut down to the bottom of the V left by the parting tool and ride the side of the gouge against the shoulder left by the parting tool cut, as shown in figure 4. If the corner of the gouge cuts into the facet, you will ruin your work, so be careful. At its tip, the ray should show the full curve of the gouge. Shape the first 3/4 in. of all the convex rays with the same tool, then switch to a 1/4-in. #4 gouge to shape the



Shape tips of convex rays with a ½-in. #3 gouge, carefully avoiding tearout on cross-grain cuts (above). Left hand helps control the tool on concave rays (below).

Cut from the bottom upward with a 1/16-in. #11 veiner to carve the veins in the wings.

The finished shell is ready to be separated from its backing and glued on a piece of furniture. The curves and flats are designed to catch and play with light and shadow.

next 1 in. or so of each convex ray. Lastly, switch to a ⅛-in. #6 gouge to shape the remaining section. Cut in the direction of the hinge on this last section.

Shaping the concave rays will also require a series of gouges. Again, be careful when the gouge exits across the grain and at points where the gouge cuts against the grain on the diagonal. You don't need to shape the concave rays at the hinge area, where they are spaced only 3/32 in. apart. The parting tool cut alone will give the desired visual effect in the hinge area.

7 The last detail will be to cut the five small veins on the wings with a 1/16-in. #11 veiner. These break up this large, flat surface, and accent the linear quality of the hinge area. The cuts should run parallel to the side curve of the wing and be spaced about ⅛ in. apart. Enter the wood with the veiner perpendicular to the surface to capture the full curve of the tool as it enters the wood. As with the parting tool, you may want to make a shallow cut and adjust the spacing by leaning the tool to the side. The veins should be a shallow 1/16 in. deep. Dragging the veiner back through the cut burnishes and polishes the surface.

Some areas may need a light sanding with worn 220-grit sandpaper, folded to get into corners. Be careful not to round off the crispness of sharp corners and ruin the definition they should give when the finish is applied.

To remove the shell from the backup board, slip a thin knife or palette knife between the layers of cardboard and gradually work it under the shell until it is free. The excess paper can be removed by lightly wetting it with water to soften the glue. Your shell is now ready to be glued in place. □