

ABSTRACT

Title of Document:

THE EVOLUTION OF INSTRUMENT
DESIGN AND ITS INFLUENCE ON
TRUMPET REPERTOIRE

Aaron David Holmes, Doctor Musical Arts, May
2013

Directed By:

Paul Christopher Gekker, Associate Professor of
Trumpet, School of Music

The trumpet has undergone more design changes than any other instrument in history, and trumpet repertoire has changed along with the instrument's evolutionary design features. Tonal, chromatic, and dynamic range was expanded as technological advances were applied to the trumpet. As the design attributes of the trumpet changed through innovations and experimentation, new possibilities were opened up for composers and performers alike. Although some forms of the trumpet date back to antiquity (c. 1323 BC), this survey will start with the Renaissance, where a rise in humanism, city centers, art, and music and advances in metallurgy converge.

I have chosen to perform works originally written for natural trumpet, cornetto, keyed trumpet, cornet, flugelhorn, modern Bb trumpet, and modern C trumpet to illustrate the ways in which repertoire was influenced by different iterations of the trumpet along its evolutionary design path.

THE EVOLUTION OF INSTRUMENT DESIGN AND ITS INFLUENCE ON
TRUMPET REPERTOIRE

by

Aaron David Holmes

Dissertation submitted to the Faculty of the Graduate School of the
University of Maryland, College Park, in partial fulfillment
of the requirements for the degree of
Doctor of Musical Arts
2013

Advisory Committee:
Professor Paul Christopher Gekker, Chair
Dr. Peter Beicken
Gregory Miller
Chris Vadala
Delores Ziegler

© Copyright by
Aaron David Holmes
2013

Table of Contents

Introduction	1
Chapter	
Natural Trumpet	3
Cornetto	6
Keyed Trumpet	8
Cornet	10
Flugelhorn	12
Rotary Bb Trumpet	13
Modern Bb Trumpet	15
Modern C Trumpet	17
Bibliography	18

CD1:

Track 1: Kent Kennan - *Sonata for Trumpet and Piano* - With Strength and Vigor

Track 2: Kent Kennan - *Sonata for Trumpet and Piano* - Rather Slowly with Freedom

Track 3: Kent Kennan - *Sonata for Trumpet and Piano* - Fast, With Energy

Track 4: George Friederic Handel - *Suite in D Major*

Track 5: Joseph Fiala - *Divertimento*

Track 6: Stanley Friedman - *Solus* - Introduction

Track 7: Stanley Friedman - *Solus* - Furtively

Track 8: Stanley Friedman - *Solus* - Scherzando and Waltz

Track 9: Stanley Friedman - *Solus* - Fanfare

CD 2:

Track 1: Alessandro Melani – *“All’armi pensieri”* - Cantata

Track 2: Guillaume Balay - *Petite Piece Concertante*

Track 3: Paul Hindemith - *Concerto for Trumpet and Bassoon* - Mvt.1 Allegro Spiritoso

Track 4: Paul Hindemith - *Concerto for Trumpet and Bassoon* - Mvt.2 Molto Adagio

Track 5: Paul Hindemith - *Concerto for Trumpet and Bassoon* - Mvt.3 Vivace

Track 6: Ted Hansen - *Cavatina*

CD 3:

Track 1: Johann Nepomuk Hummel - *Trumpet Concerto in Eb* - Mvt.1

Track 2: Johann Nepomuk Hummel - *Trumpet Concerto in Eb* - Mvt.2

Track 3: Johann Nepomuk Hummel - *Trumpet Concerto in Eb* - Mvt.3

Track 4: Herbert L. Clarke - *Cousins*

Track 5: Orlando Gibbons - *Fantasia*

Track 6: Giovanni Coperario - *Fantasia*

Track 7: Carson Cooman - *Lamentoso*

Track 8: Carson Cooman - *Rise Up My Love*

Introduction

Modern brass wind instruments share a wide and rich history dating back to antiquity. More specifically, the modern trumpet belongs to a family of mouth-blown musical instruments that has followed a somewhat nonlinear path to its current state. That path includes resonating tubes from wood, reeds, shells, animal horns, metal, and variations that can include combinations of two or more of these things. Examples of trumpets have been discovered dating back to 1323 BC in ancient Egypt in the tomb of the pharaoh Tutankhamen, who ruled Egypt from ca. 1332-1323. He was buried with ceremonial trumpets made of copper and silver that were only about 18 inches long and could only really be sounded two pitches above the fundamental. Trumpets of antiquity were often associated with sacred rituals and signals to be sounded in the din of war, as the sound could carry much farther, and more distinctly, than the human voice.

