THE PEDAGOGY OF BRASS INSTRUMENTS AT THE COLLEGE LEVEL

THESIS

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MASTER OF MUSIC

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CHAPTER I

INTRODUCTION

Problems Involved

The teaching of brass instruments at the college level involves four procedures: (1) the instructor must first find out which factors in the student's playing have been neglected; (2) the instructor next has to find out what faults, if any, the student has developed and what things he is doing that are not correct; (3) next, the instructor has to be able to tell the student how to correct these faults and then should be able to demonstrate to him; and (4) the instructor has to be able to guide the student on his course of study and be able to introduce the correct things at the right time.

Purpose

Mainly, the purpose of this work is to give the brass instrument player a more thorough understanding of how to improve the many factors which combine to make up his technique as a whole; also, to give the brass instrument player a more thorough understanding of the construction and history of his instrument, as well as a list of books which can be useful in developing specific phases of brass

instrument playing. In other words, this book is intended to be a help to all brass instrument players who want to learn more about their instrument as well as to improve on it.

Value

It is intended that this work be of value to all those who play brass instruments in that it explains the correct procedures for producing the best results in connection with all factors of brass-instrument playing, lists books of instruction (the publishing house and cost of each book also) which would be valuable in the developing of certain factors of playing, gives the brass-instrument player a better acoustical understanding of his instrument, and gives suggestions on how to care for brass instruments.

CHAPTER II

HISTORY OF BRASS INSTRUMENTS

The Trumpet

The trumpet (Italian, Tromba; German, Trompete; French, Trumpette) derived its name from the Latin word triumphare. Horns were known and used in the most ancient times, but they were horns in actuality, made from the horns of animals and not from metal. The small end of the horn was opened and rounded in a cup-like manner, thus enabling our forefathers to produce uncertain sounds used for signals.

"Before the present era, probably many centuries B. C., there were horns in use called lituus, which history reports as having been introduced in Etruria by buglers in the cavalry of the Roman legions."[1] Numerous relics have been recovered since the time of Christ which illustrate the fact that there was a certain type of trumpet built in snail form that was much in use in the Roman armies and in the amphitheatres. Roman history quite frequently mentions instruments called tubas, describing them as long straight tubes ending in conical bells and made from wood or metal. Little information is available on the subject of trumpet development during the early Middle Ages, but some famous Italian

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[1]Vincent Bach, The Art of Trumpet Playing, p. 3.

paintings of the fifteenth century show angels using trumpets of a zigzag form and therefore we judge that such instruments were in use in years previous to 1400.

After the fourteenth century more frequent mention of these instruments begins to appear in contemporaneous writings and in that century it seems that trumpets built in round curls similar to our French horn were well known in Italy and France. "During the sixteenth century many forward steps were taken in trumpet development in Germany, and among other instruments we find mentioned the Feldtrummet, Clareta, and the Thurner Horn."[2] The feldtrummet was used in military circles and was a low pitched instrument while the clareta was built in high pitch and was later replaced by the clarino. The thurner horn was a brilliant toned instrument used by night watchmen on battle towers and fortified walls surrounding the cities, for signalling the approach of enemies or reporting fires. "The trummet or trommet was one of the first wind instruments used for musical performances."[3] It was built in low D but being equipped with a set piece or crook, could also be used in C.

"Another horn identified as 'Das Jaeger Trummet' was proportioned similarly to the Thurner Horn and used by huntsmen."[4] Smaller models of das jaeger trummet were called "post horns" and drivers of stage coaches were equipped with

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[2] Ibid. [3] Ibid., p. 4. [4] Ibid.

them. Even yet, in certain European countries, the custom prevails for stage coach drivers to signal their approach and departure by merry blasts on their horns.

"The trumpet is one of the oldest instruments used as an accompaniment or lead for singing and as early as 1607 overtures were written for five trumpets."[5] Each of the five had a different pitch, the highest being the clarino, then the quinto, alto, basso, and the vulgano basso which was the lowest voice. The clarino, the highest-pitched of the five, came into prominence during this period. This instrument was used frequently in churches and for concert music. It was during this period that the trumpet began to be used in art music, an example being the use of the clarino and tromba sordine of Monteverdi's "Orfeo" (1607). "In 1638 there appeared a 'Modo Per Imparare a Sonare di Tromba' (Method of Learning to Play the Trumpet) by Fantini."[6] Towards the end of the seventeenth century, trumpets were quite freely used in operas, cantatas, etc., for scenes of a military character or for the expression of joyful triumph. At this time there developed the art of playing the highest register of the trumpet where the harmonics form a full scale, while formerly only the low and middle registers had been used in which fanfarelike motives only are possible. During

