

The Working Methods of Guarneri del Gesù and their Influence upon his Stylistic Development

Text and Illustrations by Roger Graham Hargrave

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The Mould and the Rib Structure

The elegance and purity of the violin form exercises such fascination that it has been the subject of enquiry for more than two centuries; questions about its design have generated almost as much interest as the subject of Cremonese varnish and its composition. Although several eminent studies have demonstrated the regular use of mathematics in the process of early instrument construction, recognising that mathematics was applied is considerably easier than understanding how it was applied. If they ever existed as such, the exact mathematical formulae used to create the first Cremonese violins are unlikely to be rediscovered.

The violin family was developed more than four hundred years ago, and it was already two hundred years old when Guarneri Del Gesù began making instruments. Although it is probable that he would have known about any existing mathematical formulae, he may never have been required to use them. Unlike the Amatis (and, possibly, Stradivari), Del Gesù almost certainly made instruments based upon already existing designs. Indeed, his supposed variety of original designs is assuredly an illusion. If his violins are unique it is because of his free-ranging use of tools and materials, and above all his creative fantasy;

they were not, in their basic form, the result of any innovative mathematical composition.

The outline of a violin is only one element of its complex design. It is still not known which was established first, the mould around which the violin was constructed (which represents the chamber of air inside the instrument) or the complete violin, from which the mould was then derived. However, because it is the starting-point for the process of construction, the mould has been the major preoccupation of design theorists. The use of an inside mould was central to the Amati system, and accordingly it became the cornerstone of all Cremonese construction. In the seventeenth century, with the exception of Jacob Stainer it is hard to find evidence of the consistent use of such a mould by makers outside Cremona.⁷ Whether later Cremonese makers created their moulds mathematically or simply copied or adapted existing moulds, they were still effectively working within the Amati tradition.

The contents of the Museo Stradivariano indicate that Antonio Stradivari developed and used a comparatively large number of different moulds during his long working life. But this does not mean that all, or any, were mathematically devised. Pollens⁸ has demonstrated that when the twelve surviving Stradivari violin moulds are superimposed on each other,

they fall into several groups.⁹ Stradivari appears to have retained certain sections of particular moulds (for example, the top and centre bouts), while he modified the remainder (perhaps the lower bouts); as a result, the differences between some of his moulds are remarkably small (figure 5).

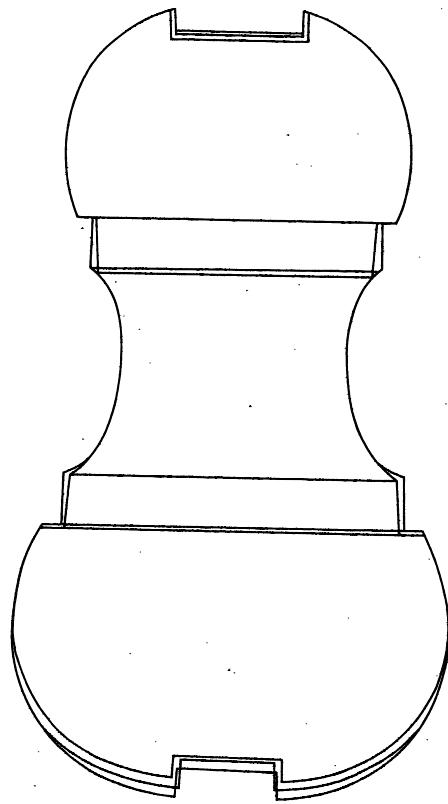


Figure 5. Several Stradivari mould outlines superimposed upon each other as described by Pollens (see footnote 10).

This implies a gradual adjustment to the lines of the form, rather than a fresh mathematically calculated construction for each subsequent development.

The variety to be found among Del Gesù's violins gives the initial impression that he too must have created a number of moulds. Yet this was probably not the case. By the 1730s Cremona had a rich, well-established tradition of lutherie and there was no need for each maker to produce new designs. The trend appears to have been towards copying or modifying existing ones. A personal style could be achieved by adjusting a line here or there or by changing the details of the scroll, soundholes or edgework; it is not unreasonable to assume that this is what Del Gesù did. Although Stradivari would then appear to stand alone in his radical reworking of the Amati mould, it could be argued with some force that even he was simply adapting rather than innovating.¹⁰ There may have been some underlying mathe-

matical formulae in Cremona, but well before the end of the eighteenth century the violin maker Giovanni Antonio Marchi commented that his contemporaries were merely tracing earlier violins in order to arrive at their own models.¹¹

Count Cozio Di Salabue, in his extensive notes about the classical Italian violin makers, says of Del Gesù, "The violins that he built from about 1731 until 1743, though ordinarily he retained the same form, they are generally quite badly worked."¹² Disregarding his verdict on the craftsmanship, what is interesting is that Count Cozio was clearly of the opinion that Del Gesù used a single mould. To some extent this notion can be confirmed by superimposing the apparently wildly different outlines of Guarneri violins made during this period. At no point do these outlines encroach upon the single mould which can be marked out within them.

