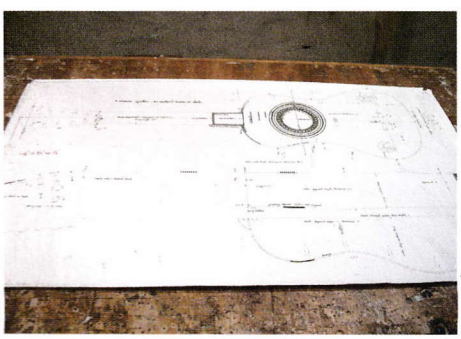
BAROQUE BEAUTY PART 1

The overall shape and form of the Baroque guitar is very similar to the Spanish/Portuguese 'vihuela', explains **Shaun Newman**, as he takes us through the first steps for recreating one of these stunning instruments

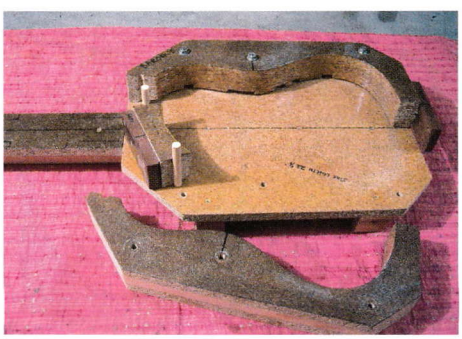
The term 'Baroque' comes from the Portuguese word 'barroco', which is a misshapen pearl. How odd! Originally it was a pejorative term, meant to describe flamboyant and ornate architecture, which seemed to be sprouting up across Europe out of control. Over time, however, it described one of the most fascinating periods for culture and of course for music, which lasted almost 200 years.

The Baroque guitar began to replace both the Renaissance lute and guitar during the 16th century and the first historical record seems to be in the mid-16th century Spanish book *Declaracion de Instrumentos Musicales*, by Juan Bermudo, published in 1555. But where did it come from? Musicologists believe the word 'guitar' derives from two Persian words: 'tar' meaning string, and 'char' meaning four, and many of these very early instruments had just four strings. By the Baroque era, however, the number had risen to 9 or 10, arranged in five courses. A course is usually a pair of strings, and sometimes a single. The guitars also had gut frets tied around the neck and fingerboard, which were moveable to help with the fact that tuning had not yet been standardised to A=440Hz (where the note 'A' is that above middle 'C'). These features gave the Baroque guitar its unique appearance.

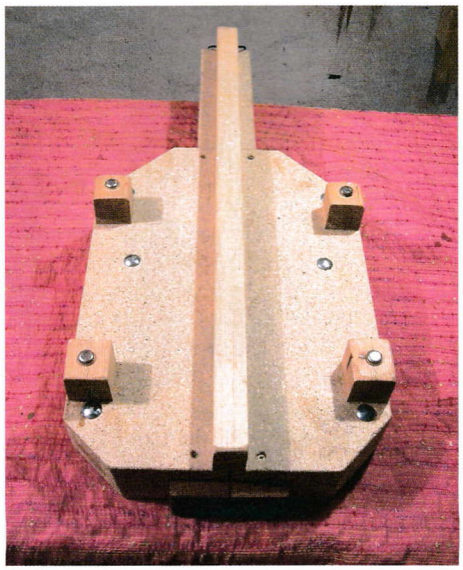
The overall shape and form of the Baroque guitar is very similar to the Spanish/Portuguese 'vihuela', but the two should not be confused as the vihuela has different roots. In essence the vihuela is a flat-backed lute, tuned in a similar way, and with a similar repertory. The Baroque guitar has rather more in common with the Renaissance guitar than the vihuela. The instrument pictured and described in this series of articles does not have the normal 9 or 10 strings but just 6, and fixed frets, as quite simply I wanted to play it in the manner of a standard six-string classical guitar with modern



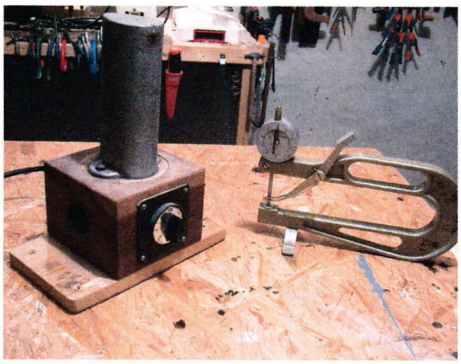
1 An example drawing of a Baroque guitar



2 The components of the mould



3 The underside of the mould with strengthening bar



4 Some specialist tools

5 The 1m long mahogany billet used to make the neck

6 A scarf joint cut at 14° for the headstock

tuning. The five course instruments of the 16th and 17th centuries would have been tuned in the 're-entry' tradition. This means that the first two courses would be at a higher pitch than subsequent ones. I would have had to spend hours getting used to such an unfamiliar setup!