Within the trumpet family are many versions in different keys, all possessing varying and subtle qualities in pitch and timbre, owing to the different design attributes and materials used to make them. Using this information with accounts of performance practices of the time can help inform modern approaches to trumpet music from this period. Timbre and tone can be affected by the addition of mutes or, in some compositions of the 20th century, by the removal of slides, creating an alternate bell.

Choosing pieces that coincide with different trumpet innovations along its evolutionary path allows for the opportunity to explore many different playing styles

as well as a wide array of trumpets that modern players are called upon to play in their everyday experiences.

Natural Trumpet

Natural trumpets from the middle ages up until just before the turn of the 14th century were mostly found in the shape of one long tube made up of a few shorter sections that are fitted together. One significant discovery that occurred ca. 1400 was the practice of filling the tubing with molten lead, which has a lower melting temperature than copper. Upon cooling, the tube could be bent into a “U” without damaging the tube, and then heated again to remove the lead. This allowed the trumpet to be reduced in length by almost two-thirds of its original size. From this point forward, we see the folded “S”-shape design point the way to a standard that still exists today. Materials used to make these trumpets were often from hand-hammered sheets of copper, brass, or silver rolled into tubing and shaped accordingly. By its very nature, hand-hammered metal is thicker or thinner in certain areas. These subtle variations will affect how the trumpet responds when it resonates. The low register is quite robust and powerful, whereas the higher tessitura tends toward softer, more lyrical tonal qualities. However, if the performer applies too much air pressure, notes can shatter and become unclear. Thus, baroque trumpets were played with a much lighter touch than are modern trumpets. The notes that are available on the natural trumpet are dictated by the overtone series, and only in the upper register does the performer have access to an imperfect diatonic scale (the seventh and eleventh partials, for example, are quite out of tune and need to be adjusted). From the late Middle Ages forward, trumpeters would discover how to play on the upper harmonic

series, allowing for compositions such as those of Alessandro Melani, Handel, and Bach.

Alessandro Melani 1639-1703 - "*All'armi pensieri*" - Cantata

Alessandro Melani was born into a large family in the Tuscan city of Pistoia. He was one of eight brothers, four of whom were well-known castrati, and all were musicians. Not much is known about his formal training save that he started at a young age. At the end of the 17th century, the composers from the Bologna school began to take the poly-choral styles (popular in Venice with composers such as Giovanni Gabrielli) and substitute one of the choirs with a soloist. At the Basilica San Petronio, Giuseppe Torelli had a great trumpeter named Giovanni Pellegrino Brandi and wrote "sonatas" with Brandi's skills in mind. This alternation between soloist and ensemble led to the instrumental "concerto" that would become quite popular and inspire many works for trumpet in the clarino register all over Italy and Europe. At the beginning of the 17th century, opera was also becoming very popular, and it is at the intersection of these popular genres where we find many works for trumpet and soprano.

George Frideric Handel 1685-1759 - *Suite in D Major*

Handel's suite in D is related to his *Water Music*, and features the clarino, the valveless high trumpet of the baroque era. Today's performance is on a modern piccolo trumpet, which is standard for performances of baroque music. The art of clarino performance, which first flourished in Italy around 1680, reached its peak in

Germany between 1720 and 1750—by Mozart’s time, the general level of ability had declined greatly. This is related to both the changing music styles in the early Classical Era, and the decay of the trumpet guilds that were such a part of daily life in medieval cities. Handel’s suite is scored for trumpet and strings, and follows a traditional format of dance movements after the opening overture.

Trumpets had served an important function for hundreds of years up to this point. As city centers grew, they were often built up with heavy walls to withstand attack from marauders or invading armies, or the other threat to a city, which was fire. If an uncontrolled fire broke out, it could be devastating. Trumpeters were relied upon to signal an impending attack or any suspicious signs of smoke. By the time of Melani’s rise to prominence within his community, the guilds had become split into the more privileged court trumpeters and the less-well-treated civic musicians. The growing prestige and importance of the trumpeters coincided with the general skill levels of court trumpeters, which led to compositions that included increasingly challenging figures and tessituras. The completion of this arc sees some of its finest and most difficult manifestations in the virtuoso clarino trumpet parts of Bach and Handel.

Some of the most famous court trumpeters started out as civic musicians. As populations grew, so too did the demand for music in churches and for all manner of ceremonies.

