Antonio Bagatella: “Regole for the construction of Violini Viole Violoncelli e Violoni”

Very little is known about the work and life of Antonio Bagatella (1716-1806). He was born in Padua and lived there most of his life. For a limited time he probably worked together with his son Francesco Antonio II Bagatella (1755-1829). What is otherwise known was largely written down by him. The instruments known to the author are 7 violins (and a rudiment of possibly another violin[1]) and a viola[2]. Bagatella also writes himself that he has worked on more violins than he has built new ones[3].
In 1786, the “Padua Academy of Science, Language and Arts” (today: Accademia Galileiana di Scienze, Lettere ed Arti in Padova) published a manuscript by Antonio Bagatella. He submitted his paper to a competition in 1782 that the academy organized on moral topics.
In the 1786 publication, a Simone Stratico writes the foreword. The significance of Bagatella's work and the practical process of submitting the paper is described by two unknown academics. They also describe the tonal assessment of one of Bagatella's violins and two violins that were sonically optimized by Bagatella. The violinists who did the judging were Giulio Meneghini and Maestro Ricci. Finally, Bagtella describes the method of constructing the violin outline. He also writes briefly about his biography and professional career. At the end of his work he lists some musicians who play violins that he has arranged[4].

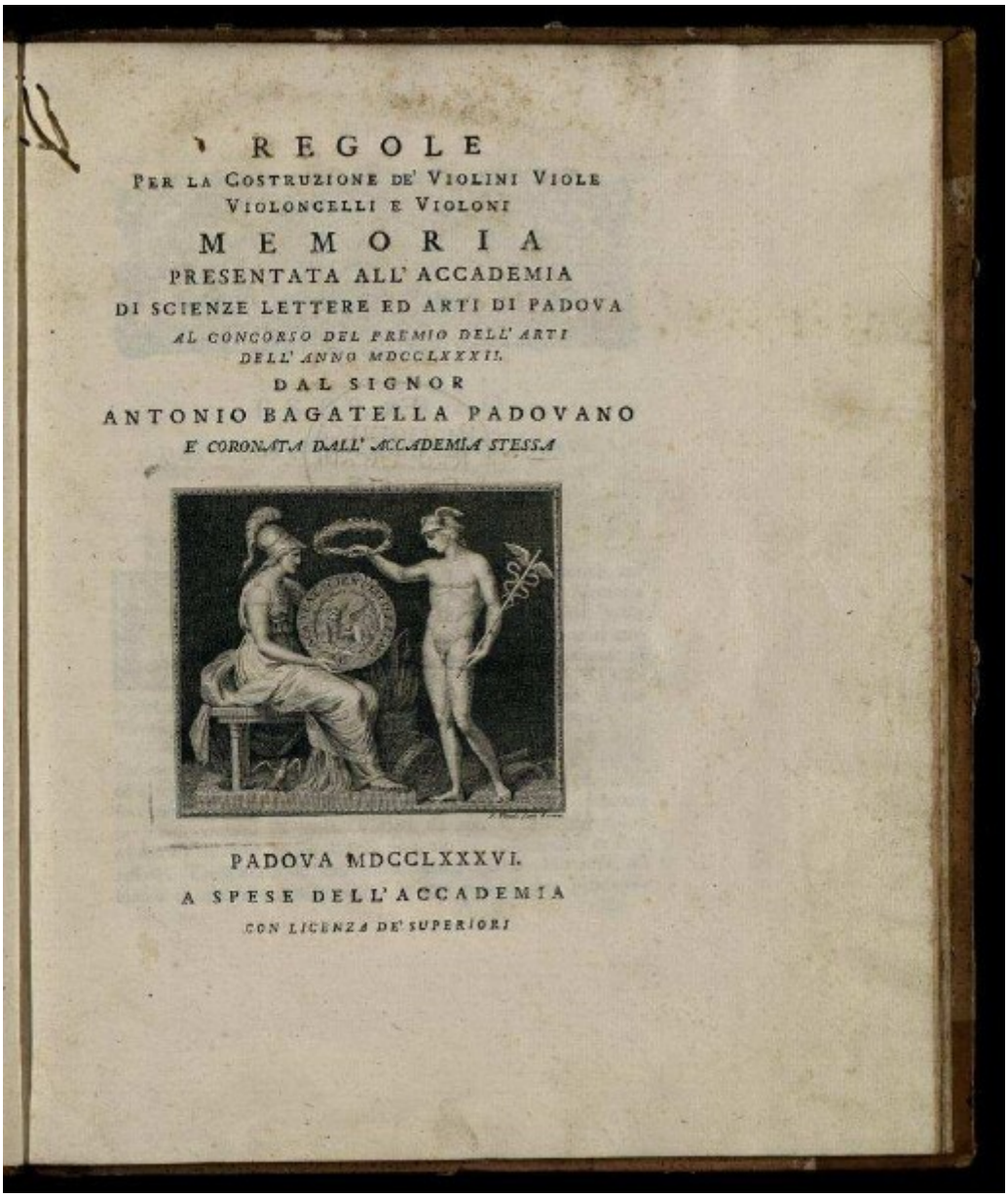
Regarding his biography, Bagatella reports that he began playing the violin at the age of about 18 and, through the intervention of Giuseppe Tartini (1692-1770), a local violin maker who is not mentioned by name[5]. He secretly learned his skills as a violin maker from this master over the course of two years and began making violins himself. After two years he would have become so competent and competitive that the other violin maker felt compelled to leave town.
Bagatella repeatedly refers to his good contacts with Giuseppe Tartini and his students. Through Tartini, who lived in Padua, and his students, he gained access to instruments by Amatis, Antonio Stradivari, the Ruggieri family and Andrea Guarneri[6]. In his work he makes particular reference to the instruments of the Amati family and in particular to those of the Amati brothers. According to him, his construction rules also work for the other Cremonese masters mentioned above. Thirty years before submitting his paper, he began working according to these rules, after 10 years of intensive search for such a rule. So that was around the year 1750[7].

What is particularly noteworthy is that less than 200 km from Cremona and approx. 15 years after Stradivari's death, the search for the Cremonese "construction secret" began. Bagatella explicitly refers to this “forgotten” knowledge that he wants to explore.