The exceptions to this rule are the violins of the transitional period, which include the "Dancla". With its shorter C bouts and the lower placement of the upper corners, the "Dancla" was unquestionably constructed on a different mould from every instrument known or believed to have been made by Del Gesù after 1731. As might be expected, its outline matches several outlines of Del Gesù's father; in particular, it is virtually identical to one dating from 1705. These Giuseppe Filius Andreæ outlines are in turn derived from Del Gesù's grandfather, Andrea Guarneri, who clearly obtained them from the Amatis. In fact the "Dancla" outline matches several Brothers Amati violins and even an Andrea Amati remarkably well, and also fits quite well around the "S" (ms. 39) mould at the Museo Stradivariano. In comparing these outlines, the positioning of the corner blocks and the size of the overhangs could not be taken into account. Nevertheless, there can be little doubt about the original source of the design.

It is possible that after 1731, Del Gesù was using two very similar moulds. If this was indeed the case, the first was preferred up until about 1738/9, although the "Stretton", "Kreisler", "King" and "Joachim" are among the exceptions which may have been built on a slightly wider mould. After about 1740, all the instruments appear to have been constructed upon the wider model. This could well be based upon the "grand pattern" of the Amatis, with which it corresponds very well. On the other hand, in almost every case, the violins which appear to have been constructed upon a larger mould also have larger overhangs; to complicate matters there are

one or two instruments which lie between both categories, in particular the "Ysaÿe". The idea that such instruments as the "Diable", the "Kemp" and the "Ole Bull" share the same basic design and were constructed upon the same or very similar moulds, seems at first glance virtually insupportable. However, the overhang variations may well be enough to account for most of the apparent differences in both length and width.¹³ In the final analysis, it may be impossible to prove whether Del Gesù used one, two, three or more moulds, but in any case they would have been extremely close in size and shape.

All the violin moulds in the Museo Stradivariano have certain features in common (figure 6).

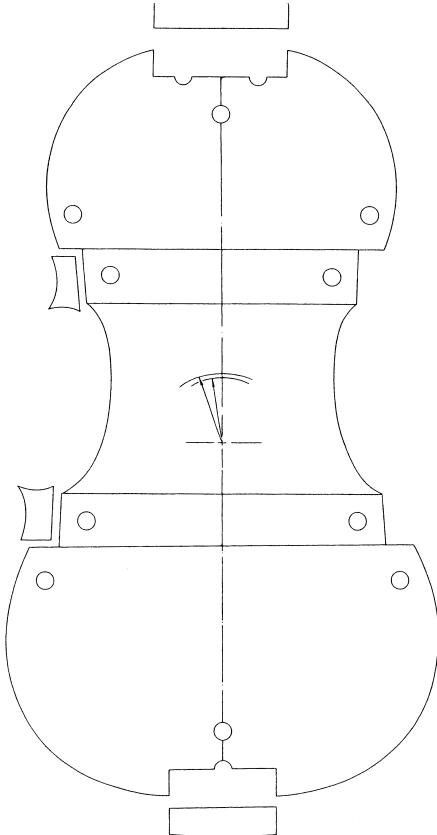


Figure 6. Reproduction of a Stradivari violin mould from the Museo Stradivariano.

They are Xat boards, mainly of slab-cut walnut, although willow and poplar are also to be found. These boards range in thickness from 13 to 15 mm, and Del Gesù's moulds must have been much the same in this respect: A thicker mould would not have allowed both sets of linings to be fitted, whereas a thinner mould would have been too flexible. Each mould has six recesses, or mortises, into which the two end blocks and the four corner blocks were set and onto which the ribs were eventually glued. These have ob-

viously been subject to extensive wear and several have been repaired. The interior work of Del Gesù's violins, the size, shape and position of the blocks and linings all indicate that he used a mould which was similar in concept to those in the Stradivari museum. Unfortunately, reliable measurements of Del Gesù's blocks are difficult to obtain and for the time being it is only possible to make general observations about their size, shape and position in relation to the surviving Stradivari moulds.¹⁴