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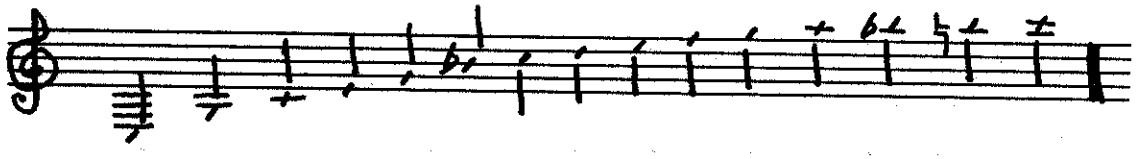
[5]Ibid.

[6]Willi Apel, Harvard Dictionary of Music, p. 771.

this period of the seventeenth century, the composers Haydn and Johann Sebastian Bach composed music in which these instruments had unusually effective parts. These compositions are still played frequently today. Many of the compositions of Johann Sebastian Bach are so difficult that we can hardly comprehend how the trumpeters of those days were able to perform them. Some of the instruments used in those times are still in existence and in this day of fine trumpets we marvel that trumpeters could ever have played those parts with the inferior instruments at their disposal. Extraordinary strength and energy are required to play such parts as "Das Brandenburg'sche Konzert."

The difference between the <u>feldtrummet</u> and the <u>clarino</u> was solely in the pitch as the register of the instruments was the same. The notes played on the <u>feldtrummet</u> (natural trumpet) were as follows:



"Of these notes, the B flat and F were too flat and the A was too sharp."[7] The natural trumpets were usually built in D, but musical development made it necessary that the instruments be adaptable for any kind of musical performance so

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[7]Bach, <u>op. cit.</u>, p. 4.

during the sixteenth century they constructed different length crooks which enabled the player to change the pitch of his instrument to C, B, B flat, A, E, E flat, or to whatever key was necessary. The performer had the several crooks needed hanging on his music stand and attached them to his instrument as the music necessitated. Modern composers continue to follow the old custom of writing trumpet parts in varying keys and the trumpeter encounters parts written in C, D, E, E flat, F, and other keys, thus forcing him, in symphonic work especially, to have a complete knowledge of transposition. It is true that modern trumpeters use the B flat trumpet generally and the C trumpet considerably in symphony orchestras, but often they are required to use a D trumpet or an F trumpet in order to obtain the quality of tone characteristic of those instruments. Many composers seem to consult their own convenience in writing, taking it for granted that the symphony musician is well routined in transposition.

In the centuries mentioned it was only possible to play the open notes on trumpets as valves had not been invented, but inasmuch as the trumpets were built in low D it was possible for the trumpeter to play the entire scale above the middle C, which middle C is now nominated high C. It was not possible, however, to produce the tones of the chromatic scale.

In 1753, a horn player by the name of A. J. Hampel of the Royal Orchestra in Dresden conceived the idea of inserting crooks in the middle of the instrument through the use of a tuning slide. By this addition, the pitch of the instrument could be changed and minor changes in the tuning could be affected. This instrument was called "Das Inventionshorn" and a trumpet with similar possibilities was called "Die Inventions Trompete." Mr. Hampel also discovered that he could lower the entire register of the instrument a half tone by putting his hand in the bell, called "stopfen" (stopping) which greatly increased the possibilities of the instrument; but this had one very decided disadvantage in that it changed the entire timbre of the tone quality.

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During the seventeenth century a trumpet called "Tromba di Tirarsi" (trumpet to pull out) was invented. This instrument was somewhat similar to our present-day trombone and was quite frequently used in the compositions of Johann Sebastian Bach.[8]

More drastic steps were taken toward the end of the eighteenth century, by the introduction of side holes covered with keys and of a sliding mechanism. Key trumpets were invented in 1770 by Kolbel of St. Petersburg, but were soon abandoned since side-holes, though fairly satisfactory on conical instruments such as cornets and bugles (key bugle), are really not applicable to instruments with a cylindrical bore.[9]

In 1801, Widinger, trumpeter in the Imperial Court Orchestra in Vienna, improved this invention by putting five keys on his horn which enabled him to play the entire chromatic scale. The tone quality of those trumpets was far from perfect. At that time there were three divisions of trumpets in general use. In the first division were three high pitched trumpets playing in A, G, and G flat; four medium pitched instruments in F, E, E flat, and D; and five low pitched trumpets built in D flat, C, B, B flat, and A. The most important invention in connection with brass wind instrument manufacture and which enabled instrumentalists to produce a perfect chromatic scale for the first time was conceived by Friedrich Bluhmel of Pless, Upper Silesia, in 1813. This was the rotary valve, and he sold his invention to Heinrich Stolzl

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[8] Ibid., p. 6.