He does not mention whether he is constructing the outline of the instrument or the internal shape. But the construction of the inner shape makes sense. In his illustrations included in the book (Figure 1), a pointed template is shown on plate[8]. He also talks about the board that he constructed using his method1. His method of determining the correct board thicknesses played a major role in his workshop work. He wanted to give instruments either a “human” or “silvery” voice. But that shouldn't be discussed here.

1 Scrollavezza 2019, p. 167
2 Stenz 2015
3 Bagatela 2008, S. XXXIII
4 Ibid, S. XLVIII
5 Fabio Fano suspects that this was almost certainly either Giuseppe Galieri from Piacenza, a student of N. Amati, or Giovanni Danieli from Padua (www.treccani.it [2.11.2024])

6 Bagatella, 2008: p. XLVIII
7 ibid, p. XXV
8 Ibid, p. XXVII



REGOLE
PER LA COSTRUZIONE DE' VIOLINI VIOLE
VIOLONCELLI E VIOLONI
MEMORIA
PRESENTATA ALL' ACCADEMIA
DI SCIENZE LETTERE ED ARTI DI PADOVA
AL CONCORSO DEL PREMIO DELL' ARTI
DELL' ANNO MDCCLXXXII.
DAL SIGNOR
ANTONIO BAGATELLA PADOVANO
E CORONATA DALL' ACCADEMIA STESSA

PADOVA MDCCLXXXVI.
A SPESE DELL' ACCADEMIA
CON LICENZA DE' SUPERIORI

Fig. 1: Title page of Bagatella's monograph 1786[9]

9 https://www.deutsche-digitale-bibliothek.de/item/IXV7VY4ERWMUV7O7LIYWOTGGSMQ2QGZC (13.01.25)

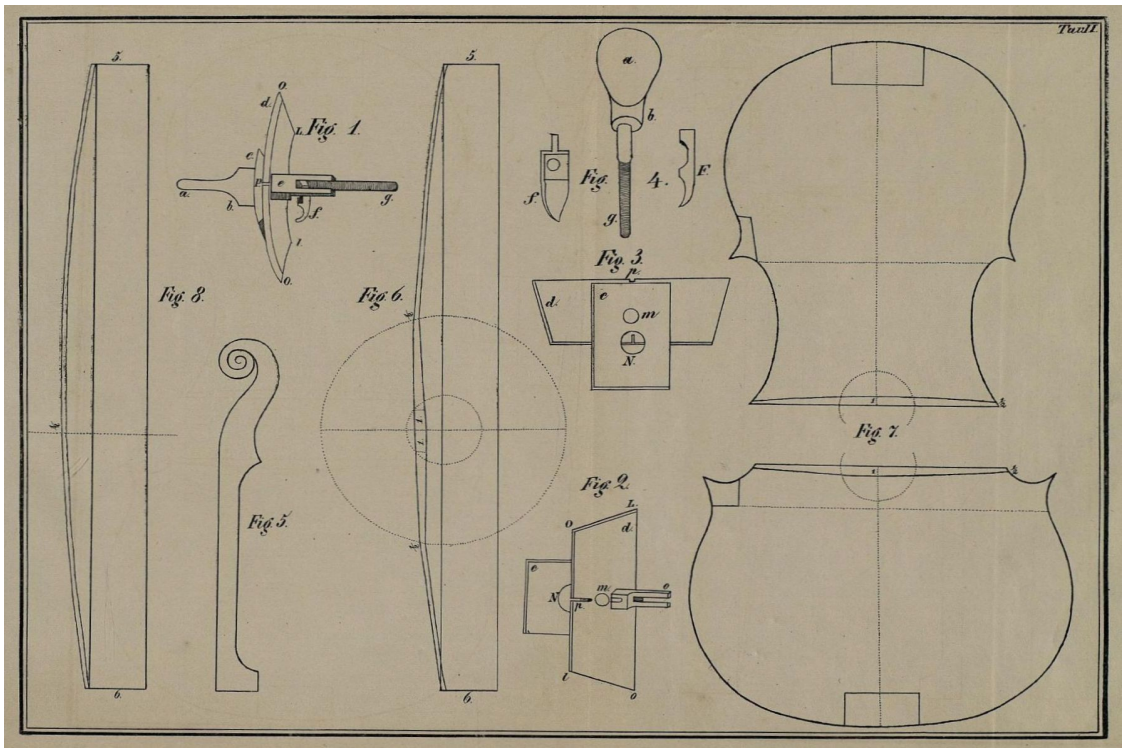
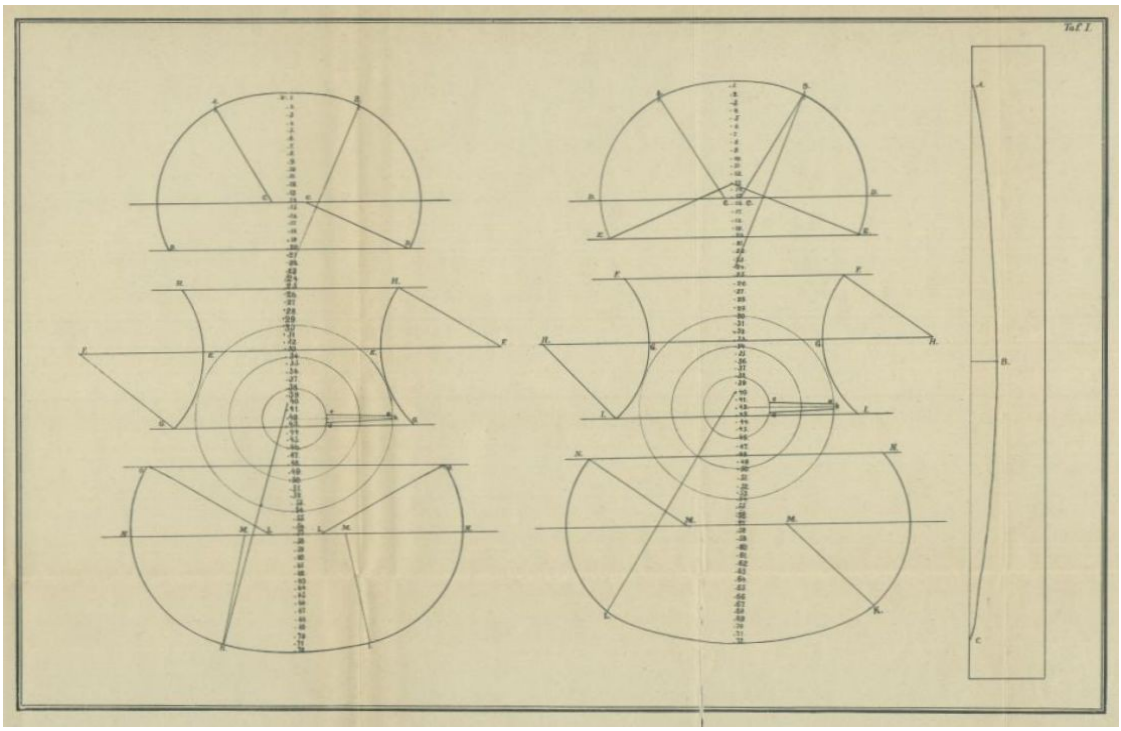