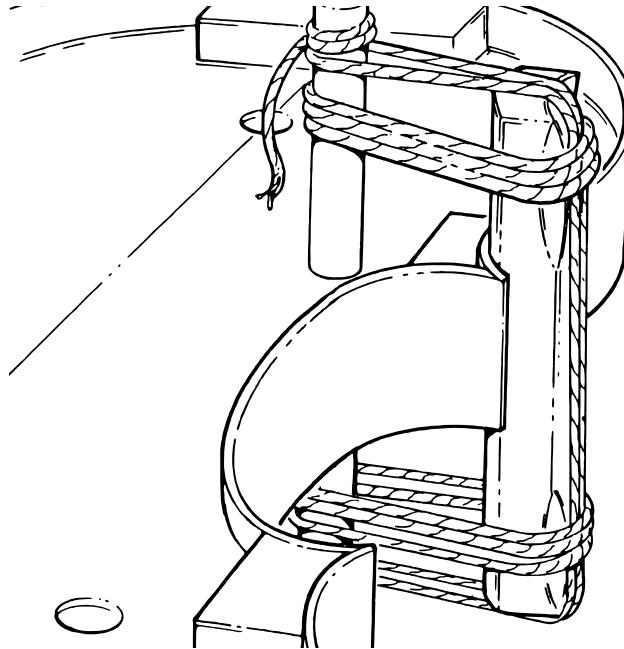


Figure 7. Method used to bind the ribs to the mould as used by Stradivari.

Although similar in depth, Del Gesù's neck block mortises were probably somewhat shorter than those of the Museo Stradivariano moulds: His rare surviving neck blocks seem to be about 50 mm across,¹⁵ considerably less than the neck mortises in the Stradivari moulds, which range from about 55 to 66 mm. Del Gesù's end-pin blocks are likewise narrower

– about 43 mm compared to the 45 to 50 mm found on Stradivari instruments and on the existing moulds. Most of the latter have small cut-outs in the top and bottom block mortises to facilitate separation of the mould from the rib structure. Measured inside the instruments, there is little variance between the corner blocks of Del Gesù and Stradivari: Both are about 25 mm wide and closely match the mould mortises.

Each of the Stradivari moulds has ten 8 mm to 9 mm round holes set at strategically important points. These were for locating the binding sticks, used to clamp the ribs to the blocks. The technique is fully

described by Pollens and Sacconi and further supported by the surviving sticks and counter blocks in the Museo Stradivariano (figure 7).¹⁶ Without an authenticated Del Gesù mould, it is virtually impossible to establish the exact method he used to bind the ribs to the mould and blocks. However, the possibility that some of the museum moulds were not of Stradivari's making suggests that this method of clamping was in widespread if not universal use among Cremonese makers.¹⁷

Most of the moulds have incised markings, including a centre line, lines showing the position of the corner blocks and a compass point with two short arcs of a circle indicating the block heights (figure 6). In almost all cases, Del Gesù's end-pin and corner blocks were finalized to a height of about 32 mm; the neck block was lower, usually about 30 mm. These measurements are generally consistent with those of Stradivari but there are several interesting exceptions, including the "Cannon", the "Carrodus" and the "Leduc", where all the block heights are increased by at least 1 mm. Interestingly, in Count Cozio Di Salabue's original notes on a fourth violin, the "Vieuxtemps", the measurements are given as 33 mm and 31 mm, making it consistent with these three. Assuming the Count was correct, the rib heights must have been reduced subsequently. (See measurements of the "Vieuxtemps", p. 95.)

Previous Cremonese makers including Stradivari usually made their blocks and linings of willow.¹⁸ However, following the example of his father's later works, Del Gesù preferred spruce. Both blocks and linings were probably fashioned from split wood, since although they often give the appearance of having been cut back in haste, no seriously uneven splitting has occurred. Otherwise, Del Gesù paid scant attention to the course of the annual rings which can be found running in all directions (figure 8).

His block wood is generally coarser than the belly wood and it may be that he was economising by using oVcuts, since there is no doubt that willow linings are easier to bend. The particular shape of Cremonese corner block mortises meant that the blocks only needed to be squared on two sides and this would have been particularly useful whenever oVcuts were being used.

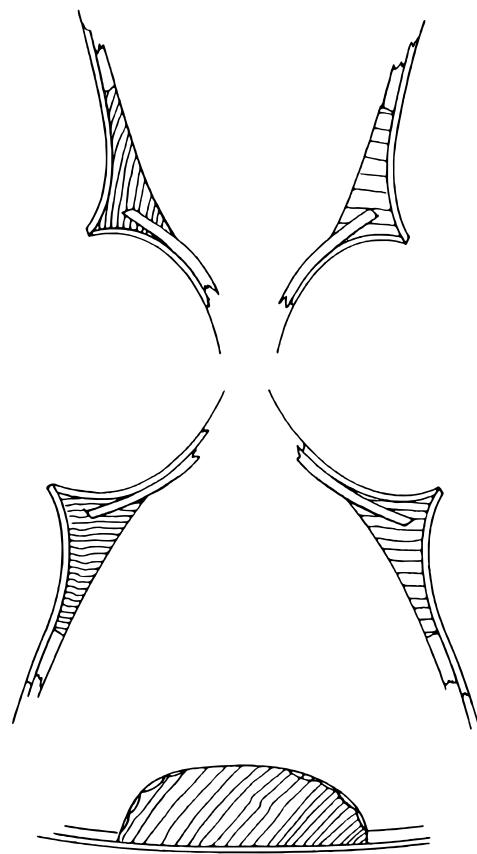


Figure 8. Reproduction of the four corner blocks and the end block of "Soil" del Gesù, showing the direction and width of the year rings.

