

SHAPING A CELLO FINGERBOARD

PETER GOODFELLOW explains his technique for producing a fine ebony fingerboard



Violin maker and restorer Peter Goodfellow, originally from Australia, now lives and works in north-east Scotland

The majority of violin makers say that working on ebony fingerboards is their least favourite job. Ebony is difficult to work with: it blunts the sharpest of plane blades; and if the dust it produces – which migrates to even the furthest-flung corners of the workshop

– gets near the unvarnished white wood of a new instrument, the results are less than spectacular.

It helps if you have a concept in mind of what a nicely shaped cello fingerboard should look and feel like. As for shape, if you look along the barrel of a fine English sporting gun you'll see that it has a graceful rise along its length that is combined with elegance and a fine finish. A fingerboard is similar in the sense that the sides flare out and it rises along its length towards the widest end. The overall feel and look of the finished fingerboard is of the utmost importance to the player and their instrument.

Preparing a cello fingerboard is a challenge, and my method follows steps that allow me to achieve a consistent result each time.



ALL PHOTOS: JULIE GOODFELLOW

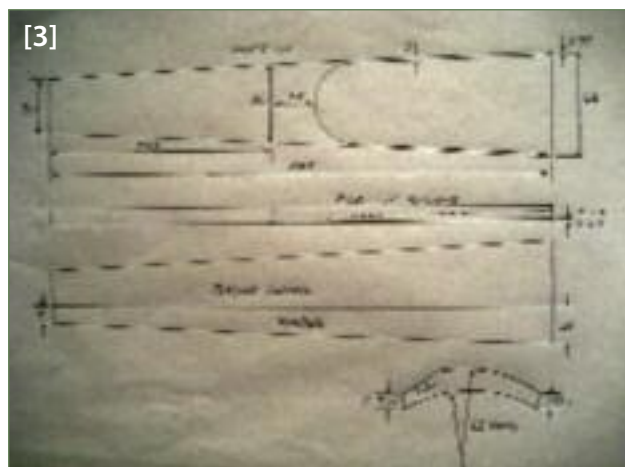
Three holders used for shaping fingerboards



Planing the underside

[1] I use three holders when shaping fingerboards. The holder on the left of the picture is used for planing the unshaped ebony blank and finishing the underside. The one in the middle is for holding the blank in the vice when planing the sides and also doubles as a counterform when gluing the board on to the neck. The third one is for holding the board when shaping and finishing the playing surface.

[2] I begin by planing the flat side that will become the gluing surface, using a straight edge to check for flatness and straight-edged winding sticks to check for any twisting along the length.



Measurements to be marked out on the fingerboard

[3] I mark out on the fingerboard the measurements as shown in the photograph, with white chalk on the ebony. For this cello model the fingerboard length is 585mm. I remove any excess from the widest end of the fingerboard, which allows me flexibility when tuning it, and square the ends with a file and flat sanding block.

To calculate the fingerboard length for positioning the notes on the end of the fingerboard in the upper register of the A string I use the following proportions of the swinging string length (the length of the string at the correct pitch measured between the top nut and the bridge): E = 0.84; F = 0.85; and F sharp = 0.859.



[4] Planing the side so that the fingerboard is square

[4] I plane the sides squarely to the marked lines, stopping proud of the marks, which will later be removed during final neck shaping.

With the sides planed square and to the correct dimensions, I now plane the relief on the underside of the fingerboard. I plane it from the point where the neck ends, reaching the maximum depth at the widest end of the board. I go to 0.8mm on the A-string side and 1.0mm on the C-string side. The reason the hollowing is introduced into the playing surface is so that the string will always vibrate freely in front of the finger when the string is stopped.

The relief allows the hollowing in the playing surface to be planed without reducing the edge thickness in the middle, allowing the sides to stay parallel. It also helps to accentuate the gun-barrel effect when sighting along the fingerboard.



[5] The playing surface profile marked on the nut end of the fingerboard

[5] Using a marking gauge, I mark the height for the sides: 7.75mm on the A-string side and 7.25mm on the C-string side. The 0.5mm difference allows me to incorporate a slant to the C side in conjunction with setting the neck for bow clearance in the C-bouts.

