

# Undergraduate Research Journal

---

Volume 20

Article 5

---

2016

## The Effects of Trumpet Construction on Literature from Antiquity through the Classical Period

Chase T. Christensen

*University of Nebraska at Kearney*

Follow this and additional works at: <https://openspaces.unk.edu/undergraduate-research-journal>

 Part of the [Music Commons](#)

---

### Recommended Citation

Christensen, Chase T. (2016) "The Effects of Trumpet Construction on Literature from Antiquity through the Classical Period," *Undergraduate Research Journal*: Vol. 20 , Article 5.

Available at: <https://openspaces.unk.edu/undergraduate-research-journal/vol20/iss1/5>

This Article is brought to you for free and open access by the Office of Undergraduate Research & Creative Activity at OpenSPACES@UNK: Scholarship, Preservation, and Creative Endeavors. It has been accepted for inclusion in Undergraduate Research Journal by an authorized editor of OpenSPACES@UNK: Scholarship, Preservation, and Creative Endeavors. For more information, please contact [weissell@unk.edu](mailto:weissell@unk.edu).

# **The Effects of Trumpet Construction on Literature from Antiquity through the Classical Period**

*Chase T. Christensen*

There is a consensus among musicologists and historians that over the course of time, no musical instrument has changed with regard to its construction, purpose, and symbolism more so than the trumpet.<sup>1</sup> Throughout the millennia, what was once a ubiquitous auditory signaling tool has become an indispensable facet of the modern orchestra, wind band, brass ensemble, jazz, chamber, and solo repertoire. In the hands of a dedicated artist, the trumpet is capable of radical feats of musical expression and virtuosity rivaling that of the violin, piano, and even the human voice. Its sound is distinct and powerful, yet profoundly versatile – seemingly able to move mountains with one breath, and lull one to sleep with the next. The boldest of composers have envisioned such soundscapes, and history’s greatest performers have dedicated their lives to realizing them.

Such realizations – and even, arguably, such visions – would at best be difficult to achieve, impossible at worst, with an instrument physically and acoustically incapable of producing the sounds with which the artist creates music. After all, the sound of every instrument is a product of its physical construction. It is the hollow, wooden body of the violin, its strings, and the bow hairs which vibrate them that produce the distinct timbre associated with that instrument. It is exhaled air vibrating the vocal folds as it passes through them which gives the voice its own distinctive timbre. The voice and the violin are constructed in vastly different ways. Consequently, the voice and the violin are two vastly different musical instruments. Furthermore, it is the minute variation in the measurements, materials, and assembly of each component of the violin which differentiates the sound of a Stradivarius model from that of a Cecilio product. Likewise, the shape of the mouth, the diameter of the throat, an individual’s dental structure, and the length of his/her vocal folds are important factors that differentiate one human’s voice from every other.

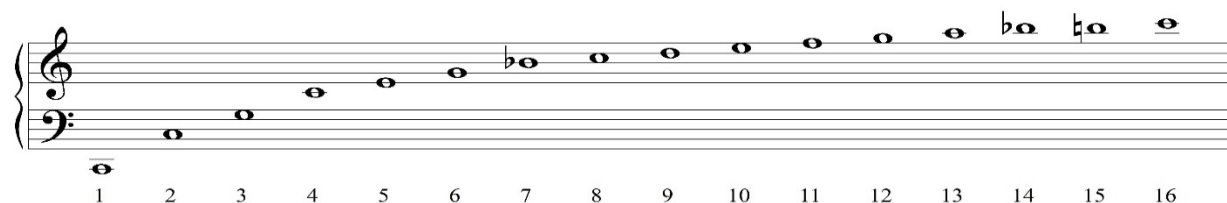
In the same way, a trumpet’s construction is fundamental to its distinct tone color. Over a period of centuries, this tone color and its resonant qualities have changed as the trumpet’s construction has changed. These changes are also reflected in the purpose and function of the instrument in society, as well as in the actual music written for it. While the design of the B-flat trumpet as it is known today was not finalized until the mid-20<sup>th</sup> century, some of the most progressive changes in trumpet construction and literature have occurred between the first known iterations of the instrument during antiquity and what is known as the Classical period of Western art music during the Common Practice Era. The best understanding of the historical