Cornetto

Giovanni Coperario (John Cooper) c. 1570-1626 - *Fantasia*

John Cooper was an English composer and musician who worked in the royal court of Charles I.

Orlando Gibbons 1583-1625 - *Fantasia*

Orlando Gibbons was an English composer and musician who is considered one of the great composers from the turn of the 17th century.

The cornett (also cornetto, or zink) is an interesting hybrid instrument with a wooden tube and finger holes like those of a woodwind but with a mouthpiece similar to that of the trumpet. The mouthpiece was usually made from a piece of brass, bone, or ivory, with a rim that is much sharper than that of a trumpet mouthpiece, and is often described as resembling an acorn. Made from a single block of wood that was split down the center, bored out, and then reattached, it was said to have a sound that was more vocal in quality than trumpet-like. Because of its relatively short length, it is not wholly governed by the overtone series. The pitches are made from a combination of lip tension and various fingerings. This allowed for superior pitch accuracy as well as an impressive range. Treatises published around the turn of the 17th century describe the tonguing techniques with a much softer syllable than modern trumpeters typically employ. Many passages were written with dizzying

subdivisions—a modern player usually attempts this with a “tu ku tu ku”-like tonguing pattern. This, however, was considered to produce too crude of a sound on the cornetto. The favored tonguing techniques of the time would be considered almost a “doodle” tongue by today’s standards, with syllables such as “le-re-le-re” or “te-re-te-re.” The cornetto was considered the equal of the violin as a solo virtuoso instrument, and its tone was often compared to the sound of a lamb, symbolizing innocence. Some models were even designed with the bell in a hexagonal shape, to mimic the baptismal font, furthering the religious imagery. (The violin, in contrast, was already incurring elements of “satanic” cleverness, which continued through the days of Paganini and into the 20th century). In general, modern performances of cornetto music should be sensitive to its softer tonal qualities and more vocal articulation.

Keyed Trumpet

Johann Nepomuk Hummel 1778-1837 - *Concerto for Trumpet*

In the 18th century, clarino trumpet playing had reached its zenith and by 1750 was in decline in part because of the rise of humanism. The trumpet guilds were associated with the courts, and their members began to be looked upon as bourgeoisie. This helped spur experiments to bring the trumpet more in line with the melodic capabilities of other instruments. Some of these experiments included adding tone holes. One such trumpet was described as having a large tone hole near the bell, covered by a piece of leather. Slide trumpets had been around in a few different forms but always proved cumbersome to play. Near the end of the 18th century, trumpets with keys over the tone holes, like a clarinet, begin to appear. A trumpeter named Anton Weidinger became a well-known performer on the keyed trumpet. It was for Weidinger and his keyed trumpet for which Hummel's trumpet concerto was composed and first performed in 1804. The addition of the keys brought chromaticism to the lower octave of the trumpet and led to new possibilities for both solo and orchestral trumpet parts. The keyed trumpet was initially well received but, after the invention of the valve, when compared side by side, was said to be less clear and less powerful. The keyed trumpet would eventually be overshadowed by the valve trumpet, which was a superior mechanical device.

Joseph Fiala 1748-1816 - *Divertimento*

Fiala's *Divertimento* is written for the keyed trumpet, an instrument that had a short time of prominence, from approximately 1795 to 1820. Resembling a bugle with clarinet keys, it allowed for chromaticism that was not possible on the clarino; however, the key system also compromised the sound and projection of natural trumpets. When the valve was invented around 1815, the integrity of the brass design was not interrupted by holes, preserving the tonal intensity, and quickly drove the keyed trumpet into obscurity. Nonetheless, some of the most notable trumpet literature was composed for the keyed trumpet; Haydn's *Concerto in Eb* (1796) and Hummel's *Concerto in E* (1803) are two examples. Hummel also composed a trio for violin, keyed trumpet, and piano, which has never been found, although several performances have been documented. Fiala's work is in the style outside military concerts, and was originally scored for solo keyed trumpet with military band.

Cornet

Guillaume Balay 1871-1943 - *Petite Piece Concertante*

Balay was born in Crozon, France, where he served with the 119th Infantry Regiment in the French Army. In 1849, he won the first prize award from the National Academy of Music in Paris for the cornet. Later, Balay would take the post as Head of Music for the 119th infantry Regiment in 1898, and then go on to replace Gabriel Pares in the position of Head of Music for the Republican Guard in 1911. During his tenure with the French Military, Balay's compositions were adopted into their standard repertoire.

