

PART II

Chapter 5

Measuring a 1716 violin

In the summer months of 1816 Count Cozio di Salabue made detailed measurements of some of his instruments. On 29th May 1816 he measured a 1716 Stradivari violin:

*1816, 29 mag^o, Mil^o. forma (P.G.)
misura del mio piu bello e grande V[iolin]^o di Ant[oni]^o Stradivari del 1716.
Ver[ni]^{ce} rossa, prese col Compasso compresi li profili del Coperchio.¹*

1816, 29th May, Milan, mould (P.G.)²
measurements of my most beautiful and large violin of Antonio Stradivari of 1716.
Red varnish, taken with dividers including the profiles [purfling] of the front plate.

Giuseppe Baretta's 1831 Italian-English dictionary translates *compasso* as 'a pair of compasses' and *compasso matematico* as 'dividers'. Since Count Cozio is not likely to have wanted to draw circles, it is reasonable to interpret his *compasso* as indicating a large pair of dividers, possibly with legs which were jointed at their mid-point so that the lower halves could be pivoted inwards towards the vertical. Although the Count's dividers were sufficiently large to measure across the purfling-to-purfling distance on the lower bout of a violin (c205mm) they were evidently not large enough to allow a single measurement of the full length of a violin's body length (c356mm) which is why the Count establishes the body-length measurement for an instrument in stages (see later in this chapter).³ It makes very good sense for Count Cozio to have defined the outer limits of his measurements as exact points on the front plate – namely, the outer line of the purfling – leaving the small width of border-wood lying to the outside of the purfling to be measured separately with small callipers or, simply, a rule(r).

Count Cozio's reference to his *compasso* is also important since there are different methods of measuring the length or breadth of a violin given that the front and back plates rise and fall. If a flexible tape is used – a tailor's tape – and the tape lies on top of the arched surface of an instrument – 'over the arching' – then the resulting measurement will be slightly longer than if the same measurement is taken above the instrument – point-to-point – with dividers.⁴ In the latter case, the needle-tips of the dividers would then be laid against a ruler to obtain the precise dimensional result.

At the beginning of the nineteenth century in Italy (as indeed across the whole of Europe) there were few standardised measurements of length, size, or weight; there were more than 200 units of length called a 'foot'. The difficulty encountered in trying to interpret Count Cozio's measurements of his instruments is that the present-day investigator initially has little idea which reference unit he was using, and which variant (if any) of that unit was used, for example, in Milan (as against Turin or

¹ BSCr, LC, ms. Cozio 47, folio 13v; see also Cozio/Bacchetta p. 241. Underscores are as in the manuscript.

² The *Più Grande* mould.

³ Count Cozio used a flexible tape when measuring his cellos.

⁴ Even 'over the arching' is ambiguous with respect to the minimum width of the C-bout, since the tape can either be left to follow both the convex central arch and the concave 'scoops' as the top plate approaches the C-bout edges, or the tape can be tensioned so that it forms a bridge between the central arch and the C-bout edges. Resultant dimensions will change from method to method. 'Point-to-point' measurements made with callipers have the potential to be more accurate and reliable.

Bologna or Brescia or Cremona). Fortunately, Count Cozio makes his measuring system perfectly clear in his documents, where, writing in 1816, he explains:

*Le sue misure prese col compasso sono come segue sul piede di Parigi di dodeci pollici di ponti 12 caduna misura comprese le profilature.*⁵

The measurements, taken with dividers, are as follows; on the foot of Paris of twelve *pollici*, of 12 *ponti*, each measurement including the profile [purfling].

The ‘Foot of Paris’ (or ‘Foot of the King’ – *Pied du Roi*), as a length, was defined by a French law of 10th December 1799 as 9,000mm divided by 27.706 = 324.839mm. One *Pied du Roi* was divided into twelve *pouces* (of 27.07mm) and one *pouce* was divided into twelve *lignes* (of 2.26mm). Count Cozio’s equivalent Italian terms were *pollici* and *ponti*.⁶

Count Cozio repeatedly makes clear the fact that his bout and length measurements terminate at the outside line of the purfling. In BSCr, LC, ms. Cozio 20 (not transcribed by Renzo Bacchetta) the Count introduces a set of measurements of a 1715 Stradivari violin with the following text:

Misure del retroscritto violino detto Stradivari, prese col compasso superiormente, compresi li profili ma esclusi i bordi, prese col piede di Parigi detto del Re.

Measurements of the aforementioned violin of Stradivari, taken with dividers from above, including the profile [purfling] but excluding the borders, taken with the foot of Paris, named of the King.

Further iterations of this information are:

| | |
|---------------------------|---|
| 29 th May 1816 | <i>Misure col compasso sul coperchio compresi li profili</i> ⁷ |
| 29 th May 1816 | <i>Prese col compasso e coi profili nel coperchio</i> |
| 29 th May 1816 | <i>prese col compasso coi profili</i> |
| 30 th May 1816 | <i>Misure prese col compasso compresi li profili</i> |
| 30 th May 1816 | <i>misure come sopra col compasso compresi i profili</i> |
| 30 th May 1816 | <i>prese col compasso e compresi li profili</i> |
| 31 st May 1816 | <i>col li profili e prese col compasso</i> ⁸ |

On 7th June 1816, when measuring his father’s 1668 Nicolò Amati violin, Count Cozio writes:

[...] *prese col compasso col piedi di Parigi del Rè compresi li profili nel coperchio ed esclusi li bordi che sono di ponti uno ed un terzo di grossezza.*⁹

[...] taken with dividers with the foot of Paris, of the King, including the profile [purfling] of the front plate and excluding the borders which are one and one-third *ponti* in thickness [width].

