Stradivari

For over 200 years, Antonio Stradivari has been universally regarded as the greatest violin maker who ever lived, yet it is not widely known that he made virtually every kind of bowed-and plucked-string instrument popular in the Baroque period, including lutes, viols, mandolins, guitars, and harps. Stradivari provides a fascinating biography of this legendary maker, based on newly discovered material in church and civic archives, alongside technical descriptions and analyses of many of the maker’s workshop materials preserved in the Museo Stradivariano in Cremona, particularly as they relate to extant and lost instruments, Baroque stringing and instrument adjustment, and early performance practice. There are separate chapters for each type of instrument, allowing the reader to locate information easily. The book contains tables of measurements of Stradivari’s forms and patterns, over 100 black and white photographs and drawings, and color photographs of 16 of Stradivari’s most important violins, violas, and cellos.

Stewart Pollens served as the Conservator of Musical Instruments at the Metropolitan Museum of Art from 1976 to 2006, where his duties included the restoration and maintenance of the museum’s encyclopedic collection of over 5,000 instruments. He is the author of The Violin Forms of Antonio Stradivari (1992), The Early Pianoforte (Cambridge, 1995), Giuseppe Guarneri del Gesù (1998), and François-Xavier Tourte: Bow Maker (2001). In 1997, he was the recipient of the American Musical Instrument Society’s Nicholas Bessaraboff Prize for The Early Pianoforte, a study of the invention and early history of the pianoforte. He now works as an independent researcher, consultant, and conservator of musical instruments.
This series continues the aim of Cambridge Musical Texts and Monographs to publish books centered on the history of musical instruments and the history of performance, but broadens the focus to include musical reception in relation to performance and as a reflection of period expectations and practices.

Published titles

John Butt
*Playing with History: The Historical Approach to Musical Performance*

James Garratt
*Palestrina and the German Romantic Imagination: Interpreting Historicism in Nineteenth-Century Music*

Christopher Hogwood (ed.)
The *Keyboard in Baroque Europe*

John Haines
*Eight Centuries of Troubadours and Trouvères: The Changing Identity of Medieval Music*

Daniel Leech-Wilkinson
*The Modern Invention of Medieval Music: Scholarship, Ideology, Performance*

Michael Musgrave and Bernard Sherman (eds.)
*Performing Brahms: Early Evidence of Performance Style*

Stewart Pollens
*Stradivari*
Contents

List of plates page vi
List of figures vii
Acknowledgements xi

Introduction 1
1 Historical background 3
2 Stradivari's workshop materials 53
3 The violin forms and patterns 67
4 Violin fittings and setup 104
5 The dance master's kit 136
6 The viola da gamba and viola d'amore 143
7 The lute 166
8 The mandola and mandolino 189
9 The guitar 205
10 The harp 223
11 The workshop 233

Appendices
1 The Hill bass-bar collection 283
2 Thomas Salmon's "The Theory of Musick Reduced to Arithmetical and Geometric Proportions," from Philosophical Transactions of the Royal Society of London (1705) 293
3 A case study: the "Messiah" violin 297

Notes 306
Bibliography 322
Index 329
Color plates

The plates will be found between pages 274 and 275.

1  “Hellier” violin, 1679
2  “Rosgonyl” violin, 1686
3  “Castelbarco” violin, 1699
4  “Russian” violin, 1700
5  “Ward” violin, 1700
6  “Betts” violin, 1704
7  “Dushkin” violin, 1707
8  “Solli” violin, 1714
9  “Rode” violin, 1715
10 “Cadiz” violin, 1715
11 “Jupiter” violin, 1722
12 “Lord Norton” violin, 1737
13 “Tuscan” contralto viola, 1690
14 “Bass of Spain” cello, 1713
15 “Batta” cello, 1714
16 “De Munck” cello, 1730
Figures

Note: MM indicates Musée de la Musique, Paris; MS indicates Museo Stradivariano, Cremona.

