THE DEVELOPMENT AND UTILIZATION OF THE VALVED BRASSES
IN THE ORCHESTRA OF THE FIRST HALF
OF THE NINETEENTH CENTURY

THESIS

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By

Michael A. Olson, B.M.
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CHAPTER I

THE DEVELOPMENT OF BRASS VALVE MECHANISMS

The need for a valve mechanism of some type was first felt by French horn players, and after the horn's valve system had somewhat proved itself to composers as well as instrumentalists, it was adapted for the other brass instruments.¹

Charles Clagget's Valve Mechanism

Aside from some experimentation with flap keys (c. 1801)² the first recorded idea for making chromatic brass instruments other than by the free slide is credited to an Irishman by the name of Charles Clagget. In 1788 he obtained an English patent for his "Chromatic Trumpet and French Horn." Clagget's idea was to join together two instruments pitched a semitone apart and arrange for one mouthpiece to connect to either of them at will. This arrangement resulted in the performer being able to produce

a complete chromatic scale. The nature of the valve mechanism is not revealed in Clagget's patent specifications. There is no evidence of the general exploitation of his instrument, which seems to prove that his chromatic instrument was nothing more than an unsuccessful experiment with no practical use. The importance of Clagget's invention is its early date.

Invention of the Valve Proper

Ralph Morley-Pegge states:

Which of the two, the Saxon Heinrich Stölzel or the Silesian Friedrich Blühmel, who jointly took out a ten-year patent for valves in Berlin in 1818, was actually the first in the field will now probably never be known, for even their contemporaries were unable to agree about it. Piecing together the story from such sources as have been available to the writer, the probabilities seem to favour the theory that Stölzel was the first to produce a valve of any kind but that Blühmel made the first more or less satisfactory one.

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5 Adam Carse, Musical Wind Instruments (New York, 1965), p. 64.

Stölzel was a horn player, first in the private band of the Prince of Pless, and later in the Royal Opera orchestra of Berlin. He was classified as a "Royal Chamber Musician" and was an instrument repairman for the King of Prussia as well. What is known of Blührmel's general circumstances is very vague and only indicates that he played in a band sponsored by a small mining company. He is first recognized as a signatory to the above patent application, after which little is known until after the expiration of the patent and the separation of the two partners. At this time Blührmel tried unsuccessfully to secure another valve patent and in desperation decided to lay claim to the 1818 patent. The Prussian Patent Office did not accept his assertion, however. It is generally known that in 1815 Stölzel was in Berlin with a valved instrument he had invented. This valved horn was eventually made by the well-known instrument makers Griessling and Schlott. Morley-Pegge concludes by stating that in all probability the actual valve was planned by Stölzel, but Blührmel was responsible for making the first satisfactory one.7

Stölzel's Valve

The 1818 valve, being square in form, was in need of many improvements, but it did have

7 Ibid., pp. 31-32.
one excellent feature which its predecessors did not have -- the windways in the body were unrestricted and the angles within were not sharp or abrupt. These square valves were made for some ten years and finally took the form of cylindrical valves which were not much larger in diameter than the associated tubing. The Stölzel valve had two defects

![Diagram of Stölzel's Valve Patent](https://via.placeholder.com/150)

**Figure 2--Diagram of Stölzel's Valve Patent**

(Spring not Shown)

A--Piston in "up" Position

B--Piston in "down" Position

of design, in that there were sharp bends in the air column and the internal passages were constricted.⁹

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⁸Bate, *op. cit.*, p. 148.

Shaw's Spring Slide Mechanism

Aside from mere improvements of the Stölzel valve, the next real valve invention was made in 1824 by a Londoner by the name of John Shaw. His patent, numbered 5013, was for "transverse spring slides for trumpets, trombones, French horns, bugles, and every other instrument of the like nature."\(^{10}\) The tubing of Shaw's invention was arranged in a long narrow "U" which was shortened at certain points on the tubing by depressing a touchpiece which was a short tubular "staple."\(^{11}\) His valve system consisted of four "spring slides," three ascending and one descending (an inverted ascending valve), for horn or trumpet. Bugle horns and trombones utilized six valve slides, five

\[\text{Figure 3--Shaw's Ascending (left) and Descending (right) Valves}\] \(^{12}\)

\(^{10}\)Ibid., p. 149. \(^{11}\)Galpin, op. cit., p. 231. 
\(^{12}\)Bate, op. cit., p. 151.
ascending and one descending. Each ascending valve raised the pitch by a semitone, while each descending valve, always closest to the bell, lowered the pitch by a semitone. A look at Figure 4 will show that when all of the valves are in "up" position, the air is directed through A, B, and C but returns to the bell by crossing through D to D'. If one of the staples A, B, or C is depressed, the tubing is short-circuited to A', B', or C', thus leaving the appropriate length of tubing. If valve D is depressed the airstream moves in the direction of the dotted arrows, thus lengthening the tubing to its appropriate length.\textsuperscript{14}

The spring slide had a common defect with the Stölzel valve in that it also had the acoustical fault of having sharp bends in the air-column, but it did do away with a constricted internal passageway. The importance of Shaw's spring slides is that they established three principles which were to affect instrument makers for years to come.

\textsuperscript{13}\textit{Ibid.}, p. 151.
\textsuperscript{14}\textit{Morley-Pegge}, \textit{op. cit.}, p. 37.
These principles were the use of (1) twin pistons, (2) independent valves, and (3) ascending valves. These valves are still in use in Vienna; however, their general use declined in the middle of the nineteenth century.\textsuperscript{15}

A gradual change in the pattern of progress should be noted in that the instrument maker of the third decade of the nineteenth century no longer looked to the horn player for ideas as to the needs of brass instrument, but made improvements in the interest of all the different brass families. This adjustment of need brought about many new inventions related to the field of brass mechanics. A few of these were of lasting worth, but many of them were only improvements or modifications of earlier endeavors.\textsuperscript{16}

The Vienna Valve

Another new valve invention of some real value appeared in the late 1820's. The new valves were said to have been improved versions of Shaw's spring slides, but Morley-Pegge states that there had been only one common feature between the two mechanisms: they were of a twin-piston design. The Vienna valves were set one behind the other on a single windway while the spring slides were arranged in right angles to the double windway. In addition Shaw used a combination of both ascending and

\textsuperscript{15}Carse, \textit{op. cit.}, p. 71.

