TRUMPETS
AND OTHER HIGH BRASS

A HISTORY INSPIRED BY
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Ways to Expand the Harmonic Series

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Fingerhole Positions

The position, size, and tone holes influence the pitch of each note. The rule to apply: the smaller the tone hole and the nearer it is to the bell, the less the pitch rise when opened. The larger the tone hole and the closer it is to the mouthpiece, the more the pitch rises. The position of the tone holes is determined not only by musical, but also by ergonomic considerations. The distance between the holes is limited by the reach of the fingers. To compensate for those limitations, tone holes can be sanded or outlined. The distance from the mouthpiece raises the pitch; undercutting the hole in the direction of the bell lowers the pitch. Undercutting was sometimes done later to change the pitch of each note. The position and size of the tone holes influence the intonation or the temperament of a cornetto. However, it is often difficult to decide whether it was done by the maker or by a later user. The following rule applies: undercutting the hole in the direction of the mouthpiece raises the pitch; undercutting the hole in the direction of the distal end lowers the pitch. The position of the tone holes is thus determined by the position of the outermost fingerholes. Mersenne additionally gives the distances between the individual fingerholes as 13 lines (39.94 mm). According to Mersenne, the distance between the two groups of fingerholes (that is between the third and the fourth fingerholes) is only 7 lines (15.83 mm), and therefore smaller than the distance between the other holes. This is surprising, since it corresponds neither to his drawings (where the tone holes seem to be equidistant) nor to surviving instruments. A pupil of Mersenne, the cornettist Jean Overton, on the other hand, has measured many historic cornetti, states that while there are some generalities in terms of fingerhole locations, there does not appear to be a constant.

Marin Mersenne provides the following measurements for his *Fossa des comets*:

<table>
<thead>
<tr>
<th>Diameter at Receiver</th>
<th>Diameter at End</th>
<th>First Hole</th>
<th>Second Hole</th>
<th>Third Hole</th>
<th>Fourth Hole</th>
<th>Fifth Hole</th>
<th>Thirteenth Hole</th>
</tr>
</thead>
<tbody>
<tr>
<td>NMM 9.475 mm</td>
<td>9.375 mm</td>
<td>229 mm</td>
<td>269 mm</td>
<td>308 mm</td>
<td>355 mm</td>
<td>397 mm</td>
<td>440 mm</td>
</tr>
<tr>
<td>SMM 9.475 mm</td>
<td>9.375 mm</td>
<td>227 mm</td>
<td>269 mm</td>
<td>308 mm</td>
<td>355 mm</td>
<td>397 mm</td>
<td>440 mm</td>
</tr>
<tr>
<td>TMM 9.475 mm</td>
<td>9.375 mm</td>
<td>227 mm</td>
<td>269 mm</td>
<td>308 mm</td>
<td>355 mm</td>
<td>397 mm</td>
<td>440 mm</td>
</tr>
</tbody>
</table>

Edward Tarr observed that the two groups of fingerholes on the front are often spaced further apart on cornetti of supposed German provenance than they are in Italian instruments. Tarr found that cornetti with a smaller space between the two groups of fingerholes (Italian design) require cross-fingering to intone c′ correctly, while those instruments with a larger gap (German design) allow the c′ to be played with the two lowest tone holes open. These two varieties are possibly reflected in the slightly different fingering systems found in Italian and German treatises of the time. Aurelio Virgiliano’s manuscript *Il Dolcimelo*, written ca. 1600, specifies cross-fingering for the note c′, possibly reflecting an idiosyncrasy of Italian cornetti, in which the two groups of fingerholes are close together as in German instruments (© Museo Internazionale di Musica & Strumenti Musicali, Bologna, Ms. C, 33, 37)).
CHAPTER 3

3.15 This serpent, made entirely of leather without a wooden core, dates from the late sixteenth or early seventeenth century and is most likely of Italian origin (© Bologna, Museo internazionale e biblioteca della musica, no. 1829).

Herbert Heyde has argued that the serpent most likely originated in Italy, not in France. The serpent's derivation from Italian snake-shaped cornetti, as outlined above, supports this hypothesis, which is also lent credence by two early surviving serpents, possibly of Italian origin, that date from the late sixteenth or early seventeenth century, and a third signed by an Italian maker active in the late eighteenth century. The presumably earliest of the three is housed in the Museo internazionale e biblioteca della musica in Bologna (no. 1829). Noteworthy are the V-shaped bends and oblique straight sections; the bell terminates in a simplified dragon's head. It measures about 1400 mm in length with an internal bore diameter of ca. 12 to 65 mm. There are two groups of fingerholes, four on the upper bobe and three on the lower, as well as a tone hole on the back. John Henry van der Meer has questioned the suitability of this instrument for making music, based on the positions of the tone holes, and suggested that it may have been intended as a stage prop. However, in palm down position of the right hand and palm up position of the left, all fingerholes and the thumbhole can be reached. This serpent is exceptional in being made entirely of leather without a wooden core.

The second serpent with zoomorphic features is preserved in the Sammlung alter Musikinstrumente in Vienna (SAM 237). Originally from the Ambras collection, this instrument is first mentioned in a serpent in an inventory from 1665. It is certainly also possible that this is the bass of the snake-shaped instruments mentioned in the 1596 Ambras inventory. There are six fingerholes on the front, but no thumbhole. The snake's head with remnants of red paint inside is at the mouth-piece end, thus providing a more realistic representation of the animal. The initial bore, with a diameter of 26.5 mm, is formed by a metal sleeve inside the snake's head; the overall effective length of the instrument is 1807 mm with a terminal diameter of ca. 91 mm, resulting in 8-foot C. A recent examination with X-ray tomography revealed that this serpent is pieced together from a total of thirty U-shaped wooden segments of irregular form and thickness. Moreover, stamped into the leather at the bell end are the initials GFP and a master's mark in the form of a shoe, presumably that of the person who made the leather covering. Schlosser assumed Italian provenance and suggested that it was made at the end of the sixteenth or in the early seventeenth century, while Darmstädtter considers a possible provenance from German-speaking regions.

A third serpent with a dragon- or snake-head bell, and also featuring applied mythological figures playing various musical instruments, is preserved in the collection of the Boston Symphony Orchestra. It is signed PELLEGRINO DE AZZI / VENETIA and bears the arms of the Republic of Venice, allowing it to be dated to before 1797. A late example of the dragon-head style, it is the only serpent among this group that actually bears the name of an Italian maker.