In January 1823, in connection with a viola made by Andrea Amati, the Count writes:

*Le misure col piede del re di Parigi della controdescritta viola d’Andrea Amati presa col compasso, compresi li profili e non i bordi.*¹⁰

The measurements with the foot of the King, of Paris, of the previously described viola of Andrea Amati are taken with dividers, including the profile [purfling] and not the borders.

Significantly, in taking the measurements (in 1820) of another instrument (thought to have been made by Andrea Amati) Count Cozio precedes his measurements with:

⁵ Cozio/Bacchetta p. 23.

⁶ Count Cozio almost always writes *polici* (a single ‘l’), and frequently changes *ponti* to *punti*.

⁷ ‘Measurements with dividers on the front plate including the profile [purfling]’.

⁸ BSCr, LC, ms. Cozio 47, folio 16r, 17v, 20v, 23r, 25r, 26r, 26v; see also Cozio/Bacchetta pp. 243, 244, 247, 249, 251, 251, 252.

⁹ BSCr, LC, ms. Cozio 47, folio 34r; see also Cozio/Bacchetta p. 258.

¹⁰ BSCr, LC, ms. Cozio 47, folio 119r; see also Cozio/Bacchetta p. 320.

*Misure col piede di Parigi compresi li profili ed esclusi li bordi prese col compasso e così non misurate le curve.*¹¹

Measurements with the foot of Paris including the profile and excluding the borders, taken with dividers, and thus not measuring the curves [the archings].

Thus the Count's point-to-point measurements always terminate at the outer line of the purfling. The border-wood of the plate is measured separately and that width must be added, twice, to the bout-width or body-length measurement to arrive at the full extremity-to-extremity dimension.¹²

The four most important measurements on a violin are:

1. the maximum measurement across the Upper Bout
2. the minimum measurement across the Centre Bout
3. the maximum measurement across the Lower Bout
4. the Body Length, from the top extremity to the bottom extremity.

The upper point of this last measurement is where the curving extremity of the plate meets the side of the neck-foot. The back plate of an instrument is usually used for this measurement of length since it is clear of obstructions such as the tail-piece, the bridge, and the fingerboard. However, Count Cozio almost always used the front plate since the instrument's bridge afforded him a midpoint from which measurements could be taken in either direction.

¹¹ BSCr, LC, ms. Cozio 47, folio 107r; see also Cozio/Bacchetta p. 309.

¹² As indicated in Chapter 3, the term 'border' refers to the distance between the outside line of the purfling and the extremity of the plate; the term 'overhang' refers to the shorter distance by which the underside of a front-plate edge – or the upper side of a back-plate edge – projects beyond the vertical outside face of the ribs. The border, usually, is approximately 3.75mm; the overhang 2.5-2.75mm. The border and overhang measurements on the upper and lower bouts of the *Messiah* violin have been stated to be 3.75mm and 2.4-2.6mm respectively (*The Strad*, March 2011 poster supplement); on the 1709 *Viotti* violin 3.6mm and 2.2mm (*The Strad*, March 2006 poster); on the 1715 *Titian* violin 3.8mm and 2.5-3.0mm (*The Strad*, February 2009 poster).

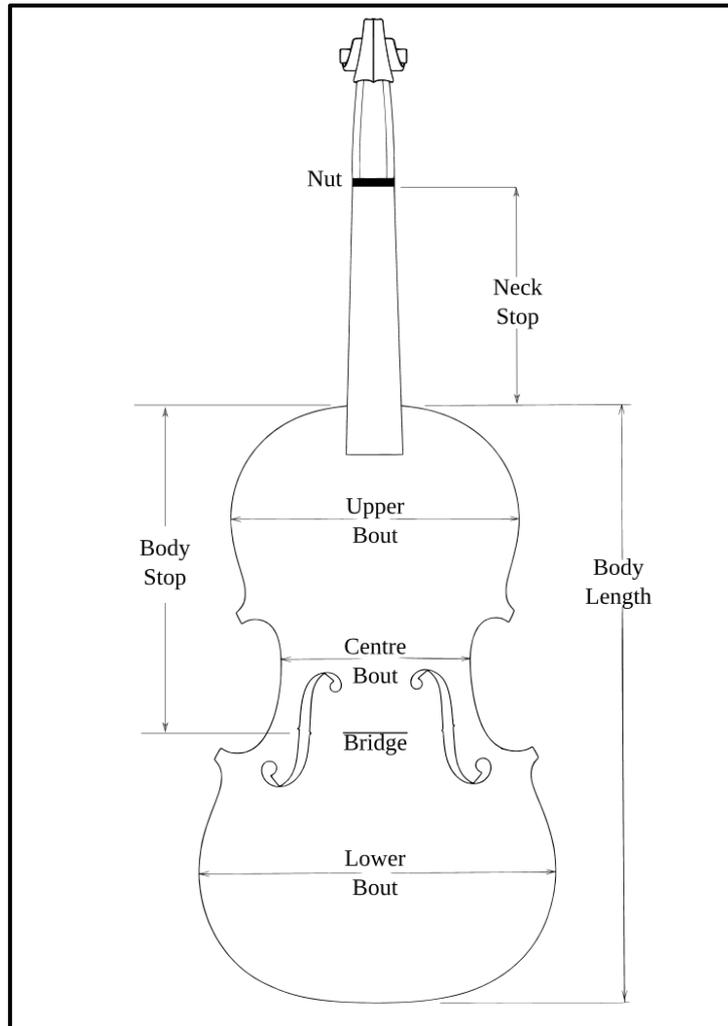


Figure 1: Outline of violin with major points of measurement (fingerboard is shortened)