So, if the instrument is only in the Baroque style, and therefore not truly authentic, why make one? For me it is the challenge of creating an instrument of such beauty, elegance, complexity and sheer style in a way that I could play it. The inlay work, the parchment rose, the peg head and the fingerboard all offer exciting challenges just asking to be overcome.

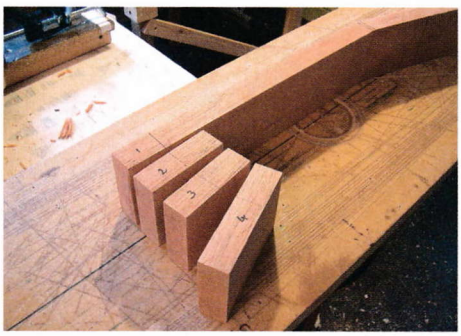
Materials

Baroque guitars were made from many different timbers, but a fairly consistent choice involved maple. Supplies of this wood have always been plentiful in Europe, and that is certainly one of the reasons for its selection. Similarly spruce is in plentiful supply, and luckily extremely resonant, so is most often the timber used for the soundboard. I felt it would be good to add some contrasting colours to the design, so pulled out some mahogany from my timber store to help make up the back and ribs (i.e. the sides of the instrument), as well as some rosewood for bindings and some of the inlays. The neck and headstock are of cedar and the bridge, pegs and fingerboard ebony. Other timbers are used here and there, which will be described later. The intricate rosette is made from calfskin vellum, and is usually described as a 'parchment rose'.

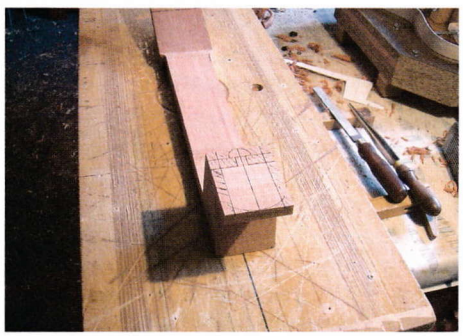
First considerations

Before starting to build any instrument, consideration must be given to both the dimensions and the method of construction. The dimensions are relatively easy to determine if a drawing is obtained. There are several available online and mostly they are to scale (**photo 1**) – see supplier list at end of article. I would strongly advise getting hold of one as a guide throughout the build. Most classical guitars are made using one of two methods, either a workboard or a mould, I chose the latter as it holds everything very securely during construction and can be used over and over again.

The components of the mould are mainly made from 18mm chipboard (**photo 2**). Running along the length of the underside is a 30 × 40mm baton to help keep the neck support rigid, and four blocks were introduced to help raise the mould from the workbench to allow cramps to be used when it came to fitting the back (**photo 3**).



7 The blocks that will make up the heel



8 The slipper heel marked out

9 A dovetail saw is used to cut out the slipper heel

10 The heel slot is chiselled out

Some makers will give the mould a slight lowering of the headstock end of that part, which supports the neck. This will eventually allow the neck to tilt forward slightly ensuring the strings will reach the bridge without buzzing on the frets. The tilt is just 1.5mm from the heel end of the mould to the end of the neck support. The mould that I have used here is created flat as the bridge and saddle that I have designed will lift the strings sufficiently to avoid buzzes. This process will be explained later.

Some specialist tools are usually required – for example, a thicknessing gauge and a bending iron (**photo 4**). Both of these are commercially available, but can be home-made – there are several clips on, for example, YouTube describing how to make them. Other specialist tools needed will be explained as they are referred to in the text.

Most other requirements are usually to be found in a reasonably well-equipped workshop; however, some specialist punches can be useful when it comes to making the rose.

