Chapter 2

Source moulds and resultant violins[1]

Antonio Stradivari made his violins by utilising a thick (*c*14mm) internal wooden mould (or 'form') to which the four C-bout corner blocks, together with the top and bottom blocks, were lightly glued, and around which the thin lengths of rib were shaped and then strongly glued to the blocks. Simplistically, once all the glue had dried the 'garland' of blocks and ribs could be carefully detached from the inner mould and the front and back plates could then be attached to the garland to create the sound-box. Although Stradivari's moulds, made of walnut wood, have varying lengths, widths, and proportions, these variations are often by no more than a few millimetres and sometimes the difference between a particular measurement on one mould and the same measurement on another is just one millimetre.[2]

Almost all the moulds have identifying letters, inked or incised in capital letters: for example, the letters *P*, *S*, and *T* (possibly indicating *Prima*, *Seconda*, *Terza*), *G* (*Grande*?), *PG* (*Poco Grande*?, *Più Grande*?), and *MB* (*Modello Buono*?).[3] Some of the moulds also have dates, either inked or incised into the surface of the wood: thus the mould marked *SL* has an incised date (translated) of '9th November 1691', and one of the two moulds marked *S* is dated '20th September 1703'. The two *B* moulds are dated '3rd June 1692' and '6th December 1692' (both incised) while the *PG* mould is dated '4th June 1689' (also incised). It should be noted that the text on the upper part of the *PG* mould – *Antonio Stradivari / f*[orm]*a grande* – is not in Stradivari's handwriting, likewise none of the writing on the *G* mould (apart, possibly, from the capital-letter *G*).

Count Cozio di Salabue owned some of Stradivari's moulds, obtained from Paolo Stradivari and his son Antonio (II) Stradivari. On 27th February 1823 the Count began writing an inventory:

> *Nota ossia inventaro delli modelli, forme di legno, e ferri particolari dell Ant*o *Stradivari e dell'Amati che si aggiungerebbero alla Collezione delle instrumenti di Antonio Stradivari*.[4]
>
> Note, or inventory, of the models, moulds of wood, and individual metal tools of Antonio Stradivari and of Amati which are to be added to the Collection of the instruments of Antonio Stradivari.[5]

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[1] The research which underpins this chapter was carried out during 2012 at the Museo Stradivariano in Cremona where all the Stradivari moulds, tools, and drawings were displayed (and had been displayed since 1979). In late 2013 the entire collection was transferred to the new Museo del Violino, situated at the Palazzo dell'Arte in the Piazza Marconi, Cremona. A personal visit to the Museo del Violino in May 2014 revealed that only a handful of the exhibited items had an adjacent, numbered, descriptive card (and no catalogue of the newly-assembled collection was available). Numerical identifications of the moulds (in the present text) therefore use the Museo Stradivariano numbers.

[2] Not that Stradivari, nor anyone else, knew anything about millimetres as a unit of measurement. According to Simone Sacconi (Sacconi (1972) pp. 196-197) the only difference between the four major measurements of the *PG* mould of 4th June 1689 and those of the *P* mould of 25th February 1705 is a one millimetre difference between the minimum width of the respective C-bouts: *PG* mould 103mm, *P* mould 102mm. These near-identical straight line dimensions would not, however, prevent different curvatures being created for each mould if Stradivari had chosen to do so.

[3] Some inscriptions have been added to the moulds after 1902: compare the Hills' illustration (Hill (1902) p. 194) of the *TV* Tenor Viola mould with the photograph of the same mould in Mosconi and Torresani (1987) p. 30.

[4] BSCr, LC, ms. Cozio 72; not transcribed by Renzo Bacchetta.

[5] Does the phraseology used by Count Cozio indicate that Stradivari owned moulds and tools which had previously belonged to the Amati family? George Hart writes (Hart p. 173): 'The circumstance of all the tools, patterns, and models of Niccolò Amati having passed into the possession of his pupil Stradivari, and not into that of his son Girolamo (who was then thirty-five years of age), clearly shows that the son did not succeed to his father's business.'

The first page of this inventory begins by describing three cello moulds, followed by two viola moulds (*CV* and *TV*). The listing of the violin moulds then follows (Plate 1):

