

## Making a Violin Day 1 The plates

This is one page in a series about making a violin by hand in the traditional way. Please see the [introduction](#) for more about the series and links to other pages. The [glossary](#) contains an explanation of the terms used.



Today the wood for the violin is selected and the plates are prepared.

Violin maker Derek Roberts selects a piece of spruce for the front of the instrument from his store of seasoned wood. The store also contains pieces of maple which will be used for the back, ribs and scroll.

The excitement of making a violin is here in these pieces of wood. Beautiful in their own right, they will be fashioned by the hands of a master craftsman into a beautiful instrument which will in turn produce wonderful sounds in the hands of a master musician.



Left is the wedge of spruce as it was sawn from the tree. Spruce is strong and light and has ideal resonant qualities.



A saw cut through the wedge allows it to be opened up like a book, into two plates.

The two plates will eventually be glued together. First they have to be flattened and squared to make a perfect joint.

Derek uses a large plane to flatten the face of each plate. He then planes the edges of each plate square.





Derek checks the edges with a square, and the faces with a straight edge. More work must be done with the plane until a perfect result is obtained. Then the two plates can be glued together.



Derek examines the joint before applying glue. The two plates must fit together perfectly. The final joint will be almost invisible. Hot animal glue is applied to the joint. Derek rubs the two surfaces of the joint together to get rid of excess glue.



Finally the plates are cramped together. The glue will take several hours to dry. Later, the outline of the front will be marked and roughly sawn out.



This wedge of maple will be prepared and jointed in the same way, for the back of the violin. Maple selected for violin making is often strikingly figured, as in this piece.

The flame, as the figuring is called, appears to flicker as it catches the light from different angles. This gives a very attractive effect to the finished instrument.

## Making a Violin Day 2 The blocks

This is one page in a series about making a violin by hand in the traditional way. Please see the [introduction](#) for more about the series and links to other pages. The [glossary](#) contains an explanation of the terms used.

Today the blocks are glued to the mould and shaped.

The blocks are cut from willow, a strong, light wood which is easily carved. There are six blocks, two end blocks and four corner blocks.



Above, violin maker Derek Roberts is planing one of the corner blocks. You can see the five other blocks roughly positioned round the mould.

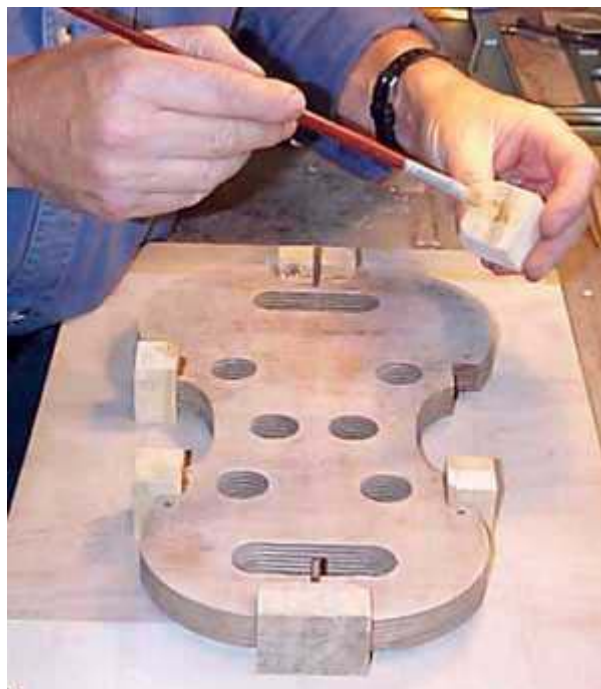


The corner blocks will form the corners between the C ribs and the top and bottom bouts. The top block will have the neck joint cut in it, and the bottom block will have a tapered hole reamed for the end pin.

Each block is worked with a small hand plane and checked with a square. It must be accurate to achieve a good fit with the mould.

The blocks are glued to the mould. Animal glue is heated and applied with a brush to the block surface. The joint is easy to break later on when the ribs are complete and the blocks need to be detached from the mould.

The mould itself forms the basis for building up the rib structure of the instrument. There are two types of mould, the inside or Italian mould, used here, and the outside or French mould. Each violin maker makes his or her own moulds based on patterns for different models of instrument.



The holes through the mould will be used at a later stage for attaching cramps to the instrument.



Once the six blocks are glued to the mould, work starts on shaping each block.  
Right, a corner block is shaped with a large gouge.



## Making a Violin Day 3 The ribs

This is one page in a series about making a violin by hand in the traditional way. Please see the [introduction](#) for more about the series and links to other pages. The [glossary](#) contains an explanation of the terms used.

Today violin maker Derek Roberts prepares the ribs and bends them to shape.

The rib structure will be built up on the mould which has been prepared with blocks in the [previous stage](#). Shown here is the template which will be used to guide the shaping of the ribs, being placed on top of the mould.



Each violin maker has his or her own sets of templates for different models of instrument. The template shown here is for a Stradivarius model from the early 18th century. Derek made this template of thin plywood from drawings of the Stradivarius instrument.



Each rib is made from a thin slice of flamed maple.

The rib is very flexible and light when finished. Strength is provided by the six blocks, and by the linings which will be made later and fixed to the ribs and blocks.