Some useful measurements

Before proceeding, and whether you have a drawing or not, the following measurements may be of help:

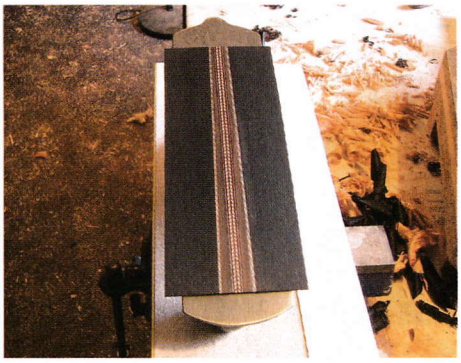
- Overall length of finished instrument – **910mm**
- Width at lower bout – **260mm**
- Width at waist – **156mm**
- Width at upper bout – **195mm**
- Body depth at tail - **98mm**
- Body depth at heel – **94mm**
- String length from inside edges of nut and saddle – **628mm**
- Width of fingerboard at nut – **48mm**
- Width of fingerboard at fret 12 – **58mm**
- Thickness of neck at frets 1, 7 and 9 – **21mm, 25mm, 25.5mm**
- Radius of sound hole – **42mm**
- Length of headstock – **187mm**
- Width of headstock at widest point – **78mm**
- Thickness of headstock, including face and back veneers – **16mm**
- Bridge length including mustachios – **215mm**
- Soundboard and fingerboard thickness – **3mm**
- Thickness of back and sides – **2mm**
- Action at fret 12 – **3mm treble, 4mm bass**

The head & neck

Some makers begin the build by making up the ribs or the soundboard; others begin with the neck, which is the approach I chose. This part of the instrument is made from a billet of mahogany 960mm long, 76mm wide and

11 A straightedge helps

12 The slipper heel looks a bit more elegant



13 The headstock veneer

25mm thick (**photo 5**). The first operation is to create a scarf joint at one end to give the headstock its characteristic angle. This angle is normally around 14° (**photo 6**), then sections are cut from the opposite end of the billet to make up the heel block, which is later carved into a conical or tapered shape (**photo 7**). This method of construction is known as the 'slipper heel' and is the traditional way the Spanish makers have constructed their guitars over several centuries. The slipper part will support one end of the back when it is put on, and the heel helps to locate the ribs securely. The form of the slipper and heel are marked out on the timber (**photo 8**), cut out with a dovetail saw (**photo 9**) and the waste material from the slot is chiselled out (**photo 10**). As the bottom of the slot must be dead flat it should be tested with a straightedge (**photo 11**). These slots will later accept tapered wedges to ensure a very strong join between the heel and ribs. Finally, the slipper, the heel and the slots are cleaned up and made to look just a little elegant (**photo 12**).

Before the headstock is shaped it is normal to put a veneer on the face, this one is made from a thin piece of ebony no more than 1.5mm thick and is backed by a sycamore veneer (**photo 13**). I chose to inlay the headstock face with a tapered insert made from rosewood with some slant check purfling made into a herring bone. The whole insert was bounded at either edge with white/black/white purfling – see supplier list to obtain purflings. On this occasion I also chose to put a veneer on the back of the headstock as well, this time made from ziricote with a herring bone purfling running through the centre. These veneers with their inlays are made up in a simple flat jig made from plywood with blocks and wedges to push the component parts together as the adhesive is curing (**photo 14**).

To ensure a clean line to the shape of the headstock I glued a small sheet of 1mm model maker's ply, which is made from birch, offering a pale background to the black lines that were transferred from a template made from the drawing and acted as guides for cutting out the outline (**photo 15**). As there are several small curves in the design, I attached blocks to either edge of the headstock to avoid any splitting when they were removed on the pillar drill (**photo 16**). After the drill and bandsaw had completed their tasks (**photo 17**), the ply sheet had to be removed. A Stanley No.80 scraper plane works very well here, and it was intriguing to see the patterns of the face veneer slowly emerge (**photo 18**).