---

<sup>1</sup> Edward H. Tarr, *The Trumpet* (Amadeus Press, 1988), 7; Elisa Koehler, *Fanfares and Finesse: A Performer’s Guide to Trumpet History and Literature* (Indiana University Press, 2014), 1.

path of the trumpet and its idiomatic literature will be gleaned from a chronological approach. Therefore, an examination must first be made of the earliest trumpets, their purposes in the ancient world through the Middle Ages, and some of the most characteristic musical works of those periods. Next, the evolution of the trumpet during the Renaissance will be explored, followed by the Baroque period. Finally, the composers of the Classical period will offer their own insights about the purpose of the trumpet and its place in the musical realm. The advancements in the construction of the trumpet have had a profound impact on the parallel advancements of Western trumpet literature from antiquity through the Classical period.

Despite their name, brass instruments are not classified with respect to the raw materials from which they are formed; it is the necessity of the player's lips vibrating against a mouthpiece or resonant tubing of some kind, disrupting the interior air column at regular intervals, which all brass instruments have in common.<sup>2</sup> Therefore, animal horns blown at the narrow end were the earliest predecessors of all brass instruments.<sup>3</sup> Archeological discoveries of horn artifacts have been traced to ancient Mesopotamia, Israel, Egypt, Greece, and parts of South and West Africa. According to the *Encyclopædia Britannica*, the horns used in ancient Israel – known as shofars – were “made from the horn of a ram or other animal, [and] were used on important Jewish public and religious occasions.”<sup>4</sup> After the horn was harvested, it was subjected to heat which softened it enough to shape and smoothen. A hole was made in the small end of the horn, and a sound was produced in a way very similar to the way modern brass instruments are played, with the player (known as a *Ba'al Tekiah*, or “Master of the Blast”) altering his embouchure to facilitate the various natural harmonics of the horn (see Example 1). Due to the imperfect nature of each horn's shape, these natural harmonics would frequently ascend in fourths or sixths instead of the more perfect series shown in Example 1. In Biblical times, the shofar sounded the Sabbath, announced the New Moon, and proclaimed the anointing of a new king. Shofars continue to be used today in traditional Jewish ceremonies such as Rosh Hashanah.<sup>5</sup>



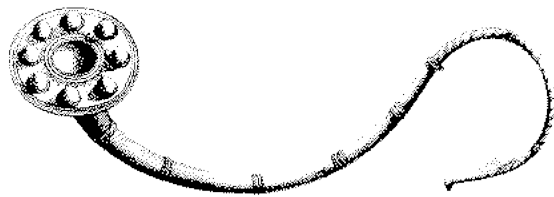
**Example 1** The natural harmonic series

<sup>2</sup> 2015; available [on-line] from <http://www.britannica.com/art/brass-instrument>

<sup>3</sup> 2015; available [on-line] from <http://www.britannica.com/art/horn-musical-instrument-group>

<sup>4</sup> 2015; available [on-line] from <http://www.britannica.com/topic/shofar>

<sup>5</sup> Ibid.



**Figure 1** Lur

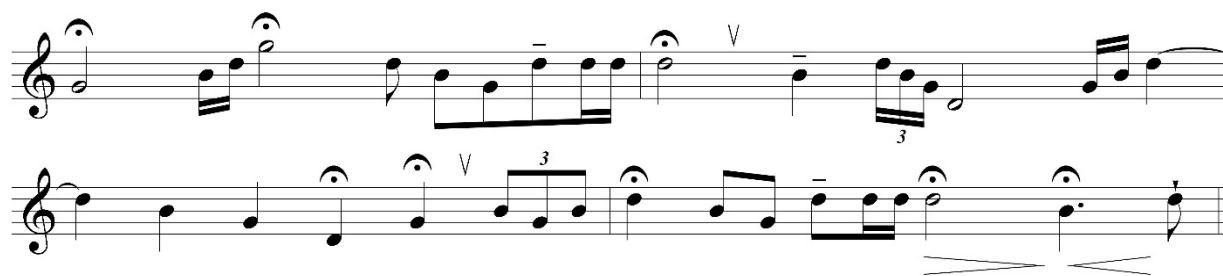
However, the discovery of metal horns such as the lur (see Figure 1) – found in Scandinavia and dating as far back as the Bronze Age (3300 B.C.E.) – prove that animal horns were not the only source of ceremonial sounds in ancient times.<sup>6</sup> About three dozen lurs have been discovered, always in pairs, and they appear to have been used during religious