The rib is planed to a fine thickness and measured with a dial gauge to an accurate tolerance, typically 0.1 mm.

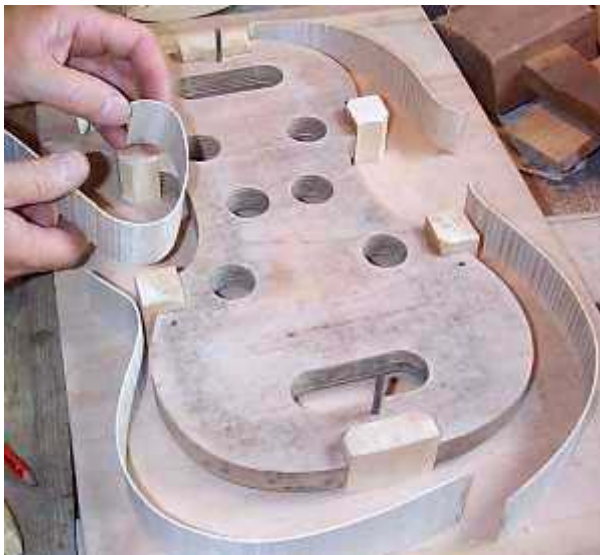




The rib is placed on a shooting board and planed to the right depth for this stage.

Later on, when the ribs have been glued to the blocks, the depth will be reworked. Now each rib is bent to shape on a bending iron.

The bending iron is a piece of brass with an electric heating element inside. Derek made the bending iron himself, the brass having been cast to order in a small foundry.



The ribs are roughly bent to shape and are put in place against the blocks on the mould.

The shape of the instrument begins to emerge.



## Making a Violin

### Day 4 Completing the rib structure

This is one page in a series about making a violin by hand in the traditional way. Please see the [introduction](#) for more about the series and links to other pages. The [glossary](#) contains an explanation of the terms used.



Today violin maker Derek Roberts completes the rib structure. He will shape the blocks and glue all the ribs into place.

The ribs have been bent in the [previous stage](#). The C ribs are now glued to the corner blocks and cramped up.

With the C ribs in place, Derek uses a scribe to mark the curved shape of the corner on a block. The template which sits on top of the mould is used to guide the line.



The block is carved to the marked line with a gouge and finished with a file. The curve is made in the block to receive the shape of the rib as it curves outwards to the corner.

Derek marks the rib corners with a square. The ends of the C rib must be cut off where they overhang the block, and a perfectly square joint made where the bottom rib joins the C rib at the corner.



Left, you can see that the near corner blocks have been cut to the curved shape. The far blocks have still to be shaped.

Derek applies hot glue with a brush to a block, to fix the top rib into place.

The lower rib has already been glued to the blocks and cramped up.



Both top and bottom rib are cramped up now. The procedure must be repeated on the other side.

The flame in the maple ribs shows its silvery qualities.





Derek flattens the ribs with a plane so that they will fit closely with the violin back.

You can see the finished shape of the blocks and how they provide strength and shape for the ribs.

The linings will add yet more strength when they are in place.



## Making a Violin Day 5 The linings

This is one page in a series about making a violin by hand in the traditional way. Please see the [introduction](#) for more about the series and links to other pages. The [glossary](#) contains an explanation of the terms used.

Today the linings are shaped and glued to the rib structure which was completed in the [previous stage](#).

The linings are made from willow, the same wood as the blocks.

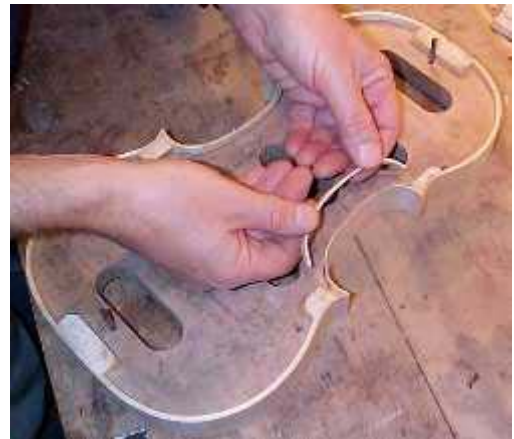


Above, violin maker Derek Roberts bends one of the linings on the hot bending iron to the required curved shape.

Left, a shaped lining is marked to the correct length. This one is for a bottom bout.



The linings are sawn to the marked lengths.



Right, the linings for the top and bottom bouts are ready for glueing.





A lining is glued to the inside of a C rib. One of the bottom bout linings has already been glued to a bottom rib and it is held in place with wooden clothes pegs while the glue sets.

This detail shows how the C lining is morticed into the corner block. If the lining were simply glued in place to the C rib, it would tend to come unfixed as the instrument aged. The mortice helps to prevent this from happening.



All the linings for the back of the instrument have now been glued in place.

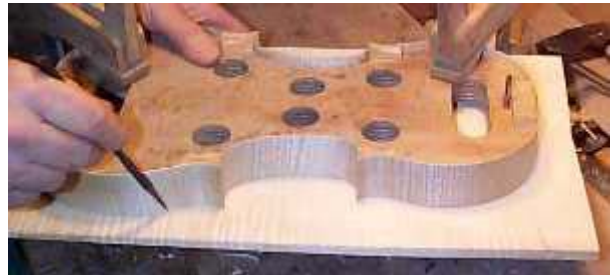
A set of linings must also be made for the top, but these can only be fitted later when the mould is removed.