[9] Apel, op. cit.

who applied for a patent on it. Joseph Riedl, a brass instrument maker of Vienna made further improvements on this valve.[10]

In 1839 Perinet of Paris invented the so-called piston type valve which is still in use. Since that time numerous valve systems have been invented and tested but the rotary and the piston type valves are the only two which have survived and are in general use today. Rotary valves are mostly used in Germany, Austria, Russia, and Italy, while the Perinet valves are used in most English speaking countries and in France.

"The first example of a part for the valve trumpet would seem to be that in Halevy's 'La Juive' (1835) in which two valve trumpets are used side by side with two crooked natural trumpets."[11] Because of the comparatively recent development of such brilliant trumpet technique, composers have not only used the trumpet as a melodic instrument but have, on many occasions, used the instrument on a plane superior to that of the woodwinds. One has only to study the scores of Stravinsky, Shostakovitch, Hanson, Harris, etc., to see that this is true.

The Horn

Since all of the earliest brass instruments are related, to some extent, the following explanation will deal only with the most immediate predecessors of the modern horn.

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[10] Bach, op. cit., pp. 6-7. [11] Apel, op. cit., p. 772.

The French horn (French, Cor-a-pistons; Italian, Corno Ventile; German, Ventilhorn) in its earliest form was a type of hunting horn made of a plain pipe which was coiled in a circle large enough to permit it to be carried over the shoulder. It had a shallow mouthpiece of the trumpet pattern and as a consequence its tone was loud and brilliant. "Towards the close of the seventeenth century the hunting horn was built in a considerably smaller size, proper for use in the orchestra."[12] These instruments were similar in most respects to the modern horn except that they had no valves or crooks so that only the tones of one in the same harmonic series could be obtained. The details of the development leading from the hunting horn to the natural horn are difficult to trace.

> Throughout the first half of the eighteenth century the orchestral horns had a trumpet-like sound and were frequently objected to as being coarse and vulgar. It was not until 1750 that the instrument took on those proportions which gave it its typical mellowness of timbre.
> . . . . . .
> In 1770 the horn player Kolbel constructed an instrument called "Amorschall," i.e., a horn with a modified bell and with lateral holes covered by keys, the first instance of the use of keyed brass instruments.
> . . . . . .
> Around 1770 the horn player Hampel of Dresden discovered that the natural tones of the horn could be lowered to the extent of a semitone or a tone by inserting the open hand with the fingers close together into the bell. This technique made it possible for the first time to produce "artifical" horn tones, thus bridging to some extent the gaps between the natural tones.[13]

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[12] Ibid., p. 341. [13] Ibid.

In the late eighteenth century horns were provided with crooks, i.e., additional lenghts of tubing by which the fundamental tuning of the instrument could be changed. This change could not be made while the instrument was being played. Only in its higher register, then, where the partials are close together, was the "natural" horn a satisfactory instrument. Certain "stopped" tones, in addition to the natural harmonics, could be produced by blowing in a certain manner, or by inserting the hand into the bell of the instrument; but in quality, these tones were very different from the "open" tones.

In 1813 an invention was made which revolutionized both the trumpet and the horn; this was the system of valves, or pistons. As stated in the discussion on the history of the trumpet, this invention was made by Bluhmel of Pless, Upper Silesia, and the type of valve that he invented is known as the rotary valve.

> Crooks built into the instrument were provided with a piston having two holes of exactly the diameter of the pipe. In their natural position the lower holes in the pistons do not affect the natural length of the pipe. Depressed, the higher hole in the piston communicates with a built-in crook, thus instantaneously lengthening the whole column of air exactly as if a new crook had been inserted. A complete chromatic scale of open notes is thus made available--an improvement of incalculable value for orchestral music.[14]

"The horn's orchestral use began early in the eighteenth century against some opposition on account of its alleged

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[14]D. N. Ferguson, A History of Musical Thought, p. 202.

harshness."[15] The first example of a part for the valve horn appeared in 1835 in Halevy's "La Juive." This is also the first time a part for a valve trumpet appeared.