The Hills, in their 1902 monograph, provide the measurements for a large selection of Stradivari instruments,¹³ stating: ‘The measurements given in these tables were all taken with a rule over the modelling¹⁴ – *i.e.* exterior to the instruments.’¹⁵ The Hills’ phraseology could be more explicit:

- was the ‘rule’ a tailor’s flexible tape, or what we today would call a ruler?¹⁶
- what does ‘over the modelling’ mean?
- how could the measurements have been taken in any way other than ‘exterior to the instruments’?

Despite these ambiguities, the near certainty is that the Hills’ 1902 measurements were not taken with a flexible tape lying directly on the contoured surface of the instrument, nor with a wooden or metal

¹³ Hill (1902) pp. 291-298.

¹⁴ The Hills’ *modelling* is today’s *arching*.

¹⁵ Hill (1902) p. 295.

¹⁶ In their 1902 monograph (p. 32) the Hills refer to a statement made by George Hart (Hart p. 173) who himself cites Vincenzo Lancetti’s unpublished 1823 manuscript, ‘Biographical Notices’ (of Cremonese violin makers). The Hills write: ‘Lancetti appears to have formed his conclusions from the fact that a wooden rule or straight-edge [...] [was] found among the Stradivari relics [...].’ It thus appears that a ‘rule’, to the Hills, was not a flexible tape as used by a tailor.

ruler. Eleven years earlier, at the end of their 1891 monograph on the *Salabue/Le Messie* violin, the Hills supplied ‘the exact measurements of the violin’. It is reasonable to assume that their manner of measuring the *Salabue* violin in 1891 was the same as that later used for the large selection of instrument measurements included in their 1902 *Antonio Stradivari* monograph. The Hills’ 1891 ‘exact’ measurement of the body length (the back plate is assumed) of their *Salabue* violin – ‘14 inches’ – is equivalent to 355.6 millimetres, which is within 0.4mm of today’s calliper-derived measurement of 356mm.¹⁷ Thus the almost identical body-length measurements (355.6mm in 1891, 356mm in 2011) indicate that the Hills used dividers (or a beam calliper with sliding pointers) to measure the body length of the violin – the identical method used by current investigators (and by Count Cozio).

An upper-bout or lower-bout width measurement made with a flexible tape lying on the surface of an instrument will usually be approximately 1.2mm longer than a calliper measurement since, at the physical points where these measurements are taken, the profile of the arching is usually not pronounced. However, a flexible-tape measurement of the minimum width of the centre bout will be approximately 3mm longer than the point-to-point equivalent (despite a violin’s narrow C-bout width) since the arching profile, at this central point, is at its most pronounced. The body-length measurement of a violin will be approximately 1.5mm greater when measured with a flexible tape than when measured with callipers. Therefore, if the Hills’ 1891 ‘14 inches’ (355.6mm) for the body length of their *Salabue* violin was the result of using a flexible tape, a calliper-defined equivalent would have been approximately 354mm, which would then indicate that the length of the *Messiah* violin has increased by 2mm during the past 120 years.

The sequence in which Count Cozio measured the various dimensions of his instruments is consistent from instrument to instrument. As already shown, the Count’s text for his 1716 Stradivari violin (see Plate 16) begins:

*1816, 29 mag^o, Mil^o. forma (P.G.)
misura del mio piu bello e grande V^o di Ant^o Stradivari del 1716.
Ver[ni]^{ce} rossa, prese col Compasso compresi li profili del Coperchio*

Count Cozio subsequently added an annotation to the left margin (in rotated text):

Ratificate con compasso più esatto
Confirmed with a more accurate *compasso*

Note that this annotation applies to *all* the measurements on the page; the upper brace simply groups together the three measurements of width while the lower brace groups the measurements of length.

Count Cozio’s *compasso più esatto* is likely referring to large dividers fitted with a precise and finely-cut adjusting thread so that the spring-loaded legs, when opened out, could have their needle-tips positioned on the instrument with complete security and repeatability; these dividers may have been combined with a newly-acquired *Pied du Roi* rule[r] with *pouce (polici)* and *ligne (ponti)* markings positioned with the highest level of accuracy which was obtainable at the start of the nineteenth century. The Count’s corrections (see below) show how minimally inaccurate were his initial measurements and also demonstrate his determination to define the physicality of his 1716 violin with absolute certainty.

¹⁷ Measurement from the poster supplement for the *Messiah* violin, published by *The Strad*, March 2011.