The addition of the linings has made the fragile rib structure much stronger. The linings also provide a better glueing surface than the ribs alone, for fixing the front and back plates.

## Making a Violin Day 6 The back

This is one page in a series about making a violin by hand in the traditional way. Please see the [introduction](#) for more about the series and links to other pages. The [glossary](#) contains an explanation of the terms used.

Today the back plates are marked and sawn out and the rough arching of the back is done. The plates of maple wood have already been flattened and jointed.



Violin maker Derek Roberts marks the outline of the rib structure (completed in the [previous stage](#)) onto the plates. First the line of the ribs is followed. Then Derek uses a washer to mark a second line outside the ribs. This is the outline of the plates, as they must overhang the ribs. The inner line will be used to position the ribs exactly on the plates.



Derek uses a bow saw to saw round the outer line.

Right, the roughly sawn back emerges from the plates.



A marking gauge is used to mark the edge thickness of the back.





Derek uses a knife to trim the roughly sawn edge down to the marked lines.

The rough arching of the back is done with a large gouge. A skilled maker works quickly, removing large amounts of wood with each sweep of the tool.

The back is held in a holding jig while Derek works on it. The same jig will be used to hold the front when that is rough arched.



This is an exciting and dynamic stage of the making. The glorious curves of a violin back take shape very rapidly under the gouge.

The marks of the gouge remain to be smoothed off in a later stage.

Now that the rough arching is complete, the final outline and the corners are worked with a file.



## Making a Violin Day 7 The front

This is one page in a series about making a violin by hand in the traditional way. Please see the [introduction](#) for more about the series and links to other pages. The [glossary](#) contains an explanation of the terms used.



Today violin maker Derek Roberts saws out the front plates, completes the rough arching and begins the final arching. The front plates are marked, sawn out and trimmed in the same way as the back plates were done in the [previous stage](#).



As for the back, the edge is trimmed down to the marked line with a knife and with a chisel (right), and then filed to achieve the final outline and shape of the corners.

Below, a large gouge is used to begin the rough arching. The spruce used for the front is softer than the maple used for the back and so is easier to cut.





The rough arching is complete. The arching is developed further with smaller gouges and a tiny violin maker's thumbplane.

The thumbplane is made from brass and is held between the thumb and forefingers. The curved cutting edge of the blade and curved base of the plane enable very precise shaping of the arch.



As work progresses with the thumbplane on the arching, templates are used to guide the shaping of the instrument.



The long arch template is used in the middle of the front to establish the contours. There is another long arch template of slightly different shape for the back.

Here is one of the set of five templates for the cross arch, used at different positions across the front. The back has its own set of five cross arch templates.

Derek made these templates out of thin plywood, from drawings of the Stradivarius model for this instrument.



With the outline finalized and the arching roughly worked to the templates, this stage is complete. Later on the purfling will be inlaid and the contours of the arching will be finished with a scraper. Then the insides of the front and back will be hollowed out.



## Making a Violin

### Day 8 Preparing the neck block

This is one page in a series about making a violin by hand in the traditional way. Please see the [introduction](#) for more about the series and links to other pages. The [glossary](#) contains an explanation of the terms used.



Today violin maker Derek Roberts starts work on the neck and scroll of the violin. These are made from one solid block of flamed maple wood.

First the block must be planed square and to the correct dimensions. Here Derek checks the edge with a square.

A template is used for the neck and scroll outline, which is marked onto the wood with a scribe.

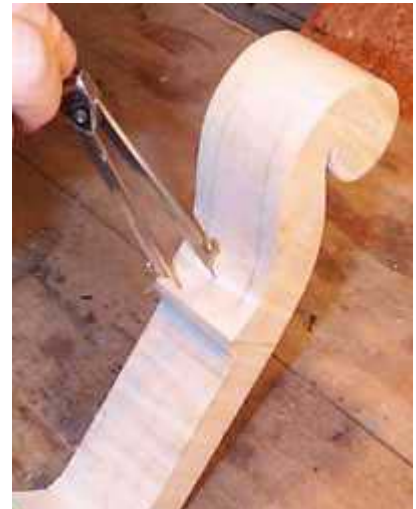


Derek uses a coping saw to roughly saw the outline. Then various tools are used to work down to the outline and shape the initial profile of the scroll.



Above, Derek uses a gouge on the back of the pegbox, and left, he uses a file on the head of the scroll.

Now the final shape of the back of the pegbox is marked out. The marked lines will be used in the next stage to guide the removal of waste wood.



The four pegholes are drilled. Later on the pegholes will be enlarged and a taper cut with a reamer.

## Making a Violin Day 9 Carving the scroll

This is one page in a series about making a violin by hand in the traditional way. Please see the [introduction](#) for more about the series and links to other pages. The [glossary](#) contains an explanation of the terms used.



Today violin maker Derek Roberts carves the scroll from the neck block which was prepared in the [previous stage](#).

The back of the scroll and pegbox have been carefully marked out.

Derek uses the marked lines as guides for saw cuts across the sides of the pegbox and at the back and sides of the scroll head. These cuts must be made carefully, to avoid cutting away too much wood and leaving saw marks on the finished scroll.