\textsuperscript{16}Bate, \textit{op. cit.}, p. 150.
descending types of valves while the Vienna valves were but two or three descending valves. As to the exact origin of the Vienna valve there is little known. That they were in existence before 1830 is proven by the fact that there are a few earlier instruments of this type exhibited in

Figure 5--The Vienna valves
A--First type with portion of piston exposed (the first valve is depressed)
B--Uhlmann's improved Vienna valve

17Ibid., p. 155.
various collections. One defect in the earlier models of these valves was that the pistons protruded through their casings when the finger-levers were depressed, resulting in collected dust and grit. In 1830 Leopold Uhlmann overcame this deficiency by fully enclosing the piston and using an external connecting rod.18

The Rotary Valve

The next major event in brass history was the grant in 1832 of a patent to Joseph Riedl of Vienna for his "Rad-Maschine," which was a simple but efficient rotary valve. The rotary valve never gained much popularity in England, France, or Belgium, but it promptly became the standard valve in Germany and Austria.19

The rotary, being the simplest of all valve mechanisms, consisted of an inner cylinder drilled by two passageways which were precision fitted into an outer valve casing. This casing was in turn attached to the main and subordinate tubing. When the fingerplate or key was depressed, the cylinder rotated a quarter-turn, which in turn diverted

19Carse, op. cit., p. 72.
the air-stream into the appropriate tube. 

The rotary valve in its original form is used today on French horns, trumpets, and tubas in Europe. In American orchestras the rotary valve can be found on French horns and, to a limited degree, on trumpets and tubas.

The Berliner-Pumpe

In 1835 the first great stride in the improvement of piston valves was made in Berlin by Wieprecht, who occupied a high position in Prussian military music. He, along with the maker J. G. Moritz, made a new valve which came to be known as the "Berliner-Pumpe." By making the piston relatively large in diameter, Wieprecht was able to avoid hard right-angles internally by making curved passageways.

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20Bate, op. cit., p. 154.
Also, by bringing all of the external tubing to the valve casing on the same horizontal plane, the vertical movement of the piston was decreased and the use of the bottom of the casing as a windway was avoided. When Adolph Sax began his business in Paris in 1843 he began using the Berliner-Pumpe without recognition to the inventor and probably enjoyed much of his early success because of these excellent valves. In 1845 Wieprecht challenged Sax concerning this matter but decided finally that taking it to a court of law would not yield any profit.²³

²²Bate, op. cit., p. 156.
²³Ibid., pp. 154-156.
The Patent Lever Valves

John Shaw, inventor of the spring slides, was responsible for the next important innovation concerning the development of the valve. In 1838 he secured a patent for what he called "swivel valves" for brass instruments, which was exploited by the maker, J. A. Köhler. Shaw's invention, which had nothing in common with his spring slides, consisted of two plates of metal, one of which rotated against the other by way of a pivot point. One plate, permanently built into the instrument, was perforated by two holes which acted as entrances to the mouthpipe and the main windway. Two "U-tubes" of different lengths were attached to the other plate and each acted as a bridge between two holes. When the movable plate was in "home" position, its shorter knuckle-tube completed the main windway, but when the plate was rotated, the air-column was lengthened by the longer knuckle-tube. The opposed plates

Figure 8--Shaw's swivel valve

24Ibid., p. 158.
were in the shape of two capital "I's" and, because the contact surfaces were exposed, they were subject to grit and dirt. This drawback was remedied in Shaw's specifications when he suggested that the mechanism could be constructed with circular plates. Köhler produced the valves in this manner and titled them "Patent Lever Valves." The original version of the disc valve was produced by Köhler for approximately two years, after which he produced a much improved valve with a fixed plate that was pierced by four holes and attached to both main and subordinate tubing. The movable plate still had two "U-tubes" attached to it, but they were considerably smaller. Köhler called this invention the "New Patent Lever Valve."²⁶ This valve was more efficient in that the air-stream was directed

²⁵Ibid., p. 158. ²⁶Ibid., p. 157.

Figure 9--Köhler's new patent lever valve²⁵
either straight to the bell or to the bell via the valve-loop. A much lighter action was the result of this improvement, but because of friction, the valve could not be kept air-tight. This trouble finally overcame Köhler and the invention was discarded.\textsuperscript{27} If Köhler had had the availability of hard plating and lapping techniques, the course of valve history might have been completely different.\textsuperscript{28}

The Périnet Valve

The piston valve as we know it today is basically that which was introduced by François Périnet in 1839. The diameter of the valve was somewhere between the Stölzel and Berliner-Pumpen types. There was less constriction within the valves due to built-up air-passages which resulted in a freer-blowing instrument and a more pleasing tone.\textsuperscript{29} The valve's friction, inertia, and diameter were lessened by placing the curved passages inside the piston on the diagonal. After much experimentation with the Périnet valve, a physician and acoustician by the name of Dr. J. P. Oates developed what he called an "Equitrilateral valve" in which he brought the internal passages to the surface at points of an equilateral

\textsuperscript{27}Morley-Pegge, \textit{op. cit.}, pp. 45-46.

\textsuperscript{28}Bate, \textit{op. cit.}, p. 159.

\textsuperscript{29}Morley-Pegge, \textit{op. cit.}, p. 49.
triangle. There was a problem, however, of the valve ports and the main tubing, which, being of different diameters, caused some constriction.\textsuperscript{30} It was apparent by 1850 that the Périnet type of valve was to hold its own. Most of its improvement is accredited to Gustav Besson, who in 1855 devised a system of valves which did not have the problem of inconsistencies of bore.\textsuperscript{31}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{fig10.png}
\caption{The Périnet-besson valve\textsuperscript{32}}
\end{figure}

There were a number of minor patents granted between 1850 and the present day, but most of them were nothing more than innovations peculiar to individual instrument makers and were not concerned with fundamental changes. One novel device which proved unsuccessful was the finger-slide. The device, invented by Samson in 1862, consisted

\textsuperscript{30}Bate, \textit{op. cit.}, p. 160. \hspace{1cm} \textsuperscript{31}\textit{Ibid.}, p. 161.

\textsuperscript{32}\textit{Ibid.}, p. 160.
of a lever which, by entrance to the piston via a slot in the side of the valve casing, relayed a positive up-and-down movement to the actual valve. 33

In the last hundred years many makers and instrumentalists have done much to improve or rid the valve systems of inherent weaknesses. Compensating valves have been produced which attempted to correct valve-tube length by adding extra tubing automatically when two or three valves were used simultaneously. In addition, efforts have been made to correct intonation problems by utilizing separate valves and valve-tubes for every semitone stage below the open notes of the harmonic series. Many schemes had been devised to add these extra ascending and descending valves to instruments and were applied mainly to tubas, bombardons (bass tubas in F), saxhorns, and cornets. 34

There has been experimentation with conical valves, combinations of valves and slides, and other contraptions which may be seen in many excellent collections of musical instruments. 35

Adam Carse sums this chapter up nicely when he states:

That it took nearly half a century for the valve to become firmly established as an essential part of the mechanism of brass instruments was probably due to the mechanical inefficiency of the early valves. The makers of brass instruments, accustomed, as they were, to fashioning only the plain brass tube without any mechanism, had to learn a new craft when they

33 Carse, op. cit., p. 74. 34 Ibid., pp. 74-76.
35 Ibid., p. 76.
embarked on the construction of valves. New processes, new tools and new machinery had to be devised in order to make a mechanism which required not only careful and accurate workmanship, but also involved problems in cutting, bending and joining of metals such as did not arise in the pre-valve period. The making of air-channels running diagonally in curves through the piston was not a matter which could be accomplished by casual or improvised methods; it is even now intricate, specialized and highly skilled work which requires special tools and machinery. Small wonder, then, that the early makers of valves failed to produce mechanism that was dependable in its action, free from leakage, and based on principles that were both acoustically and mechanically sound; a valve must not only work well, but it must wear well; not until all these requirements were fulfilled did players finally abandon the "natural" instruments, of which they knew the shortcomings and pitfalls only too well. . . .