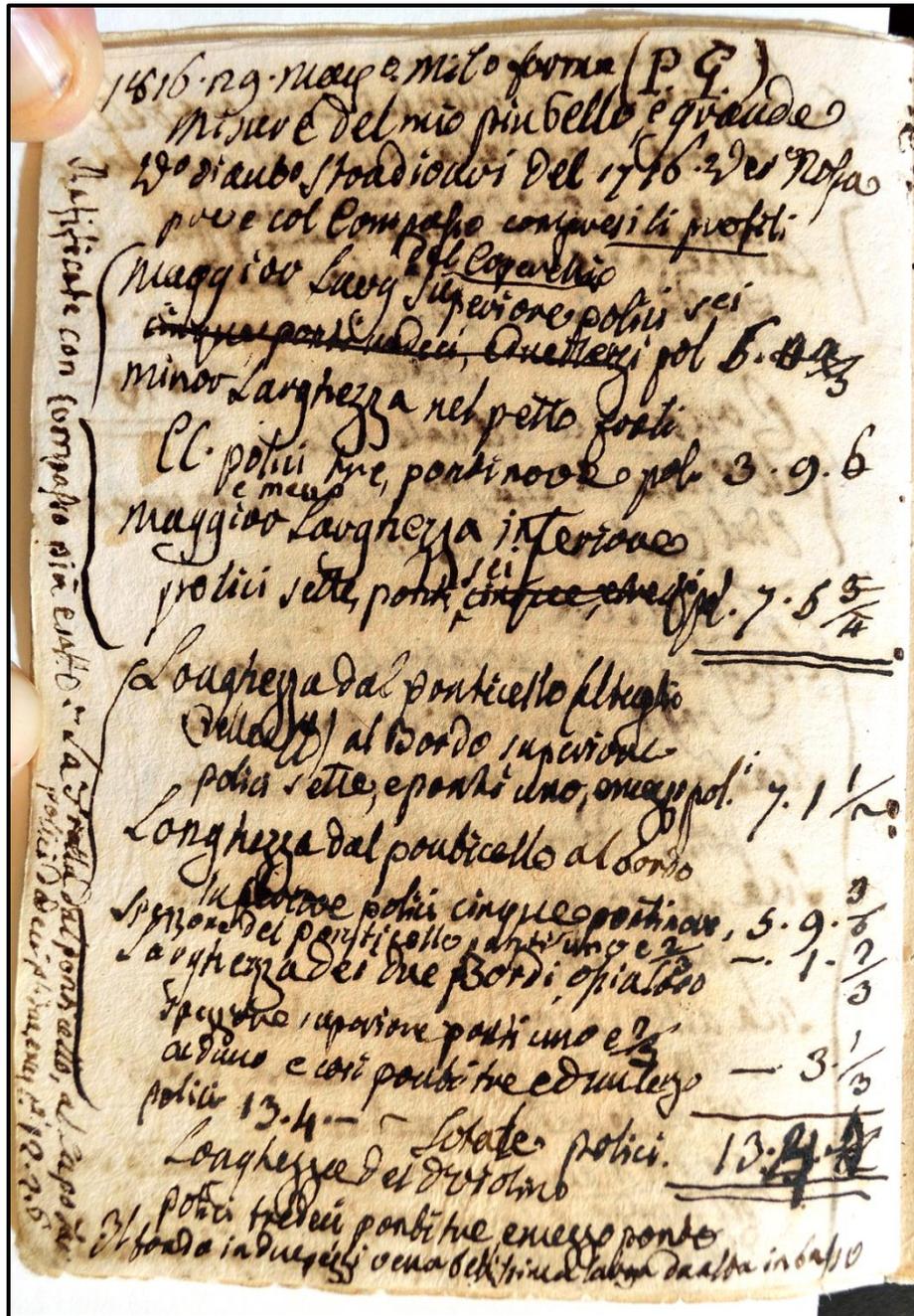


Plate 16: BScr, LC, ms. Cozio 47, folio 13v.

Maggior larg[hezz]^a superiore polici sei

cinque ponti undeci e due terzi: 5. 11²/₃ [the 5 altered by hand to 6]¹⁸

Minor larghezza nel petto fra li CC – polici tre, ponti nove e mezzo: 3.9.0/6¹⁹

Maggior larghezza inferiore

polici sette, ponti sei cinque, e tre q[uart]ⁱ: 7. 5. ³/₄ [the 5 altered to 6 and the ³/₄ crossed out]²⁰

¹⁸ Count Cozio's initial measurement – polici cinque, ponti undeci e due terzi ('five pollici and 11²/₃ ponti') – was then firmly crossed out and replaced with: polici sei ('six pollici'). The initial measurement equates to 161.71mm, a difference of just 0.7mm from the 'more accurate' measurement of 162.42mm.

¹⁹ Count Cozio variously represents mezzo (half) with '½' or with '3/6'. In this case, it appears that he initially wrote a zero, '0' (with his usual bisecting horizontal line), to indicate that there was no subdivision of one ponto, and then, with his 'more accurate compasso', re-measured the centre bout and added an upper tail to the zero to become a 6, shorthand for six-twelfths of one ponto (i.e. a half). The e mezzo, with its 'squeezed in' placement on the page, gives every appearance of being a subsequent addition.