Once the blocks were glued in position, they were marked out for cutting. Stradivari achieved this with the aid of small, individual templates (figure 6); remarkably, several sets of these templates have survived the ravages of time.¹⁹ Both Pollens and Sacconi describe the process he used.²⁰ Individual templates were not only more straightforward to make than the alternative full- or half-body templates; as moulds became worn, warped or damaged, especially in the mortise areas, they were both more easily adjusted and more compatible with badly aligned blocks. It would seem that Stradivari used only two corner block templates, one for the top corners and one for the lower corners, and he simply transposed these from side to side. Although it is unlikely that the curves of these templates were altered, even relatively minor variations in the positioning of the blocks (as a result of a worn or twisted mould) would have contributed to the type of variation in corner shapes which we associate with all Cremonese work, including that of Nicolò Amati and Stradivari. It may be significant that the "PG" mould²¹ has four individual templates. This mould has been heavily repaired in the mortise areas, and as a result the corner block mortises on one side are slightly deeper than

those on the other. Two extra corner block templates were made to fit the reshaped mortise holes, but the curves have been carefully matched so that the corners theoretically remain the same.

One of Del Gesù's consistent peculiarities is his selection of rib wood. It was usually fine grown maple, cut on the quarter. Unlike the Amatis, he appears never to have used slab-cut ribs, even when using slab-cut backs; centuries of experience had probably taught the later Cremonese masters that these were prone to cracking and warping.²² Del Gesù's ribs seldom matched the back wood and only rarely were they cut from the same billet. Even where the match appears perfect, as with the "Leduc", he generally failed to align the slope of the figure in the same direction all round the instrument.²³ Often the ribs were made up from unmatched pieces: Plain wood was used in conjunction with highly figured wood, or narrow and wider Xames were mixed. In particular, the lower rib(s) were often completely different from the others.

Del Gesù thicknessed his ribs with a coarse-toothed plane iron. Unlike Stradivari, he made no attempt to remove the marks left by the toothed iron on the inside of the ribs, and they are usually clearly visible through the soundholes. The ribs were finished with a scraper on the outside only. However, even on his early instruments (see the "Kreisler" photographs, pp. 24-27, volume I) the remains of tooth plane markings can sometimes be seen on the outside of the ribs, beneath the varnish.

As a rule, Del Gesù thicknessed his ribs fairly evenly to about 1 mm. Exceptionally, as in the case of Paganini's "Cannon", they average 1.5 mm. Occasionally, as with the "Soil" of 1733, in the immediate corner block gluing area they are reduced to as little as 0.3 mm. Thinning the rib ends in this way was only viable because the block itself provided a stable backing. This may have been done to make the curves of the centre bouts easier to bend. From the beginning, Del Gesù's centre bout curves were never as tight as those of Stradivari; in fact, because of these more open curves, it may even have been possible for him to bend them without the aid of heat.²⁴ There is some evidence which suggests that Del Gesù was using fresh wood;²⁵ this too would have eased the bending process. In fact, the combination of shallow curves, thinner ribs, and fresh wood must have made the rib bending process easier for Del Gesù than it was for most Cremonese makers. Nevertheless, it appears to have been an onerous task for him. Numerous creases

and cracks occur in the tighter curves of his rib structures, the "Heifetz" being an excellent example. Generally, the ribs are quite buckled along the Xame. Although this may be due to the use of fresh wood, in many cases it looks very much as if the ribs were bent in a series of small creases rather than in a smooth curve.

Following the marking process, the blocks were cut to shape, beginning with the centre bout curves.²⁶ The centre bout ribs were bent and glued in place, and the outer curves of the block to which the upper and lower ribs would be attached were cut. Del Gesù habitually cut the points of his corner blocks considerably shorter than those of Nicolò Amati and Stradivari, producing in his earlier violins rather small corners.²⁷ In these earlier works, the corner blocks were clearly set out and cut with care. Judging by Del Gesù's attitude to other tasks, it seems unlikely that he worked without reference to some form of template even in his later years;²⁸ however, it can be assumed that his swift cutting of the blocks resulted in rib corners which were neither square nor true to the curve of the template (figure 9). On Del Gesù's violins it is not unusual to find the four corner blocks cut with different curves, running in different directions and finishing either shorter or longer than each other. Furthermore, the rib mitres often lean at various angles, a feature which can be extreme in later works. As the Hill brothers observed, "the corner blocks were not left true by the gouge - the only tool he made use of - nor were the sides accurately bent."²⁹ Small wonder that as a result, all eight corners (back and belly) are frequently dissimilar.