36 Ibid., p. 77.
CHAPTER II

THE UTILIZATION OF THE VALVED BRASSES IN THE ORCHESTRA
OF THE FIRST HALF OF THE NINETEENTH CENTURY

No matter what the tonal quality of the natural instruments was, it was obvious that a chromatic instrument of some merit was inevitable. The brass instrument, which could only produce approximately ten or twelve notes in a given key, was becoming progressively more inadequate as music in the nineteenth century became more and more chromatic and less and less stable in its tonality. As the first chapter of this work states, the solution to this problem came about at the beginning of the nineteenth century when a lengthening device was conceived.¹ The adoption of the valved brasses was by no means a chronologically simple process. Each composer reacted to the change from the natural instruments to the valved instruments in an individual way depending on his training and environment. The following study is designed to be an examination of the manner in which the most prominent composers wrote for the brasses during their development in the first half of the nineteenth century.

The First Quarter Century

With the exception of the slide trombones, hand-horns and natural trumpets made up the brass instruments in the orchestra at the beginning of the nineteenth century. The hand-horns had a selection of crooks which made it possible for the instrument to play in any key between B-flat alto (nine feet) and B-flat basso (eighteen feet). The trumpets were either crooked or constructed in the keys of eight-foot C through six-foot F, and played the harmonics in each particular key. On rare occasions these trumpets combined crooks in order to play a nine foot B-flat and sometimes even an A or A-flat.² Throughout the first half of the nineteenth century the brass section remained in a rather fluid state, most frequently containing two to four horns, two trumpets, and three trombones.

The Natural Horn

In the first part of the nineteenth century the French horn was given the name "hand-horn" as a result of a technique by which the natural instrument could produce the missing notes between those in its harmonic series. By partially placing the right hand in the bell, all the pitches between the third and the sixteenth open notes could be produced without much loss in tonal quality.

Morley-Pegge states that Anton Joseph Hampel, who was the second horn player in the King of Poland's orchestra at Dresden, "extended and codified a technique about which at least something must have been known much earlier, even if little or no practical use had been made of it, at any rate so far as the horn was concerned." 3 Another use for this technique was the correction of faulty intonation on certain pitches which previously were naturally out of tune. If the horn player remained in the upper part of his range, his instrument became more of a chromatic instrument, which contributed considerably to the delayed acceptance of the valved horn. 4

In comparison with the open tones, the stopped notes were of different tonal qualities and showed a tendency to be of a different sonority among themselves. These differences were caused by the differences in the bell-opening left by the musician's hand. The tone became increasingly dull as the opening in the bell was decreased. This problem resulted in the very difficult task of producing an even scale and a clean, secure production of tone. 5

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3 Morley-Pegge, op. cit., p. 89.
4 Carse, The Orchestra from Beethoven to Berlioz, p. 409.
By adding the stopped notes to the open notes, the following chromatic scale, with the exception of the missing D-flat, is possible.\(^6\)

\[
\begin{array}{c}
\text{open notes} \\
\text{flattened by a semitone} \\
\text{flattened by more than a semitone}
\end{array}
\]

Figure 11--The natural horn's chromatic scale\(^7\)

The above chromatic scale is of course not to be misinterpreted as the range of the natural horns since the range of each of the horns depended on its own key.\(^8\)

The prominent composers before Beethoven's time did not use the stopped notes in their orchestral compositions, except for F natural (see Figure 11, number 11 flattened), which was considered an open sound regardless of the partially closed bell.\(^9\)

\(^7\)Sachs, op. cit., p. 205.
\(^8\)Berlioz, op. cit., pp. 247-248.
\(^9\)Gevaert, op. cit., p. 205.
Beethoven's greatest advancement of horn music lay in the expanded use of the horn in solo and tutti passages. This extended use of the horn was probably made possible through the use of the stopped tones. Where his predecessors had used the horn to fill in the harmony in full orchestral passages, Beethoven gave the horns the theme with the strings quite often. Examples of this utilization can be seen in his Symphony No. 7 in A major, Opus 92, Symphony No. 8 in F major, Opus 93, and Symphony No. 9 in D minor, Opus 125. In the closing section of the Seventh Symphony the horns and woodwinds play a counter-melody while the strings bring the main thematic material to a close (see Figure 12).

Figure 12--Excerpt from the fourth movement of the Seventh Symphony.

Another excellent example of the horns in a melodic passage with the strings in full orchestra occurs in the first movement of the Seventh Symphony (see Figure 13).

Figure 13--Excerpt from the first movement of the Seventh Symphony.
The first full orchestral statement of the theme in the first movement of the Ninth Symphony provides another fine example of this practice. With the exception of the B-flat horns, trumpets, and tympani, the entire orchestra is given the theme which is in the minor mode. This theme illustrates the occurrence of several notes not in the harmonic series of the horn (see Figure 14). The trumpets and B-flat horns participate harmonically but do not participate melodically due to the limitations put upon the horn by its natural scale.

Another example of tutti passages can be seen in the final movement of the Ninth Symphony. This passage is mainly woodwind, horn, and trumpet in combination with the strings playing thick, heavy chords (see Figure 15).
Figure 15--Excerpt from the fourth movement of the Ninth Symphony.

In later passages the horns double first with woodwinds and then with the 'celli and first bassoon. The previous examples, as well as other similar examples, illustrate the increasing melodic use of the horn in tutti passages.

More impressive are the solos for horn. From Beethoven's scores one observes that the horn solos were not usually doubled. In most of the scores studied the horn solos were accompanied by a light string or woodwind background. In the early symphonies it is a rare occurrence to not find some horn solos. As the years passed the solos grew in length and frequency, probably due to Beethoven's increasing realization of the full potentiality of the natural horn. In the horn section the solos were not always written for the first horn or for the first of each pair of horns. This treatment can be illustrated in the Seventh Symphony where the second horn is granted a four-measure solo of a scalewise nature (see Figure 16).
Later in the same work there is another interesting example of a solo for second horn (see Figure 17). This "pedal" passage involves the continual use of a stopped tone, the low F sharp. The same figure is seen earlier in the symphony, but in this particular case the part is completely exposed except for a soft string accompaniment.