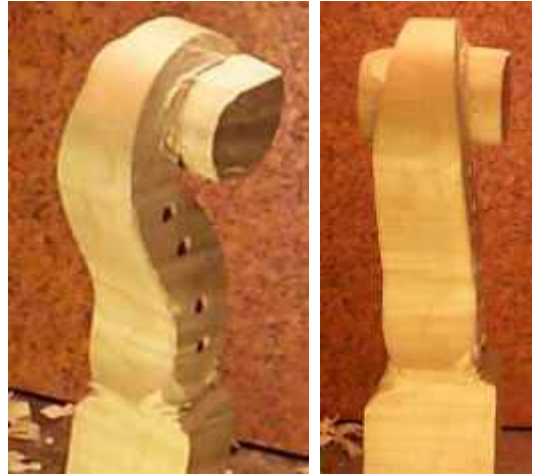
The sawcuts (left) enable the waste wood outside the marked lines to be removed more easily. First Derek saws out some wood on each side of the head of the scroll.





Then more of the wood is removed from the pegbox sides using a chisel.

After more work with a gouge the roughly carved shape of the scroll emerges. The outside of the pegbox has been shaped and only requires finishing. The first turn of the scroll head has been started.



Now the work on the second turn of the scroll starts. A further set of saw cuts is made in the volute. The excess wood is sawed out and the carving progresses towards the eye of the scroll. Right, the shape of the eye has been cut with a small gouge.





More work is done to carve the eye and the volutes of the scroll. This picture and the one below show the two main techniques of cutting with a gouge.

Here the gouge is held upright by the handle, in order to make vertical cuts. These are used to shape the profile of the turns in the scroll.

Right, the gouge is held by the blade near the cutting tip, to make angled cuts. The faces of the side of the scroll must all slope inwards towards the centre. This is called undercutting.



The basic shape of the scroll has now been carved. There is more work to do: the peg box must be hollowed out, all the edges have to be chamfered, and two flutes must be cut on the back.

Then a fine finish is achieved with a scraper.

## Making a Violin Day 10 Finishing the scroll

This is one page in a series about making a violin by hand in the traditional way. Please see the [introduction](#) for more about the series and links to other pages. The [glossary](#) contains an explanation of the terms used.



Today violin maker Derek Roberts finishes the scroll which was carved in the [previous stage](#).

First the pegbox is hollowed out with a chisel.

Then a skew chisel is used to cut the flat inside surface of the pegbox cheek. Above you can see the two tools, a left skew chisel and a right skew chisel, one for each cheek of the pegbox.



Derek uses a file and a knife to put a chamfer on the edges. This is the final stage in shaping the profile of the scroll.



Two flutes are carved around the outside of the scroll head and down the back of the pegbox. Left, Derek cuts one of the flutes with a small gouge.





Finally all the surfaces are given a smooth finish with steel scrapers. Violin makers prefer to achieve a fine finish with scrapers, rather than sandpaper.

Scrapers do less damage to the surface fibres of the wood than sandpaper. This helps the figure of the wood to show to its best advantage after varnishing.

All that remains to be done is to ream the peg holes. This will be done at a later stage.



## Making a Violin Day 11 Finishing the outline

This is one page in a series about making a violin by hand in the traditional way. Please see the [introduction](#) for more about the series and links to other pages. The [glossary](#) contains an explanation of the terms used.



Today violin maker Derek Roberts finishes the outline of the violin.

First the front and back plates must be aligned with the rib structure.

In the violin back, Derek drills holes for two small wooden pins. These locating pins are used to position the front and back accurately on the rib structure of the instrument.



The front, back and rib structure are placed together.



The front and back plates overhang the rib structure by a small margin. With the plates pinned in place, the overhang is checked.



The plates can be taken apart to make adjustments to the overhang, and then easily repositioned on the rib structure using the pins.



Derek has taken the back plate off the rib structure to file the edge.

At this point he is making the final adjustments to the outline of the instrument, making the overhang even throughout and ensuring that all the curves flow perfectly.

Right, Derek shapes the corners.

An accurate outline is critical for inlaying the purfling.



## Making a Violin Day 12 Purfling

This is one page in a series about making a violin by hand in the traditional way. Please see the [introduction](#) for more about the series and links to other pages. The [glossary](#) contains an explanation of the terms used.

Today violin maker Derek Roberts inlays the purfling in the plates, whose outline was finished in the [previous stage](#). Purfling is a delicate sandwich of different coloured woods which is inlaid in a channel cut around the margins of the instrument.

Pictured right are the purfling marker, purfling pick and two strips of purfling.



Left, Derek uses the blades of the purfling marker to score two parallel lines a short way in from the edge of the plate. Then, right, he deepens each line with a knife.



The wood between each knife cut is removed with the purfling pick. This is a very small narrow-bladed chisel. Using this method, a purfling channel is cut around each plate, ready to receive the inlay.

This picture shows the difference between the pair of parallel lines marking out the purfling channel in the plate on the left, and the purfling channel in the plate on the right which has been fully cut out.

Cutting the channel in the corners is particularly delicate work. At this point two strips of purfling will meet in a mitred joint.



A strip of purfling is heated and bent to shape on the bending iron. This is the same iron that was used to [bend the ribs](#).

The curved purfling is fitted into the channel. Small adjustments are made to the depth and width of the channel with a knife and a purfling pick, to ensure a comfortable fit.