Longhezza dal ponticello (al taglio delle FF) al bordo superiore – polici sette e ponti uno e mezzo: 7. 1. $\frac{1}{2}$
 Longhezza dal ponticello al bordo inferiore – polici cinque ponti nove: 5. 9. $\frac{3}{6}$ ²¹
 Spessore del ponticello – ponti uno e $\frac{2}{3}$: - 1. $\frac{2}{3}$
 Larghezza dei due bordi ossia loro spessore superiore – ponti uno e $\frac{2}{3}$ caduno, e così ponti tre ed un terzo: -
 3. $\frac{1}{3}$
 Polici 13.4²² – Totale longhezza del violino
 Polici tredici ponti tre e mezzo ponto: 13. 3. $\frac{1}{2}$ [the 3. $\frac{1}{2}$ overwritten with 4. 0]²³
 1816, 29th May, Milan, mould (P.G.)
 Measurements of my most beautiful and large violin of Antonio Stradivari of 1716.
 Red varnish, taken with dividers including the profiles [purfling] of the front plate.
 Maximum upper width: 6 *pollici*
 Minimum width in the chest between the CC [the C-Bout]: 3 *pollici* and 9 $\frac{1}{2}$ *ponti*
 Maximum lower width: 7 *pollici* and 6 *ponti*
 Length from the bridge (at the ‘notch’ of the *f*-holes) to upper border: 7 *pollici* and 1 $\frac{1}{2}$ *ponti*
 Length from the bridge to lower border: 5 *pollici* and 9 $\frac{1}{2}$ *ponti*
 Thickness of the bridge [measured at the foot]: 1 $\frac{2}{3}$ *ponti*
 Width of the two borders, or their thickness, in the upper [bout]: 1 $\frac{2}{3}$ *ponti* each and thus 3 $\frac{1}{3}$ *ponti*
 Total length of the violin: 13 *pollici* and 4 *ponti*.²⁴

Consequently (and using the ‘Paris Foot of the King’ units of 27.07mm for 1 *pollici* and 2.26mm for 1 *ponti*):

The front-plate upper-bout width measurement (between the outer line of the purflings) is 6 *pollici* = 162.42mm. Adding 3 $\frac{1}{3}$ *ponti* (7.52mm) for both border-widths produces a total of 169.94mm. The March 2011 measurement of the front-plate upper-bout width (extremity to extremity) of the *Messiah* violin (published by *The Strad*) is 167mm.

The front-plate C-bout width measurement is 3 *pollici* and 9 $\frac{1}{2}$ *ponti* plus 3 $\frac{1}{3}$ *ponti* for the two borders = 110.20mm. The March 2011 measurement of the front-plate C-bout width of the *Messiah* violin (*The Strad*) is 108.9mm.

The front-plate lower-bout width measurement is 7 *pollici* and 6 *ponti* plus 3 $\frac{1}{3}$ *ponti* for the two borders = 210.57mm. The March 2011 measurement of the front-plate lower-bout width of the *Messiah* violin (*The Strad*) is 207.5mm.

The Count’s cumulative front-plate length measurement is 13 *pollici* and 4 *ponti* = 360.95mm. The March 2011 measurement of the front-plate length of the *Messiah* violin (*The Strad*) is 356mm.

²⁰ Count Cozio initially wrote *polici sette, ponti cinque e tre qⁱ [quarti]* (‘seven *pollici* and 5 $\frac{3}{4}$ *ponti*’), but then firmly crossed out *cinque e tre qⁱ*, replacing it with *sei* (‘six *ponti*’). The difference between the two measurements is 0.56mm.

²¹ Although there is no mention of the phrase *e mezzo* the Count’s $\frac{3}{6}$ does not appear to be an error.

²² This written confirmation of the revised total length of the body has been entered into an unused space of the paper.

²³ BSCr, LC, ms. Cozio 47, folio 13v; see also Cozio/Bacchetta p. 241 (but without a transcription of the Count’s crossed-out texts).

²⁴ At the very bottom of folio 13v Count Cozio writes a single descriptive comment on this 1716 violin: *Il fondo in due pezzi, vena bellissima, larga da alto in basso* (‘The back in two pieces, the most beautiful flames, wide from the top to the bottom’). The final part of this description does not fit well with high-resolution photographs of the *Messiah* violin’s back plate (see MIAM:CC/Milnes p. 157; Beare *et al.* (2013) p. 185; the *Messiah* poster supplement, *The Strad*, March 2011). For a line-by-line transcription, translation, and explanation of every one of the 1716 (P.G.) measurements see the present author’s article *Count Cozio’s measurements of his 1716 Stradivari violin*; free to read at www.themessiahviolin.uk.

| <u>Summary</u> | Count Cozio 1816 (<i>compasso più esatto</i>) | <i>The Strad</i> 2011 (callipers) |
|----------------|--|--------------------------------------|
| Upper Bout | 169.9mm (front plate) | 167/167.5mm (front/back) |
| C-Bout | 110.2mm | 108.9/108.3mm |
| Lower Bout | 210.6mm | 207.5/208mm |
| Body Length | 360.95mm | 356/356mm |

These dimensional differences – most especially the 4.95mm difference in body length – indicate that the 1716 (*P.G.*) violin which Count Cozio measured on 29th May 1816 is not the *Messiah* violin (unless the Count's measurements can be demonstrated to be flawed).

If errors are suspected within Count Cozio's measurements of length, one might consider whether he

- inadvertently included the thickness of the bridge more than once
- measured to the top and bottom extremities of the front plate (rather than to the outer line of the purfling)
- made small errors in measuring each longitudinal segment of the front plate (these errors then combining to produce an inaccurate overall result).