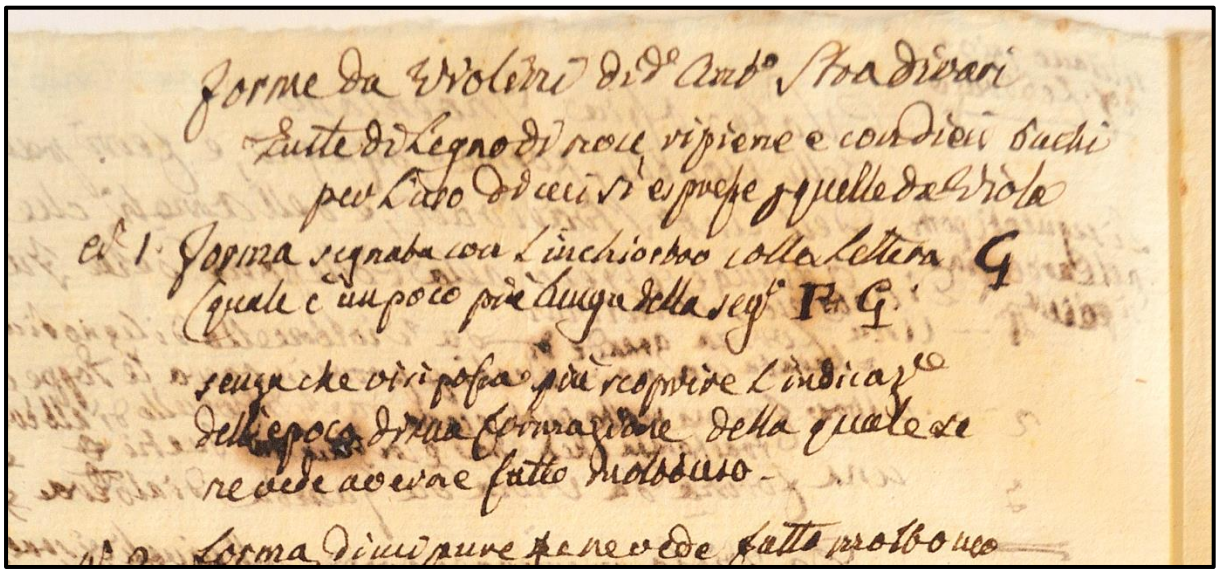

Plate 1: BSCr, LC, ms. Cozio 72

> *Forme da violini di d*[ett]*º Antº Stradivari*
> *tutte di legno di noce ripiene e con dieci buchi*
> *per l'uso di cui si espresse*[?] *per quelle da viole.*
>
> Moulds of violins of the aforementioned Antonio Stradivari
> all of solid walnut wood and with ten holes[6]
> for the use of which [?] for those of violas.

The violin moulds which Count Cozio describes are identified by him as *G*, *PG*, *B* (3rd June 1692), *B* (6th December 1692), *SL* (9th November 1691), *S* (20th September 1703), and *P* – seven in total. Following the death of Count Cozio in 1840, his banker, Giuseppe Carli, drew up an inventory (May 1841) of the Count's unsold instruments and workshop artefacts.[7] The inventory states that 'three wooden cello moulds of various dimensions' and 'three wooden violin moulds of various dimensions' were still being held at the Carli offices.[8] Whether these six moulds were specifically Stradivari moulds, and whether they had previously been included in the Count's February 1823 inventory, is unknown.[9] The 1841 correspondence between Giuseppe Carli and Countess Matilde (Count Cozio's daughter) strongly suggests that these six moulds were subsequently returned to the family's Castello di Salabue residence.[10]

Countess Matilde died in April 1853, after which her remaining instruments and artefacts were inherited by her cousin, Rolando Giuseppe Dalla Valle (Marchese di Pomaro, Lù, e Mirabello) of Turin. According to Elia Santoro, Rolando Giuseppe carefully guarded his Stradivari artefacts and refused to let anyone see them.[11] However, in 1881, at least fourteen (and perhaps as many as thirty) varied items from the Dalla Valle collection – moulds, drawings, templates, and some tools – were exhibited at the National Italian Exhibition which was held in Milan.[12] After the death of Rolando

[6] Through which binding cords could be passed to secure the ribs to the six blocks while the glue dried.
[7] See BSCr, LC, ms. Cozio 84; Cozio/Bacchetta pp. 335-338; Santoro (1993) pp. 175-179.
[8] No dimensional details of these moulds, nor letter identifications, are provided by Carli.
[9] It is possible that Carli's three cello moulds were those which had been described by Count Cozio at the start of his 1823 inventory.
[10] See Chapter 6 for the correspondence.
[11] See Santoro (1993) p. 193.
[12] See also Chapter 11, especially the text associated with footnote 41.

Giuseppe on 22nd February 1891[13] some of these items passed to his youngest son, Marchese Alessandro Dalla Valle. The *Introduzione* to Renzo Bacchetta's *Carteggio* transcription includes an extract from a letter, dated 22nd September 1948, written by Paola Dalla Valle (1864-1950), Marchesa di Pomaro and surviving wife of Alessandro:

> *Nella divisione del patrimonio Salabue fra le famiglie Davico, Dalla Valle, Annibaldi, residui di violini toccarono al M.se R. Alessandro Dalla Valle ed ebbe anche le forme…*[14]
>
> In the distribution of the Salabue inheritance among the Davico,[15] Dalla Valle, [and] Annibaldi families, the remaining violins came down to Marchese R Alessandro Dalla Valle and he also received the moulds ...

The 'distribution' to which Paola refers must be that which was made after the death in 1891 of her father-in-law.[16]

In 1920 the violin maker Giuseppe Fiorini (1861-1934) bought the Stradivari artefacts and the papers of Count Cozio which were still in Paola's possession. Alfredo Puerari (author of the *Prefazione* to Simone Sacconi's *I "Segreti" di Stradivari*) indicates that, at an unknown date between 1920 and 1930, Sacconi saw the Stradivari items belonging to Fiorini, and in return for Sacconi finishing the construction of two of his violins Fiorini, 'in gratitude, presented to Sacconi some of the authentic designs of Stradivari for the model [form] of a violin.'[17] Giuseppe Fiorini's subsequent (1930) gift to the town of Cremona of all his Stradivari items included '20 forms for instruments'.[18] However, early photographs of the Sala Stradivariana in Cremona show twenty-three moulds on display within the glass cabinets.[19] Since 1930 some moulds have seemingly disappeared, or have been withdrawn, since the present-day Museo del Violino in Cremona currently exhibits fourteen wooden violin moulds and three wooden viola moulds (as was previously the case at the Museo Stradivariano in 2012).

Giuseppe Fiorini was not the first to donate violin-workshop materials to the town of Cremona:

> The history of the Stradivarian Museum began in 1893, the year in which the town of Cremona accepted Giovanni Battista Cerani's donation of moulds, patterns and various tools that had belonged to Cremonese violin makers, including some of Antonio Stradivari's.[20]

Cerani acquired these items from the violin maker Enrico Ceruti (1806-1883). According to Giacomo Stradivari (1822-1901):

> I recall the fact that one of my brothers gave to Signor Motta, Professor of Drawing, all the moulds and patterns which existed in the attic of our house, and which subsequently passed from Motta's possession to that of the violin-maker Enrico Ceruti.[21]

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[13] See Santoro (1973) p. 75, footnote 25; see also http://notes9.senato.it/Web/senregno.NSF/023abfe89ea8a95dc1256ffc004e7c82/f6986cea3166e67dc12570690031869d?OpenDocument (accessed March 2012).