The tuning pegs

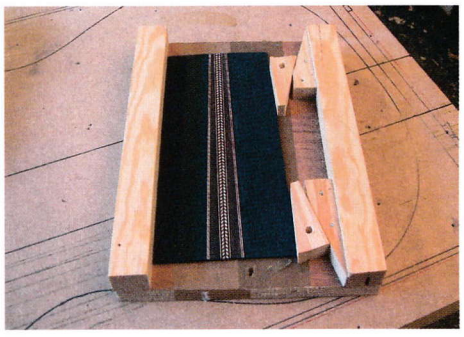
The pegs for this instrument are made from ebony, though boxwood, rosewood or fruitwoods may be used. It can be quite tricky making a set that has each peg identical to all of the others unless you are an experienced turner, so it may be simpler to buy a set in (**photo 19**) – see supplier list at end of the article. Each peg should have a 1:30 taper along the shank, which is normally the taper found on a violin/viola reamer. I recommend buying a reamer first, establishing the taper ratio, and proceeding from there.

As mentioned earlier, a baroque guitar has nine or 10 strings. Even if nine strings were used, a tenth peg was fitted for symmetry. The holes for each peg are drilled through the headstock in the positions marked out on the veneer. Each hole should be no larger than the diameter of the reamer at around 5mm from its end. The peg is then made to fit after carefully reaming all of the holes. Take out too much and the peg will slip right through to the end, and too little it will not pass through the headstock (**photo 20**). The pegs should protrude by around 2cm to allow a small hole, 1.5mm in diameter, to be drilled through the end to allow the string to be wound on.

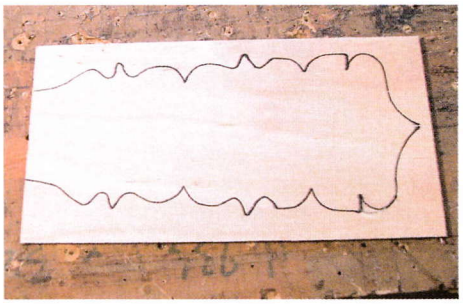
Making a peg shaper

Even if the peg holes are reamed very carefully, the pegs may have to be shaped for a perfect fit as even factory made ones are not identical. Peg shapers are commercially available, but can be expensive, costing up to £200. It is very easy to make one yourself. All that is needed is a block of hardwood measuring 10cm square and around 15cm long. The block is sawn in half lengthways and the two halves are held together along one edge with a heavy hinge (**photo 21**). A hole is then drilled down through the block where the two inside faces meet to a depth of around 10cm. This hole is then carefully reamed along its length. This ensures the two faces that meet have a housing shaped exactly to the profile of the reamer. I have also found it useful to make my own peg winder, as even the best fitting ones can be difficult to turn (**photo 22**).

The shaping itself is done with a sheet of abrasive placed along one of the inner faces of the shaper and when it is closed onto a peg and held firmly, the peg is rotated until it has even wear along the length of the shank. This ensures a snug fit into the headstock. Care must be taken not to take too much off the shank, otherwise one peg may protrude more than the others, thus destroying the symmetry (**photo 23**).



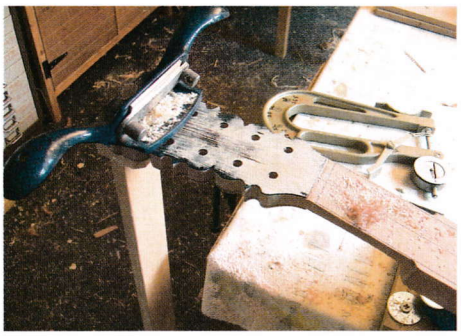
14 The jig that holds the headstock veneer together



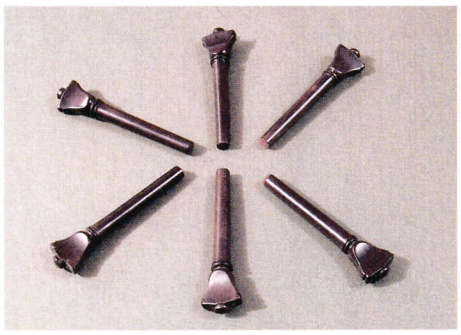
15 The headstock design transferred to model maker's ply

16 Avoiding splits on the edges of the headstock

17 The final shape of the headstock



18 The scraper plane in use



19 A set of commercially available pegs

20 Reaming the peg holes

One thing I always find useful while reaming these holes is to make up a mock headstock showing the position of each individual peg. This then ensures that if there are any differences, they will be returned to the hole specifically reamed for that peg and that one alone (**photo 24**).