events. The lur itself underwent developmental changes; later forms had removable mouthpieces which closely resemble those of modern brass instruments.<sup>7</sup> Bronze instruments have been discovered in Ancient Roman excavations, and it is clear from the writings discovered alongside them just what their purpose was. Roman trumpets were first and foremost military instruments. The tuba (see Figure 2), as it was known, was a 117cm-long conical instrument which produced a tone described as “horrible, terrible, raucous, and rough.”<sup>8</sup> This instrument was responsible for signaling charges and retreats. Other quasi-trumpets of antiquity include the chatzotzrah of Israel, the salpinx of Ancient Greece, the buccina and the lituus of Ancient Rome, the Celtic karnyx, the South Indian tirucinnam, the hao t’ung and la pa from China, and the dung from Tibet.<sup>9</sup> The earliest trumpets were not used as musical instruments in the modern sense; they served specific functions in military and religious settings.



**Figure 2** Roman tuba

Music theorist Johannes de Grocheo wrote a treatise – *De arte musicae* – which mentioned the range of late medieval trumpets in the year 1300. According to his writings, the trumpet of this time was played in the very low register, and a skilled player would have command of the “three perfect consonances,” that is, the octave, fifth, and fourth (i.e. the first four notes of the harmonic series). An analysis of visual artwork of the period corroborates this



<sup>6</sup> 2015; available [on-line] from <http://www.britannica.com/art/lur-musical-instrument>

<sup>7</sup> Tarr, 28.

<sup>8</sup> Ibid., 26.

<sup>9</sup> Ibid., 22-31.

claim, as many depictions of trumpet players feature loose lip muscles and puffed-out cheeks.<sup>10</sup> Four kinds of literature existed for the trumpet: trumpets with percussion instruments (first for warfare, then for ceremony), trumpets with woodwind and percussion instruments (for ceremony), trumpets with woodwind instruments (for processions, then dancing), and trumpets alone. Example 2 shows a characteristic piece for the latter classification, dating from the 13<sup>th</sup> century. The *Hejnal Mariacki* (“St. Mary’s Dawn”) continues to be sounded hourly from the Church of St. Mary in Krakow, Poland. As expected of this time period, the notes of the fanfare fall within the natural harmonic series. Tradition states that the final note of the call is cut short to commemorate a trumpeter who was struck by an arrow while sounding the call during an invasion of Poland in 1241.<sup>11</sup> As seen in Example 3, a reconstruction of a typical 14<sup>th</sup> century trumpet/woodwind piece by Herbert Heyde, the upper part – played by a shawm – is considerably more florid than the lower part, played by the trumpet.<sup>12</sup> Like Example 2, this music reflects the acoustical limitations of the trumpet at that time. It also reflects the sacred and modal organum of the era, in which a moving vocal line would embellish a drone.

Part of the reason that trumpet construction remained largely stagnant for hundreds of years is that general technological advancements were slow, and even slower when being applied to instrument making. Even through the Middle Ages, trumpets were constructed of cast bronze, and the true profession of a brass instrument maker did not exist.

Virtually all of the metal trumpets to this point – whether short or long – were straight.

**Example 3** 14<sup>th</sup> century music from an *alta* ensemble

However, at the dawn of the Renaissance shortly before 1400, instrument makers discovered a

<sup>10</sup> *Ibid.*, 42.

<sup>11</sup> Koehler, 129.

<sup>12</sup> Tarr, 49.