[14] Cozio/Bacchetta, *Introduzione*, Giovanni Iviglia, p. XIII; also reproduced by Patrizia Frisoli (Frisoli p. 34).

[15] See Chapter 6 for further information about the Davico family.

[16] Federico Sacchi (Sacchi p. 22, endnote 14) states that, in 1891, 'there were four violins only left in the possession of the [Dalla Valle] family, and one of them is believed to be a Guarnerius'.

[17] Translated from Sacconi (1972) *Prefazione*, p. XI.

[18] Pollens (1992) p. 27.

[19] See Bonetti *et al.* pp. 18 and 19. The Sala Stradivariana was succeeded by the Museo Stradivariano.

[20] Museo Stradivariano website, accessed January 2012.

[21] Hill (1902) p. 168.

The Museo Stradivariano numbering of the Stradivari moulds for violins and violas was as follows:

MSCr. 1	*MB* violin mould
MSCr. 2-5	*S* violin mould
MSCr. 6-10	*P/B* violin mould
MSCr. 11-15	*T* violin mould
MSCr. 16-20	*Q* violin mould
MSCr. 21-27	*PG* violin mould (4th June 1689)
MSCr. 28-32	*SL* violin mould (9th November 1691)
MSCr. 33-37	*B* violin mould (3rd June 1692)
MSCr. 38	*B* violin mould (6th December 1692)
MSCr. 39-43	*S* violin mould (20th September 1703)
MSCr. 44-48	*P* violin mould (25th February 1705)
MSCr. 49-53	*G* violin mould
MSCr. 54	*Violino un quarto* mould
MSCr. 153-157	*Piccolo violino* mould
MSCr. 55-58	Contralto viola mould
MSCr. 205-209	*CV* contralto viola mould
MSCr. 229-233	*TV* tenor viola mould[22]

The first entry in Count Cozio's 1823 inventory of his Stradivari violin moulds (see Plate 1) is:

> *Nº 1 Forma segnata con l'inchiostro colla lettera G (quale è un poco più lunga della seg*[na]*ta PG senza che vi si possa più scoprire l'indicazione dell'epoca di sua formazione della quale se ne vede averne fatto molto uso.*
>
> No. 1: Mould marked with ink with the letter ***G*** (this is a little longer than [the one] marked ***PG***, without anything further which would indicate the date of its making, and which has clearly been used many times.

It is reasonable to assume that the capital-letter *G* was drawn on the mould, in ink, by Stradivari (Plate 2); however, the remainder of the writing on the *G* mould – *Questa forma è un poco più longa / della forma PG / dell Antonio Stradivari* – is not in Stradivari's hand; it may be the case that Count Cozio was responsible for the annotation.

[22] Mosconi and Torresani pp. 38, 41, 42, 48, 50, and 53. Six further moulds were obtained by the Musée du Conservatoire National de Musique, in Paris, at the posthumous auction of Vuillaume's possessions in 1880; the moulds were described by the auctioneers as *Six moules de différent modèles provenant de l'atelier de Stradivarius* (Milliot p. 543) but it is unclear how the auctioneers, five years after Vuillaume's death, could be so certain of the moulds' origin. The documentation currently offered by the Musée de la Musique (where these moulds are now displayed, exhibit numbers E.901.1-6) states that these moulds were *Rapporté d'Italie par Tarisio, cédé à Jean-Baptiste Vuillaume* ('brought from Italy by Tarisio and passed to Jean-Baptiste Vuillaume'). The moulds are identified as being for 'violoncelle' (E.901.1), 'basse de viole' (E.901.2), 'violoncelle' (E.901.3), 'mould' (E.901.4), 'viole d'amour (?)' (E.901.5), and 'mould' (E.901.6); the Musée de la Musique website accessed June 2014.

Plate 2: The Stradivari *G* mould

The second inventory entry (Plate 3) is:

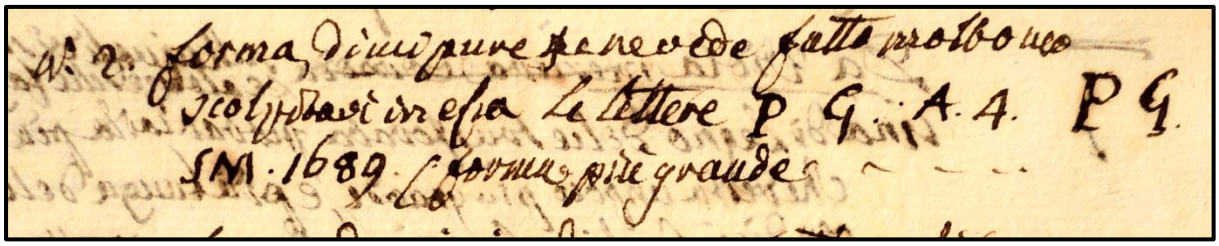

Plate 3: BSCr, LC, ms. Cozio 72

> *N° 2 forma, di cui pure se ne vede fatto molto uso*
> *scolpitavi in essa le lettere P G A.4.* ***PG***
> *SM. 1689. (forma più grande - - - -*
>
> No. 2: mould which has also clearly been used very often,
> carved in this the letters *PG* "On the day of 4 **PG**
> SM 1689" (larger mould - - - -