Once the heights for the sides have been established, I mark out the playing surface profile at each end of the fingerboard. The angle of the Romberg (the flat area on the fingerboard under the C string that was introduced by the innovative German cellist Bernhard Romberg in the 19th century) is marked on the C side at 30 degrees to the gluing surface, with its width 9mm at the nut end and 20mm at the bridge end. The radius to join the Romberg is 62mm from the A side.



[6] Planing the Romberg

[6] In order to plane the Romberg, I spot-glue (with Superglue) the fingerboard to its holder, using wooden shims to pack the free end. The Superglue – which I use sparingly – is easily scraped off afterwards.

To achieve a flat and true surface for the Romberg I finely set the plane and, holding it at a slight angle to the planing direction, plane in one continuous stroke along the full length until the height of the side and the angle are correct. I use a bevel square to check the Romberg angle. If the angle deviates along the length then the resulting surface will be twisted. I check with a straight edge and a depth gauge that the correct hollowness has been achieved. The hollowing is usually at its deepest point at approximately the place where the neck ends.



[7] Using a template to check the profile of the radius on the playing surface

[7] I now plane the radius, checking with a template as I go along and ensuring that I keep a crisp straight line where the radius and the Romberg meet. I mark this line with a pencil to aid the process.

The template I use is for the radius only. If you try to shape the fingerboard with a template that incorporates both the Romberg and the radius, the resulting angle and radius will be incorrect and the fingerboard will be the wrong shape.

When planing, I find that working methodically from side to side rather than haphazardly gets the job done in the least time. Pencil lines drawn on the surface help me to see where I have been. My aim is to achieve the best possible finish with the plane before final finishing. A damp cloth periodically wiped over the fingerboard helps the planing process and keeps dust to a minimum.



[8] Checking for high spots with a straight edge

[8] I use a small straight edge placed along the length to check for high spots. If I find any, I correct them, aiming to achieve a continuous free-flowing shallow curve from end to end.



[9] Checking hollowing for string clearance

[9] I always check with both a straight edge and a depth gauge that the correct hollowness for string clearance has been achieved.



[10] Smoothing the radius of the playing surface with a curved sanding block



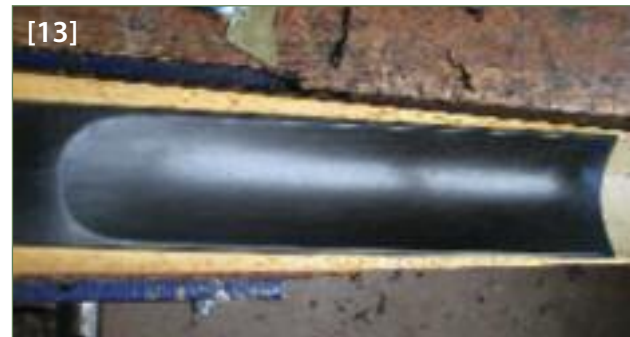
[12] Shaping the underside scoop

[10] I smooth and finish the playing surface using a curved sanding block with a radius slightly larger than that of the fingerboard. I first sand obliquely across the radius (thus removing the facets left by the plane blade) before sanding along the length. I take care not to 'sand away' the correct radius by checking with the template, and I am careful not to lose the crisp line where the radius joins the Romberg.

Working from a medium- to a fine-grade sandpaper and wiping the board with a damp cloth between grades helps produce a fine finish. For the Romberg and the sides of the fingerboard I use a flat sanding block. For final polishing I use 2,400-grade micromesh and wipe the surface with a fine metal polish and Danish oil. Doing this a few times produces a surface with a durable and satin finish.



[11] Trimming the underside of the radius with a sharp knife



[13] The finished scoop

[11] To finish the scoop on the underside of the fingerboard, I use a sharp knife to trim to the marked shape.

[12] For the scoop in the underside I mark the edges at 2.0mm, flaring the ends to 0.75mm at the widest end. At 25mm from the neck root I mark a radius to join these lines. Using a thumb plane, I remove the excess wood to the marked lines. I usually finish the scoop last and vary its length and depth when tuning the fingerboard.

[13] For final shaping I use a shaped scraper and a small sanding block, taking care to keep a crisp profile on the end. Finally I sand the end and polish.

NEXT MONTH >> David Burgess describes his technique for stabilising cello necks