The *Petite Piece Concertante* is representative of the French cornet style. The cornet came from adding piston valves to the posthorn, which had a conical bore that expanded throughout most of the length of tubing. A conical bore is known to give the cornet a mellower tone and a more flexible playing response. This flexibility lends itself nicely to the technical runs and flourishes that are commonplace in 19th and early 20th century cornet parts.

Herbert L. Clarke 1876-1945 - *Cousins*

Cousins duet for cornet and trombone typifies the style of wind band writing that was occurring in early 20th century America. Considered to be one of the great cornet soloists of the 20th century, Clarke wrote four method books, many works for wind band, solos, and works for other combinations of instruments. He would eventually cross paths with Frank Holton, who was a fine trombone player and maker

of brass instruments. The Leblanc Educational Publications *How I Became a
Cornetist* states:

“It did not take long for Holton and Clarke to get together, and after a series of experiments in the fall of 1916, a cornet made by Holton, embodying the ideas of Clarke- a cornet that astounded all who have heard it by its wonderful tone qualities. Not a long model nor a short model, but a happy medium combining the best qualities of the two, which quickly became the standard of the industry.”

There was a long gestation period for the valve cornet due to the reticence of trumpet players to take up the new invention. The initial valves were not well implemented, but that was largely ironed out by 1839 with a patent for a valve that did away with the sharp inner angles. This made for a better playing experience in both the lower and higher registers. By the mid 19th century, composers were making greater demands, and this led to trumpeters gravitating to the more agile cornet.

Flugelhorn

Ted Hansen 1935 - *Cavatina*

Cavatina, published in 1975, was written for Flugelhorn and piano. Literally “winghorn,” the name is derived from its German military use to command the flanks into position.

Two elements lend a characteristically dark tone to the flugelhorn: the first is the size of the bell, and the second is the very deeply cupped, almost conical, mouthpiece. The flugelhorn (a staple in English brass bands) became popular during the 20th century among jazz musicians. *Cavatina* is quite lyrical and free in places. The melodies, harmony, and rhythm have an almost jazz-like infusion and are very well suited to the flugelhorn.

Carson Cooman 1982 - *Rise Up My Love*

Carson Cooman is an American composer and organist who has written hundreds of works spanning many different genres. The vocal work *Rise Up My Love*, for flugelhorn and soprano, was composed in 2009 and sets the text from the Bible’s Song of Songs. The design characteristics that account for the beautiful dark tone of the flugelhorn (large bell, conical mouthpiece) make it a perfect fit for ballad-like solos or chamber settings. These characteristics also make playing in the upper register trickier, and Cooman’s choice to set this vocal duet as a ballad in a range that is the sweet spot for the flugelhorn proves to be a remarkable selection.

Rotary Bb Trumpet

Paul Hindemith 1895-1963 - *Concerto for Trumpet and Bassoon*

Hindemith's *Concerto for Trumpet and Bassoon* was commissioned in connection with the Connecticut Academy of the Arts and Sciences and completed in September of 1949. The work was originally two movements; he added the third movement in 1952.

The concerto reflects his theoretical philosophy in which he considered the 12 tones of any given scale more equally than the usual seven diatonic pitches favored in most Western music. Like many of Hindemith's compositions, we find angular themes as evidenced by his preference for melodies that avoided clear allusions to major and minor harmony. The modern Bb trumpet, for which this work was written, was well established for both orchestral and solo repertoires. It made an early appearance in the military bands of the early 19th century. Orchestral trumpeters were not fond of the cornet initially, as it did not possess the clarity that was desired; however, by the mid 1800s, the music was becoming more challenging.

On the heels of the Industrial Revolution, instrument manufacturers were refining the relatively recent valve mechanisms. In this need to find better instruments to meet the music's increasing demands, trumpeters begin to gravitate to the Bb trumpet, and it is here that we see the Bb trumpet gain its foothold that largely persists today.

Germany had been the center of trumpet making for hundreds of years. A rise in nationalism in the early part of the 20th century caused German orchestras to look for locally manufactured instruments, which were trumpets of the rotary valve style.

The rotary valve trumpet shares some attributes with the cornet; however, it has a somewhat smaller bore and its conical taper ends in a larger bell. It also has wider curves in the tubing. All of these characteristics combine to give the rotary valve Bb trumpet a darker tone without losing its ability to sparkle in the loud and high passages. The rotary valve trumpet sound gave the German orchestras a unique sound.