This *PG* mould, in fact, has the following text cut into its surface – *A4GIV1689* – which indicates 'On the day of 4th Giu[gno] [June] 1689'; see Plate 4:

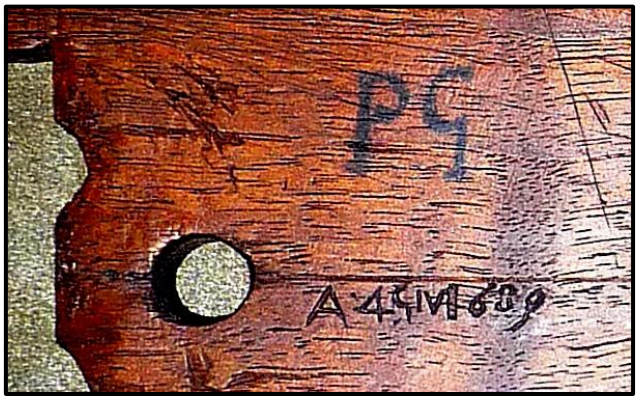

Plate 4: The Stradivari *PG* mould (1689); inked letters and incised date.
The photograph has been digitally enhanced, by the present author, to clarify the incisions.

Count Cozio's misunderstanding of the text has been brought about by the very close positioning and shaping of some of the letters and numbers cut into the surface of the mould (the precision of the letters and numbers suggests that the incisions may have been made using metal punches). The Count has mis-transcribed the incised letter *G* as the letter *S*, and he has misunderstood *IV1* and transcribed it as the letter *M*. In addition, the Count has 'double counted' the *1* as both the final vertical stem of his letter *M* and the first numeral of *1689*.

At first sight it is disconcerting that Count Cozio identifies the 4th June 1689 *PG* mould as 'larger' when it is smaller than the previously mentioned *G* mould. However it is possible that the Count was comparing this *PG* mould with the subsequent mould in the inventory, the 3rd June 1692 *B* mould rather than the previous entry for the *G* mould. The manner in which the Count has used an opening bracket before the words *forma più grande*, the four flicks of his pen after *grande*, and the absence of the closing bracket perhaps indicates a connection between the *PG* mould and the *B* mould which follows (Plate 5):

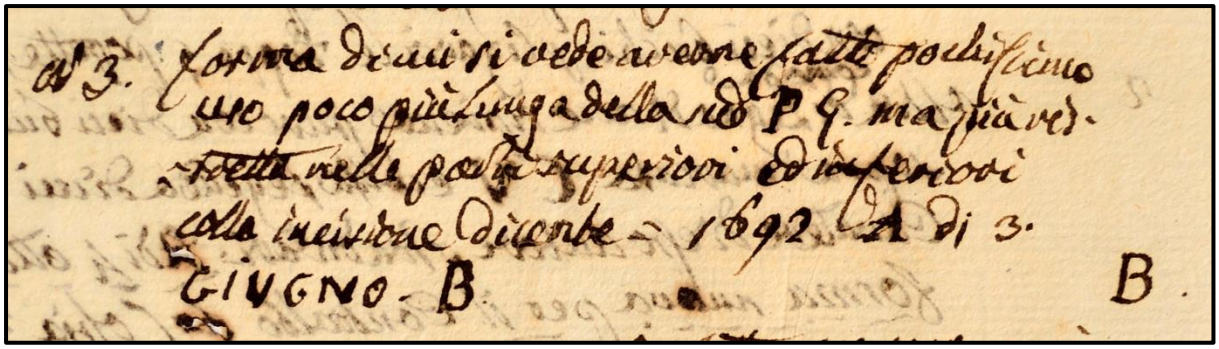

Plate 5: BSCr, LC, ms. Cozio 72

> *N° 3 forma di cui si vede averne fatto pochissimo uso poco più lunga della sud*[etta] *PG ma più ristretta nelle parti superiori ed inferiori colla incisione dicente: 1692 A di 3.GIVGNO B.* ***B.***
>
> No.3: mould which can be seen to have had very little use, slightly longer than the aforementioned *PG* but narrower in the upper and lower parts [bouts], with an incised [date] stating: "1692 on the day of 3rd June B". **B.**

The remaining descriptions of the violin moulds are:

> *N° 4 forma di cui se ne vede fatto poco uso, però (su di essa vi fece al mio violino assai forte vernice giallicia con l'agionta di caratere d'autore nel biglietto 1736 – danni 92) più corta di circa tre ponti della sud*[ett]*ª B e di un sol ponto della PG ma da q*[uest]*ª anche più ristretta* [?] *nella parte superiore di due punti Segnata scolpita dicente A.6.DCBE 1692 B.*
>
> No. 4: mould which, clearly, has been little used, however (it was used to make my very sonorous violin [with] yellowish varnish, also with the maker's handwriting on the label 1736 – aged 92) shorter by about three *ponti* than the aforementioned *B* [3rd June 1692] and by just one *ponto* than the *PG* but this is also narrower [?] in the upper part [upper bout] by two *ponti*.[23] Carved mark stating "On the day of 6th December 1692 B".

As demonstrated in Chapter 5, one *ponto* is equivalent to 2.26 millimetres and therefore Count Cozio's 'shorter by about three *ponti*' is 6.78mm. The difference in length between the 6th December 1692 mould and the 3rd June 1692 mould has been defined as 6mm.[24]

> *N° 5 altra più tosto si vede usata poco più lunga ma più stretta nei CC della preced*[en]*te 6 xbre) segnata con inchiostro S L e scolpitovi A DI 9 Nõb 1691.*
>
> No. 5: another, evidently used only a little; longer, but narrower in the C-bouts [compared to] the preceding 6th December [mould], marked with ink *S L* and carved "On the day of 9th November 1691".