It must be remembered that the natural horn was not abandoned overnight in favor of the horn with valves. Brahms, as well as the rest of the composers in his day, continued to write for the natural horn as well as for the horn with valves. It is possible that the composers of that time thought the horns with valves to be a "passing fancy." Moreover, for some years after the invention of valves, we find composers (Brahms among them) writing for two valve horns and two natural horns in the same composition.

As is true with the trumpet, the comparatively recent development of such brilliant horn technique has led composers not only to deal more often with the horn melodically, but also to write more complicated, technical passages for the instrument.

The Trombone

The trombones (French, Trombones; Italian, Tromboni; German, Posaunen) were the first of all our brass instruments to appear in their present shape. In many pictures of medieval bands and orchestras it is the familiar slide-mechanism and the characteristic downward slope of the bell-joint in the "Sackbuts" (under this name they existed from early times

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[15]W. S. Pratt, The History of Music, p. 346.

much as they are at the present) that first attract a modern musician's attention. The trombone "developed in the fifteenth century out of a large trumpet (hence the name trombone, i.e., large tromba) by the addition of a slide, and the earliest representations, on paintings of the late fifteenth century, show all the essentials of the present instrument."[16]

> In the sixteenth and seventeenth centuries there seems to have been, besides the alto, the tenor, and the bass, a very high soprano trombone, in appearance and pitch something like the soprano trumpets which one sees in Bersaglieri bands. In Bach's day it was the custom at church festivals to give each of the four parts of the chorale to a trombone in unison with the voices, and it was either to this soprano trombone or to the old Zinke that the highest part was alloted.
> . . . . . .
> The extreme compass possible on the Zinke-family was from the first added A below the staff, in treble cleff, to an octave above the first added A above the staff, in treble clef. This instrument gradually fell into disuse, and, according to Gevaert, showed the last flickering signs of life in Gluck's Viennese production of Orfeo (1762). Gevaert adds, "Twenty years later, the old instrument having been definitely put aside, Mozart replaced it, in its office of soprano to the trombones, by oboes and clarinets playing in unison. For more than three-quarters of a century afterwards, the orchestra had no brass instrument able to execute the simplest diatonic scale at the pitch of a woman's voice."[17]

The German name posaune points to another line of descent, the large and straight buysine, a name which in turn goes back to the buccina. The buysine was a medieval

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[16]Apel, op. cit., p. 767.

[17]Cecil Forsyth, Orchestration, p. 133.

straight trumpet from which the trombone eventually evolved. The buccina was an ancient Roman brass instrument, but it differed from the buysine in that it was longer and was curved so that it nearly formed a circle. "The last was a psuodo-antique variety of the trombone used during the French revolution for festive occasions, with the bell shaped into a dragon's head."[18]

Trombones were common throughout the sixteenth century in the ceremonial bands of princes and of large cities as well as in churches. Since the trumpets of that time were limited to the performance of military signals, the trombones were used in the rendering of art music because the sliding mechanism made them suitable for this type of work. Because of the less expanded bell of the old trombones, their sound was relatively soft and therefore blended with the strings.

The soprano trombone soon dropped out of use, leaving the alto, the tenor, and the bass in possession of the field. This continued to be the usual arrangement down to Beethoven's middle life, when the alto trombone began to find itself edged out of the orchestra. This was due to the fact that its tone quality in the middle and lower registers could not compete successfully with that of the tenor trombone, while in its upper register it was at an equal disadvantage with the trumpet. Because the orchestral tradition was already

[18]Apel, op. cit., p. 103.

firmly fixed on three different trombones, another trombone was brought in to take the place of the alto trombone. As a result of this, a second tenor trombone became firmly established in the orchestra. These two tenor trombones, added to the bass trombone, established a formula which is adhered to in most countries up to the present day. An exception to this tradition is to be found in France. There, the bass trombone began to be discarded around 1830. Since then, the French custom has been to write for three trombones, all of which are tenors. Later a "contra-bass trombone was added by Richard Wagner for the performances of his Music Drama."[19]

"Among the earliest compositions prescribing trombones are G. Gabrieli's 'Sacre Symphoniae' (1600)."[20] Bach and Handel used trombones occasionally, but mostly in unison with voices for the sake of greater sonority. "Gluck was perhaps the first to make effective use of the trombone for accompanying chords, e.g., in the aria 'Divinite du Sytx' of his 'Alceste,' and Mozart gave the trombones a prominent place in his 'The Magic Flute' and 'Don Giovanni.'"[21] Beethoven introduced the instrument into symphonic music in the finale of his Fifth Symphony. However, it was not until after 1850 that the trombone became a firmly established orchestral instrument.