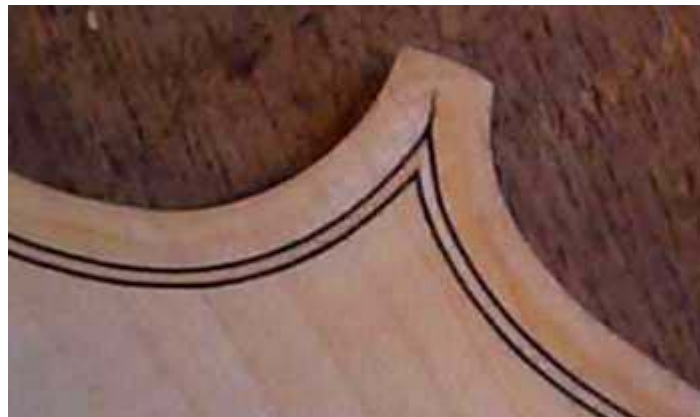
The most difficult stage in inlaying the purfling is forming the mitre where two strips of purfling join at the corners of the instrument.

The mitre terminates in a very delicate point which is called the "bee-sting".

The neatness of the purfling, and especially the bee-sting, are important elements in the aesthetic design of a violin.



A very sharp chisel is required to shape the ends of the purfling strips to form the bee-sting. This is a test of the violin maker's skill.



To fix the purfling in the channel, Derek applies hot animal glue with a brush and presses the purfling down into the channel.





Finally Derek gently taps the purfling with a light hammer, to ensure a positive fit and to squeeze out surplus glue.

The purfling has now been inlaid in both the front and back plates, which begin to take on their final appearance. However, you can see that further work is needed to remove the tool marks which are still visible.



## Making a Violin Day 13 Final arching

This is one page in a series about making a violin by hand in the traditional way. Please see the [introduction](#) for more about the series and links to other pages. The [glossary](#) contains an explanation of the terms used.

Today violin maker Derek Roberts completes the final arching on the top and bottom plates, having finished the purfling in the [previous stage](#).

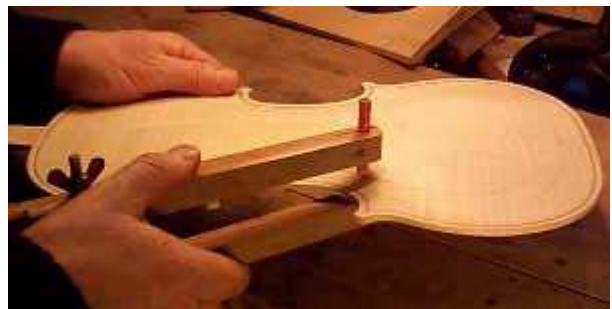


The external contours of the instrument have already been roughly carved on [Day 6](#) and [Day 7](#). In this final stage the contours are shaped precisely and the wood is very finely finished. The tools used, shown above, are a thumbplane and a selection of steel scrapers. Also shown are templates and a pencil gauge.



Before Derek starts on the final arching, he carves a narrow flute over the line of the purfling, around the edge of the instrument. The finished arching will rise up from this flute.

Derek uses the pencil gauge to mark out a contour line in pencil on the back plate.



This and other contours marked with the pencil gauge will guide the final shaping of the arch.

Templates are also used to guide the final shaping. These templates are made of thin plywood, shaped from measurements taken from the original Stradivarius instrument.



A small brass thumbplane is ideally suited for work on the complex contours of the instrument.

The first step is to remove the gouge marks left from the rough arching of [Day 6](#).

Only tiny shavings of wood are removed, compared with the large amounts removed during rough arching.





The next step is to finish the contours of the plate, using the pencil lines and the templates as guides.

Although the thumbplane can shape the contours very accurately, it still leaves small tool marks visible on the plates. A much finer finish to the surface of the wood is desired.

Derek uses a flexible steel scraper to remove the tool marks together with any other irregularities in the surface of the arch.

The scraper has a small fine cutting edge which produces a silky smooth finish, allowing the grain of the wood to show at its best. Violin makers prefer to use scrapers rather than abrasive paper for this final finishing.



Scrapers of different shapes are used to suit the contours being worked on. Here Derek uses a small oval scraper to blend in the flute over the purfling with the main part of the arching.





## Making a Violin Day 14 Hollowing

This is one page in a series about making a violin by hand in the traditional way. Please see the [introduction](#) for more about the series and links to other pages. The [glossary](#) contains an explanation of the terms used.

Today violin maker Derek Roberts hollows out the back plate of the violin.

The final arching was done on the outside of the plate in the [previous stage](#). Now a similar process of removing excess wood is carried out on the inside of the plate.

First Derek checks the back to make sure that the final arching has been accurately completed.



Excess wood on the inside of the back will be carved out with gouges. Derek marks a pencil line around the edge. Wood inside this line will be hollowed out, leaving a flat area around the edge for glueing onto the rib structure when the instrument is assembled.

The back is put in a holding jig and a large gouge is used to remove wood quickly.





Initially the work is done by eye. As the hollowing progresses, the thickness of the plate must be checked.

Now you can see the hollowing taking place while the area around the edge remains flat. The gouge marks visible on the plate will be removed later.