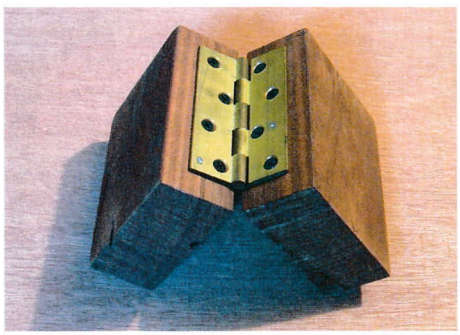
The fingerboard

This is made from a billet of ebony measuring 254mm long and 60mm wide. It is planed down to a thickness of just 3mm (which will be the same thickness as the soundboard), and it is tapered from 48mm at the nut end to 58mm at fret 12. The taper is indicated by strips of masking tape (**photo 25**). The overall string length of the guitar – the distance between the inside edge of the nut and the inside edge of the saddle – is 628mm and the fret spacings are as follows. Fret 1 – 35mm from the nut; fret 2 – 68mm from the nut; fret 3 – 99.5mm; fret 4 – 129mm; fret 5 – 157mm; fret 6 – 183mm; fret 7 – 208mm; fret 8 – 231.5mm; fret 9 – 253.5; and for later reference, fret 10 – 274.5; fret 11 – 294.5; fret 12 – 313mm. Fret 12 is normally the halfway position for the whole fret layout; however, a small extra length is added overall to help cope with 'compensation', which allows for minor variations in pitch due to the string being pressed down onto the fret and thus adding to the tension. Here the expression is 'intonation'. The tiny bit of compensation sorts out a number of intonation issues.

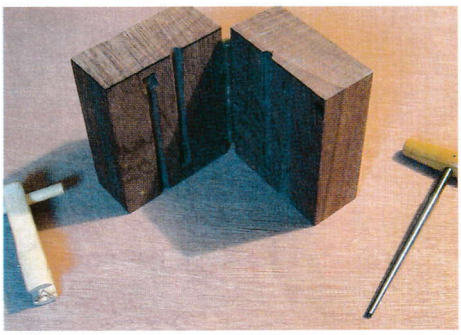
The frets are then tapped into place later on in the build (this process will be explained later). The upper part of the fingerboard can now be fitted to the neck. I always drill four small holes (1.5mm in diameter) through the fret slots at 1 and 8, and tap four hardboard pins in to hold the fingerboard in place as the adhesive cures. If this precaution is not taken and the fingerboard slides out of line as the adhesive is curing, it will be impossible to tune the guitar correctly later on (**photo 26**).

The ribs: making, shaping, strengthening & bending

Having looked in detail at a number of images of Baroque guitars, I wanted to make the ribs decorative and this is where I began to use the mahogany I had been keeping for some time. I cut out two strips at around 24mm wide (**photo 27**) and brought them down to a thickness of around 1.5mm. The length of each was 640mm, which allowed for some overlap to be trimmed back at a later stage. The remainder of the ribs were made from maple, treated in a similar fashion. To set off the contrast, I inserted a strip of black tulipwood between the joins making for quite an attractive feature (**photo 28**). The components were held in my 'wedge and lace' jig until the adhesive cured (**photo 29**). Given the fragility of the ribs so far, just 1.5mm thick with several glued areas, I decided to strengthen them before they were shaped and bent. Two sheets of sycamore veneers 0.5mm thick came to the rescue. A sheet was glued on what would each become the insides of the ribs and then their profile could be applied. This meant tapering them to the height of the heel from a point 250mm from the heel end. It is important to remember that a left- and a right-hand rib must be made, given that you would not want the sycamore on one side accidentally to face outwards (photo 30) while the other showed off the beautiful maple and mahogany! Once tapered, the ribs could be bent to shape on the hot iron. During this operation it is necessary continually to check that the bend you apply conforms to the inside edge of the mould. Once a good shape has been achieved, the ribs can be cut to length and a tailblock made to secure the lower end of the build so far. The block is made from mahogany that has been laminated in three parts to offer some side-grain to help secure the soundboard and back when they are attached. If both are glued onto end-grain, the join is less secure. The block is 15mm thick, 60mm wide and the height is that of the width of the lower end of the ribs (**photo 31**). In almost all guitars the join between the ribs