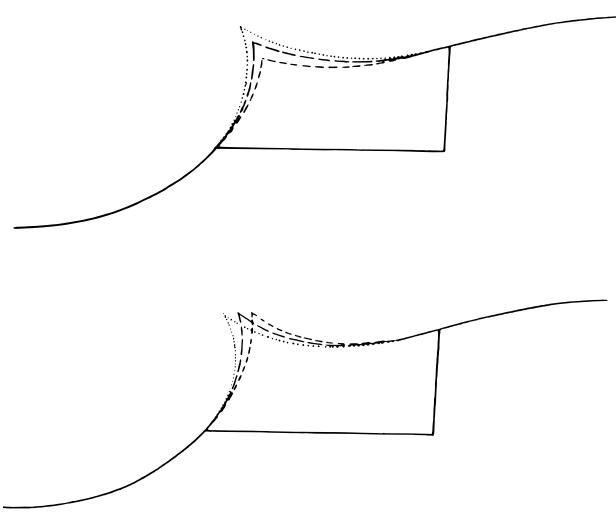
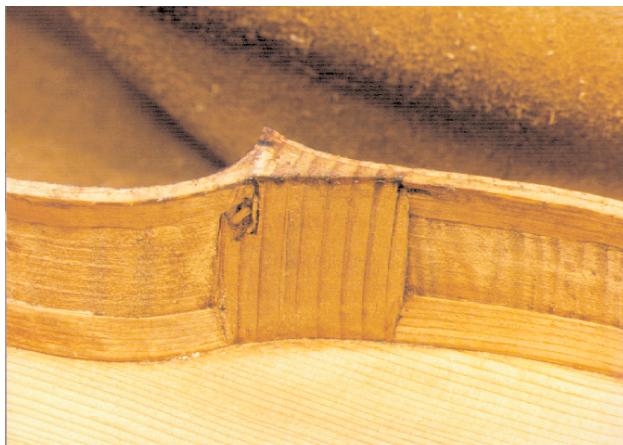


Figure 9. Possible curve and length variations of the corner blocks, of which del Gesù used several combinations.



Interior of “Soil” del Gesù, 1733, showing typical form of del Gesù’s blocks and linings, middle bout linings quickly mortised deep into corner blocks.

Whenever the blocks were cut at different angles, it caused the ribs to twist slightly on the mould. This in turn altered the curves outside the immediate area of the corner, creating back and belly outlines which were different from each other and from the mould itself. On the “Lord Wilton”, the centre bout ribs are clearly not square; they taper inwards towards the belly side, and the belly is considerably narrower across the centre bouts as a consequence. This taper is more marked on the treble side, where the centre bout of the back is much straighter, and the belly outline is deeply curved in compensation (figure 10). The explanation is almost certainly that the ribs twisted on the mould as a result of the corner blocks not having been finished square to it, and in fact this detail is apparent from the rib corners. Such discrepancies could have repercussions far beyond simply altering the outlines: In the long run, the disposition of the soundholes was also affected. As the Hills acknowledge, “We cannot say the master was over particular in making his sides conform quite accurately to the mould. Approximately correct was in all cases sufficient unto the day!”³⁰ This approximation is the prime cause of any variation in the shape of the out-

lines, although other contributory factors will emerge in the course of our discussion.

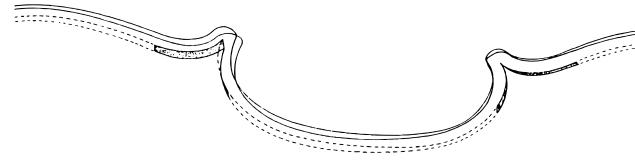


Figure 10. Cutting the corner blocks at various angles led to variations in the back and belly outlines of del Gesù’s instruments.

Any changes to the two endblocks were also capable of modifying the upper and lower bouts significantly. This can be observed on some of Del Gesù’s later works, where the top block is occasionally rather pointed, as on the “Heifetz” (1741), or extremely flat, as on the “Lord Wilton” (1742). By finishing the end blocks proud of the mould, the rib structure could have been lengthened significantly. This process may or may not have been carried out deliberately. On the “Vieuxtemps” of 1741, the position of the neck block appears to have been extended considerably, resulting in what for Del Gesù is a longer than usual stop length and upper bouts.

The extension of the “Vieuxtemps” may have been carried out on the normal sized Del Gesù mould, in which case the neck block would have been cut proud of it (figure 11). The ensuing gaps between the ribs and the mould could have been filled out in advance, possibly by the addition of paper or card strips fixed to the edges. Equally, the ribs may simply have been stretched across these gaps. Another alternative would have been to elongate the ribs after removing them from the mould and before finalising the back outline, and, as shall be demonstrated, this seems to be the most likely explanation.