The *SL* mould is longer, by 3mm, than the 6th December 1692 mould; the C-bouts of the *SL* mould are narrower by 2mm.[25]

> *N° 6 altra più usata, quasi simile alla sud*[ett]*ª S L, con lettera manuscritta S e A di 20 1703 Settembre.*
>
> No. 6: another, used more, almost the same as the aforementioned *S L*, with handwritten letter *S* and "On the day of 20th September 1703".

The Count's description of the seventh mould is:

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[23] See Chapter 5 for full details of the measuring units – *pollici* and *ponti* – used by Count Cozio, and their metric equivalents. See also Chapter 5, Figure 1. The *PG* mould of 4 June 1689 is not the much larger (and now lost) *P.G.* mould; see N. Sackman, *The case of the missing mould*, published in *The Strad*, June 2018, pp. 54-58.

[24] See Pollens (2010) p. 71.

[25] Mould measurements from Sacconi (1972) p. 197.

> *N° 7 altra, che vi si vede moltissimo adoprata, con indicazzione manuscritta P, e scolpitovi A 25. Fb. 1705, stata moltissimo usata, ed esse e forma grande, ma solo uno ponto sopra ed altro in fondo meno accosta della P.G.*
>
> No. 7: another, which can be seen to have had heavy use, with handwritten indication *P*, and carved "On the day of 25th February 1705", very heavily used, and this is a large mould, but only one *ponto* in the upper [bout width] and another [*ponto*] in the lower [bout width] less [i.e. narrower] when placed against the *P.G.*

As with the *G* mould, the additional inked inscription on this *P* mould is not written in Stradivari's hand, nor that of Count Cozio:

> *Antonio Stradivari f*[orm]^{a} *Grande questa è un poco più corta e in qualche parte più stretta della forma P.G.*
>
> Antonio Stradivari, large mould; this is a little shorter and in some parts narrower than the mould *P.G.*

If 2.26mm (one *ponto*) is added to both the upper-bout and lower-bout widths of the *P* mould (UB 161mm, LB 200mm[26]) they would measure 163.26 and 202.26 millimetres respectively; these measurements are larger than the equivalents on the *G* mould (161 and 201mm[27]). This evidence points towards a larger-than-*G* mould which was lettered *P.G.* but with these letters perhaps representing *Più Grande*. This now-lost *P.G.* mould (as identified by Count Cozio within his description of the *P* mould and by the unknown writer of the additional inscription) is not the extant 4th June 1689 *PG* mould, which, being smaller than the *G* mould, might usefully be identified hereafter as *Poco Grande*.

In the *Liutologia* section of Bacchetta's *Carteggio* transcription Count Cozio makes some relevant comments about sizes and proportions of violins. In the *Corpo delli instrumenti* ('Body of the instrument') section he writes:

> […] Must be fairly large but not enormous, of Stradivari the mould G is believed to be the best; however some [violins derived from the] mould P.G. are strong and good of voice but [the tone] approaches that of a viola [*ma si aprossima a quella del Contraldo*].[28]

The text indicates a *P.G.* mould which was larger than the *G* mould (the additional internal volume of the sound-box tilting the tone of the instrument towards that of a viola). In the entry *Curve de' Violini* Count Cozio writes:

> The small [violin] moulds, and even the medium, need no longer be used nowadays, since people want great power combined with quality of sonority; but even less is it necessary to think (as has happened with the Parisians of the school of ...[29]) of making violins of still larger size than the Stradivari *G.P.*[sic][30] since if made with due proportions, the sonority would be too fat [*troppo grossa*]. On the contrary, it is observed that generally the best instruments come only from Stradivari's *G* mould, as I am in the process of demonstrating.[31]

The Count's commentary clearly indicates that there were violins which were larger than those derived from the *G* mould (and, apparently, some violin makers in Paris were making violins even

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[26] Sacconi (1972) pp. 196.
[27] *Ibid.* pp. 197-198.
[28] Translated from BSCr, LC, ms. Cozio 9.
[29] Here Count Cozio leaves a space where, presumably, he intended to write the name of the leader of the violin-making school in Paris, but never did so.
[30] The Count's reversal of the two letters may be nothing more than a momentary mis-connection between brain and hand. See also Cozio/Bacchetta p. 94 where the Count's letters are transcribed as *P.G.*.
[31] Translated from BSCr, LC, ms. Cozio 9.

larger than those derived from the *P.G.* mould). Count Cozio's 1808 description of the 1724 Stradivari violin which he sold to Niccolò Paganini is consistent with the two statements quoted above:

> *forma più grande P.G.* […] *fortissimo di voce e quasi tenore*.[32]
>
> Mould larger *P.G.* […] very powerful sonority and like a viola.

For a detailed account of the now-lost *P.G.* (*Più Grande*) mould, its dimensions, and its relationship with the 1724 Stradivari/Cozio/Paganini violin see N. Sackman *The case of the missing mould*, published in *The Strad*, June 2018, pp. 54-58.