Fig. 2: Plate 2 from Antonio Bagatella's "Regole" [10] (pointed template, longitudinal curvature)
He describes two methods that differ only slightly:



Method 1 Method 2

Fig. 3: Plate 1 from Bagatella's "Regole"[11] (construction method 1 and 2) Method 1 is suitable for the construction of the violin and method 2 for the viola, cello and violone/double bass (Figure 4).

10 Wunder 1896, Tafel 2
11 Wunder 1896, Tafel 1

Bagtella's method is based on a vertical line divided into 72 equal parts. Horizontal lines are drawn through these at seven points and the arches are constructed using defined compass strokes. The corner blocks are not drawn, but the upper and lower blocks are. He also constructs the position of the F-balls and the length of the F-holes, the bass bar position and length, the top thicknesses and the voice position (Figure 5). He describes a method for constructing the longitudinal arch (Figure 4) and describes the length of the neck in words. He gives two instructions for the thickness centers of the top: one to achieve a warm, human violin voice and another to achieve a silvery metallic voice. To do this, he slightly changes the diameter and position of the center of the 3 concentric circles. He does not say why he divides the line into 72 parts or how long this line should be. He probably assumed that it was generally known what length the instrument to be constructed should have.

Method 1

- Draw a vertical line the length you want for the instrument you want to construct
- This line is divided into 72 equal parts.
- Draw horizontal lines through points 14, 20, 25, 33, 43, 48 and 57 (approximately 21 parts on both sides, or 26 parts at point 33).
- Draw a semicircle with a radius of 9 parts around the zero point X.
- From point 14, 2 parts are subtracted to the left and right. This creates points C.
- From point 24, draw an arc through X. This creates points A and B.
- From points C draw arcs from A and B to line 20.
- From point 33, 10 ½ parts are subtracted to the left and right. This creates points E.
- From these, subtract 15 parts outwards. The points F are created.
- Around the points F, draw circular arcs through the points E from line 25 and up to line 43. The points H (line 25) and G (43) are created.
- Draw a semicircle with a radius of 9 parts around the point 72 (Y).
- Draw a circular arc through Y around the point 40. The points I and K are created.
- From point 57, 3 parts and 6 parts are removed to the left and right. The points L and M are created.
- Draw a circular arc around M from point K or I up to line 57. The points N are created.
- Around L draw a circular arc from point N to line 48.