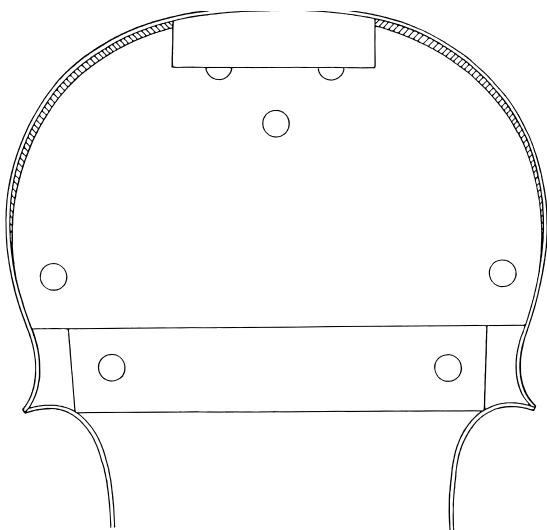


Figure 11. How the upper ribs of the “Vieuxtemps” may have been extended by packing out the mould.

The “Fountaine” pochette of 174031 probably had the opposite treatment. Here the lower block appears to have been extended, producing distorted lines in the lower bouts which suggest that in this case the gaps between the ribs and the mould were not packed out. The “Fountaine” also has a longer body than the more conventional looking 1735 pochette, the “Chardon”,³² which was presumably made on the same mould. As has been mentioned, Del Gesù’s corner blocks were invariably kept short and stubby. Until about 1742 the rib mitres were also short, with the top and bottom ribs only barely overlapping the centre bout ribs (figure 12)

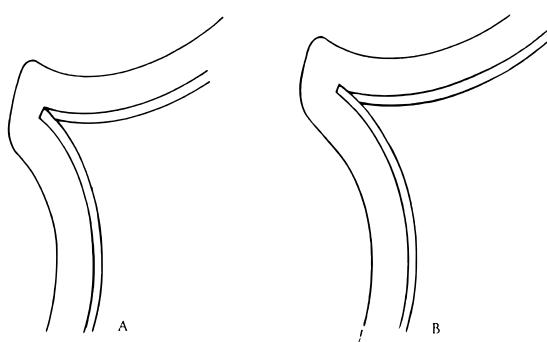


Figure 12. Variations in the rib mitres at the corners.
a) The earlier shorter version.
b) The extended outer rib of the later longer corners.

After this period the overlapping ribs became longer; this is well illustrated by the “Leduc”, where the upper and lower ribs overlap the centre bout ribs by a considerable margin. Occasionally, the central rib was hardly feathered at the end, and both rib ends simply came together to form a thick wedge. Rib

mitres of this nature may have been the result of two distinct trends in Del Gesù’s work: Firstly, the corner blocks were being finished even shorter and with flatter curves, and secondly, the back and belly corners were becoming increasingly longer and more fragile. The vulnerability of these longer back and belly corners may have inspired Del Gesù to provide more support through extended and somewhat thicker rib mitres. Almost uniquely among Cremonese makers, Del Gesù blackened the ends of the rib mitres.³³

It seems to have been the accepted practice in Cremona to form the upper ribs from one continuous piece. This holds true for all of Del Gesù’s instruments, with the possible exception of the “Kortschak”. Although virtually all existing instruments have had their upper rib cut through during the process of mortising replacement necks, the grain and figure of the upper rib wood always appears to be continuous across the neck root. The reason for this practice is not hard to fathom. The neck was fastened to the block with the aid of several nails, which were driven through the block into the neck root. Even using pre-drilled holes there was some danger of splitting the block, a calamitous occurrence at this stage of the construction; the reinforcement provided by the continuous upper rib running across the block reduced this risk considerably. Del Gesù’s use of (possibly) up to five nails would have made his coarse spruce neck blocks particularly vulnerable to splitting. Cremonese lower ribs were also generally of one piece, a fact which can easily be demonstrated and which supports the theory that the upper ribs were made in the same way. The use of upper and lower one-piece ribs avoided the need for a careful joint at the middle of the lower block. A one-piece back is long enough for a one-piece top rib to be cut from the same billet, creating a perfect match. However, one-piece bottom ribs are much longer than the back of a violin, and these could not have been cut from the back wood unless the billet was longer than necessary.³⁴ This may be why many Del Gesù violins have a one-piece bottom rib which matches neither the other ribs nor the back, but does match the bottom ribs of several other violins. It would seem that he simply cut several bottom ribs from a suitably long piece and, regardless of their matching qualities, used them as bottom ribs only. Generally, whenever Del Gesù used a one-piece bottom rib, the centre of the instrument is marked by a tiny knife cut on the edge of the rib, where it comes into contact with the back plate. On the “Soil” of 1733 this tiny nick on the ribs lines up with the remains of a centre line scribed

into the overhang of the one-piece back. Such details can also be found on instruments by Stradivari and Amati.