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Evidence of a yet larger mould than even the *Più Grande* mould is provided by the measurements made by Count Cozio on 19th June 1816 of a 1684 Stradivari violin which was owned by his banker, Carlo Carli:

> *(Più grande del P.G.). Violino del Cav. Carlo Carli, dell'Antonio Stradivari dell'anno 1684, forma grandissima, finora incognita* […].[33]
>
> (Larger than the *P.G.*). Violin belonging to Carlo Carli, of Antonio Stradivari, of the year 1684, [derived from an] enormous mould, thus far unknown […].[34]

The Count's measurements for this extremely large violin are:

Upper Bout width: 6 *pollici* and $1^2/_3$ *ponti*, plus 3½ *ponti* for the two borders [= 174.1mm][35]
Centre Bout width: 3 *pollici* and $10^2/_3$ *ponti*, plus the two borders [= 113.2mm]
Lower Bout width: 7 *pollici* and 7½ *ponti*, plus the two borders [= 214.4mm]

From the bridge up to the outer line of the purfling: 7 *pollici* and ½ *ponto* [= 190.62mm]
Thickness of bridge [measured at the base]: 2 *ponti* [= 4.52mm]
From the bridge down to the outer line of the purfling: 5 *pollici* and 10½ *ponti* [= 159.08mm]
The two borders [outside the purfling]: 3½ *ponti* [= 7.91mm]

Total body length: 13 *pollici* and 4½ *ponti* [= 362mm or 14¼ inches].

Adjacent to his measurements of the bout widths of this 1684 violin Count Cozio writes:

> *più larghi della forma P.G. ing.*.[?] *fol. 15*
>
> wider than the form *P.G.* […?] folio 15[36]

Folio 15 of ms. Cozio 47 (29th May 1816[37]) consists of a description of the aforementioned 1724 Stradivari violin – *forma P.G.* – which Count Cozio, acting through his banker, Carlo Carli, sold to Paganini in July 1817 (*venduto al Signor Proffe Paganino*). Count Cozio writes:

> *Questo ha la voce più forte, e da tenore*
>
> This has the more powerful sonority[38] and like a viola

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[32] BSCr, LC, ms. Cozio 46; see also Cozio/Bacchetta p. 227.
[33] BSCr, LC, ms. Cozio 47, folio 53r; see also Cozio/Bacchetta p. 269.
[34] Evidently Count Cozio did not possess the mould.
[35] One *pollice* equals 27.07mm; one *ponto* equals 2.26mm. See Chapter 5 for full details of these measuring units, their metric equivalents, and the Count's measuring procedure.
[36] Two weeks earlier, on 29th May 1816, Count Cozio had comprehensively measured his Stradivari *forma (P.G.)* violin dated 1716, the length of the body being established at 360.95mm. On the same day the Count also measured his Stradivari *forma P.G.* violin dated 1724, which revealed the same body length.
[37] Count Cozio has incorrectly dated his entry as '19th May'.
[38] The comparison of sonority is being made with the Stradivari *forma (P.G.)* violin of 1716 which is measured in the immediately preceding entry of ms. Cozio 47.

and specifies only two measurements for Paganini's 1724 violin:

1. the upper bout width, including the purfling, of 6 *pollici* and $^1/_3$ *ponto* [= 163.17mm]
2. the lower bout width, including the purfling, of 7 *pollici* and 6 *ponti* [= 203.05mm].

Count Cozio does not provide a measurement of this violin's border-width – on the outside of the purfling – but a combined width (bass side and treble side) of $3^1/_3$ *ponti* [7.52mm] can be proposed.[39] The bout measurements (extremity to extremity) of Paganini's violin, therefore, were:

1. upper bout 170.69mm
2. lower bout 210.57mm.[40]

The upper and lower bout measurements of the enormous 1684 violin belonging to Carlo Carli – *forma grandissima, finora incognita* – were, indeed, 'wider': 174.1mm and 214.4mm.

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In addition to the UB and LB dimensions already established for the 1724 violin – 170.69 and 210.57mm – Count Cozio states that, by comparison with the 1716 *forma (P.G.)* violin which is measured in the immediately preceding entry of ms. Cozio 47 (folio 13v) the front-plate C-bout minimum dimension on the 1724 violin is one *ponto* (2.26mm) wider than on the 1716 violin. The C-bout minimum dimension of the 1716 violin is 110.1mm (see Chapter 5); therefore the 1724 C-bout dimension is 110.1+2.26 = 112.36mm. The Count also states that the total length of the 1724 violin is the same as on the 1716 violin (360.95mm; see Chapter 5). Thus the four major dimensions of Paganini's violin were:

Upper Bout maximum	170.69mm
Centre Bout minimum	112.36mm (front plate)
Lower Bout maximum	210.57mm
Body Length	360.95mm

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A further item of evidence is to be found in a description written by Count Cozio on 19th December 1820 of a 1719 Stradivari violin:

> *Misure del più bel viol*^{o} *d'Ant*^{o} *Stradivari del S*[igno]^r *Moler*[e] *dell'anno 1719.*
> *Vernice rossa, lavoro più fino come il mio del 1716 e legno bello, fondo in due pezzi però con vena larga disuguale che discende* […] *Eguale in tutte le misure* […] *E in conseguenza di forma P.G. dal 1687* [1681?].[41]
>
> Measurements of the most beautiful violin of Antonio Stradivari belonging to Signor Molere of the year 1719.
> Red varnish, rather fine workmanship, as on my 1716, and beautiful wood, back plate in two pieces, but with wide uneven flames which descend […] Equal in all measurements [to the 1716 violin] […] And, in consequence, of mould *P.G.* of 1687.

There is no surviving mould which has the date 1687 (or 1681) inked or incised upon it. This loss is all the more regrettable since Signor Molere's 1719 violin, the 1716 violin measured by Count Cozio

[39] The combined border-width (bass side and treble side) on the Stradivari 1716 *forma (P.G.)* violin measured by Count Cozio on 29th May 1816 is $3^1/_3$ *ponti*.
[40] The Stradivari 1716 *forma (P.G.)* violin measured by Count Cozio on 29th May 1816 revealed all but identical upper and lower bout widths of 169.9mm and 210.5mm (see Chapter 5).
[41] BSCr, LC, ms. Cozio 47, folio 111v; see also Cozio/Bacchetta pp. 311-312. The final date-numeral may be a '1'.

on 29th May 1816, and Paganini's 1724 violin were all made around it.[42] The common assumption that a reference, by Count Cozio, to a *P.G.* or a *forma più grande* mould indicates the extant *PG* (*Poco*) mould of 4th June 1689 is thus undermined.