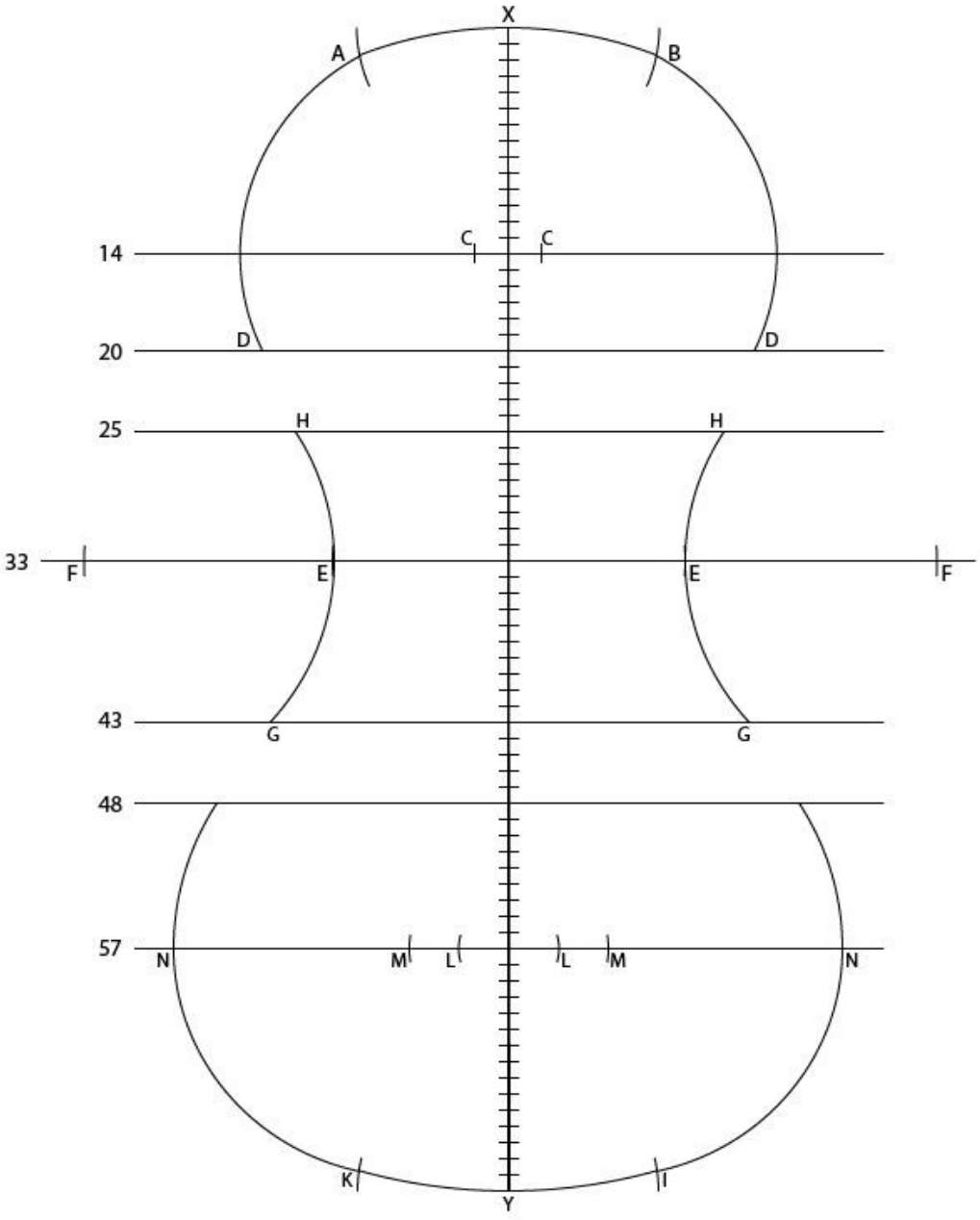


Fig.4: method 1

Method 2

- Draw a vertical line the length you want for the instrument you want to construct
- This line is divided into 72 equal parts.
- Draw horizontal lines through points 15, 20, 25, 33, 43, 48 and 57 (approximately 21 parts on both sides, or 26 parts at point 33).
- Draw a semicircle with a radius of 9 parts around the zero point X.
- From point 15, 1 part is subtracted to the left and right. This creates points C.
- Draw an arc through X around point 24. This creates points A and B.
- Draw arcs from A and B around points C to line 15. This creates points D.
- Draw arcs from point 13 to point D to line 20. This creates points E.
- From point 33, 10 ½ parts are subtracted to the left and right. The points G are created.
- From these, 13 parts are subtracted outwards. The points H are created.
- Around the points H, draw circular arcs through the points G from line 25 to line 43. The points F (line 25) and I (43) are created.
- Around the point 72 (Y), draw a semicircle with a radius of 16 ½ parts.
- Around the point 40, draw a circular arc through Y. The points K and L are created.
- From point 57, 6 parts are subtracted to the left and right. The points M are created.
- Around M, draw circular arcs from point L or K to line 48. The points N are created.