Modern Bb Trumpet

Kent Kennan 1913-2003 - *Sonata for Trumpet and Piano*

Kennan's *Sonata for Trumpet and Piano* was published in 1956 and revised in 1986. The revised version is the one being performed today. Kennan calls for the traditional modern Bb trumpet, and the *Sonata* is conceived as a true partnership between the trumpet and the piano. Traditional formal structure is featured in each movement: the first movement is in strict sonata allegro form, the second movement is in binary, and the third movement is a very organized rondo. Harmonically, there is much influence from both Copland and Hindemith: Hindemith in the quartal harmony of the third movement, Copland in the pastoral/somewhat edgy music in the second movement, evoking the mood of Copland's *Quiet City*. The third movement dance music brings to mind Copland's ballet entitled *Rodeo*. Notable also is his use of mutes to create offstage effects, similar to how Mahler uses offstage brass, in the first movement interludes between the first and second themes, and the coda of the second movement.

Carson Cooman 1982 - *Lamentoso Op. 863*

Cooman's *Lamentoso*, written in 2010, has the musical indications of

Rhapsodic and Vivid, and in Carson's words:

“It is a fierce lament in the tradition of an old Irish ‘caoine’. The music explores the combination of vivid trumpet sound and strong piano attacks within an extended modal/bitonal harmonic context.”

The combination of clear strong articulations, lyrical lines, and large dynamic contrasts are very well suited to the modern Bb trumpet. Today's instruments are constructed to very exacting standards, stemming, in part, from Theo Charlier's work with the Mahillon instrument company at the end of the 19th century.

This version had a longer lead pipe (similar to the cornet) that curved around and connected to the third valve as apposed to a short run directly into the first valve.

According to John Wallace:

“... a much longer, sharply tapered conical portion in this initial length ... was found to enhance certain playing characteristics. Not only did it free the high register, it also improved flexibility and added brilliance to the timbre.”

Tubing and bells with consistent, precise thickness (of varying preferences) that have been made as smooth as possible on the inner parts—as well as exacting valve alignments—make the horn easier to play.

Lamentoso stays within the standard range, in this case, concert C below the treble staff to the top line F. There are many works that call for use of more extreme registers (usually high) on the trumpet in all genres but most frequently in jazz and big-band music. Some famous high note specialists include Cat Anderson and Maynard Ferguson, to name two. Composer Lucia Dlugoszewski's solo work *Space Is a Diamond* contains extreme register shifts in both the upper octave and below our

standard low concert E. The combined design features of modern trumpets, and the desire of some trumpeters to push the outside of the envelope, enable composers to write increasingly daring works. However, players and composers who specialize in extreme registers tend to limit themselves to smaller areas of expression with regard to traditional repertoire.

Modern C Trumpet

Stanley Friedman 1951 - *Solus*

Friedman's *Solus* was composed in 1975. Written for the modern C trumpet, *Solus* makes use of many modern techniques: slide glissandos, pedal tones (low partials below the traditional trumpet's register), flutter tonguing, use of the wa-wa mute, and most dramatically in the last movement, the removal of one of the valve slides. The removal of the slide effectively creates a second bell, a "double trumpet." In the Fanfare, he is able to compose a kind of two-way dialogue performed by a single trumpeter. Although being unapologetically modern in its language, *Solus* follows a very clear dramatic narrative that is easily followed on the first listening.

Bibliography

- Baines, Anthony. *Brass Instruments: Their History and Development*. New York: Dover Publications, 1993.
- Barclay, Robert. *The Art of the Trumpet-Maker: The Materials, Tools, and Techniques of the Seventeenth and Eighteenth Centuries in Nuremberg*. Oxford: Clarendon Press, 1992.
- Dahlqvist, Reine. *The Keyed Trumpet and Its Greatest Virtuoso, Anton Weidiner*. Switzerland: The Brass Press, 1975.
- Collver, Michael and Dickey, Bruce. *A Catalog of Music for the Cornett*. Bloomington, Indiana: Indiana University Press, 1996.
- Dudgeon, Ralph T. *The Keyed Bugle*. Lanham, Maryland: The Scarecrow Press, 2004.
- Smithers, Don L. *The Music and History of Baroque Trumpet Before 1721*. Syracuse, New York: Syracuse University Press, 1973.
- Tarr, Edward. *The Trumpet*. Portland, Oregon: Amadeus Press, 1988.
- Wallace, John and McGrattan, Alexander. *The Trumpet*. New Haven, Connecticut: Yale University Press, 2011.