Chapter 1
1.1 Gaudenzio Ferrari, *The Madonna of the Orange Trees*, 1529–1530, San Cristoforo Church, Vercelli. 6
1.2 Bartolomeo Montagna, *Madonna and Child with Saints*, ca. 1500, detail of angel playing the *lira da braccio*. 7
1.3 a–g Stradivari labels from the collection of Count Cozio di Salabue. 12
1.4 Marriage record of Antonio Stradivari and Francesca Ferabosca (Ferraboschi), July 4, 1667. 14
1.5 Antonio Stradivari’s burial record, December 19, 1737. 15
1.6 Interior of church of S. Agata. 21
1.7 S. Matteo parish census return of 1668. 22
1.8 a–b S. Matteo parish census return of 1681 and street map of the area. 22
1.9 Burial record of Stradivari’s first wife, Francesca, May 25, [1737]. 23
1.10 Bill for Francesca Stradivari’s funeral expenses, May 25, 1737. 24
1.11 Stradivari’s last will and testament, autograph version, January 24, 1729. 27
1.12 S. Matteo census return of 1698. 28
1.13 Casa del Pescaroli. 30
1.14 Side elevation of Casa del Pescaroli. 31
1.15 Plan views of the three floors of Casa del Pescaroli. 32
1.16 House purchased by Stradivari in 1681. 33
1.17 Plan view of Casa Stradivari. 35
1.18 Graph of Stradivari’s instrument production. 39
1.19 S. Agata census return of 1678. 49

Chapter 2
2.1 Portrait of Ignazio Alessandro Cozio di Salabue. 54
2.2 Page of Count Cozio’s inventory of Stradivari’s workshop materials, dated February 29, 1823. 58
2.3 Sala Stradivariana, ca. 1930. 61

Chapter 3
3.1 MB form, MS no. 1. 68
## List of figures

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.2</td>
<td>Tracing of G form with overlaid compass arcs.</td>
<td>72</td>
</tr>
<tr>
<td>3.3</td>
<td>PG form, MS no. 21.</td>
<td>72</td>
</tr>
<tr>
<td>3.4</td>
<td>Paper pattern for cornerless viola d’amore, MS no. 368.</td>
<td>74</td>
</tr>
<tr>
<td>3.5</td>
<td>Form originally for guitar, later converted into cornerless viola d’amore form, MM no. E.901.4.</td>
<td>74</td>
</tr>
<tr>
<td>3.6</td>
<td>Overlay of tracings of viola forms, MS nos. 55 and 205.</td>
<td>75</td>
</tr>
<tr>
<td>3.7</td>
<td>The “Cassavetti” contralto viola, 1727.</td>
<td>76</td>
</tr>
<tr>
<td>3.8</td>
<td>Overlay of tracings of violin forms P, S, T, and Q (MSS nos. 44, 39, 11, and 16).</td>
<td>77</td>
</tr>
<tr>
<td>3.9</td>
<td>Overlay of tracings of violin forms S and SL (MS nos. 2 and 28).</td>
<td>78</td>
</tr>
<tr>
<td>3.10</td>
<td>Overlay of tracings of violin forms MB, B, and B (MS nos. 1, 33, and 38).</td>
<td>79</td>
</tr>
<tr>
<td>3.11</td>
<td>The “Harrison” long-pattern violin, 1693.</td>
<td>80</td>
</tr>
<tr>
<td>3.12</td>
<td>The “Alard” violin, 1715.</td>
<td>81</td>
</tr>
<tr>
<td>3.13</td>
<td>Overlay of tracings of violin forms PG and G (MS nos. 21 and 49).</td>
<td>82</td>
</tr>
<tr>
<td>3.14</td>
<td>Tenor viola form TV, MS no. 229.</td>
<td>82</td>
</tr>
<tr>
<td>3.15</td>
<td>The “Piatti” cello, 1720.</td>
<td>84</td>
</tr>
<tr>
<td>3.16</td>
<td>F-hole placement template for the B form cello, MS no. 272 recto.</td>
<td>85</td>
</tr>
<tr>
<td>3.17</td>
<td>Archimedean spiral from Giacomo Barozzi da Vignola, <em>Vignola or the Compleat Architect</em> (London, 1694).</td>
<td>87</td>
</tr>
<tr>
<td>3.18</td>
<td>Scroll of “Alard” violin, 1715.</td>
<td>88</td>
</tr>
<tr>
<td>3.19</td>
<td>Scroll of “Cassavetti” viola, 1727.</td>
<td>89</td>
</tr>
<tr>
<td>3.20</td>
<td>Scroll of “Bass of Spain” cello, 1713.</td>
<td>90</td>
</tr>
<tr>
<td>3.21</td>
<td>F-hole placement template for tenor viola, MS no. 234.</td>
<td>91</td>
</tr>
<tr>
<td>3.22</td>
<td>Overlay of an f-hole positioning template over a form.</td>
<td>94</td>
</tr>
</tbody>
</table>