Another example of an extended solo passage for horn is the following duet passage taken from the "Minuet" in the Eighth Symphony (see Figure 18). The duet is again lightly accompanied and involves many stopped notes.
Figure 18--Excerpt from the third movement of the Eighth Symphony.

Probably the most important solo given to any of the horns in the Ninth Symphony is the long solo for the fourth horn in "adagio" of the third movement (see Figure 19).

Figure 19--Excerpt from the third movement of the Ninth Symphony.

The solo contains arpeggios and melodic passages which are characteristic to all solos. The extreme range of three octaves and a minor second is unusual in view of the fact that in his earlier symphonies solos for horn were written in a more comfortable range. The broad range from the lowest note (great G) to the highest note (first line
A-flat) takes much control even today. In one measure there is the interval of two octaves from Great G to second line G. The solo also contains several difficult stopped notes. There has been some controversy over whether or not Beethoven intended for the solo to be played on the hand-horn or the valved horn, since the Great G could not be produced on the hand-horn. It must be added that only two valves were applied to the horn at first, and it was not until the third decade that the third valve was added. To play the Great G freely using valves, one must depress the first and third valves. At the time of the writing of the Ninth Symphony (1824) the two-valved horn employed could lower the pitch only down to the Great A. To produce the step below, the A must have been flattened by relaxing the embouchure, producing a "false-tone." Moreover, Beethoven wrote this same note twice in the Seventh Symphony (1912) before the invention of the valved horn.

Beethoven, then, in his utilization of the horn both harmonically and melodically, was setting the stage for the expansion of scoring for the horn which followed with Rossini, Berlioz, Mendelssohn, and Wagner.

Schubert wrote the stopped notes more freely than did Beethoven, while Rossini was even more lavish in their use, as in his Semiramide Overture, written in 1823. One can see by inspecting the following excerpt that the horn players who attempted this horn part must have had an
acute sense of pitch and a tremendous right-hand technique. It is interesting to note that the grace notes in this andantino passage are not written as slurred notes. The stopped grace notes must have been tongued in order to execute a clean-sounding embellishment (see Figure 20—measures 43, 55, and 59).

Figure 20—Excerpt from Rossini's Semiramide Overture
Being a horn player himself,\textsuperscript{10} Rossini made most effective use of the natural horn in each of his works.

Rossini's harmonic use of the horn is very similar to that of Beethoven. He did not use the horn in as much sustained harmony as much as Beethoven, employing it in more facile passage work.

As for Rossini's solo passages, the parts were very classic and traditional in that they were much like the hunting call. An illustration of this writing is the refined hunting call in the opening to the \textit{Barber of Seville} (1816) where two horns participate (see Figure 21). The passage could probably have been played by the upper player without straining his range, since, where the higher-pitched horns are concerned, the lower notes are easier to produce than the upper ones. The second horn player would have had more difficulty.

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{Excerpt_from_first_act_of_Barbier_of_Seville.png}
\caption{Excerpt from the first act of the \textit{Barber of Seville}.}
\end{figure}

It was approximately twenty years after the invention of the valves before the valved horn was generally specified

\textsuperscript{10}Carse, \textit{The History of Orchestration}, p. 241.
in the orchestral scores of the nineteenth century. Composers continued to write horn parts in many different keys even after the valve had virtually proved the crook system to be inadequate. It was not until the latter part of the century that many composers began to listen to experienced instrumentalists and to write in one or two common tonalities, effecting the realization of the horn as chromatic instrument.

The Natural Trumpet

Similar conditions had some effect on the valved trumpet. There are examples of natural trumpets supplied with an armory of crooks known to have been made as late as c. 1870. Carse states, "Trumpets with tuning-slides were made in the earlier part of last century, and usually stood in F without a crook." Using four common crooks, the trumpets were lowered to E, E-flat, D, and C; and, by combining two of the crooks, the keys of B, B-flat, A, and low A-flat were possible. There had been an attempt to modify pitch on the natural trumpet by inserting the hand into the mouth of the bell of a trumpet of compact

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15 Ibid., p. 233.
This idea, which was taken from the hand-horn, did not excite composers since the tone was inferior and the intonation was unbearable. Because of these difficulties, the technique of stopping the trumpet was abandoned, and composers were obliged to use only those pitches which were produced naturally.

Beethoven and his contemporaries wrote for the natural trumpet and, with the exception of a small number of Italian composers, ignored the keyed trumpet. The keys of the natural trumpet were chosen in the eighteenth-century manner, but the trumpets did advance to being the top voice of the brasses.

The discussion of writings for the natural trumpet begins with two compositions by Beethoven: the overture Consecration of the House in C major (1822) and the Ninth Symphony. These works, and the following works of this period, were chosen because they were written between the second and third decades of the nineteenth century, the period in which the valved trumpet had been invented but was as yet not in general use.

The overture Consecration of the House was scored for two trumpets in C, with no change of crook indicated. The

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16 Ibid., p. 235. 17 Berlioz, op. cit., p. 281.
18 Gevaert, op. cit., p. 220.
19 Bate, op. cit., p. 215.
intervals used most between the two trumpet parts were octaves, sixths, and thirds. Trumpets were sometimes used as the upper parts of the brass group, and were at other times interlocked with the horns (see Figure 22).

The natural trumpet was capable of being used for all tempi and was employed most of the time in tutti passages to reinforce and accentuate rhythmic patterns. The score occasionally contains fanfare-like solo passages for the trumpets. The following fanfare section of the trumpet parts is taken from the score.
Generally the score does not present any real difficulties in performance. The trumpet parts are written in a medium range and contain no difficulties in articulation. Single tonguing can be used throughout the score, but one must take great care in playing the rhythmic passages with exactness.

The trumpet parts in the first movement to the Ninth Symphony are quite continuous even during fairly soft passages. The trumpet player rests a smaller amount of time as compared with Beethoven's earlier symphonies, where Beethoven formerly let the trumpet sustain pitches while the remainder of the orchestra moved melodically. The trumpet in the last movement of the Ninth Symphony continues with the melody wherever possible. The following excerpt illustrates the prominence which the trumpet has in the melodic structure of the fourth movement to the Ninth Symphony (see Figure 24). The "Ode to Joy" theme, first stated by the 'cellos and basses in the "Allegro Assai," is at a later point taken softly by the violas and violins in crescendo to the entrance of the loud brasses and woodwinds.
In this symphony there began a practice which was to be further exploited throughout the nineteenth century, this being the simultaneous use of two trumpets crooked in different keys. This exploitation was especially true of French opera composers. Beethoven, by extending the uses of the natural brasses in his writing, probably did more for these instruments than any other composer of this period in that he realized their full potentiality as melodic members of the brass group and set the stage for the chromatic instruments which were even then being developed.

