Figure 6: Andrea Amati cello, 1572

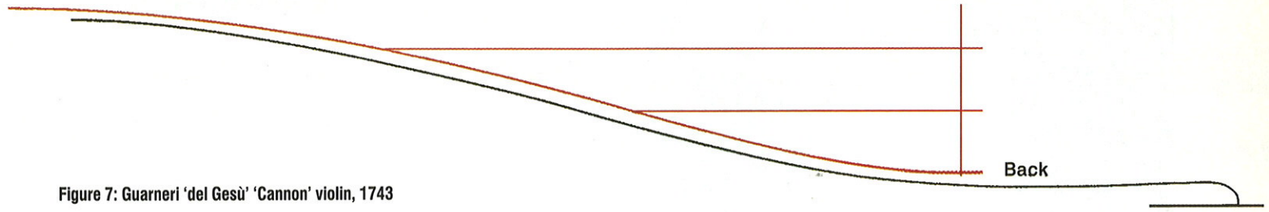
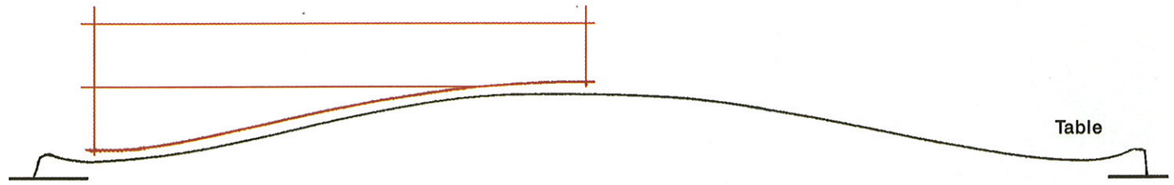


Figure 7: Guarneri 'del Gesù' 'Cannon' violin, 1743



The formula for this is: circumference/3.14 = diameter

So for a desired arching width of 157mm, a wheel of 157/3.14 = 50mm diameter would have to be cut. (Note that the width of the arching is measured from the lowest point of one side to the lowest point on the other, not from purfling to purfling.)

The height of the arching is produced by drilling a hole half the required distance from the centre of the wheel. In other words, to obtain a curve of 12mm height, the hole should be 6mm from the centre. Several holes can be drilled, at varying distances from the centre, to allow the same wheel to generate different arching heights over the same distance.

These measurements are for external archings, and the thickness of the plate is not included in the figures. This would mean that in working on a violin with a total arching height of 16mm, the thickness of the wood at the lowest part of the arch would have to be subtracted, giving an outside curve of 13mm if the wood was 3mm thick at the bottom of the arch. In practical terms I have found it convenient to cut the wheel slightly small and put an elastic band round it, which prevents slipping as the line is drawn.

The computer-generated curves are no different from those drawn by the wheel. Because the usual combination of Windows and printer cannot draw smooth curves over precise distances, it was necessary to add two features. The first is a printer with PostScript, a system that can produce graphics with great accuracy. The optional second feature is a programme called GhostScript, which mediates between the original programme and the printer, showing the proposed curves on the monitor. With this set-up I can obtain exact results by entering the required width and height then simply pressing the print button.

For the purposes of this article I have confined my examples to the major Cremonese makers from Andrea Amati to Guarneri 'del Gesù'. Obviously there are areas that need more investigation. How far did the Venetian makers use curtate cycloids? The Montagnana 'Sleeping Beauty' cello (STRAD poster October 1993) certainly fits the curves closely. What about the schools of Turin, Naples and elsewhere? The one Stainer violin I checked did not fit the system.

It would be interesting to know whether the makers working in the latter half of the 18th century were aware of this method of making archings and decided to follow their own path, or if the system was forgotten after the death of 'del Gesù'. The indications seem to be that it had been lost – the tireless Count Cozio di Salabue (1755–1840) wrote at some length on the various styles of arching without indicating any traditional construction that bound them together.

After the mid-18th century most makers copied their predecessors without fully understanding their working methods. This situation still exists today, although an impressive and growing body of work has emerged during recent years that seeks to establish the technique of the Cremonese makers. The common factor revealed in this research is a fast, flexible and pragmatic system of work, permitting a variety of styles within a given framework. Curtate cycloid curves seem to me to be very much in this efficient and practical tradition. ❑

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ACKNOWLEDGMENT

Two weeks after completing this article, I became aware of the late Tullio Pigoli's work on a similar theme in the April 1984 issue of *Liuteria*. Although I arrived at my conclusions independently of his thorough and detailed study, I would like to acknowledge that he was the first to analyse arching in this way, an especially impressive achievement given how few accurate arching patterns were available even as recently as 15 years ago.