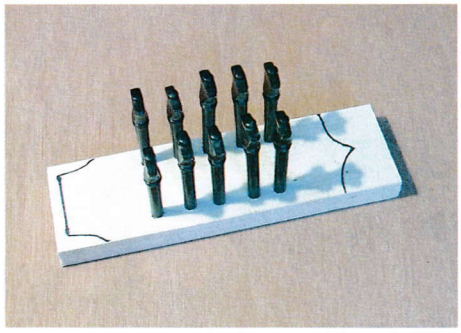


21 The peg shaper hinge

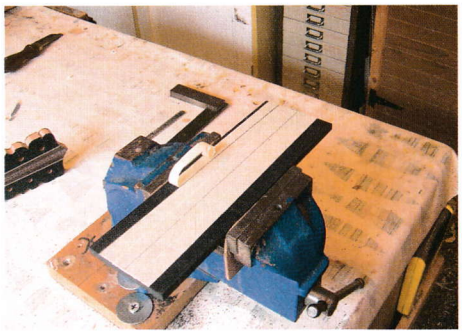


22 The peg shaper, reamer and peg winder

23 The peg shaper in use

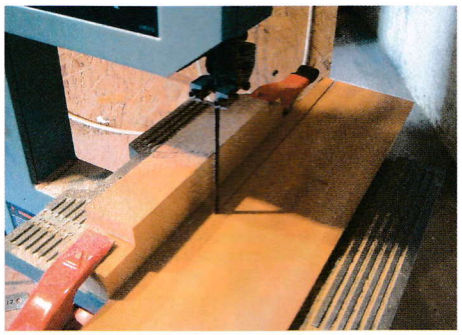


24 A neat way of organising the pegs

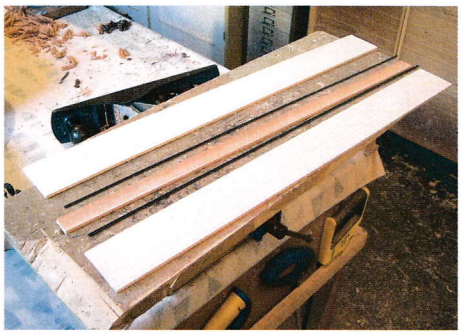


25 The fingerboard width shown with tapes

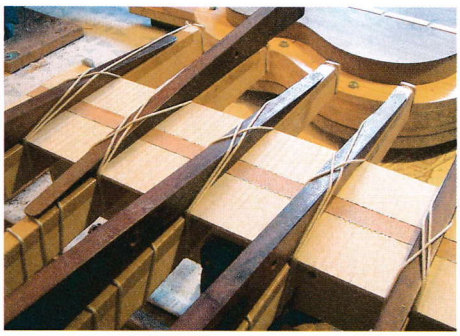
26 The fingerboard pinned in place



27 Strips of mahogany cut out on the bandsaw



28 The rib strips cut ready with tulipwood inserts



29 The ribs in the wedge and lace jig

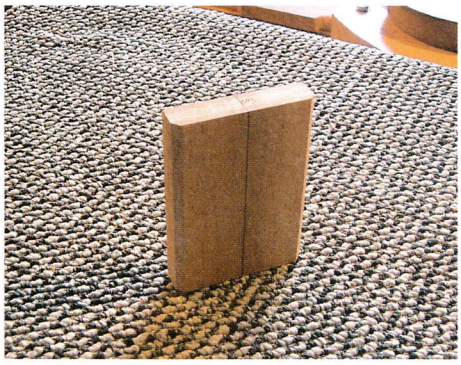
at the tail end is covered by an insert of one sort or another. Sometimes this involves a simple strip of rosewood or similar, but the join can have a more complex and decorative inlay. I chose to make one that would match that of the headstock. The tapered parts are placed into the jig described earlier and while the adhesive is curing a tapered housing is cut into the tail. A fine dovetail saw and sharp chisel (**photo 32**) are needed for this operation (**photo 33**).