Since, with Signor Molere's violin, Count Cozio prefaces his specification of the back-plate flames' descending direction with the word *però* ('but'), and since his point of comparison is with his 1716 violin (believed by some to be the *Messiah* violin), it follows that the flames on his 1716 violin must ascend. The back-plate flames on the Ashmolean Museum's *Messiah* violin descend.

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The ribs on a violin are usually 1.1 or 1.2mm in thickness. The 'overhang' of the front or back plates – the distance by which they project beyond the vertical outer face of the rib – is variable but a reasonable norm of 2.5mm can be advanced.[43] Therefore, subtracting 7.3mm (1.15+1.15)+(2.5+2.5) from a violin's front-plate or back-plate bout widths (extremity to extremity) should reveal, with reasonable accuracy, the dimensions of the bouts of the mould around which that violin was made. Subtracting 7.3mm from the upper- and lower-bout measurements of the 1724 Paganini violin (170.7mm and 210.6mm – see previous page) reveals source-mould measurements of 163.4mm and 203.3mm respectively. These *Più Grande* mould measurements can be confirmed by the addition of 2.26mm (one *ponto*) to the measurements of the *P* mould (following Count Cozio's information in mould-description 7; see p.8 of this chapter):

P mould upper bout: 161+2.26 = 163.26mm; compare with the subtractive result (above) of 163.4mm

P mould lower bout: 200+2.26 = 202.26mm; compare with the subtractive result (above) of 203.3mm.

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This differential of 7.3mm can also be used in conjunction with the measurements of a mould's bouts and length (including the top and bottom blocks, if extant), to calculate the likely plate dimensions (extremity to extremity) of a violin believed to be derived from that mould.[44] Some examples are:

	UB	CB	LB	Length
Cipriani Potter (1683): *Q* mould (with blocks)	145	95	183	331[45]
7.3mm extensions	152.3	102.3	190.3	338.3
Back-plate calliper measurements[46]	153	103	192	339
Back-plate calliper measurements[47]	152	102	191	337.5
Rose-Boughton (*c*1698): *S* mould[48] (with blocks)	154	98	195	346
7.3mm extensions	161.3	105.3	202.3	353.3
Back-plate calliper measurements[49]	161	105	201	353

[42] The Count's knowledge of a 1687 *P.G.* mould suggests that at least one page is missing from his inventory of the Stradivari moulds (BSCr, LC, ms. Cozio 72).

[43] The upper-bout and lower-bout overhang of the plates of the *Messiah* violin have been stated (*The Strad*, March 2011 poster supplement) to be 2.4-2.6mm; on the 1709 *Viotti* violin the overhang is 2.2mm (*The Strad*, March 2006 poster); for the 1715 *Titian* violin the overhang is 2.5-3.0mm (*The Strad*, February 2009 poster).

[44] It is difficult to differentiate between the *P* and *PG* moulds, their main measurements (and their curved outlines) being near identical.

[45] All mould measurements are from Sacconi (1972) pp. 195 – 199.

[46] MIAM:CC/Milnes, p. 146.

[47] Brandmair and Greiner, p. 363.

[48] MSCr. 2.

Viotti (1709): *G* mould (with blocks)	161	103	201	350[50]
7.3mm extensions	168.3	110.3	208.3	357.3
Back-plate calliper measurements[51]	168.5	109	208	358
Back-plate calliper measurements[52]	168	109	208	358
Gibson/Huberman (1713): *P* mould (with blks)	161	102	200	348
7.3mm extensions	168.3	109.3	207.3	355.3
Back-plate calliper measurements[53]	167.3	107.5	206.8	353.5
Smith-Quersin (1714): *P* mould (with blocks)	161	102	200	348
7.3mm extensions	168.3	109.3	207.3	355.3
Back-plate calliper measurements[54]	167	108	207	355
Back-plate calliper measurements[55]	167	108	207	355
Baron Oppenheim (1716): *P* mould (with blks)	161	102	200	348
7.3mm extensions	168.3	109.3	207.3	355.3
Back-plate calliper measurements[56]	169	109	208	356
Medici/Tuscan (1716): *G* mould (with blocks)	161	103	201	350
7.3mm extensions	168.3	110.3	208.3	357.3
Back-plate calliper measurements[57]	167.5	109.2	207.5	357.5
Back-plate calliper measurements[58]	167.5	109.2	207.5	357.5
Chaconne (1725): *B* mould (6th Dec. 1692)[59]	154	102	195	347
7.3mm extensions	161.3	109.3	202.3	354.3
Back-plate calliper measurements[60]	161	109	202	353

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This 7.3mm extrapolation procedure is particularly relevant when the measurements of an instrument clearly fail to correlate with a mould which is claimed to be the instrument's source.