Measuring the bridge thickness more than once is most unlikely, since, when using dividers to measure from the bridge to the purfling at one end of the front plate, the needle-tip of one leg of the dividers would be positioned at the intersection between the foot of the bridge and the front plate and then the dividers would be opened out to reach the outer line of the purfling on the same side of the bridge (and the procedure repeated on the other side of the bridge); it would be impossible to position one leg of the dividers at the bridge/plate intersection on the 'wrong' side of the bridge. In his details of a 'no label date' Stradivari violin Count Cozio carefully explains his measurement of the length of the upper part of the body of the violin:

*La lunghezza dalla parte superiore, cioè dal piede del cantino del ponticello al bordo vicino al manico cioè superiore è di pollici sette, punti tre: 7. 3.*²⁵

The length of the upper part, that is from the foot of the bridge at the 'singing' string [the 'E' string] to the border [purfling] next to the neck, that is the upper [part], is *pollici 7, ponti 3*.

In addition, the Count's sequence of measurements almost always presents the information in the same order – bridge to upper purfling outer line; bridge to lower purfling outer line; thickness of bridge; combined width of the border-wood; total length. The Count cannot have made the same mistake – including the thickness of the bridge more than once – in instrument after instrument.

If it should be claimed that Count Cozio must have forgotten his own oft-repeated specification – of measuring to the outer line of the purfling – and measured, instead, to the extremities of the front plate (notwithstanding the fact that this is physically impossible²⁶) then the total body length of his 1716 violin would be the result of:

Bridge to upper extremity: 7 *pollici* and 1¹/₂ *ponti*

Bridge to lower extremity: 5 *pollici* and 9¹/₂ *ponti*

Bridge thickness: 1²/₃ *ponti*

Total body length: 13 *pollici* and ¹/₃ *ponti* = 353.4mm, which is very small and does not correspond in any way with the current length of the *Messiah* violin: 356mm.

²⁵ BSCr, LC, ms. Cozio 20.

²⁶ If the dividers' needle-tips are secured on the wood of the plate they cannot be at the extremity; if they are at the extremity they are secured(?) on thin air.

Two indicators of reliability, with respect to the Count's system of measuring, and the measurements themselves, are:

1. In describing the viola belonging to Count Archinto (the description is dated 29th October 1816) Count Cozio mentions that the ribs have been reduced in height. He provides vertical measurements of the ribs – 1 *pollici* and 2 *ponti* at the neck, and 1 *pollici* and 3 *ponti* at the end-pin.²⁷ These measurements convert to 31.6mm and 33.9mm. Charles Beare gives the following measurements for the *Archinto* ribs (apparently on the bass side): at the neck, 31.7mm; at the end-pin, 34.5mm.²⁸

2. On 29th May 1816 Count Cozio also measured the ribs on his 1716 (*P.G.*) Stradivari violin but it is not known whether the Count was measuring the rib on the treble side or on the bass side of the instrument. If the Count was right-handed then holding the dividers in his right hand would naturally place the neck of the violin in his left hand – perhaps with the treble-side C-bout rib resting across his legs (while sitting down) – and the bass-side rib would then present itself for measuring. The Count's measurements of the height of the rib are: 31.6mm at the end-pin and 29.3mm at the foot of the neck.²⁹ The bass-side rib measurements specified in the *Messiah* poster (March 2011) published by *The Strad* are: 32.0mm at the end-pin and 29.9mm at the foot of the neck.

If these high levels of agreement are interpreted as indicating that the 1716 violin measured by the Count, and the *Messiah* violin, are one and the same, then such an interpretation acknowledges the accuracy and reliability of the Count's measurement procedure which, when applied to the bout widths, and the body length, clearly indicates that his 1716 violin, and the *Messiah* violin, cannot be the same instrument.

A commentator might cast doubt on the measurements established by Count Cozio by questioning the accuracy of his ruler, against which he plotted the tips of his dividers. Whatever might have been the logic which lay behind the French specification for the *Pied du Roi* measurement it was nonetheless a government-approved measurement, and the Count used it because it was authoritative and not subject to variation through local custom and practice (the Napoleonic 'Kingdom of Italy' – extending across most of northern Italy – existed from 1805-1814, with Milan as the capital of the Kingdom). In 1816, when the Count was measuring his instruments, his equipment (and his eyesight) apparently enabled him to measure to the equivalent of 0.5mm, and he measured dozens of instruments. The Count had no commercial need to measure his instruments, and he certainly had no need to measure them so exactly and so comprehensively; each instrument is the subject of at least twenty different measurements. The detail and extent of his measuring should be acknowledged as wholly remarkable and reflective of the sophisticated scientific capabilities during the early nineteenth century in Europe. It should be noted that, even before 1800, scientists had (at the larger end of the size spectrum) accurately calculated the size and shape of the Earth, and its distance from the Sun and the planets, while at the smaller end of the spectrum John Harrison and Thomas Mudge had both produced chronometers of extraordinary precision of manufacture (and thus accuracy of time keeping) in order to solve the problem of establishing longitude at sea. To measure an object merely to an accuracy of 0.5mm was commonplace.

Arithmetical experimentation reveals that for Count Cozio's 29th May 1816 measurements of his 1716 (*P.G.*) Stradivari violin to produce results identical (or near identical) to today's measurements of the *Messiah* violin, the base unit – the 'Foot of Paris' – would need to measure 321.4mm rather than

²⁷ BSCr, LC, ms. Cozio 47, folio 93r; see also Cozio/Bacchetta p. 301.

²⁸ Beare p. 317.

²⁹ BSCr, LC, ms. Cozio 47, folio 14r; see also Cozio/Bacchetta p. 242.