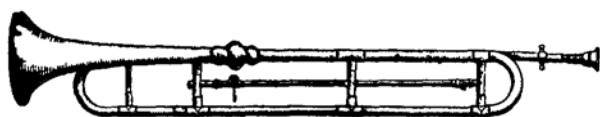
new innovation – the bending of tubing.<sup>13</sup> These instrument makers took advantage of the knowledge that different metals have different melting points:

Copper, for example, which has always formed the principal ingredient of brass, has a melting point of 1083°C; a normal brass alloy (70% copper, 30% zinc) melts at about 900°C, whilst lead is already melted at 327°C. If a straight piece of tubing [...] is filled with liquid lead and allowed to stand until the lead cools and becomes firm, the piece of tubing can be bent. [...] As soon as the bend has been made, the lead is melted once again and drawn off, so that the bend can now be joined to other pieces of tubing.<sup>14</sup>

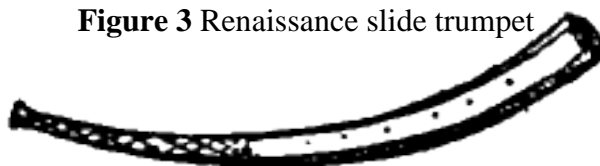
This was the innovation that revolutionized trumpet construction. Now the length of a given instrument could be reduced down to one third of the length of the actual tubing. From about 1500 onwards, nearly every trumpet that was used in a musical sense was constructed in the same folded shape that is seen in Baroque and modern fanfare trumpets.

However, the trumpet had been used ceremonially for thousands of years, and even into the Middle Ages, the Renaissance, and the Baroque era, the straight, “natural” trumpet continued to be used in royal courts.<sup>15</sup> After the advent of curved tubing, the straight natural trumpet remained a conservative staple of ceremonial music. By 1460 or 1470, use of the *clarino* or high register had become common practice, and it is likely that courts assigned pitches across the register spectrum to a corps of trumpeters. “The far-reaching, droning music of the court trumpeters’ corps can be seen as an acoustical symbol of sovereignty.”<sup>16</sup>

Also during this time, the slide trumpet was developed (see Figure 3), which involved an



**Figure 3** Renaissance slide trumpet



**Figure 4** Cornetto

extended mouthpiece that fit into the lead pipe of the instrument. The instrument itself was slid back and forth, allowing for variations in pitch.

This was, indeed, the predecessor of the trombone, early iterations of which were first depicted in the artwork of Florence around 1450.<sup>17</sup> Slide trumpets in the Renaissance would traditionally double the slow-moving

cantus firmus if they played in *alta* ensembles with similar instrumentation to Example 3.<sup>18</sup> One of the most characteristic brass instruments of the

<sup>13</sup> Ibid., 53.

<sup>14</sup> Ibid.

<sup>15</sup> Ibid., 84.

<sup>16</sup> Ibid.

<sup>17</sup> Ibid., 56.

<sup>18</sup> Koehler, 37.

Renaissance was the cornetto (see Figure 4). Despite the advances in metalworking at the beginning of the period, the cornetto was constructed of two pieces of wood – usually either boxwood or a type of fruitwood – which were glued together and coated with leather. The most common cornetto was slightly curved, and tuned in G, though other sizes and pitches were readily available to professional musicians during the 16<sup>th</sup> century. The instrument features tone holes which, when covered in different combinations, produce several distinct notes. Thus, Elisa Koehler highlights a fundamental issue about the cornetto: it is essentially a woodwind instrument with a rather small, cup-shaped mouthpiece by which the player vibrates his or her lips and disrupts the column of air inside the resonant body of the instrument.<sup>19</sup> It is this characteristic that classifies the cornetto as a brass instrument, and it is its traditional function, tessitura, timbre, and literature which classify it among the earliest of trumpets to be used strictly by professional musicians. The cornetto was the most prominent soprano instrument in ensemble music of the Renaissance, but its use began to decline at the turn of the 18<sup>th</sup> century as the orchestra developed and the violin took its place.