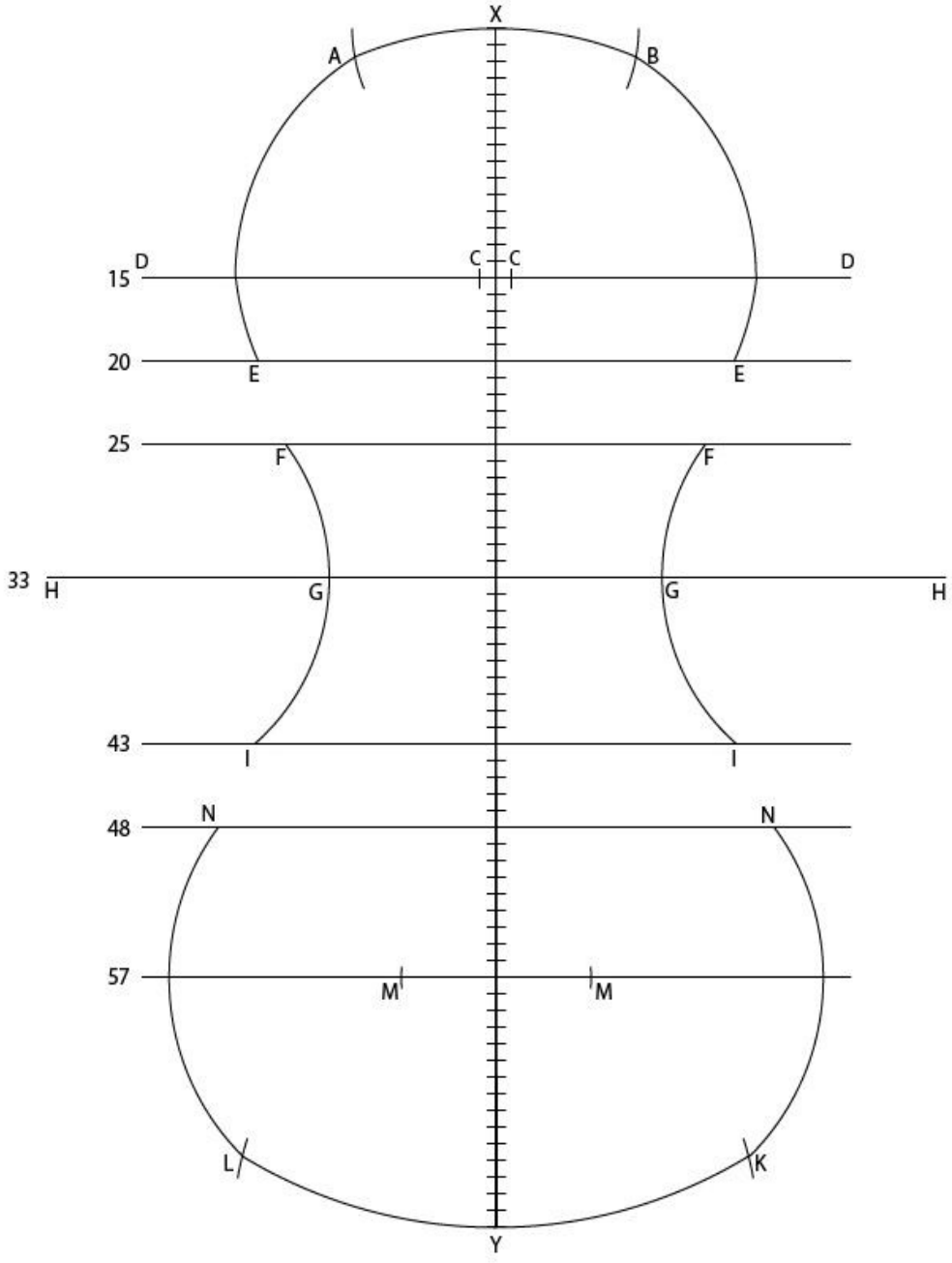


Fig.5: method 2

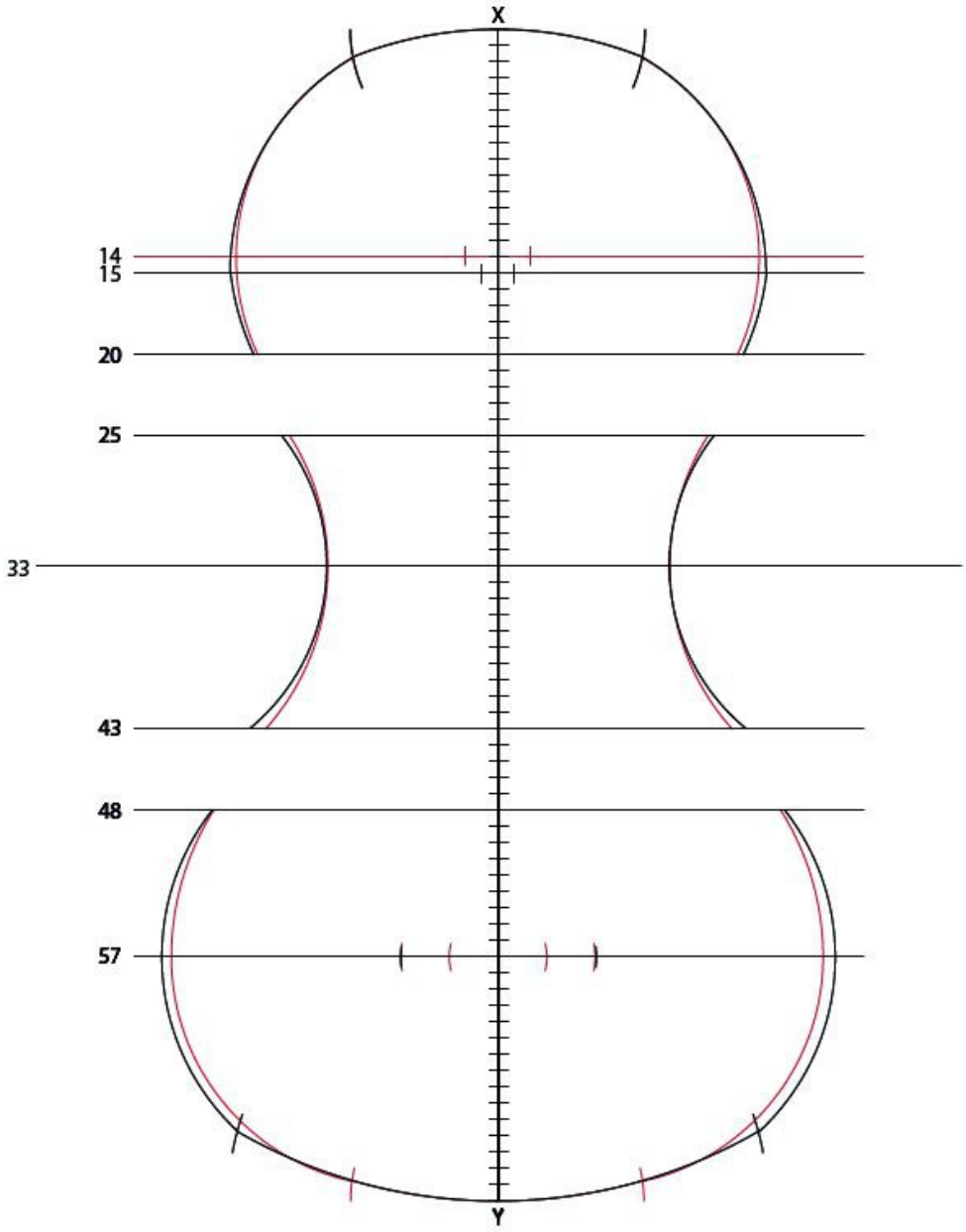


Fig. 6: Comparison of method 1 (red line) and method 2 (black line)

Construction of the strength centers, bass bars, voice position, plate thicknesses and frame heights

The construction of the blocks

- Top block with a width of 10 parts and a height of 4 parts (1 part = 1/72)
- Bottom block with a width of 8 parts and a height of 4 parts
- Corner blocks are located between lines 20- 25 and 43- 48 (no construction given)
- The rib height violin and viola 6 ¼ parts on the bottom block and 6 parts on the neck insert
- rib height violoncello and violone 12 and 11 ¼ parts

The plate thicknesses and sound settings

- for violin and viola (top)
- Thickness 1/2 parts (top slightly thicker, bottom slightly thinner) circular design
- Circles with 4, 8 and 12 parts around point 42
- Perpendicular from point 42 to the outermost circle
- from the resulting point on outermost circle, remove ¼ part upwards and downwards
- resulting in a and b
- at the smallest circle in the same place remove ½ part upwards and downwards, resulting in c and d
- back: this wedge shows the plate thickness of the back in the area between circles 30 to 54
- from 30 to the edge the same thickness, at the edge a little thinner than ½ part

- for cello, double bass and violone:
- see above reduction in the thickness of the top but from the outermost circle to ¼ part

- in order to obtain a “human, warm voice” (orchestra) of the instrument, he gives the thickness determination with the circles around 42 (see above)
- in order to obtain a “silvery” voice for soloists, he gives a method with circles around 40 from 3, 6, 9 parts
- within the circle plate thickness of 2/3 parts circle to the edge of the F-holes decreasing thickness to ½ part
- thickness consistent to the edge

The construction of the F- holes

- Length 15 parts inner notches are on line 40
- the distance between the shafts in the middle is 15 parts
- shaft width is 1 ½ parts top end of the F-holes at 32 ½
- centers of the upper sound hole at point 34 with the distance between the circle centers of 8 parts and the diameter of 1 part
- centers of the lower sound hole at point 45 ½ with the radius of 1 part and the distance between the sound holes of 22 parts the sound hole ends at line 47 or
- Centers of the lower sound hole on point 47 with the radius of 1 part and the distance between the sound hole of 22 parts
- the sound hole ends at line 47 ½

The bass bar

- Distance to the upper sound hole ¼ part running in a straight line at the same distance from the upper and lower edges
- middle of the bar is at the level of the F notches or the bridge position “not too thick”
- length is 36 parts
- glue in with tension (“..., so that it pushes upwards so that it holds the top up and does not give in to the pressure of the strings.”1)

The soundpost

- The sound post position within the first circle around 42
- not beyond the “right” (treble) bridge foot
- exactly straight and not too tight

The neck

- Neck 27 parts from “where the capsule ends at the bottom, in which the pegs are located” [corresponds to approximately the length of a neck length of 130 mm plus upper saddle]