Derek uses the pencil gauge as a quick way of judging where wood still needs to be removed during the initial stages of gouging.

The dial gauge is used to check the thickness of the plate more precisely. There is a complicated pattern of thicknesses varying from around 4.5mm at the centre to 2.6mm at the edges of the top and bottom bouts.



## Making a Violin Day 15 Thickening

This is one page in a series about making a violin by hand in the traditional way. Please see the [introduction](#) for more about the series and links to other pages. The [glossary](#) contains an explanation of the terms used.

Today violin maker Derek Roberts hollows out the front plate and completes the thickening of both plates of the violin.

The back plate was hollowed out in the [previous stage](#). Now similar work is carried out on the front. Derek uses a large gouge to begin carving the inside.



The next few photos show how quickly the work progresses. The spruce of the front is softer than the maple of the back, so the rough hollowing is completed in the space of a few minutes.





Now the gouging is complete, Derek starts finer work with the thumbplane. At first the aim is to remove the tool marks.

Next, specific thicknesses must be achieved across the plate. Derek uses the dial gauge to check these measurements.





Work with the thumbplane is much more accurate than work with the gouge. Small tool marks are left which will later be removed.

You can see the flat surface around the edge and at the top, bottom and corner block positions, ready for glueing to the rib structure.

The work is finished with a steel scraper. This produces a fine surface and removes the small plane marks. It also allows the thickness to be adjusted to an even finer tolerance, a tenth of a millimetre.



## Making a Violin Day 16 Marking the F holes

This is one page in a series about making a violin by hand in the traditional way. Please see the [introduction](#) for more about the series and links to other pages. The [glossary](#) contains an explanation of the terms used.

Today violin maker Derek Roberts starts work on the F holes or sound holes. They will be marked out on the front plate of the violin which was thickened in the [previous stage](#).

A template of thin plywood is used to give the shape of the F hole. This template belongs to the particular Stradivarius model which Derek is making.



The template is placed on the front plate and drawn round with a pencil.



Accurate positioning of the F holes is important as this will determine the position of the bridge and the length of the vibrating strings.

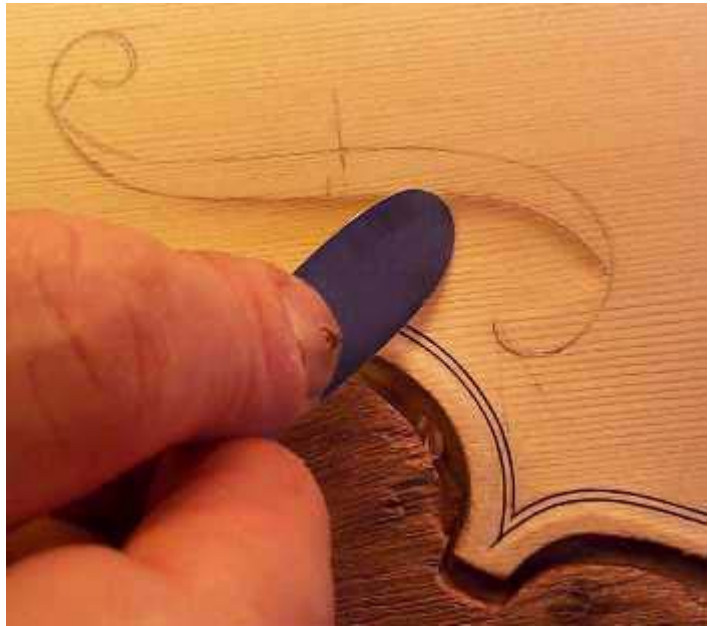


Next Derek uses a gouge to flute the edge of the F holes. The purpose of the fluting is purely aesthetic.



The fluting is finished with a steel scraper.

Below, the centres of the top and bottom holes of each F hole are marked with a scribe, and then drilled out with a hand drill.



## Making a Violin Day 17 Cutting the F holes

This is one page in a series about making a violin by hand in the traditional way. Please see the [introduction](#) for more about the series and links to other pages. The [glossary](#) contains an explanation of the terms used.

Today violin maker Derek Roberts cuts the F holes which were marked out in the [previous stage](#) on the front plate of the violin.

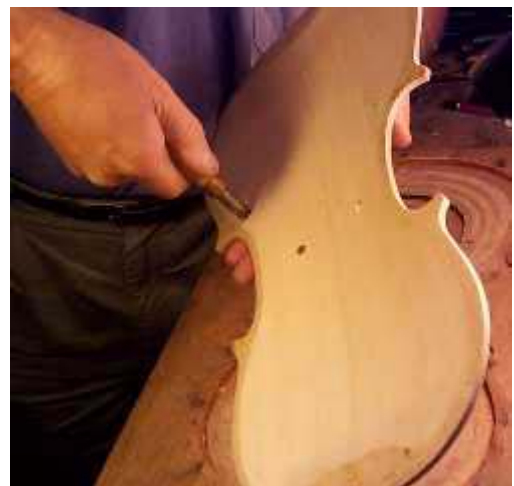


These are specially designed tools, made by Derek himself, to cut the top and bottom holes. They are different sizes because the top hole is smaller than the bottom.



Derek inserts the guide pin through one of the pilot holes drilled in the previous stage. He twists the tool and the cutters remove a small plug of wood of the correct size.