There is a substantial body of surviving literature for the cornetto. With the development of this instrument, the trumpet experienced a role reversal. Where before the trumpet was limited to slow and simplistic cantus firmus lines by its equally simplistic construction and its inability to play notes outside the natural harmonic series, the cornetto, by virtue of its more complex woodwind-esque construction, was able to play all the notes in the diatonic system, as well as chromatic pitches. Thus, the invention of the cornetto was a crucial turning point in brass instrument history, marking the beginning of the trumpet's function as a melodic instrument. Capitalizing on this, some of the earliest composers of Baroque literature wrote music in which



**Example 4** *Concerti Ecclesiastici #47 – Sonata* (Cima), mm. 42-45

the cornetto played the leading melodic role. Giovanni Paolo Cima, an Italian composer, published in 1610 his *Concerti Ecclesiastici* – a large-scale compilation of sacred works featuring both vocal and instrumental soloists. Cima's *Concerti* contain what are perhaps the first published instances of basso continuo, and at least two of his concerti feature the cornetto. Example 4 shows bars 42-45 of Concerto #47, entitled "Sonata." The piece was written *à 2*, for cornetto and sackbut, with basso continuo.

<sup>19</sup> Ibid., 25-26.

Example 5, Concerto #49 from the same collection, reveals that the cornetto also had a place among string ensembles. This sonata was written  $\grave{a}3$  for violin, cornetto, and violone (similar to a modern cello or double bass) with basso continuo. The final eight bars of the piece are included in the example to highlight Cima's use of both polyphony and tonal harmony in a fashion similar to what would be expected of typical Late Renaissance/Early Baroque literature.

**Example 6** *Concerti Ecclesiastici #49 – Sonata* (Cima), mm. 56-63

With the 17<sup>th</sup> century and the stylistic changes of the Baroque era proper also came perhaps the most important event in the modern history of the trumpet: in all its forms, the trumpet was accepted into art music.<sup>20</sup> In fact, as it was most important for all instruments to imitate the human voice as closely as possible, brass instruments quickly came to be preferred for this task over the string instruments. The wooden cornetto began to fall out of fashion shortly after the turn of the 17<sup>th</sup> century as the robust and resonant tone of the brass natural trumpets had escaped their typecast role of courtly fanfares.

**Example 5b** *Orch. Suite #4 in D – V. Réjouissance* (Bach, BWV 1069), mm. 0-2

The construction of the natural trumpet had not, however, achieved the same degree of innovation as the cornetto; it was still only able to produce notes in the natural harmonic series which was its namesake. Yet, despite practiced players' more ready access to the upper harmonics of the instrument which can produce a crude diatonic scale (harmonics 7+), music of the Baroque era written for natural trumpet (as seen in Examples 6a and 6b) clearly contains notes in the diatonic system that are not present in the natural harmonic series. The performance

**Example 6a** *Cantata – IV. Arie* (Bach, BWV 137), mm. 18-23

<sup>20</sup> Tarr, 85.



of these notes was accomplished through the technique of “lipping,” as Tarr writes. “Here and there, trumpeters must push a given note upwards or downwards by the strength of their lips [...] By means of this technique, the player can perform many passing notes written outside the harmonic series.”<sup>21</sup> This technique is still used today to correct minute intonation discrepancies inherent with the unjust tuning of the harmonic series and the imperfect construction of brass instruments.<sup>22</sup> Due to the fact that lipping such wide intervals as a semitone was incredibly demanding, requiring a near-perfect ear and equally adept muscle control, trumpeters competent enough to perform this literature were often few and far between. Don L. Smithers, in his book *The Music and History of the Baroque Trumpet before 1721*, notes that the timbres of the cornetto and the natural trumpet were “not dissimilar,” so composers such as Heinrich Schütz would frequently indicate that a cornetto may be used in lieu of a natural trumpet, as the cornetto could achieve these notes more accurately and easily.<sup>23</sup>

The Baroque era was also responsible for advancements in the construction of natural trumpets which allowed them to be played in specific keys. Examples 6a and 6b designate the passage should be played with trumpets keyed in C and D respectively. Incidentally, the music which Johann Sebastian Bach wrote for trumpet was always for either C or D trumpet.<sup>24</sup> Trumpets in different keys were initially constructed separately, and subsequent innovations led to the use of crooks – extra lengths of tubing – that could be attached to the lead pipe of the instrument to make the trumpet sufficiently longer to achieve a lower key (see Figure 5).

As the Classical period loomed, the role of the trumpet in Western art music changed drastically as composers did not find it to be versatile enough for their new stylistic tastes. Tarr writes:

The new style made a tutti instrument of the once heroic trumpet, which formerly had led the melody. Sometimes a short fanfare which closed an allegro movement or a symphony called attention to the trumpeters’ surviving court function. But heroic expression was not



**Figure 5** Baroque natural trumpet with crook

<sup>21</sup> *Ibid.*, 87-89.