The arching

- Draw line AC with the length of XY
- Mark the middle with B with the Radius of 216 parts (3 x 72)
- connecting points A and C
- the longitudinal arching curve has been created [no indication whether top or back]

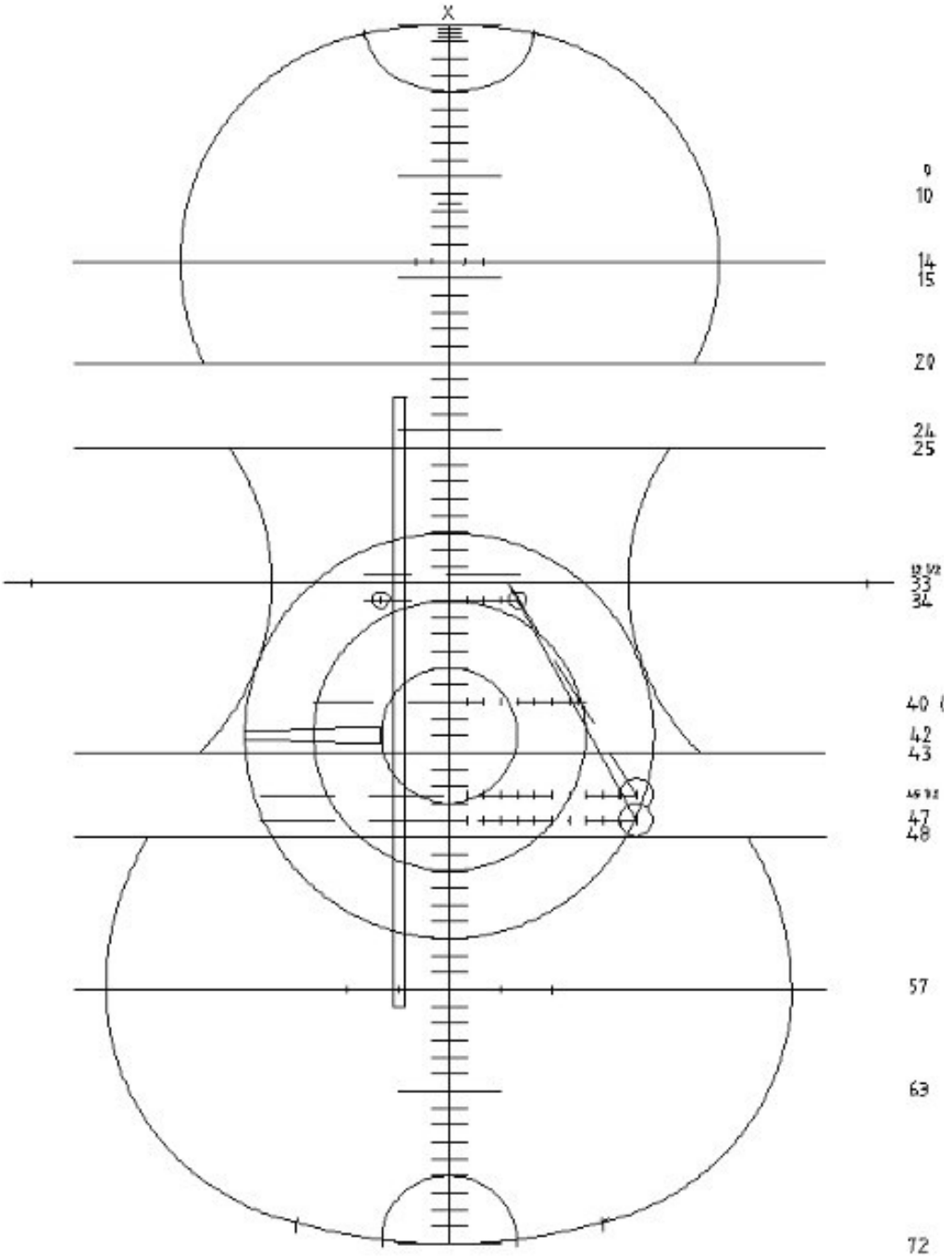


Fig. 7: Construction method 1 with upper and lower blocks, thickness centers (three concentric circles around point 42), F-holes, bass bars and plate thicknesses