The hole is started by cutting on the outside, and finished by cutting on the inside. This lessens the risk of splintering the wood.





The top and bottom holes of the F holes are now finished.

The next step is to saw out the F hole. This is a very delicate stage and care must be taken to work with the grain of the wood. There is a danger of splintering where the sawcut meets the previously cut hole.



The saw stays well within the marked line. The aim is to saw out waste wood, not to achieve the final shape. This will be done more carefully with a knife.



Above, Derek uses a razor-sharp knife to pare the wood away to achieve the right design. The top and bottom holes should be joined by a series of complex flowing curves.



Left, Derek checks that the F holes are wide enough to admit a soundpost.

Derek completes the F hole by cutting the nicks. The function of these is not only aesthetic: they also provide a guide for positioning the bridge when the instrument is set up.





## Making a Violin

### Day 18 Glue the back

This is one page in a series about making a violin by hand in the traditional way. Please see the [introduction](#) for more about the series and links to other pages. The [glossary](#) contains an explanation of the terms used.

Today violin maker Derek Roberts glues the back to the rib structure.

First Derek cuts a small bevel all around the inside edge of the back plate. This will make final shaping of the edge easier. The back linings of the rib structure should also be shaped before glueing. They are bevelled with a knife and then rounded with abrasives.



Before cramping the back and ribs together, Derek applies a thin sizing coat of glue to both the edge of the plate and to the linings and blocks.

The end grain of the blocks is very absorbent and Derek gives them an extra coat of glue. The glue is then allowed to dry thoroughly before the next stage.





A small locating pin at each end of the plate and corresponding holes in the top and bottom blocks allow the plate to be positioned exactly on the rib structure.

Special cramps are used to secure the plate to the rib structure. These are fixed all round the edges of the instrument.

The glue must be allowed to dry thoroughly before this stage is done.



Derek heats up a small palette knife in a pan of boiling water and removes a few cramps. Then he uses the hot knife to melt the previously applied glue, so that the glue on the back and on the linings fuses together. The cramps are then replaced and the next section of edge is opened and glued.

Now all the edge has been glued, the glue is left to dry with all the cramps back in place.

This method allows much more control and prevents a build-up of too much glue.





## Making a Violin Day 19 The bass bar

This is one page in a series about making a violin by hand in the traditional way. Please see the [introduction](#) for more about the series and links to other pages. The [glossary](#) contains an explanation of the terms used.

Today violin maker Derek Roberts makes the bass bar and fits it to the inside of the front plate.



The bass bar is a reinforcing strut which is fixed inside the front of the violin and lies under the line of the G string. It strengthens the front plate and helps transmit low frequency vibrations from the string to the body of the instrument.



The bass bar is made from quarter sawn spruce. It has been roughly prepared to the correct dimensions. Now it has to be accurately fitted to the internal curvature of the front plate. Left, Derek is marking the curve on the bass bar.

Small pieces of wood have been glued temporarily to the inside of the plate, to ensure that the bass bar is always correctly positioned while it's being fitted. They will be removed after the bass bar has been glued in.





Derek uses a technique called chalk fitting. Here he applies chalk to the inside of the plate along the line where the bass bar will be fitted.

Then he places the bass bar in its correct position, rubbing it against the plate. The bass bar will pick up chalk from all the points where it is making contact with the plate.



Only part of the bass bar is making contact. Wood must be removed from the bar where the chalk has marked it, so that it will eventually make contact down its whole length.

Derek uses a chisel to remove the chalked wood, and a scraper to make fine adjustments. Then he repeats the process of fitting to the plate and checking for chalk marks.





Eventually the whole of the bass bar picks up chalk, showing that it is making a good fit. Derek cleans off the chalk from the front plate before glueing.

Finally the bass bar is glued in place and cramped up.



## Making a Violin

### Day 20 Closing the box

This is one page in a series about making a violin by hand in the traditional way. Please see the [introduction](#) for more about the series and links to other pages. The [glossary](#) contains an explanation of the terms used.

Today violin maker Derek Roberts closes the box. He will remove the mould from the back and rib structure, then glue on the front.



First Derek gently taps each block to break the glue joint and free it from the mould.



Then he checks each block with a knife to make sure that the joint is completely open.

This stage is accomplished more easily if the glue was applied sparingly when the blocks were glued to the mould on [Day 2](#).

Carefully he pulls the mould free from the back and ribs. This is a dangerous moment: it is possible to crack the ribs or the blocks if one is hasty or careless.



Here is the rib structure and back with the mould successfully removed.

Next the top linings are fitted and the blocks are shaped.



The top linings will reinforce the edge and give a good glueing surface for the front.

They are made and fitted to the ribs in the same way as the linings for the back on [Day 5](#).





Left, we can see the top linings have been glued in place and the corner blocks have been shaped. Derek shapes the top block with a gouge.

Now the back and ribs are prepared for the front to be glued onto them. Derek uses a sanding board to achieve a completely flat glueing surface of the ribs, lining and blocks.



On the inside of the front plates, Derek completes shaping the bass bar with a thumbplane.

Finally the front is glued on to the back and ribs using the same method as for the back on [Day 18](#).



This is an important stage of the making. The box is now closed and all the structural work on the body of the instrument is finished.