<sup>22</sup> *Ibid.*

<sup>23</sup> Don L. Smithers, *The Music and History of the Baroque Trumpet before 1721* (Syracuse University Press, 1973), 142.

<sup>24</sup> Tarr, 110.

enough. The adaptable strings could better render the new range of expression, because in a musical work not one but several forms of emotion were now required.<sup>25</sup>

Koehler notes that the societal changes of the time also contributed to the perceived “demotion” of the trumpet in Classical literature. Monarchies, for example, which required court musicians, were being replaced by democracies.<sup>26</sup> The early music of Ludwig van Beethoven is representative of the Classical period and provides ample cases in point. Example 7 shows the famed offstage trumpet call in his *Leonore Overture #3*, composed in 1805. Written for a natural trumpet, it requires only notes in the natural harmonic series, and aside from this instance, few



**Example 7** *Leonore Overture #3* (Beethoven, Op. 72b), mm. D.21-26

excerpts from this period offer soloistic opportunities for the orchestra’s trumpet players.

The demotion of the orchestral trumpet did not stop instrument makers from experimenting with innovations to fulfill what Koehler calls “the quest for chromaticism.” The hand-stopped trumpet was developed in the early 1770s by Michael Wöggel, and was similar in concept to the hand-stopping techniques of the French horn.<sup>27</sup> A hand inserted into the half-moon shaped trumpet (see Figure 6) would lower its pitch by one semitone. While the hand-stopped trumpet did not catch on, the technique was notably used in the first movement of Franz Schubert’s *Symphony #4*, in which he wrote F-sharps for trumpets (requiring them to hand-stop while playing a G).<sup>28</sup>



**Figure 6** *Demi-lune* (half-moon) trumpet

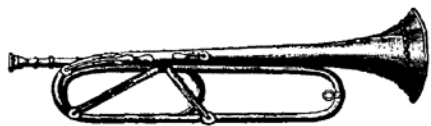
<sup>25</sup> Ibid., 144.

<sup>26</sup> Koehler, 122.

<sup>27</sup> Ibid., 44.

<sup>28</sup> Ibid., 45.

The keyed trumpet (see Figure 7) was introduced by Anton Weidinger – a Viennese trumpeter – in 1801.<sup>29</sup> Its popularity was short-lived but its impact on trumpet literature cannot be understated. Two trumpet concertos – by Franz Joseph Haydn and Johann Nepomuk Hummel – were each written at approximately the turn of the 19<sup>th</sup> century specifically for the keyed trumpet. This trumpet allowed for easily-accessible chromaticism that had not been available since the cornetto, which shared the trait of holes drilled into the main bore of the instrument.



**Figure 7** Keyed Trumpet

The Haydn concerto (see Example 8) was designed to accentuate the capabilities of the keyed trumpet – specifically, chromatic notes and lower-register diatonic



**Example 8** *Concerto for Trumpet – I. Allegro* (Haydn, Hob. VIIe:1), mm. 37-44

notes which are not incorporated by the natural harmonic series.<sup>30</sup> Conservative Viennese audiences were wary of the keyed trumpet’s radical diversions from the “new” accepted norm of harmonic series playing and supporting fanfares.<sup>31</sup> Seventeen years after the keyed trumpet, the quest for chromaticism would start afresh.

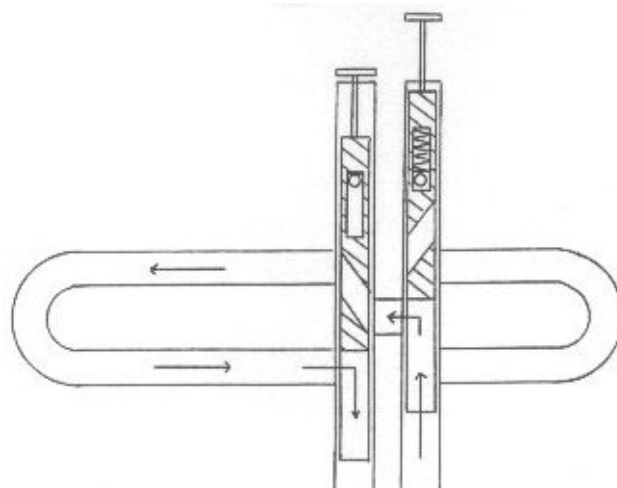
---

<sup>29</sup> Philip Bate, *The Trumpet and Trombone: An Outline of Their History, Development, and Construction* (Ernest Benn, 1978), 127.