324.84mm. It is not plausible that someone as conscientious as Count Cozio would have purchased a ruler with such an inaccurate unit of length, nor, indeed, that a manufacturer would have sold to Count Cozio such an inaccurate piece of equipment.

In addition to the 1716 violin measured on 29th May 1816 Count Cozio made detailed and complete measurements of only five other Stradivari violins:

A 1736 violin – measured on two different occasions – described as ‘large’, with a body length of 358.7mm³⁰

Another 1736 violin, *forma più piccola* (‘smaller mould’), 343.66mm³¹

A 1665 violin, *piuttosto piccola* (‘rather small’), 342.15mm³²

The ‘enormous’ 1684 violin belonging to Carlo Carli, 362mm³³

A violin of 1717 belonging to *Marchese Dalla Rovere*, 356.05mm³⁴

Of itself, a violin having a length of 360.95mm is not so unusual. Stradivari’s ‘Long Pattern’ decade of 1690-1700 included violins with lengths of 363.5mm³⁵ and, as commentators have often stated, Stradivari was constantly experimenting:

Most writers on the subject have divided Stradivari’s life into periods, and then over-praised or depreciated this or that epoch. Such a procedure is to a great extent misleading, for no man of Stradivari’s commanding genius could be tied down to act on strict lines. [...] It is perhaps correct to say that he experimented more frequently before 1700, though the more we study his works the more clearly do we perceive that Stradivari was always experimenting even to his last days. Hence it came about that he produced works of varying merit [...].³⁶

Count Cozio’s 1716 (*P.G.*) violin demonstrates that Stradivari, around 1700, did not abandon larger-than-normal violins, and, for at least three violins – of 1716, 1719, and 1724 – used his *Più Grande* mould dating from 1681/87 (see Chapter 2).

Yet another objection to the discrepancies between Count Cozio’s 1816 measurements and the present-day dimensions of the *Messiah* violin could be founded upon concerns about shrinkage of the wood. Front-plate and back-plate measurements for a range of Stradivari violins – the measurements provided by Charles Beare³⁷ and Rudolf Hopfner³⁸ – are relevant here. If shrinkage is to be observed it is much more likely to be seen in a violin’s soft spruce front plate rather than in the hard maple back plate. In the following lists, an asterisk denotes where the front-plate measurement, in millimetres, is smaller than the back-plate measurement. Beare’s measurements are:

³⁰ BSCr, LC, ms. Cozio 47, folios 19r and 28v; see also Cozio/Bacchetta p. 245. For details of the double measurement see the present author’s article, *The ‘Muntz’ violin*, at www.themessiahviolin.uk.

³¹ BSCr, LC, ms. Cozio 47, folio 20v; see also Cozio/Bacchetta p. 247.

³² BSCr, LC, ms. Cozio 47, folio 40r; see also Cozio/Bacchetta p. 264.

³³ BSCr, LC, ms. Cozio 47, folio 53r; see also Cozio/Bacchetta p. 269. See also Chapter 2.

³⁴ BSCr, LC, ms. Cozio 47, folio 95r; see also Cozio/Bacchetta pp. 301-302.

³⁵ Hill (1902) p. 293. The Hills list two violins, 1690 and 1694, both identified as ‘Typical long pattern’, and both having body lengths of 363.5mm (14 ⁵/₁₆ inches).

³⁶ Hill (1902) p. 38.

³⁷ Beare pp. 316-321.

³⁸ Hopfner pp. 55-73.

| UB front/back | CB front/back | LB front/back | Body Length front/back |
|---------------|---------------|---------------|-------------------------|
| *160/162 | *102/106.4 | *200.5/202.4 | *352/353.5 (Tullaye) |
| *166.3/168 | *107.2/107.5 | *203.5/207 | *352.5/344 (Guyot) |
| 161.5/161 | *104/105.9 | *200.3/201 | *352/354 (B. Knoop) |
| 167/166.5 | *108.5/109 | *205.5/206.5 | *353.5/355 (Emiliani) |
| 167.5/167.5 | 109.5/109.5 | *205.5/208 | *356.5/358 (Parke) |
| *166.5/167.5 | *108.5/109.5 | *205.3/206.5 | *355.2/356.5 (Soil) |
| 167.5/167 | *108.5/109.2 | *207.3/207.5 | *355/355.5 (L. Blunt) |
| *167/167.5 | 108.9/108.5 | *206.5/207.5 | *354.5/355.5 (Sarasate) |
| 161.8/160 | *107.2/109.1 | *200.5/201 | *351.5/353.2 (Muntz) |

Rudolf Hopfner provides similar data:

| UB front/back | CB front/back | LB front/back | Body Length front/back |
|---------------|---------------|---------------|--------------------------|
| *165/167 | *105/107 | 209/206 | 354/354 (Brüstlein) |
| *163/166 | *106/107 | *203/206 | 354/354 (Hämmerle) |
| *164/167 | *105/108 | *203/207 | *353/355 (Smith-Quersin) |
| *165/169 | *107/109 | *205/208 | *354/356 (B. Oppenheim) |
| *163/166 | *102/107 | *203/205 | 354/353 (Rawark) |