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[19]Forsyth, op. cit., p. 134.

[20]Apel, op. cit., p. 767. [21]Ibid.

The Tuba

It is almost impossible to define "tuba." The name seems to be applied, in free-and-easy speech, to any sort of present-day bass-pitched brass instrument other then the trombones. Properly, for the sake of clear understanding, it would be well to limit the term to such of those instruments as are of wide conical bore and possess cup-shaped mouthpieces. This, however, has not been done.

All the instruments called by the name may, historically considered, be looked on as the artistic successors of the serpent, Russian bassoon, and ophicleide group, these of which belonged to the cornett and key bugle family.

"Composers minds have been confused, partly by Wagner's unfortunate misnomer 'Tuben' for a family of instruments only one of which is a true tuba, and partly by a number of inaccurate descriptions in which the distinction between the whole-tube and the half-tube groups of valve-brass has been overlooked."[22]

What we now call the tuba underwent a series of changes from the time of the cornett family, which goes back to the tenth century, up until nearly the middle of the nineteenth century. "William Friedrich Wieprecht, from 1824 in royal service at Berlin and from 1838 chief of the Prussian military bands, in 1835, with the help of others, perfected the

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[22]Forsyth, op. cit., p. 151.

bass tuba."[23] "Two of the earlier instances of the use of the tuba are an overture by Otto Bach (1858) and Wallace's opera 'Love's Triumph' (1862)."[24]

> The orchestral godfather of all this group of instruments was Richard Wagner. His original and successful intention was to introduce a new tone-colour into the orchestra akin to but different from that of the horns. The new instruments were to be, and actually were, modified horns.[25]

Wagner, desiring to be able to write eight-part harmony for horns in "The Ring," added to the two pairs of horns of his previous orchestra two pairs of an instrument devised by him, and then, to thicken the bass, added another instrument which was capable of playing an octave below the normal bass of the set. Therefore, he had nine instruments in all. The new instruments, which took the lower notes of his harmony, were as follows: (1) tenor tuba, (2) bass tuba, and (3) double-bass tuba or contra-bass tuba.

The tenor tuba was not really a tuba, because its bore approached the comparatively narrow bore of the horn, and its mouthpiece was much like the funnel-shaped mouthpiece used by the horn. Since the mouthpieces for these tenor tubas had no cups, their tone was of a smooth quality not unlike that of the horn. Their fundamental key was that of B flat,

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[23]Pratt, op. cit., p. 475.

[24]Percy A. Scholes, The Oxford Companion to Music, p. 962.

[25]Forsyth, op. cit.

and they had three valves like those of the horns, plus a fourth one for correcting the intonation of the lowest octave.

The bass tuba actually was not a true tuba either. It was a reproduction of the tenor tuba, the difference being that the bass tuba was larger and had a range lying a perfect fourth lower.

The double-bass tuba or contra-bass tuba, unlike its companions, was a true tuba. It had the bore of a tuba and also had a cup-shaped mouthpiece. Its fundamental was C and its lowest note was the E flat five spaces below the bass staff. Wagner used two tenor tubas, two bass tubas, and one contra-bass tuba. "This group, then, of the so-called 'Wagner Tubas' was made up of two distinct types of instrument, a quartet of two high and two low modified horns and one true tuba."[26]

There are four tubas which are in general use today, all of them having been modeled after Wagner's true tuba. They are: (1) the euphonium or tenor tuba in B flat, (2) the E flat bass tuba or EE flat bass tuba, (3) the F bass tuba, and (4) the B flat bass tuba or BB flat bass tuba. Technically, there is a difference between the E flat bass tuba and the EE flat bass tuba and also between the B flat bass tuba and the BB flat bass tuba; the pitch is the same but the double letter indicates, in each case, a larger bore.

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[26] Ibid., p. 152.