Fitting the ribs to the heel

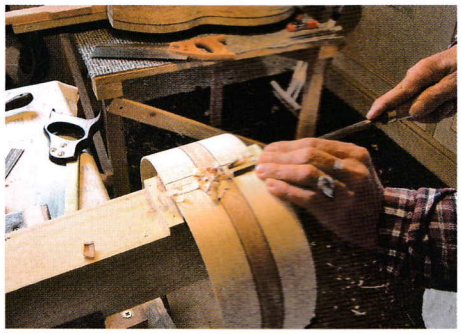
As mentioned earlier, two tapered slots are cut into the sides of the heel and wedges are used to secure the ribs. Before fitting, the ends of the ribs that will go into the slots have to be cut at an angle which conforms to the taper of the cone-shaped heel (**photo 34**).

It is as well to test the fit of the ribs dry, as the wedges must bring the two edges between the heel and ribs exactly together. If the wedge is too thin, a gap will appear; if it is too thick it will not run the full length of the join. Some makers hedge their bets by making up four wedges – two for each side – and tap the first two in from above, then remove the shell of the instrument from the mould and tap the other two from below. For me the challenge is to get the tapers spot on and to see no gaps (**photo 35**).

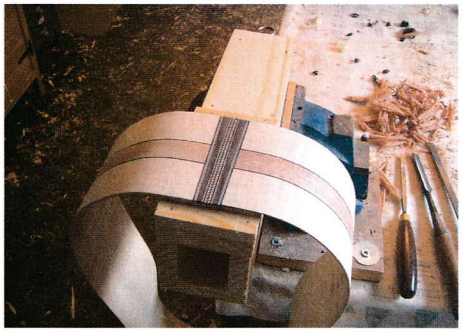
30 Bending the ribs on the hot iron



31 The tailblock completed

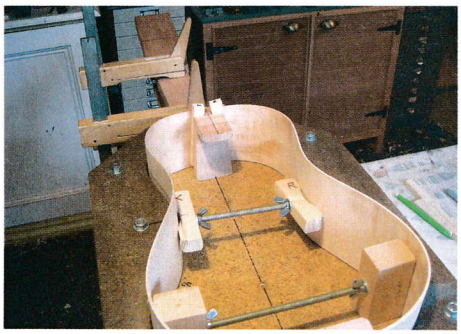


32 The tailblock housing is chiselled out



33 The tailblock inlay in place

34 The tapered rib ends are marked out



35 A dry fit of the wedge

SUPPLIERS

These suppliers stock everything from Baroque guitar tuning pegs, through to strings, finishes, tools, timbers, bindings, purflings, calfskin vellum, drawings/plans and books and videos on guitar making and in the one case (Elena Dal Cortivo.... and just look at her work!) complete parchment roses made in traditional patterns

- **www.stewmac.com** – for all materials, tools, plans, drawings and accessories, and in particular bearing-guided router cutters for purflings and bindings
- **www.tonetechluthierssupplies.co.uk** – for timbers, tools and rosettes (not parchment roses)
- **www.luthierssupplies.co.uk** – for timbers, tools and plans
- **www.madinter.com** – for tools, exotic timbers, baroque guitar pegs and many accessories
- **www.tonewoods4luthiers.co.uk** – for beautiful, exotic timbers and inlay materials
- **dictum.com** – for fine quality luthier tools and some fine timbers (especially Alpine spruce)
- **www.smallwonder-music.co.uk** – for inlay materials, purflings and m.o.p materials
- **www.eurofinishes.com** – for 'General Finishes' acrylic resin
- **www.luthiersnook.com** – good for Baroque guitar pegs
- **www.williamcowley.co.uk** – calfskin vellum for the 'parchment rose'
- **www.schreinerhistoricalguitars.com** – information source for help building a Baroque guitar
- **www.harmonialutherie.com**
  cincinnatiearlymusic.com – as above
- **www.parchmentroses.com** – just look at her work on parchment roses and gasp!
- **www.graphtech.com** – for 'Presentation Style' bridge pins with m.o.p. inlays
- **www.earlymusicshop.com** – gut and similar strings for early instruments
- **www.stringsdirect.co.uk** – for D'Addario strings in full or part sets

NEXT TIME

Join Shaun in the Summer issue as he begins construction, bracing and fitting of the soundboard as well as creating the outer rosette and the delicate 'parchment rose'