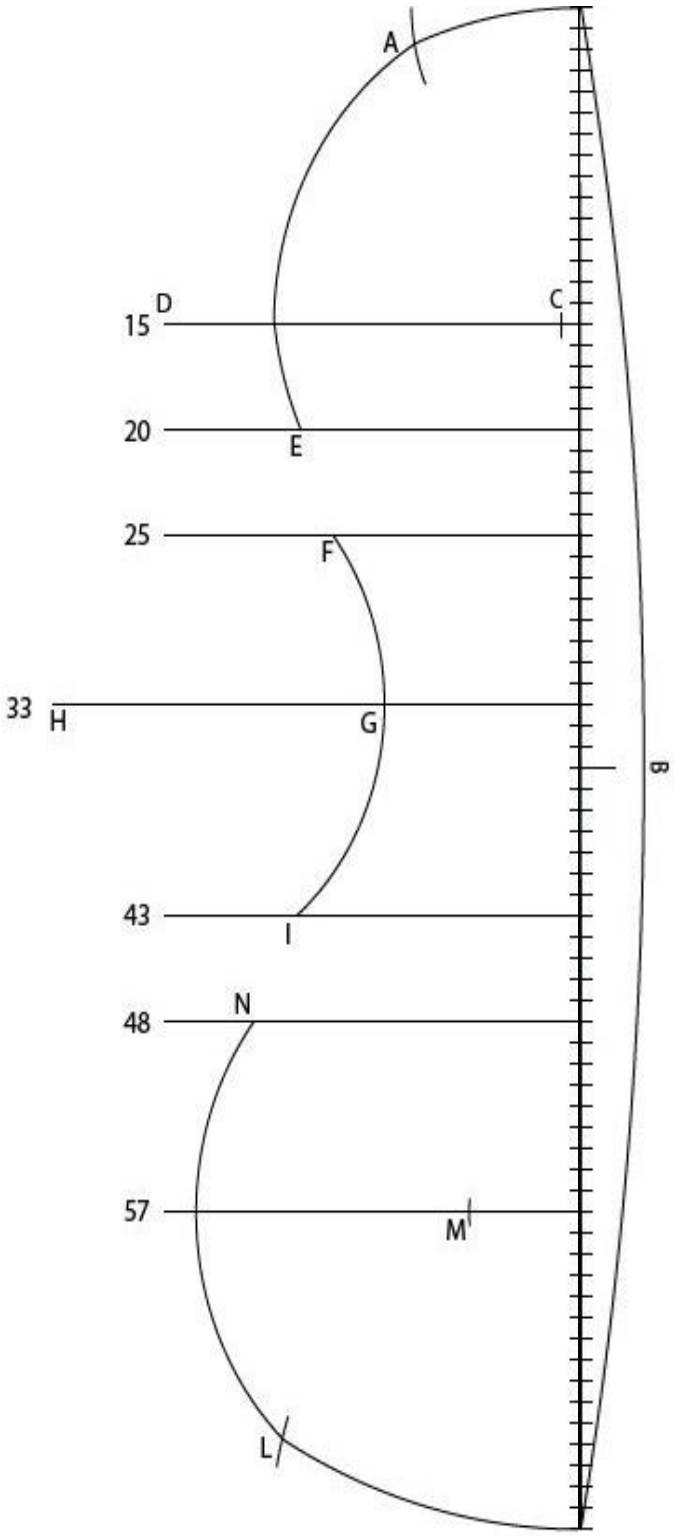


Fig. 8: arching construction

These are the instructions as Antonio Bagatella describes them. He does not refer to sources or other influences. For this reason, we will now look at selected sources that could be from or before Bagatella's time.
The **"Museo del Violino"** (Cremona) contains drawings (MS 713 - 716) that are attributed to the workshop of Giovanni Battista Ceruti (1756-1813)[12]. In 1786 he came to Cremona and began working there with Lorenzo Storioni (1744-1816). There are a total of four paper drawings on which the construction of a violin is drawn according to Bagatella's method or parts of this construction method are used (MS 713). In addition, the corner outlines are also constructed in them, which are missing in Bagatella's method. In these drawings, the F-hole is constructed as described by Bagatella, but unlike Bagatella, it is drawn in full. The name Bagatella is not mentioned anywhere. It is not known whether the drawings were made by Giovanni Battista Ceruti or by his sons.

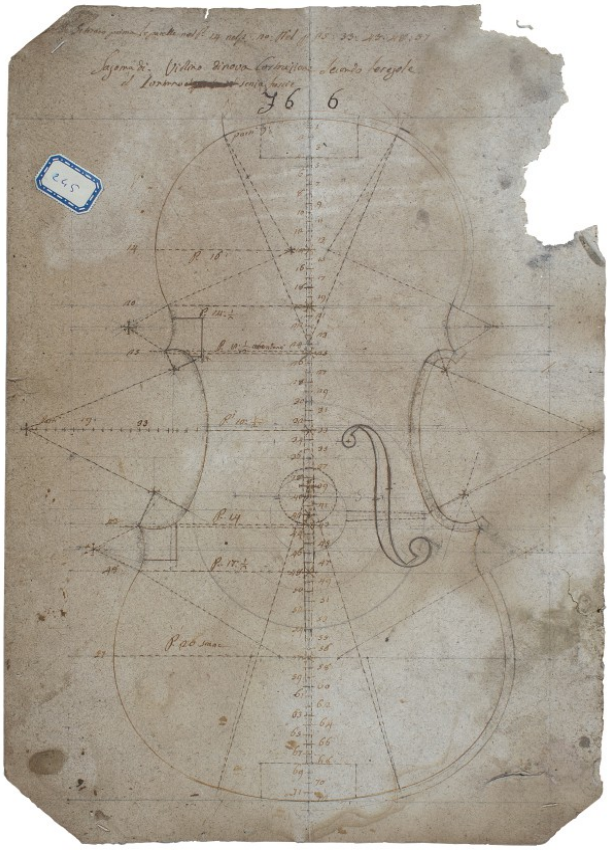


Fig. 9: Sketches from the Ceruti workshop, MS 714[13]

12 Cacciatori 2016, p. 257 -259
13 ibid

The **National Music Museum South Dakota University** has a paper template (NMM T-18) [14] (Figures 12 and 13) from the estate of a possible Cremonese workshop (possibly Hieronymus II Amati[15]) from the late 17th century[16]. It is notated on one side with a number sequence up to 70 and a circular construction around the scale point. The bass bar, the tuning position, the position of the F-holes and plate thicknesses are also indicated. Except for the bar and the position of the lower F-ball, this drawing corresponds to Bagatella's construction (Figure 14). It once belonged to the collection of Count Cozio di Salabue (1744- 1840), who received it from Paolo (1708- 1775), Antonio Stradivari's son. It later became the property of Giovanni Battista Guadagnini (1711- 1786), then of the Antoniazzi family, from here to Leandro Bisiach (1864- 1946) until it finally passed to the South Dakota Museum in 1984.

Fig. 10 and 11: NNM T18, National Music Museum [17]

14 Information Arian Sheets, written contact (Curator of the String Instruments Collection of the National Music Museum, The South Dakota University)
15 Dipper 2013, p. 18
16 ibid
17 ibid