The advantage of a one-piece bottom rib is that it avoids the need for a careful centre joint. The great disadvantage of both one-piece top and bottom ribs is that they are more difficult to bend with precision, and they compound the inaccuracies of badly cut blocks. Del Gesù obviously had problems in both respects. Although the first corner of a one-piece rib is relatively easy to bend, as is the gentle curve around the upper and lower bouts, the second corner is less so. It must be bent against the prepared curve of the bouts and at exactly the right place. On several later instruments, Del Gesù plainly had difficulties in achieving this: When the ribs were fastened to the blocks, a small swelling appeared where they could not be pressed home against the mould, and this eventually transferred itself to the outline. This may provide some explanation for the fact that when late outlines are superimposed upon earlier outlines, they appear to spring outward at the blocks in a fairly random manner. To some extent this is true of the "Lord Wilton", the "Carrodus" and the "Cannon".

Especially after about 1740, Del Gesù's apparently erratic preparation of the corner blocks resulted in considerable twisting of the one-piece ribs on the mould, leading in turn to even greater variations in back and belly outlines. He may have been forced to cut some lower ribs to compensate for such twisting, but this was probably a rare occurrence. Whenever he appears to have used a two-piece bottom rib, it is more likely to be the result of later repair work. The "Cannon" and the "Leduc" are rare examples of genuine two-piece bottom ribs. All the "Leduc" ribs also match the back of the instrument, an uncommon feature, and it can be assumed that Del Gesù cut them from the back wedge which was otherwise too short for a one-piece bottom rib.

With the ribs bent and glued in position, Del Gesù fitted the linings, which were cleaved from straight-grained spruce. In common with those of Stradivari, they were probably about 2 mm \times 7.5 mm in section. Employing the Amati system, he mortised the centre bout linings deep into the corner blocks (figure 13). Often the linings were brutally spliced into crudely cut oversized mortises. Del Gesù did what was essential with the minimum of fuss; his rib structures may be fairly described as stable but hastily made. In his final years, he appears to have chosen an even quicker method of mortising the centre bout linings.

This was a technique favoured by Carlo Bergonzi whereby, instead of cutting an oblong slot, two rapid knife cuts were used to prepare the block and one swift cut to prepare the lining (figure 14). The linings for the "Ole Bull" were inserted in this way.

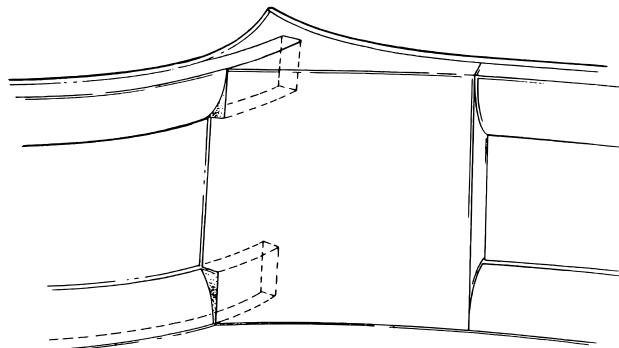


Figure 13. SimpliWed drawing of the Amati system of mortising the centre bout linings into the corner blocks.

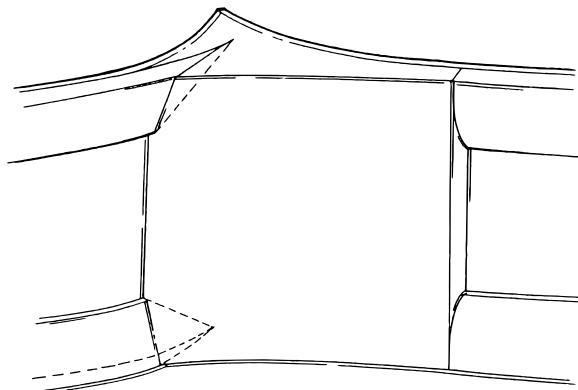


Figure 14. SimpliWed drawing of the method of mortising the centre bout linings, favoured by Carlo Bergonzi, which del Gesù used on the "Ole Bull".

Until recently, the deep mortising system employed by Del Gesù and his contemporaries was something of a puzzle. However, when it was realised that the classical makers glued the back and front linings in place before releasing the ribs from the mould, the reason for both the deep mortises and the peculiar shape of the corner blocks became apparent (figure 15). Using this method the ribs are sprung rather than slipped off the mould, and the whole process of disengaging the two can place considerable stress on the structure. Mortising the linings deep into the corner blocks helps prevent accidental damage during this delicate procedure. With both sets of linings glued in place, the rib structure is far

more stable both before and after being released from the mould. There could be no possibility of further inaccuracies being built into the structure as a result of forcing the second set of linings into place on the fragile ribs, unsupported by the mould.