It was not until the second quarter of the nineteenth century that the valved instruments began to be specified in some of the orchestral scores of composers such as Halévy, Meyerbeer, Bellini, Donizetti, Berlioz, and Wagner.

The Second Quarter Century

Concerning the transition of the natural brasses to the valved brasses in the orchestra of this period, there
was much progress. It must be kept in mind, however, that this was a time of prejudice and skepticism especially where the French horn was concerned. Many composers and musicians had the deep conviction that the silvery, undulterated tone possessed by the hand-horn was unfavorably altered by the use of the newly-invented valves. There was also much concern over the use of valved horns in playing natural horn parts since the stopped notes, which were intentionally written, became open notes by the convenient use of valves. Berlioz pointed out, however, that the valved horn could in the hands of an experienced player produce stopped notes in addition to open notes. He further stated that it was up to the composer to indicate in the score whether certain notes were to be open in the new sense or stopped in the traditional sense. It must also be added that much of the reluctance to accept the valved instruments in orchestral compositions was due to an abundance of unskilled performers and even laymen who tried to play the new instruments at first.

The brass section of the orchestra at this time was beginning to supply its own harmony without the aid of either woodwinds or strings. This capability was mainly

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22Coar, *op. cit.* , p. 112.
due to the common inclusion of trombones in the operatic and orchestral scores of the day. Composers had at their disposal a self-contained body of pure brass tone which was capable of producing varied degrees of color contrasts. The valved horns and trumpets of this time were being utilized as melodists to a limited degree, and when composers were bold enough to forget the prejudice associated with the natural instruments, they discovered that there was much harmonic and melodic flexibility at their disposal. As a result, the characteristic hunting calls of the horn and the military calls of the trumpet became practically nonexistent.23

Composers of opera displayed the earliest interest in the lengthening-valve and, consequently, valved horns, trumpets, and cornets made their first appearance in the operatic scores of this period.24 The valved horn was first used only as a substitute for the natural horn. This use brought much uncertainty and indecision which has already been stated previously. It was in Halévy's La Juive, produced in Paris in 1835, that the valved horn ("cors à pistons") was first specifically called for in an orchestral score.25 The orchestral score

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24 Ibid., p. 245.
of this opera called for two natural horns and two valved horns. Four horns were usually employed in the operatic scores, but the lower octave of these instruments was seldom used. The lower octave was used only when cors à pistons were specified. To a large extent Halévy utilized two pairs of horns crooked in different keys, but when the cors à pistons were present, they played parts of a greater difficulty than would be feasible on the hand horn.  

The valved trumpet in F, which was a long trumpet unlike today's small trumpet in F, was the instrument most normally seen in the scores of this time. On Berlioz's tour of 1842-1843, he observed that the Germans had abandoned the natural trumpet almost entirely. These valved instruments were first supplied with a set of crooks in order to put the instrument in the correct key of the composition, which in turn also enabled the performer to produce a maximum of open notes.

There is some confusion as to the first appearance of the valved trumpet in the orchestra. Lavoix states that the valved trumpets made an 1827 appearance in Chelard's

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26 Coar, op. cit., p. 125.
27 Baines, op. cit., p. 569.
28 Schwartz, op. cit., p. 181.
29 Baines, op. cit., p. 569.
Macbeth. Schwartz, however, states that special parts for valved trumpets are seen for the first time in 1836 in Meyerbeer's Les Huguenots. Other opera composers such as Bellini, Donizetti, and Halévy began writing for the valved trumpet, as well as the valved horn, and began to treat these instruments as melodic voices. As operatic orchestration progressed, a new development occurred with the introduction of "cornet à pistons" parts by such composers as Berlioz and Bizet. The cornet was "the outcome of applying the valve-system to a small circular horn known in France as le cornet, and elsewhere as the post-horn." This practice enjoyed much success in France and contributed somewhat to the delayed adoption of the valved trumpet in that country. In Germany the valved cornet did not gain too much ground mainly due perhaps to the competition with the valved "flügelhorn" which made its appearance at about the same time. French composers usually wrote cornet parts in addition to trumpet parts, but the usual role of the cornet was to take the place of the trumpet in smaller or second-rate orchestras.

30 Bate, op. cit., p. 215. 31 Schwartz, op. cit., p. 177.
32 Bate, op. cit., p. 215.
34 Baines, op. cit., p. 570.
35 Carse, The Orchestra from Beethoven to Berlioz, p. 419.
36 Carse, The History of Orchestration, p. 216.
The valved trumpet had much difficulty gaining any significant attention in England, owing to the popularity of the slide trumpet. Beginning with the close of the eighteenth century, the slide trumpet enjoyed much success in England throughout the nineteenth century and was hardly known outside the country. This instrument was usually built in F, the same pitch as the trumpet normally used in the nineteenth century, and was a simple trumpet capable of lowering any open note a half or whole step. The slide was pulled backward toward the player to lower the pitch and was returned to its closed position by the tension of a spring. The slide trumpet caused the introduction of the more efficient valved trumpet to be delayed until the middle of the nineteenth century, but by the end of that century the valved trumpet began to replace it.

Both Bellini and Donizetti accepted the capabilities of the valved horns and trumpets, and both composers utilized them enthusiastically, realizing the melodic and harmonic advantages of the valved instruments. Bellini and Donizetti both were pioneers in scoring the brasses as a unique tonal color.

Berlioz's activity as a composer coincides roughly with the adaptation of valves to brass instruments, but

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37 Bate, op. cit., p. 215.
38 Schwartz, op. cit., p. 178.
he was not able to take full advantage of their benefits because of the limited acceptance which was characteristic of the second quarter of the nineteenth century. His scores illustrate the use of open and stopped notes on natural horns, which were crooked in various keys, and the use of two cornets in addition to two or four natural trumpets.\footnote{Ibid., p. 257.} In the following excerpt from \textit{Le Carnaval Romain}, Opus 9, Berlioz utilized two horns crooked in C and two other horns crooked in E, and wrote stopped and open notes for both horns. In the same measures he wrote a very simple trumpet call for two natural trumpets pitched in D. This type of trumpet part is found very frequently in the scores written in this period. Below the trumpet parts, which are written in unison, there are two parts written for two "cors à pistons" in A. It can be seen from the excerpt that the cornets are given a much more florid part than the trumpets, obviously due to the facility rendered by the valves. Berlioz did not use the cornet extensively in his works, but when he did, it was to supply the missing notes in his upper brass harmony. Moreover, Berlioz felt generally that one should give the cornet very slow and dignified parts.\footnote{Berlioz, \textit{A Treatise on Orchestration}, p. 295.} Berlioz tried very hard to make natural instruments act as chromatic ones by writing for horns and
trumpets in a number of different keys which required many varied crooks. By the use of valved cornets, trombones, the ophicleide (a large keyed bugle later replaced by the tuba), and ingenious management of the crooked and open notes of horns and trumpets, Berlioz succeeded in producing a thoroughly sonorous and full-voiced brass harmony. An excellent example of Berlioz's wide range of instruments in different keys is in his Benvenuto Cellini Overture, Opus 23. In this composition he wrote for one horn in G, one horn in E, two horns in D, one natural trumpet in E, one natural trumpet in D, and two "cornetti à pistons" in A. With a battery of upper brasses such as this, a chromatic-like feeling was not entirely impossible to achieve especially with the brass in the hands of a genius like Berlioz.