### Chapter 4

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1</td>
<td>Tenor viola neck pattern (MS no. 237) with corner block (MS nos. 230–233) and f-hole patterns (MS nos. 235 and 236).</td>
<td>108</td>
</tr>
<tr>
<td>4.2</td>
<td>“B” cello neck pattern, MS no. 276.</td>
<td>111</td>
</tr>
<tr>
<td>4.3</td>
<td>Violin bridge pattern dated 1711, MS no. 142.</td>
<td>114</td>
</tr>
<tr>
<td>4.4</td>
<td>Cello bridge pattern, MS no. 285.</td>
<td>115</td>
</tr>
<tr>
<td>4.5</td>
<td>Cello tailpiece pattern, MS no. 282.</td>
<td>118</td>
</tr>
<tr>
<td>4.6</td>
<td>Interior of a Stradivari violin.</td>
<td>121</td>
</tr>
<tr>
<td>4.7</td>
<td>Original bass-bars from Stradivari violins dated 1703, 1704 (“Betts”), and 1714.</td>
<td>122</td>
</tr>
<tr>
<td>4.8</td>
<td>The “Spanish Court” violin bow.</td>
<td>133</td>
</tr>
<tr>
<td>4.9</td>
<td>Bow head pattern and models, MS nos. 499–501.</td>
<td>134</td>
</tr>
<tr>
<td>4.10</td>
<td>Bow frog patterns, MS nos. 479–498.</td>
<td>135</td>
</tr>
</tbody>
</table>

### Chapter 5

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.1</td>
<td>Engraving of a sordino, or mute violin, from Filippo Bonanni, <em>Gabinetto armonico pieno d’istromenti sonori indicate e spiegati</em> (Rome, 1722).</td>
<td>137</td>
</tr>
<tr>
<td>5.3</td>
<td>Pochette pattern and soundhole positioning pattern, MS nos. 424 and 425.</td>
<td>138</td>
</tr>
<tr>
<td>5.4</td>
<td>The “Clapison” pochette, 1717.</td>
<td>140</td>
</tr>
<tr>
<td>5.5</td>
<td>Pochette pattern and soundhole positioning pattern, MS nos. 430 and 431.</td>
<td>141</td>
</tr>
<tr>
<td>5.6</td>
<td>Prototype for an automatic mute, MS nos. 502–504.</td>
<td>142</td>
</tr>
</tbody>
</table>
# List of figures

**Chapter 6**
- 6.1 Viola da gamba pattern, MS no. 259.  
- 6.2 Viola da gamba form, MM E.901.2.  
- 6.3 The “Carl Frühl” cello, converted from a viola da gamba.  
- 6.4 Neck pattern, MS no. 308.  
- 6.5 Fretted fingerboard pattern, MS no. 256, and fingerboard curvature pattern, MS no. 258.  
- 6.6 Fretting system proposed by Thomas Salmon in his *Theory of Musick* (1705).  
- 6.7 Pattern for a viola d’amore, MS no. 344.  
- 6.8 Pattern for a viola d’amore, MS no. 364.  

**Chapter 7**
- 7.2 Lute body pattern, MS no. 388 verso.  
- 7.3 Lute body pattern, MS no. 390.  
- 7.4 Lute body pattern, MS no. 391.  
- 7.5 Comparison of lute body pattern outlines, MS nos. 388v, 389, 390, and 391.  
- 7.6 Lute neck pattern, MS no. 392 recto, lute pegbox pattern, MS no. 393, lute pegbox pattern, MS no. 394, and lute pegbox pattern, side view, MS no. 395.  
- 7.7 Lute bridge, MS no. 396.  
- 7.8 Magno Dieffopruchar label and repair label inserted by Antonio Stradivari.  
- 7.9 Underside of lute soundboard made by Antonio Stradivari.  
- 7.10 Interior of lute by Magno Dieffopruchar.  
- 7.11 Lute rose by Antonio Stradivari.  

**Chapter 8**
- 8.1 “Cutler-Challen” *mandolino* attributed to Antonio Stradivari, 1680.  
- 8.2 Mandolin bridges and pattern, MS nos. 415, 416, 417, and 418.  
- 8.3 Mandolin body patterns, MS nos. 421, 422, and 423.  
- 8.4 Mandolin neck patterns, MS nos. 403, 404, 405, and 406.  
- 8.5 Mandolin patterns, MS nos. 419 and 420.  