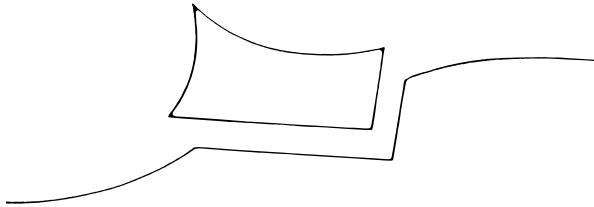


Figure 15. The open form of the Cremonese corner block mortise, with its angle of more than 90°, making it easier to spring the block over the mould.

Once the rib structure with its strengthening linings had been completed, but before the mould was removed, several important operations were carried out. In each case these operations were aided by the extra stability which the mould imparted to the rib structure. Initially, Del Gesù planed flat the side of the ribs which would come into contact with the back, and the rib heights were established at approximately 32 mm, exceptionally 33 mm. It is generally accepted that the Cremonese ribs were tapered in some way, with the end-pin block being higher than the neck block. Where this taper begins and ends, and whether or not it was taken from the back or the belly side, is difficult to establish, especially when more than two hundred years of damage and distortion have clouded the evidence. In Del Gesù's case, his characteristic inconsistency makes even well-preserved examples difficult to evaluate.

The available data indicates that Stradivari tapered the ribs on the belly side. The "ex Regnier" Stradivari violin of 1722 has the remains of a scribe line on the upper bass rib, indicating the final height of the upper block (figure 16).

This scribe line runs parallel to the back and rib joint, from which point it was obviously struck with a marking gauge. The rib measurements, and the angle which the scribe line makes between the neck root and the top edge of the rib, leave little doubt that in this case the taper ran between the neck block and the upper corner block only. This observation is supported by the measurements of a large number of well-preserved Stradivari violins.

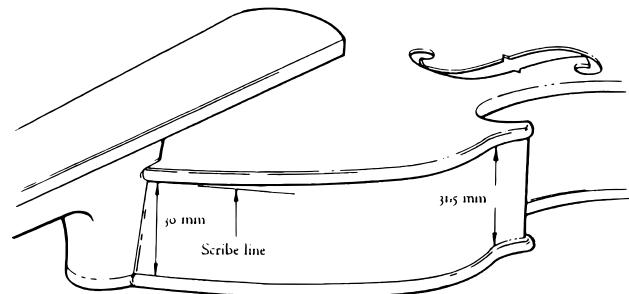


Figure 16. SimpliWed drawing showing the position of the scribe line on the 1722 "Ex Regnier" Stradivari.

In spite of the fact that Del Gesù's rib structures were not always finished with Stradivarian accuracy, the available measurements indicate that he also tapered them from the top corner blocks to the neck block. The reasons for this taper are unclear – and unless any definitive documentary evidence is uncovered, will probably remain so – but the result is that the belly is bent downwards from the upper corners. This certainly imparts some stress to the belly, which may provide some acoustical or structural advantage.

Having tapered the ribs, Del Gesù again turned his attention to the linings. These he trimmed back with a knife; numerous tiny cuts on the insides of the ribs suggest that they were cut back with some speed (figure 17).

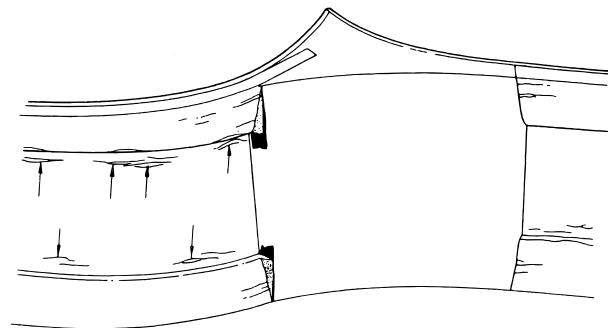


Figure 17. SimpliWed drawing showing the position of the knife marks on a set of del Gesù ribs.

The edges of the moulds in the Museo Stradivariano are also heavily scarred with knife cuts, revealing

that the linings must have been cut to shape while the mould was still in place.³⁵ This was only logical: With the rib structure still rigidly fixed on the mould, the job would be that much easier to accomplish. Besides, with both sets of linings glued in place, shaping the linings before removing the mould made the task of removal itself considerably easier.³⁶ Stradivari shaped his linings with some care, certainly more than the Amatis, but Del Gesù simply sliced them back – an act which confirms that the linings were made from split wood. Although he made some attempt to take off the roughest edges with either a rasp or some flexible abrasive,³⁷ he probably reasoned that they were of little aesthetic importance. With the exception of a few minor details, the rib structure was now complete and ready to be presented to the back, in order to mark the outline.