<sup>30</sup> Koehler, 124.

<sup>31</sup> *Ibid.*, 127.

In 1818, Heinrich Stölzel and Friedrich Blühmel filed a joint patent in Berlin for the piston valve (see Figure 8), and this would revolutionize Western music.<sup>32</sup> When playing an instrument with no valves depressed, the total length of tubing is at its shortest. Adding additional tubing will make the instrument slightly longer, and thus, sound in a lower key. For example, a trumpet keyed in C could be lowered to the key of B if a specific length of extra tubing was added. A properly-designed, air-tight valve offers the player the ability to access that extra tubing or not at the discretion of the player or composer. When depressed while playing, a valve can divert the air stream through these alternate pathways as allowed by the construction of the instrument. Valves allowed for true chromaticism across the full range of the instrument, as each descending semitone essentially “unlocked” a new harmonic series built on that new



**Figure 8** Stölzel valve system

---

<sup>32</sup> Bate, 155.

fundamental note.

The image shows a musical score for Example 9, Romeo and Juliet Overture (Tchaikovsky), mm. 446-484. The score is written for trumpet and consists of six staves. The first staff begins at measure 450 with a forte (ff) dynamic. The second staff continues the melody. The third staff starts at measure 460. The fourth staff has a 'sempre ff' marking. The fifth staff starts at measure 470. The sixth staff starts at measure 480 with a fortissimo (fff) dynamic and a '4' marking above a note.

**Example 9** *Romeo and Juliet Overture* (Tchaikovsky), mm. 446-484

The unlocking of the seven harmonic series and the full chromatic scale resulted in a potential for musical expression unparalleled in the prior history of music. The advent of valve systems did not replace the previous millennia of trumpet literature – more precise construction techniques actually bolstered performances of it and even allowed performers to better interpret the music that came to them (e.g. the fulfillment of true octave doubling in the music of Beethoven where the composer was forced to write awkward leaps to compensate for the technical inabilities of the trumpet). While an analysis of specific ways in which composers of the Romantic period utilized these innovations lies beyond the scope of research exploring the evolution of the trumpet and its literature through the Classical period, Example 9 provides a survey of the newly-possible technical abilities facilitated by the advent of the piston valve. It is clear that the music written for the two trumpet parts reveals that the composer was familiar with this innovation. The chromaticism displayed in this excerpt – characteristic of the Romantic period – requires use of all seven harmonic series, meaning it cannot be played on a trumpet without piston valves. Further innovations to the construction of the trumpet continued through

the 19<sup>th</sup> century until the construction of the modern B-flat trumpet was standardized in the mid-20<sup>th</sup> century.

The advancements in the construction of the trumpet have had a profound impact on the parallel advancements of Western trumpet literature from antiquity through the Classical period. Ambitious composers drove innovative efforts to improve trumpet construction, and keen artists were eager to explore new possibilities. Without these innovations, the trumpet may have been relegated to the ceremonial or signaling purposes of antiquity, and may never have been officially accepted as a viable contribution to Western art music. The trumpet has fast become one of the most expressive musical instruments in history. Dedicated artists continue to push the capabilities of the instrument to new heights, leaving in their wake a rich collection of literature that in itself captures the details of the trumpet's dynamic essence throughout human history.