As to the ranges of Berlioz's horn parts, there are many instances of the upper notes in the upper range of the fourth horn exceeding that of the third horn. An explanation might be that the second pair of horns often were written in unlike keys and did not function as a pair at all. They were used as separate horns in different keys in order to use as many open tones as possible.

\[42\] Sachs, op. cit., p. 424.

\[43\] Carse, The History of Orchestration, p. 258.
Figure 25--Excerpt from Berlioz's Roman Carnival Overture.
As a result each horn within the section receives frequent solos in the works by Berlioz.\textsuperscript{44}

In his horn music there seems to be little consistency in the number of measures played by the valved horns. For example, in the Roman Carnival Overture, the horns participate in 240 of the total 446 measures (approximately 54 per cent). In the Symphonie Fantastique, Opus 14, however, the amount varies from a high percentage to a rather low one. In one of the movements from Berlioz's Romeo and Juliet Symphony, Opus 17, the third and fourth horns are granted one note apiece.

In his moving harmonic parts, Berlioz wrote taut, nervous, rhythmic passages for the horn. Unlike his predecessors he divided the beats unevenly and inconsistently (see Figure 26).

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{roman-carnival-excerpt.png}
\caption{Excerpt from the Roman Carnival Overture}
\end{figure}

The use of octaves and thirds between two horns is prevalent. The horns often jump from an octave to a unison. The unison passages occur both in harmonic backgrounds and in tutti or solo sections. These unisons are more often seen in tutti or solo passages, however.

Many of the melodic lines in the works studied are given to the horns in combination with the full woodwind section. These melodies are scored for a solo horn doubled by one or more woodwinds as well. There are also many instances where a single horn, regardless of the number of the part, carries the melody. Examples of tutti and solo passages are seen in the following excerpts from the Fantastic Symphony.

![Figure 27--Excerpt from the second movement of the Fantastic Symphony.](image)

The above horn part is doubled with a clarinet and is accompanied by strings. The following solo for fourth horn is not doubled but is again accompanied by a light string accompaniment.
Figure 28--Excerpt from the third movement of the Fantastic Symphony.

In Figure 29 the horn is alone except for the very soft roll executed by the bass drum.

Figure 29--Excerpt from the fifth movement of the Fantastic Symphony.

Berlioz generally used tones in the harmonic series in spite of the availability of the valves and the technique of stopping the horn. The tones in the series constitute 86 per cent of the notes in the Fantastic Symphony and about 83 per cent of those in the Roman Carnival Overture.

The works of Berlioz illustrate a unique mixture of traditional and radical horn writing. A passage might include horn fifths for a moment, followed by a long succession of notes requiring adjustment (see Figure 30). The following example seems to indicate Berlioz's attempt to adapt traditional horn writing to the valved horn.
At this time (1830) Belioz was not convinced that the valved instruments had value, but in his *Treatise* (1882) he finally admitted their advantages.

An early objection to the valved trumpet in orchestral compositions was that the tone of the new instrument was not as powerful as that of the older instrument. Berlioz speaks on the differences between these instruments by stating that the tonal quality of the piston instrument cannot always be used interchangeably with that of the natural trumpet and that the newer instrument must be treated in a special way. He especially recommended the use of the valved instrument in melodic passages occurring in the middle register.\(^4\)

In the *Fantastic Symphony* Berlioz, as usual, wrote for two valved trumpets, along with two natural trumpets. The valved instrument is used quite freely in the melodic sense while the natural trumpet, used in conjunction with

\[^4\text{Berlioz, *A Treatise on Modern Instrumentation*, p. 142.}\]
the valved instrument, stays strictly within its own harmonic series. Both instruments were omitted from the second and third movements of the work.

In the fourth movement one instrument does not play without the other, though they play different parts and rhythms. On occasion the natural instrument with its piercing tonal quality was allowed to play above the valved instrument provided that the melodic passage fit into the harmonic series. This movement shows excellent care in scoring for the two instruments together and results in a homogeneous trumpet sound.

Berlioz's Ouverture des Francs Juges, Opus 3, written between 1826-1828, was scored for four trumpets--two "trombe" in E natural and two "trombe à pistons" in E-flat. The trumpets were crooked in different keys in order to produce the highest possible number of notes. Since the natural trumpet was crooked in E-natural and the overture began in the key of A-flat, the instrument was capable of playing notes which were enharmonic to the closely related keys of F minor, E-flat major, and D-flat major. Because of this capability the natural instrument could be more effectively used in keys other than A-flat and, therefore, be more useful later in the work. The E-flat crook, which was used by the valved trumpet, was selected in order to minimize the number of sharps or flats
in the key signature. The use of this crook provided the signature of one flat in this overture.

In the following excerpt a diatonic scale in the second and third octave range and the scope of over an octave can be seen (see Figure 31). It might be added that the natural trumpet could not produce a diatonic scale unless the scale was written in the fourth octave. To perform these high passages much strength and endurance was required.

The following excerpt also illustrates the appearance of new intervals of small and wide leaps. These intervals could not have been produced had it not been for the availability of the valved trumpet which provided chromaticism, scale passages, and a flexibility not known with the utilization of the natural trumpet.

\[\text{Figure 31--Excerpt from Overture des Francs Juges}\]
The **trombe à pistons** in F is utilized in the final movement of the overture. This movement contained a melodic passage which was orchestrated with the strings and woodwinds. The part was modified somewhat to place the melody in the best range of the instrument (see Figure 32). Figure 32 again illustrates the new-found freedom in writing for the trumpet that was made possible by the new instrument.

The range of this overture extended from the third harmonic to the eleventh harmonic with the chromatic notes written between them. There did not seem to be any technical difficulties or unusual articulations in the score, and the score did not require any muted effects.