A Stradivari violin, label-dated 1689, soubriquet *Arditi*, was exhibited in Montpellier, France, in 2008. The Montpellier Exhibition Catalogue states that the bout and length measurements are 169, 112, 209, and 357mm.[61] The dimension of the centre bout – 112mm – suggests that these measurements were achieved with a flexible tape lying on the arched surface of the violin. If so, then calliper equivalents

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[49] Hopfner, p. 53. Hopfner (*ibid*. p. 45) states: 'The measurements of the belly and back were not made, as is often the case, across the arching. They rather state the direct distance (i.e. with callipers) at the widest or narrowest point.'
[50] Sacconi's mould-length measurement of 354mm is clearly an error; the correct length is 350mm.
[51] *The Strad*, March 2006, *Viotti* poster.
[52] Brandmair and Greiner, p. 363.
[53] *The Strad*, November 2013, *Huberman* poster.
[54] Hopfner, p. 67.
[55] Brandmair and Greiner, p. 363.
[56] Hopfner, p. 71.
[57] Brandmair and Greiner, p. 363.
[58] Beare, p. 319.
[59] Only the top block survives; the additional length provided by the lower block has had to be estimated.
[60] Hopfner, p. 83.
[61] Montpellier, p. 41.

would likely be 167.8, 109, 207.8, and 355.5mm, these measurements being extremely close to those which were published on the Cozio.com website: 168.7, 108.7, 208, and 356mm.[62] For the *Arditi* violin the Montpellier catalogue states:

> […] only two [Stradivari moulds] predate 1689 and could have been the origin of the "Arditi". One is marked "MB", and another "S". The "S" form is slightly longer and most likely to be the one used.[63]

The suggestion that the *MB* mould and the *S* mould (MSCr. 1 and 2) pre-date 1689 is not supported by any information written on the moulds themselves – neither has a date.[64] The opinion that these two moulds pre-date 1689 appears to derive from Simone Sacconi:

> Making an exception of the two forms for violin marked with the letters "MB" and "S", among the first constructed by Stradivari (almost certainly the first and second) […].[65]

The dimensions of the *S* mould (MSCr. 2) – 'most likely to be the one used' – are:

UB 154mm CB 98mm LB 195mm Length 346mm[66]

Adding 7.3mm to the widths and to the length produces resultant-violin dimensions of:

UB 161.2mm CB 105.2mm LB 202.2mm Body Length 353.3mm

The present author's proposed calliper measurements for the *Arditi* violin (see previous page), and the Cozio.com measurements of the same violin (see above), are:

UB 167.8mm CB 109mm LB 207.8mm Body Length 355.5mm
UB 168.7mm CB 108.7mm LB 208mm Body Length 356mm

<u>Clearly, the *S* mould was not used in the making of the *Arditi* violin</u>.

The source mould is more likely to have been the *PG* mould of 4th June 1689. This mould's dimensions are:

UB 161mm CB 103mm LB 200mm Length 348mm[67]

Adding 7.3mm to the widths and to the length produces resultant-violin dimensions of:

UB 168.2mm CB 109.2mm LB 207.2mm Body Length 355.3mm

These results fit firmly with the present author's proposed calliper measurements for the *Arditi* violin and the Cozio.com measurements (both above). Thus the near certainty is that Stradivari made the 1689 *Arditi* violin between June and December 1689 using his new *PG* (*Poco*) mould.

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One further example is the Stradivari *Serdet* violin which is label-dated 1666. Kevin Coates has stated that the source for this violin was the *MB* mould,[68] which has a body length (including estimated top

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[62] The source of the Cozio.com measurements, and their methodology, is unknown, but they appear to be calliper measurements. The *Arditi* violin had the Cozio.com identification number 413 (website accessed December 2012).
[63] Montpellier, p. 40.
[64] A second *S* mould (MSCr. 39) has the date *20 1703 Setembre* inked upon it.
[65] Sacconi (1972), p. 47.
[66] 'with top and bottom blocks fitted'; *ibid.* p. 195.
[67] 'with top and bottom blocks fitted'; *ibid.* p. 196.
[68] Coates, K., *Geometry, Proportion and the Art of Lutherie*, Oxford, Clarendon Press, 1985, p. 173.

and bottom blocks) of 342mm.[69] Extending this measurement by 7.3mm (for the top and bottom overhangs) would produce a resultant-instrument body length of 349.3mm; the 2013 Ashmolean Museum *Stradivarius* catalogue specifies the body length of the *Serdet* violin as 356mm.[70] Private correspondence to the present author has indicated that calliper measurements of the *Serdet* violin are:

UB 167.8mm CB 110.8mm LB 208mm Body Length 356.5mm[71]

Subtracting 7.3mm from these widths and length reveals the dimensions of the source mould:

UB 160.5mm CB 103.5mm LB 200.7mm Length 349.2mm

The dimensions of the *MB* mould are:

UB 156mm CB 101mm LB 193mm Length 343mm[72] (or 342mm)

<u>and therefore the *MB* mould was not used in the making of the *Serdet* violin</u>.

The extant mould which most closely corresponds to the proposed dimensions of the source mould for this violin is the *PG* mould of 1689:

UB 161mm CB 103mm LB 200mm Length 348mm[73]

The discrepancy between the date incised on the *PG* mould – 4th June 1689 – and the label-date inside the *Serdet* violin – 1666 – prompts the conclusion that the source mould for the *Serdet* violin cannot have been the extant *PG* mould, but other conclusions can be reached.

[69] Simone Sacconi (Sacconi (1972), p. 195) states that the length of the *MB* mould, 'including the top and bottom blocks', is 343mm, but the top and bottom blocks for the *MB* mould do not exist; none are shown in Sacconi's 1972 photograph of the mould (*ibid*., p. 48), nor in Mosconi and Torresani, p. 38. The present author's proposition of 342mm for the total length of the mould includes an estimated 10mm maximum depth for a bottom block and a 12mm maximum depth for an upper block.

[70] Beare *et al*. (2013), p. 48.

[71] It is noticeable that these measurements of the *Serdet* violin are very similar to those of the *Arditi* violin.

[72] Sacconi (1972) p. 195.

[73] *Ibid.* p. 196.