The euphonium or tenor tuba in B flat has a fundamental note of B flat. This instrument has four valves, making it possible to join up the fundamental note chromatically with the next harmonic and so providing an easy range of three octaves from B flat three spaces below the bass staff, some players attaining a range of over four octaves. For marching lightness this instrument is sometimes robbed of its fourth valve and the corresponding tube, and it is then reduced in compass at the bottom, reaching only an E below the staff in bass clef.

The E flat bass tuba or the EE flat bass tuba sometimes has four valves, as in the euphonium or tenor tuba in B flat, and the range lies a perfect fifth lower. More commonly, however, only three valves are provided. This instrument is sometimes produced in a circular form for placing round the body of a marching bandsman, and is then called the E flat helicon (a more recent American innovation of this instrument is the Sousaphone, the difference in the two instruments being in the shape of the bell).

The F bass tuba is a reproduction of the E flat bass tuba or the EE flat bass tuba, the only difference being that the range of the former extends one whole tone above that of the latter. This instrument is often preferred for orchestral use over the other tubas.

The B flat tuba or BB flat tuba is, in fundamental note, an octave below the euphonium or tenor tuba in B flat. It

is usually provided with only three valves and its range, in comparison to the euphonium or tenor tuba in B flat, is short by an augmented fourth at the bottom of its register (i.e., the bottom note, instead of being B flat is only E--the fundamental B flat being barely possible). This instrument, like the E flat bass tuba or EE flat bass tuba, sometimes takes the circular form; it is then called the B flat helicon (or Sousaphone).

The development of the tuba and of tuba technique has affected modern writing in much the same manner as has the development of technique on the other advanced brass instruments. More and more is demanded of brass players in the way of technique, and no exception has been made for the tuba player. In more recent compositions, the tuba has not only been given a more interesting part but very frequently is treated as a melodic instrument.

CHAPTER III

MECHANICAL AND ACCOUSTICAL FACTORS OF BRASS INSTRUMENTS

Common Factors of All Brass Instruments

Numerous mechanical improvements have been made in both the rotary and piston type valve. These improvements have not only brought about a surer-acting valve but have greatly improved the playing qualities of the instruments to which they are attached. Each style of valve has its advantages and it is debatable as to which is the best. The rotary valve is more reliable and is favored by those players who have not gained the flexibility of finger movement necessary to operate the piston valves successfully. The keys of the rotary valves do not rest directly on the rotary piston but on bearings and as the tone goes practically straight through the valves on open notes, the playing is freer. One peculiarity of the rotary valve is that the action is considerably shorter than that of the piston valve and it can be lowered as much as desired. On the other hand, if the rotary valve gets out of order it is very difficult to repair. Should this happen during a concert there is slight possibility that the player can take his instrument apart and repair it instantly.

Piston valves allow a clearer technical performance and in quick passages the player has one great advantage in that even if he does not press the valve fully down to the low position, the valve will be thrown down by its motive force. Piston valves can be taken apart and cleaned easily and are very simple to adjust. However, they do require great agility of the fingers and must be pressed down correctly. Any side pressure will cause friction between the piston and the cylinder and delay the valve action.

> Perfect valve action can only be secured when the pistons and casings are of different metals. The coefficient of friction between two different metals is much smaller than if two parts of the same metal are rubbed together. Nickel silver has proven by far to be the best material for pistons as it is very hard and peculiarly resistant to the acid in saliva.[1]

It is impossible for a musical instrument to be built perfectly in tune. From the study of acoustics we learn that enharmonic tones like C sharp and D flat are distinctly different notes and have a different number of sound vibrations. It is the same with other enharmonics; therefore, when tuning a piano the expert piano tuner tunes the D flat between D flat and C sharp so that the pianist will be able to use it for both tones. A brass instrument manufacturer has to face these difficulties of tempering the scales, as well as other obstacles impossible to overcome exactly.

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[1]Letter, Conn Instrument Company, Elkhart, Indiana, August 26, 1949.