It is noticeable that some of these violins reveal curiously inconsistent comparative measurements between the front plate and back plate: the 1698 *Baron Knoop* violin, the 1703 *Emiliani* violin, and the 1721 *Lady Blunt* violin all have front-plate upper bouts which are larger than their back-plate equivalents, but the two other bout measurements are smaller; the 1711 *Parke* violin has identical front/back upper and centre bouts but a much smaller front-plate lower bout; the 1707 *Brüstlein* violin has a wider front-plate lower bout (by 3mm) but smaller front-plate centre and upper bouts (by 2mm in both cases). The evidence does not consistently point towards a faster rate of front-plate shrinkage and, moreover, it cannot be guaranteed that Stradivari's violins, when constructed, showed absolute equality of dimension in both plates; present-day calliper measurements of the *Messiah* violin³⁹ reveal a front-plate centre bout which is wider than the back-plate centre bout (108.9/108.3mm) but front-plate upper and lower bouts which are narrower than those of the back plate (167/167.5mm and 207.5/208mm).

The Hills' 1891 monograph concludes with their measurements of their *Salabue* Stradivari violin: Upper Bout 6⁵/₈ inches; Lower Bout 8¹/₄ inches; Body Length 14 inches.⁴⁰

The Hills' measurements, converted to millimetres, are:

| | |
|-------------|----------|
| Upper Bout | 168.27mm |
| Lower Bout | 209.55mm |
| Body Length | 355.6mm |

A subsequent set of *Messiah* measurements was made in 1969 by David D. Boyden,⁴¹ who supplies the following information:

| | | |
|-------------|---|---|
| Upper Bout | 6 ⁵ / ₈ inches / 168mm | [the precise metric equivalent is 168.27mm] |
| Lower Bout | 8 ³ / ₁₆ inches / 213mm | [the precise metric equivalent is 207.96mm] |
| Body Length | 14 inches / 356mm | [the precise metric equivalent is 355.6mm] |

³⁹ *The Strad*, March 2011, *Messiah* poster.

⁴⁰ Hill (1891) p. 31. The Hills do not specify a C-Bout minimum measurement.

⁴¹ Boyden (1979) p. 26. Boyden does not indicate whether he was measuring the front or the back of the violin, nor his manner of taking the measurements, but his results strongly point towards the use of callipers.

These measurements can be placed alongside recent specifications:

| | Cozio 1816 (front plate) | Hills 1891 (back plate) | Boyden 1969 | <i>The Strad</i> 2011 (front/back) | MIAM:CC 2011 (back plate) |
|-------------|-----------------------------|----------------------------|-------------|---------------------------------------|------------------------------|
| Upper Bout | 169.94mm | 168.27mm | 168.27mm | 167/167.5mm | 167.5mm |
| Lower Bout | 210.57mm | 209.55mm | 207.96mm | 207.5/208mm | 208mm |
| Body Length | 360.95mm | 355.6mm | 355.6mm | 356mm | 356mm |

The upper bout of the *Messiah* violin apparently saw no change whatsoever in width between 1891 and 1969 but then saw a shrinkage of approximately one millimetre between 1969 and 2011; conversely, the lower bout apparently shrank by approximately 1.5mm between 1891 and 1969 but has not shrunk at all since then. Whilst it is likely that these variations in the UB and LB measurements are nothing more than the result of human imprecision they nonetheless serve to throw into focus the enormous, and quite implausible, body-length reduction of 5.3mm between 1816 and 1891. Wooden string instruments undoubtedly expand and contract as environmental conditions change but wood cannot disappear, longitudinally, at a rate of more than 5mm within 75 years. If the 1816-1891 shrinkage was plausible then the violin should have undergone at least the same rate of longitudinal shrinkage in the initial 100 years between 1716 and 1816; i.e. between 1716 and 1891 the body length of the violin should have shrunk by at least 10mm. In the more-than-125 years since 1891 the body length has not shrunk by even one millimetre. The only possible evidence-based conclusion is that today's *Messiah* violin is not the 1716 (*P.G.*) Stradivari violin measured by Count Cozio on 29th May 1816.

Count Cozio also measured the diagonal apex-to-apex distance between the *f*-hole 'wings' of his 1716 Stradivari violin:

*Longhezza delle FF prese al solito alla ponti interna al fondo e d'esterna superiormente polici due, ponti sette e mezzo ponto*⁴²

Length of the *f*-holes, taken as usual between the inside point [of the wing] at the bottom and the outside [point of the wing] at the top, *pollici 2, ponti 7, and ½ ponto*.

The Count's measurement converts to 71.09mm. The March 2011 *Messiah* poster published by *The Strad* defines this diagonal *f*-hole length, between the tips of the wings, as 72.2mm (treble side) and 72.5mm (bass side). This discrepancy further undermines any association between the 1716 Stradivari violin measured by Count Cozio and the *Messiah* violin.

Clearly, the 1716 violin described by Count Cozio in 1808 (*si crede forma G* – see Chapter 3) is not the 1716 (*P.G.*) violin which the Count measured on 29th May 1816. The measured violin is very likely to be the same as that which was initially described in 1774-75, described again in 1801 (*forma più grande*), and retained by Count Cozio until 1823 when it was included in his *la Collezione (Primo Inventaro)* (see Chapter 6). For the reasons given in Chapter 6 it is likely that this violin is the same as that described by Count Cozio in 1834 (ms. Cozio 81) and, after the Count's death, was sold by his daughter, Matilde, in 1841.

⁴² BSCr, LC, ms. Cozio 47, folio 14r; see also Cozio/Bacchetta p. 242.