## Making a Violin Day 21 The fingerboard

This is one page in a series about making a violin by hand in the traditional way. Please see the [introduction](#) for more about the series and links to other pages. The [glossary](#) contains an explanation of the terms used.

Today violin maker Derek Roberts shapes the fingerboard and glues it onto the neck block.

The fingerboard is made from ebony. Usually it is bought machined to a rough finish, for the maker to shape to exact measurements. First, Derek checks the measurements with callipers.



The top surface of the fingerboard has to be shaped very carefully because it has a big effect on the playability of the violin.

Left, Derek checks the curve with a template.

Below, the top surface is sanded with a shaped sanding block.



Derek finishes the hollow of the under-surface with a steel scraper.

The next stage is to glue the fingerboard onto the neck block, which was finished on [Day 10](#).

First, Derek uses a block plane to flatten the heel of the neck block. This is the part which will be glued into the body of the instrument. Unless it is perfectly flat, it will be difficult to set the neck in accurately.



Finally the fingerboard is glued onto the top of the neck block and cramped into place.

The neck is still only roughly shaped. It will be finished after the neck has been glued into the body.

This end-on view shows the curved shape of the cramping block, matching the curve of the fingerboard.





## Making a Violin Day 22 The neck joint

This is one page in a series about making a violin by hand in the traditional way. Please see the [introduction](#) for more about the series and links to other pages. The [glossary](#) contains an explanation of the terms used.

Today violin maker Derek Roberts makes the neck joint and fits the neck to the body. The neck and fingerboard were assembled in the [previous stage](#).



The joint is in two parts, at the heel of the neck and at the top block of the body of the instrument. The measurements of the joint must be marked out before the joint can be made. Right, Derek marks out the heel of the neck.



The measurements are transferred to the body of the instrument. This should ensure a perfect fit: it is critical that the neck is set very accurately into the body.

Derek makes a series of saw cuts in the side of the neck where the wood is overlapping the fingerboard.



These saw cuts make it easier to remove the waste wood with a chisel. The neck is finished flush with the sides of the fingerboard.

Derek planes a taper on the heel of the neck, using the lines previously marked out. Once he has planed down to the lines he will make no more adjustments to this part of the joint.



Next Derek turns his attention to the other part of the joint, in the body of the instrument.

Here he cuts into the spruce front to start the back edge of the joint. This must be perfectly square with the centre joint of the plates, to ensure that the neck is set into the body perfectly straight.

Derek uses a fine tooth saw to cut the sides of the joint through the spruce front and the maple ribs.



He cuts carefully through the spruce and into the top block.

He removes the maple ribs, exposing the top block. This part of the joint can then be cut in the top block. It is a complex operation because there are four faces of the joint which have to fit together perfectly.



Just the right amount of wood must be taken away, so that the neck runs straight down the body and it is set deep enough and at the right elevation. Each cut can change each of these settings.



To achieve a perfect joint, Derek uses the method of chalk fitting, also used in [fitting the bass bar](#).



Derek tests the fit of the neck in the body, making small modifications as indicated by the chalk. This process is repeated several times over.

Right, the picture shows that the neck is not set deeply enough yet. More wood must be taken from the sides of the joint in the top block.



An elevation stick is used to test whether the neck is set in at the correct angle yet.



Finally the fit is judged to be correct and the joint is glued and cramped.

## Making a Violin

### Day 23 Finishing the neck

This is one page in a series about making a violin by hand in the traditional way. Please see the [introduction](#) for more about the series and links to other pages. The [glossary](#) contains an explanation of the terms used.

Today violin maker Derek Roberts finishes shaping the neck and the back button.

The neck is still only roughly shaped. It was fitted into the body of the violin in the [previous stage](#).

The back button is that part of the back which is glued onto the heel of the neck.

Derek starts by marking out a semi-circle with dividers, to form the shape of the button.



He saws out the waste wood from the button with a coping saw, continuing the cut into the neck block.

Derek starts roughly shaping the neck with a knife.





He uses a chisel to cut out the semi-circular shape of the button and continue the shape into the neck.



The shaping continues, first with a knife and then with files.

Below right a flat hand-cut rasp is used, and left a half round file.



Derek uses callipers and a template to check the shape of the neck.

Finally Derek finishes the neck off with a scraper and with abrasive paper.





This has to be done very carefully because the neck is the part of the instrument which the player handles. It must not have any irregularities which the player might detect.



## Making a Violin Day 24 Finishing

This is one page in a series about making a violin by hand in the traditional way. Please see the [introduction](#) for more about the series and links to other pages. The [glossary](#) contains an explanation of the terms used.



Today violin maker Derek Roberts finishes shaping the edge and does the final scraping.

First Derek cuts a chamfer around the front and back edges.



A file is used to soften the edges of the chamfer.

The file does not give a very fine finish, so the shaping and smoothing of the edges is completed with abrasive papers of different grades.





Above, a cork is used to support the abrasive paper as Derek shapes the corner. Left, a thin strip of wood is used as he shapes the bottom bout.

Here Derek uses a small teardrop shaped scraper around the margin of the instrument, where the arch rises up to meet the edge.



This picture shows how the edgework and the fluting over the purfling blend together.



The whole instrument is then scraped very lightly - front, back, ribs and scroll. This produces a better finish on the larger surfaces of the instrument than can be achieved with abrasive paper.



The violin is ready for varnishing.