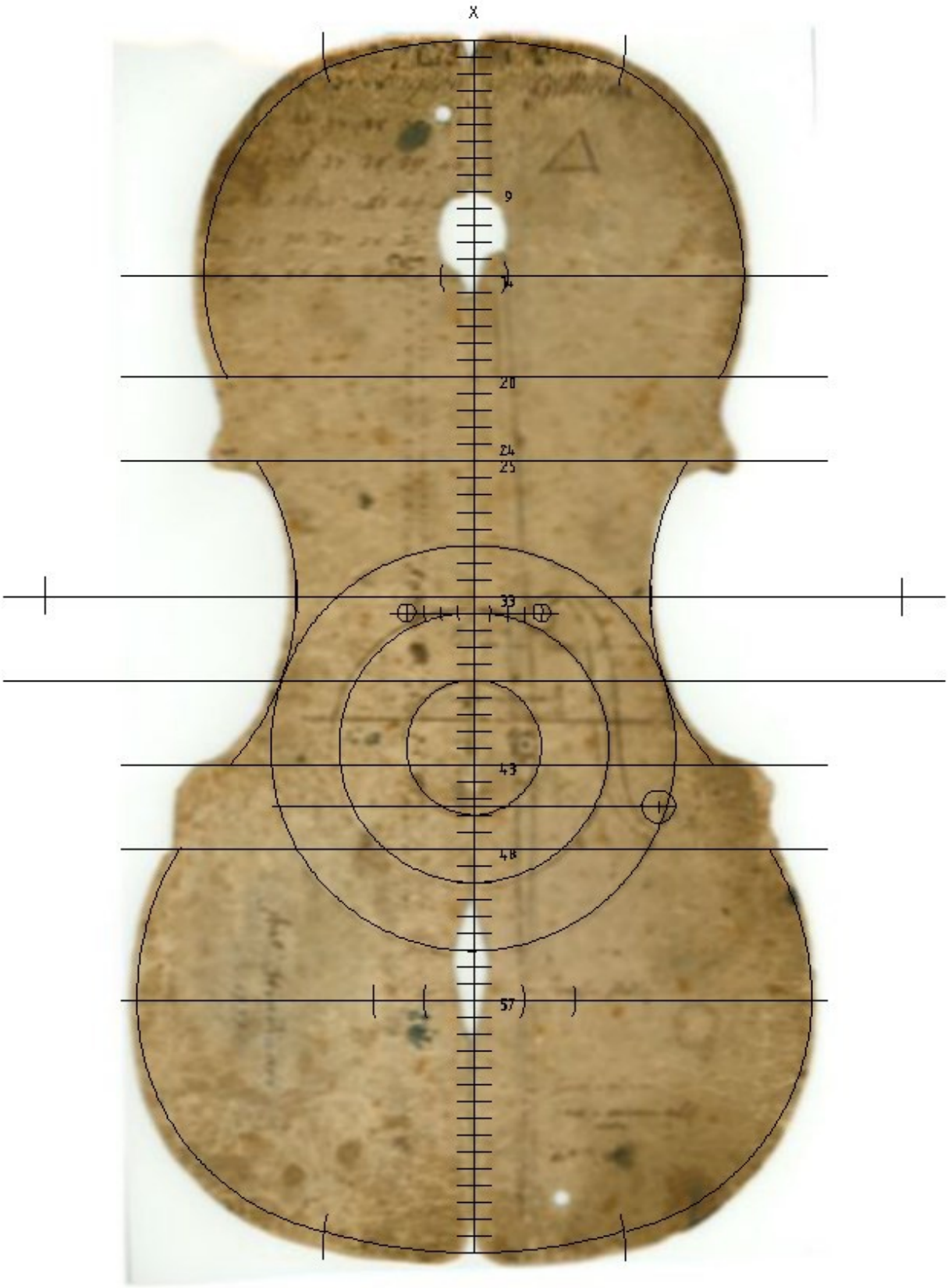


Fig. 12: NMM T18 with superimposed construction (method 1)

The manuscript **"Librem segreti de buttegha"** about violin making in Cremona exists as a copy in excerpts by an unknown writer. This text was probably written in the first half of the 18th century. The writer reports on the construction and design of the violin. What is interesting in connection with Bagatella is the 72-fold division of the total length of the violin (with the quotients 3,9,12 and 24)[18]. Bagatella was in contact with Giuseppe Tartini. He owned two of his violins[19]. Tartini was in contact with Gasparo Visconti (1683 - possibly 1713), a well-known violinist from Cremona, and it was not only through him that he was in contact with the best violin makers in Cremona. A transfer of knowledge from there to Bagatella is therefore conceivable. Tartini's interest in scientific work and understanding of acoustics is documented by his extensive writings.

Summary

Even if Antonio Bagatella was not known for his instruments, his work on the "Regole per la costruzione de' Violini Viole Violoncelli e Violone" was. It is not clear whether and on what prior knowledge Bagatella's work was based. It is highly likely that it was not Bagatella who developed this method, but rather he used knowledge that had long been known. Therefore, the value of his writing lies in the documentation of historical knowledge of his time and provides an insight into the working methods of the old Cremonese violin makers. The search in this area is not complete and new documents keep emerging. The author would be very happy to enter into an exchange with colleagues and would like to thank the colleagues who have supported me already in my search so far.

Contact: www.violini.org; christian.pabst@violini.org

(The entire treatise on Bagatella can be read on the website www.violini.org/Studien [as of 2022]).

Literature and sources:

Bagatella, Antonio: Regole per la costruzione de' Violini Viole Violoncelli e Violoni, Manoscritto e Stampa with prefazione critica e agiornata, a cura di Sauro Malagoli e Lorenzo Frignani, reprint: Modena 2008

Cacciatori, Fausto: Antonio Stradivari, Disegni modelli forme, Catalog the reperti delle Collezioni Civiche Liutarie del Comune di Cremona, Cremona 2016

Da Col, Paolo; Airenti, A.; Lowenberger, F..: The Tartini Relics, in: The Galpin Society Journal LXIV: S. 248- 261), Volume 64, Oxford 3/2011

Dipper, Andrew: Librem segreti de buttegha, A book of workshop secret's: The violin and its fabrication, in Italy, circa 1725- 1790, Minneapolis 2013

Heyde, Herbert: Musikinstrumentenbau, 15.- 19. Jahrhundert Kunst- Handwerk- Entwurf, 15.- 19. Jahrhunder Kunst- Handwerk- Entwurf, Leipzig 1986

Pabst, Christian: Die Konstruktionslehre im Geigenbau, Markneukirchen 2000
(https://violini .org/wp-content/uploads/2016/05/Projektarbeit-WS-99.pdf)
Die Konstruktionsmethode des Antonio Bagatella, 2021 (https:// violini.org/studien/)

Stenz, Jens: A 1759 viola by Antonio Bagatella, in: The Strad, February 2015, London

Schaum, Johann O.H.: On the construction of violins, violas, violoncellos and violons: with 2 copper plates, Leipzig 1806

Scrollavezza, Elisa; Zanrè. A.: I segreti di Sgarabotto, Parma 2019

Wunder, Franz (editor): Rules for the manufacture of violins, violas, violoncellas and violons, Goettingen 1896

All drawings were made by the author. (Figures 4- 8 and 12). For permission to reproduce, I thank the Museo del Violino (Cremona) (9) and the National Music Museum, The South Dakota University (Vermillion) (10,11).

18 Dipper 2013, S. 13 ff.
19 Da Col 2011,