Mendelssohn had available these same brass instruments, but did not seem to do much with them in the way of any
real innovations. In most of his symphonies and concert overtures he omitted the trombones completely, which left his brass section harmonically helpless. Mendelssohn often wrote expressive melodies for the horns and occasionally included notes other than open notes in his trumpet parts, but he did not realize the potential harmonic and melodic capabilities of the brass group as did the French opera composers of the same period. Carse says,

One wonders why, if he [Mendelssohn] could write a few chromatic notes for trumpets, he did not make much more free use of them to secure a more full-bodied brass harmony. . . . In making frequent use of brass tone played very softly, Mendelssohn helped considerably to diffuse knowledge of that valuable effect. 46

Concerning Schumann, whose orchestral work falls almost entirely within the ten years 1841-1851, there is little to be written except that he readily adopted valved horns and valved trumpets in their early stages of development. He freely used these instruments melodically in such compositions as his third and fourth symphonies and his Manfred Overture, Opus 115, of 1849. 47 In the incidental music to Manfred, Schumann used the valved trumpet in two most interesting ways. In the overture, he wrote parts for three "ventil-trompeten" in E-flat. These three trumpets produced incomplete seventh chords in addition to triads,

46Carse, The History of Orchestration, p. 262.
47Ibid., p. 265.
and they were used independently, as a section, as the upper part of the complete brass ensemble. There was also the appearance of the second partial which was in the range of the E-flat trumpet and could be adequately produced (see Figure 33). To perform this part today on the B-flat trumpet one would have to resort to a "false-tone" technique in order to produce the note, since the lowest note in the range of the B-flat trumpet is F sharp. The low C (concert Eb) is best played by the trombone.

In Wagner's early operas, the usual combination of two natural horns and two valved horns is seen. It was

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Figure 33--Excerpt from Schumann's Manfred Overture

not until the writing of Lohengrin (1847-48) that Wagner finally wrote for the valved horn only. The horn parts in Lohengrin were scored in a way that Wagner had not used previously and did not use afterwards. In certain sections of the opera numerous changes of key were written without adequate time to change the crooks. A typical example of this peculiarity is found in Figure 34. This procedure

[Music notation]

Figure 34--Excerpt from Act II of Lohengrin

of writing has confused performers and historians alike, but the explanation seems to be that Wagner had at his disposal a very talented hornist by the name of Joseph Randolph Lewy who wrote a series of exercises for the valved horn with the intention of preserving the good qualities of the hand-horn. According to Lewy, the valves were simply a means by which the instrument changed to various keys. Since Wagner had great admiration for Lewy and his

49 Schwartz, op. cit., p. 199.
51 Coar, op. cit., p. 126.
opinions, there is every reason to believe that Wagner wrote the horn parts to *Lohengrin* on the advice of Lewy.\(^{52}\)

In *Rienzi Overture* (1840), *Der Fliegende Holländer Overture* (1841), and *Tannhäuser Overture* (1845), Wagner illustrated his master of the principles of writing for the valved horn. Wagner, unlike his predecessors, generally wrote horn parts in a comfortable range and tessitura as seen in the following illustration of the ranges and tessituras of the horns in *Rienzi, Flying Dutchman, and Tannhäuser*.

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**Figure 35**—Ranges and tessituras of horns in three Wagnerian overtures.

\(^{52}\) Blandford, *op. cit.*, p. 694-697.
There is much difference between Wagner's parts for hand-horn and his parts for valved horn. In the music cited previously, the Waldhorn (hand-horn) parts remain predominantly in the harmonic series of the particular horn. An example of this use is the fact that 94.5 per cent of all the notes required of the natural horns in the Tannhauser Overture were members of the series. As for the notes written for the valved horns, only 55 per cent of the notes were members of the harmonic series. In Rienzi, 93 per cent of the notes written for the Waldhorn were in the series, while less than 50 per cent of the valved horn's notes were in the series. In the Flying Dutchman Overture, Wagner utilized 93 per cent harmonics in the Waldhorn parts and 62 per cent in the parts for ventil horn.

In the works studied, Wagner recognized very promptly that the lower harmonics could be utilized with the use of the valved horn. The number of stopped notes below the seventh harmonic in the natural horn parts in comparison with those in the valved horn parts is significant. On the natural horn very few notes below the seventh harmonic were used. In the ventil horn parts, however, 40 per cent of the notes were below the seventh harmonic. After this innovation by Wagner, composers realized that they could write traditional horn parts in any possible key, and had at their disposal a horn which, by the use of the valves,
could produce quite lyrical melodies and was not encumbered by the old handicap of tonal inequality.\textsuperscript{53}

It is interesting to note that when the valved horns first appeared in orchestral scores, no single key was used. Horns in several keys were used. According to Berlioz the four keys most used and most satisfactory were those in E, F, G, and A-flat.\textsuperscript{54} The F horn has been the only one of the four mentioned by Berlioz to survive in this country.

The following examples of solo and tutti writing by Wagner are representative of his handling of the hand-horn and valved horn.

![Figure 36--Excerpt from the *Flying Dutchman* Overture](image)

The previous excerpt contains a very chromatic passage for the first and second horn. The natural horns in D have some chromaticism also, but are permitted to execute this much more slowly.


\textsuperscript{54}Berlioz, *A Treatise on Modern Instrumentation*, p. 142.
In the fourth measure of Figure 36 the third note (b) in the natural horn part is a stopped note, but is amply supported by the very sonorous notes in the valved horn parts.

In all of these examples the natural horn part illustrates the tenacity with which the third and fourth horns adhere to the harmonic series.

It is very difficult to include only the previous examples of Wagner's use of the horn since nearly every page of Wagner's scores reveals an important horn part. There is enough material to warrant an entire dissertation on the various solo passages throughout his complete works.
There is little doubt that the horn was one of Wagner's most favored brass instruments at this time. The early Wagnerian horn parts were rather trivial, as in some passages in Rienzi, but the horn parts soon progressed to the noble stature of those in the Ring and later works.\textsuperscript{55}

Wagner can also be accredited with being the first composer to score well for the valved trumpet. Much of the time he utilized three and occasionally four trumpets. Wagner was very familiar with the capabilities of the valved trumpet, and realized that the tonal color of the trumpet could be effectively scored and appreciated. For a considerable amount of time, Wagner wrote parts for trumpets with crooks in order to throw them into various keys. This method of writing created much difficulty for the trumpet player, since on many occasions Wagner would unmercifully require the musician to make excessive changes of crooks within a given amount of time. An example of this practice can be found in the Introduction to Act III of Lohengrin, where a total of ten changes of crooks are indicated. Since there are ninety-six measures of trumpet music where the changes occur and the usual performance time for these measures is close to two and a half minutes, the trumpet performer is required to make a change on an average of one every fifteen seconds. Trumpeters who first

\textsuperscript{55}\textit{Ibid.}, p. 135.
had to read these parts revolted, finding that it was easier to transpose the parts than to change the crooks.\textsuperscript{56}

\begin{figure}
\centering
\includegraphics[width=\textwidth]{figure39.png}
\caption{Excerpt from \textit{Introduction to Act III} of \textit{Lohengrin}.}
\end{figure}

At the present time most trumpet players prefer to transpose these parts and do not even consider a change of crook.