**BIBLIOGRAPHY**

- Bate, Philip. *The Trumpet and Trombone: An Outline of Their History, Development, and Construction*. London: Ernest Benn Limited, 1978.
- Cima, Giovanni Paolo. *Concerti Ecclesiastici*. Ed. Andrea Friggi. 1610.
- Encyclopædia Britannica. *Brass Instrument*. 2015. Web. 21 October 2015.  
<http://www.britannica.com/art/brass-instrument>.
- *Horn*. 2015. 21 October 2015. <http://www.britannica.com/art/horn-musical-instrument-group>.
- *Lur*. 2015. 21 October 2015. <http://www.britannica.com/art/lur-musical-instrument>.
- *Shofar*. 2015. 21 October 2015. <http://www.britannica.com/topic/shofar>.
- "Trumpet." *Encyclopædia Britannica*. Vol. 27. 1911. Image.
- Greenough, James B. *Cæsar's Gallic War*. Boston: Ginn & Company, 1899. Image.
- Koehler, Elisa. *Fanfares and Finesse: A Performer's Guide to Trumpet History and Literature*. Bloomington: Indiana University Press, 2014.
- Meinl, Bernhard. *Baroque and Renaissance Trumpets*. 1 January 2009. Image. 25 October 2015.  
<http://www.ewaldmeinl.de/btrpeng.htm>.
- Musical Instrument Museums Online. *Demilune Trumpet*. n.d. Image. 11 November 2015.  
<http://exhibitions.europeana.eu/exhibits/show/musical-instruments-en/experimental-instruments-mimo/item/200>.
- Rasmussen, Hans Kokholm. *Luren.org*. 12 October 2007. Image. 21 October 2015.  
<http://www.luren.org/index.html>.
- Smithers, Don L. *The Music and History of the Baroque Trumpet before 1721*. Syracuse University Press, 1973.
- San Diego State University. *Cornetto*. n.d. Image. 21 October 2015.  
[http://trumpet.sdsu.edu/M151/Knowledge\\_Webs/3Early\\_MusicY/cornetto.htm](http://trumpet.sdsu.edu/M151/Knowledge_Webs/3Early_MusicY/cornetto.htm).
- Tarr, Edward H. *The Trumpet*. Ed. Reinhard G. Pauly. Trans. S. E. Plank and Edward H. Tarr. Portland: Amadeus Press, 1988.
- Tchaikovsky, Peter Ilyitch. "Romeo and Juliet Overture." *Romeo and Juliet Overture and Capriccio Italien*. New York: Dover Publications, Inc., 2013. 89-100. Print.

**LIST OF EXAMPLES**

Example	Source	Page
1. The natural harmonic series .....	Tarr, 12-13 .....	2
2. <i>Hejnal Mariacki</i> .....	Koehler, 130.....	3
3. 14 <sup>th</sup> century music from an <i>alta</i> ensemble .....	Tarr, 49.....	4
4. <i>Concerti Ecclesiastici #47 – Sonata</i> (Cima), mm. 42-45 .....	Cima, 171 .....	6
5. <i>Concerti Ecclesiastici #49 – Sonata</i> (Cima), mm. 56-63 .....	Cima, 180.....	7
6a. <i>Cantata – IV. Arie</i> (Bach, BWV 137), mm. 18-23 .....	Tarr, 89.....	7
6b. <i>Orch. Suite #4 in D – V. Réjouissance</i> (Bach, BWV 1069), mm. 0-2 .....	Tarr, 89.....	7
7. <i>Leonore Overture #3</i> (Beethoven, Op. 72b), mm. D.21-26.....	Koehler, 123.....	9
8. <i>Concerto for Trumpet – I. Allegro</i> (Haydn, Hob. VIIe:1), mm. 37-44 .....	Koehler, 124.....	10
9. <i>Romeo and Juliet Overture</i> (Tchaikovsky), mm. 446-484 .....	Tchaikovsky, 89.....	12

**LIST OF FIGURES**

Figure	Source	Page
1. Lur.....	Rasmussen.....	3
2 Roman tuba.....	Greenough,63.....	3
3. Renaissance slide trumpet.....	Encyclopædia Britannica, Vol. 27.....	5
4. Cornetto.....	South Dakota State University.....	5
5. Baroque natural trumpet with crook.....	Meinl.....	8
6. Demi-lune (half-moon) trumpet.....	Musical Instrument Museums Online.....	9
7. Keyed trumpet.....	Encyclopædia Britannica, Vol. 27.....	10
8. Stölzel valve system.....	Bate, 156.....	11