**Chapter 9**
- 9.1 The “Hill” guitar, 1688.  
- 9.2 Patterns for guitar peg heads, MS nos. 376–381.  
- 9.3 Guitar form, MM no. E.901.5.  
- 9.4 Guitar pattern, MS no. 374.  
- 9.5 Guitar neck pattern, MS no. 375.  

**Chapter 10**
- 10.1 Harp, 1681.  
- 10.2 Harp, detail of pillar and harmonic curve.  
- 10.3 Harp pattern, detail of top of pillar showing blocked-out cupid and siren, MS no. 386.  
- 10.4 Harp pattern, detail of back of harmonic curve, MS no. 386.  
- 10.5 Harp, detail of back of harmonic curve.
List of figures

Chapter 11

11.1 Alessandro Capra, engraving, possibly by Cesare Bonacina, 1672. 234
11.2 Sector, ivory, eighteenth century. 237
11.3 Re-creation of Stradivari’s system of lashing the ribs to the corner blocks. 248
11.4 Corner template for the corners of a cello, MS no. 275. 249
11.5 Thickness calipers, MS nos. 662 and 663. 250
11.6 Pressure-point marking tool, MS no. 665. 251
11.7 Interior surface of a back plate of a Stradivari violin. 252
11.8 Back of “Piatti” cello pegbox, 1720. 255
11.9 Interior of “Bass of Spain” cello. 256
11.10 Template for aligning the 1690 “Medici” tenor viola, MS no. 240. 257
11.11 Compass point in the button of the “Betts” violin, 1704. 258
11.12 Fingerboard alignment guide for the tenor viola, MS no. 247. 259
11.13 Cross-section of wood and varnish from rib of 1736 “Paganini” Stradivari cello, ultraviolet fluorescence, 100X. 265
11.14 Varnished wood from pegbox of 1730 “Pawle” Stradivari cello showing pigment particles, white light, 100X. 266
11.15 Page from the 1735 inventory of the aromatori Valeriano Meschieri. 267
11.16 Woodcut used as the source of the decoration for the ribs of the “Greffuhle” violin, MS no. 511. 272
11.17 Title page from Giovanni Ostaus, La vera perfettione del disegno di varie sorti di ricami, & di cucire ogni sorte di punti à fogliami, punti tagliati, punti à fili, & rimessi punti incrociati, punti à stuora, & ogni altra arte, che dia opera à disegni. Fatto nuovamente per Giovanni Ostaus (Venice, 1567). 273
11.18 Woodcut from Giovanni Ostaus, La vera perfettione del disegno di varie sorti di ricami . . . (Venice, 1567), folio Ci verso, plate 34. 274
11.19 Rubbing of an engraved rib or possibly an impression made from a printing block used in the decoration of the “Greffuhle” violin, MS no. 512. 275
11.20 Paper pattern for the decoration of the “Greffuhle” violin pegbox, MS no. 513. 275
11.21 Practice piece for rib decoration executed on a scrap of maple, MS no. 519. 276
11.22 The “Greffuhle” violin, 1709. 277

Appendix 1

1a–f Bass-bars from Hill collection. 287–292
Acknowledgements

I wish to express my sincerest thanks to Dr. Andrea Mosconi, Curator of the Museo Stradivariano in Cremona, for granting me repeated access to the collection, as well as to Drs. Josiane Bran-Ricci and Florence Gétreau, former curators of the musical instrument collection of the Conservatoire National Supérieur de Musique in Paris, for permitting me to examine the Stradivari artifacts in the collection they once supervised. I am deeply grateful to the administrators and staff of Cremona’s Archivio di Stato, the Archivio Storico Diocesano, and the church of S. Agata for allowing me to peruse documents in their care. I should also like to acknowledge the assistance of Senator Paolo Bodini, the former mayor of Cremona, for arranging access to church archives and museum collections. Without the consent and assistance of these individuals and institutions, the writing of this book would have been impossible.

Several other museums, the National Museum of Music (Vermillion, South Dakota), the Ashmolean Museum (Oxford), and the Musikinstrumenten-Museum (Berlin), supplied me with images of the Stradivari instruments in their collections, and I should like to thank their staffs, in particular Dr. André Larson and Arian Sheets of the NMM, for their generous help, as well as Heidi von Rüden of the Musikinstrumenten-Museum in Berlin. I would also like to thank the staff of the Conservatory S. Pietro a Majella in Naples for allowing me to examine the harp in their collection.