In Robert Schumann's \textit{Das Paradies und die Peri}, Opus 50, produced in 1843, there were parts scored for two "ventil trompeten" in F in movements number six and number eleven of the work. In the opening of these movements the key signature of four flats is significant (see Figure 40).

\begin{figure}
\centering
\includegraphics[width=\textwidth]{figure40.png}
\caption{Excerpt from \textit{Das Paradies}\textsuperscript{57}}
\end{figure}

\textsuperscript{56}Schwartz, \textit{op. cit.}, p. 179.

\textsuperscript{57}Labella, \textit{op. cit.}, p. 77.
Previously, composers preferred to crook the trumpets in a key which would result in the least amount of accidentals in the key signature. Furthermore, these composers chose to write the accidentals as they appeared in the part, rather than in the signature. In Das Paradies Schumann probably realized that trumpet players of the time were transposing the music which was written for several crooks, as in Wagner's Lohengrin, and decided to score the parts for the popular valved trumpet in F.

Whatever the reason might have been, the trumpet players at this time began transposing on the F trumpet and composers began writing various key signatures for the valved trumpets.58

The Valved Trombone

After the invention of the valves they were applied to trombones in place of the slide. In July, 1818, an article in the Allegemeine Musikalische Zeitung stated that Stölzel and Blüthmel had invented two valves which could be applied to the trombone, in addition to horns and trumpets, to produce all the notes of the chromatic scale. Some time after the appearance of the article, the Viennese maker Riedl made the first application of the valves to the trombone. The design was later improved

58Ibid., p. 76.
upon (c. 1830) by Uhlmann, who was also of Vienna. 59 These valved trombones were made in B-flat and G and were made chromatic by the use of a double Vienna valve. 60

In a few opera houses, the valved trombone made quite an impression. The instrument showed much more agility in comparison with the slide technique of this period. Rossini, along with a few other composers, was fascinated with this agility of the valved trombone and wrote for the instrument in his L'Italiana in Algeri. 61 The instrument soon lost its appeal after Berlioz stated that he preferred the slide trombone over the valved trombone since the valved trombone was hampered by inferior tonal quality and defective intonation. 62 Notwithstanding these comments by Berlioz, the valved trombone threatened to replace the slide instrument in military bands, but it did not gain a significant foothold in the concert and opera orchestras of this time. 63 By 1855 German trombonists had developed a more proficient technique on the slide trombone and dropped the valved trombone completely. 64

59 Carse, Musical Wind Instruments, p. 258.
60 Ibid., p. 259. 61 Bate, op. cit., p. 220.
62 Berlioz, A Treatise on Modern Instrumentation, p. 173.
63 Carse, Musical Wind Instruments, p. 259.
64 Bate, op. cit., p. 221.
CHAPTER III

GENERAL CONSIDERATIONS IN THE SECOND HALF
OF THE NINETEENTH CENTURY

In the first part of this period the contest between the valved and natural horns and trumpets was very intense. Before this time there had been some concern over whether the valved brasses were really a desirable addition to the orchestra. The concern at the middle of the nineteenth century became one of the desirability of the substitution of the natural brass instruments by the valved brass instruments. During this same period, another concept began to change. Until this time the purpose of the valve had been to effect a sudden change of crook, but it gave way to the modern conception that the valve's correct function was to render the scale of the brass instrument completely chromatic. This conception was obviously not a sudden consequence, since it found its roots in the time of Schumann's and Wagner's early works and was not permanently established until the second half of the nineteenth century was well under way.¹

¹Carse, The History of Orchestration, p. 270.
Characteristic of the second half of the nineteenth century are the complete and satisfying harmony of the brasses, and their unrestricted melodic capabilities, which were the result of all parts of the brass group being fully chromatic. Wagner, perhaps, did more for the acceptance of the instruments than did any other composer. He fully developed the melodic capabilities of each brass instrument and did much to cause composers of his time, and later, to recognize that the brass group, in itself, was capable of a much greater vocabulary than was supposed earlier. The acceptance of the valved brass would probably have been long delayed had it not been for Wagner's genius in their use.²

Unlike their German contemporaries, French horn players continued to generally use the technique of the hand-horn and did much to delay the development of valve technique in France. Trumpets were substituted by cornets for some time, especially in French operatic scores.³

Toward the end of the nineteenth century the valved horns and trumpets had their triumph over the natural instruments. Nevertheless, composers such as Strauss and Mahler deliberately continued to write for the valved instruments with various crooks, undoubtedly in order to conserve something of the romantic character of the old

natural brasses. However, musicians began to use one crook and transpose the written music at sight. The hornists usually selected the F crook, while the trumpet instrumentalists tended to select the B-flat or the A shank. It must also be added that in the last quarter of the nineteenth century the English slide-trumpet finally gave way to the valved instrument.

Summary and Conclusions

In the early part of the nineteenth century the brasses used were natural horns and trumpets which were crooked in various keys. Because of the inadequacies of these instruments, composers wrote comparatively simple orchestral parts for the trumpets and slightly more complex parts for the horns due to the stopping technique. Beethoven, however, did much to expand the melodic capabilities of the natural brasses. After the invention of the valves, orchestral composers were slow in accepting the valved instruments in their scores because of prejudice and tradition associated with the natural brasses.

The valved horn and trumpet were first used as an addition to the natural brasses in the orchestra. By the third decade the valved brasses had been utilized somewhat

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4Baines, op. cit., p. 570.
6Ibid., p. 293.
melodically by such composers as Chelard, Meyerbeer, Bellini, Donizetti, and Halévy. In France the valved trumpet was contested by the valved cornet, and in England the trumpet competed with the slide trumpet.

Crooking was the general practice in the first half of the nineteenth century, and the combination of different brass instruments in different keys was prevalent. Berlioz was mainly responsible for this concept of writing as a result of his Treatise on Orchestration and his musical compositions.

That Wagner did more than any other composer to influence subsequent composers in their writing for the valved brasses is indisputable. By the example of Wagner's works later composers realized the melodic flexibility and harmonic freedom that was inherent in the valved brass instruments.

With few exceptions the advantages of the valved brass instruments were heartily seized upon in the second half of the nineteenth century, and by the end of that century, the valved brasses had completely taken the place of any remnants of the natural brass instruments. Adam Carse says,

> The chromatic brass group derived its great increase in power, not from any accession of actual tone-weight due to the presence of valves . . . on the instruments, but from the fact that composers, having now a completely chromatic brass band at their disposal, were able to use these instruments freely at any time, for any harmony, and in any key.\(^7\)

\(^7\)Carse, The Orchestra, pp. 51-52.
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