I am deeply indebted to Eric Wen, who as editor of The Strad dispatched me to Cremona to write a preview of the 1987 Celebrazioni Stradivariane. It was during this visit to Cremona that I first saw Stradivari’s forms, patterns, and tools in the Museo Stradivariano and vowed to return to examine them more closely. In the course of the next twenty years, I made numerous visits to the Museo and came away with a more thorough understanding and deeper appreciation of Stradivari. I should like to thank Andrew Dipper for providing me with the text of a lecture on Stradivari’s house that he gave at the National Music Museum in Vermillion, South Dakota, in 1995.

Thanks also go to David Segal for graciously providing samples of Stradivari’s varnish that had been removed during restorations undertaken by Simone F. Sacconi. These materials were analyzed at the Metropolitan Museum of Art by Adriana Rizzo, Assistant
Acknowledgements

Research Scientist in the Department of Scientific Research, and at McCrone Associates by Dr. Gretchen L. Shearer, Senior Research Chemist.

Mary Laing read through the manuscript and made many suggestions and corrections, for which I am grateful. I am, of course, indebted to previously published studies: the Hills’ Antonio Stradivari: His Life and Work (1644–1737) (1902) is a classic that will never lose its appeal or value as a reference work; Simone F. Sacconi’s The “Secrets” of Stradivari (1979) provided me with many insights into Stradivari’s working process. The essays of Carlo Bonetti, Agostino Cavalcabò, and Ugo Gualazzini (first published in the journal Cremona between 1929 and 1932, anthologized in 1937, and subsequently published in an English translation in 1999 as Antonio Stradivari: Reports and Documents, 1937 by Cremona Books) provided a wealth of biographical material, as did Alfonso Mandelli’s Nuove indagini su Antonio Stradivari, published in 1903. Elia Santoro’s Antonius Stradivarius (Cremona, 1987) was also an important resource and contains an excellent bibliography, particularly of Italian publications. During my research, I constantly turned to Renzo Bacchetta’s transcription and edition of Count Cozio di Salabue’s Carteggio (1950), which contains the correspondence between Cozio and Antonio Stradivari’s youngest son and grandson, as well as to Roberto Regazzi’s Il manoscritto lirario di G. A. Marchi, Bologna 1786 (1986), which reveals the principles of violin making and acoustics that guided a close contemporary of Stradivari.

In anticipation of mounting the 1994 Guarneri exhibition at the Metropolitan Museum of Art (where I was then employed as the museum’s conservator of musical instruments) and the subsequent publication of Giuseppe Guarneri del Gesù in 1998, I convinced Peter Biddulph, the exhibition’s generous sponsor and publisher, to underwrite the research efforts of Carlo Chiesa and Duane Rosengard. Several years earlier, I had become acquainted with these two gentlemen and had followed their research efforts in the church and civic archives in Cremona. It was my hope that with a little more time and effort they might come across new biographical information on the Guarneri family for the proposed publication. In the course of their explorations, they discovered Stradivari’s last will and testament, and I was dispatched to Cremona to examine and photograph that document along with others they had unearthed. This unexpected bonus of the Guarneri project resulted in the publication of Chiesa and Rosengard’s The Stradivari Legacy by Peter Biddulph in 1998. Stradivari’s last will and testament was probably the most significant archival find since the 1930s, and it both confirms and provides the rationale for many of the complex financial arrangements that Stradivari made throughout his life (which were previously detailed in Bonetti, Cavalcabò, and Gualazzini’s Antonio Stradivari: Reports and Documents), and it provides fresh insight into Antonio Stradivari’s family relationships. I would like to thank Duane Rosengard for sharing information gleaned from his archival research.

I also wish to thank my wife, Stephanie Chase. It was her magnificent violin playing that drew me from early keyboard studies into the world of the violin. Her enthusiastic support and many constructive suggestions greatly enriched this book. Unless otherwise indicated, measurements, photographs, and line drawings are by the author.
I also wish to thank my wife, Stephanie Chase. It was her magnificent violin playing that drew me from early keyboard studies into the world of the violin. Her enthusiastic support and many constructive suggestions greatly enriched this book.

Unless otherwise indicated, measurements, photographs, and line drawings are by the author.