Silver or gold plating does no great harm, but it does have an effect. It is a well known fact that when light travels from a lighter into a heavier opaque medium a part of the light will be reflected, and the other part will travel through. For example, when the sun shines on a clean window pane a part of the light is reflected, the rest entering the room through the glass. It is similar with sound; the echo from stone walls in mountains, the echo of thunder which repeats many times, and the instant crash of lightning is caused by reflection of the sound against the stone wall or against the clouds which are a heavier medium than air. The case is almost the same with silver and gold plating in that when a brass instrument is played the metal vibrates and transmits its vibrations to the atmosphere not only through the opening in the bell but also through the walls of the tubing and the bell. Sound waves going through the brass bell also have to pass through the silver or gold plating and both silver and gold are of heavier density than brass; therefore, they will not only prevent the brass from vibrating properly but as both metals are soft and without spring temper they also reflect a part of the sound wave and therefore do not allow the vibrations to be wholly transmitted.

The velocity of sound is not the same through every medium. For instance, sound travels through air at the rate of 340 meters (about 1100 feet) per second, through copper

or brass 3558 meters (about ten times as fast as through the air), through silver 3285 meters, and through gold 1744 meters. There is not a great deal of difference between the velocity of sound through brass and through silver. Therefore, silver plating does not affect the vibrations as unfavorably as gold plating. An instrument in brass finish will always give a more brilliant, freer tone, of somewhat metallic timbre, while a plated instrument will sound more mellow and slightly heavier according to the thickness of the plating. The coating of gold or silver with which instruments are plated is always held below certain limits and is not sufficiently thick to discourage the player from using a plated instrument as other advantages gained from plating amply over-balance the disadvantages and greatly increase the durability of the instrument.

> A brass instrument cannot be forced out of tune. The entire tuning of the open notes depends on the proportions of the inside bore. If a player discovers that his instrument "becomes" out of tune, he is either mistaken and the instrument was always out of tune or it is clogged up inside.[2]

The latter condition will, to a certain extent, affect the tuning. A thorough cleaning will restore to the instrument the playing qualities it originally had. "It is absolutely impossible to blow into tune an instrument which was faultily constructed from a tuning standpoint."[3] Some players have

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[2]Vincent Bach, The Art of Trumpet Playing, p. 13.

[3]Ibid., p. 14.

claimed that they did correct faulty tuning by persistently forcing into the instrument the correct tones; however, they are in error as they only acquired the habit of deforming their embouchure by forcing certain notes up or down and by habit became so used to such artificial expedients that it became natural to play that particular instrument in tune. In other words they did not "blow in" their instruments but rather their lips and if another competent performer played upon that same instrument he would find it just as much out of tune as it was originally. The unfortunate result of such embouchure deformation is that the player will invariably force certain notes out of tune on the most perfect instrument. Of course, a certain amount of practicing will restore the embouchure. It is for these reasons that many players cannot correctly judge a new instrument upon the first trial. "Some will comprehend the qualities of an instrument in one day's trial, others not for months but it had been demonstrated that the trained musician will be able to give a fair judgment after a trial of approximately five days."[4]

> Some players still have the idea that if they play too loud they will overblow their horn. Especially is this true if one has bought a new instrument. How this is possible I fail to see, but even professionals still believe this foolishness. One may play a tone a little sharp and then a little flat but this is due to the increase and decrease of frequency of lip vibration. No human being is able to overblow a brass instrument. A

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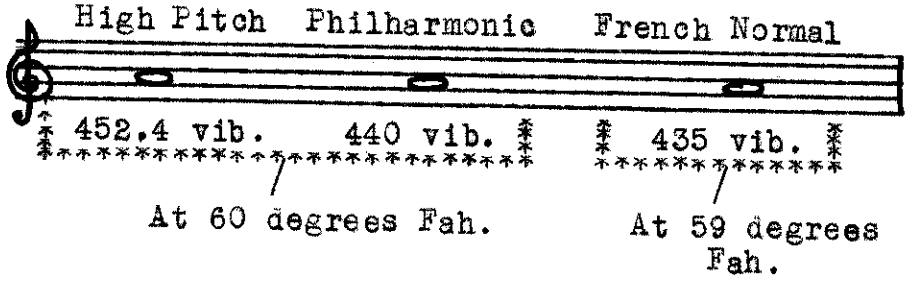
[4] Ibid.

player might overblow his lips--that is, he is unable to judge or regulate the air pressure with the elastic quality of his lips.[5]

The pitch generally used in leading musical organizations in the U. S. A. is the so-called "Low Pitch" (Philharmonic Pitch) with A as 440 vibrations (double vibrations) at 60 degrees Fahrenheit. Besides the low pitch, England also used the "High Pitch" which is mostly used in military bands and adopted at Kneller Hall (The Royal Military School of Music). The high pitch is A equals 452.4 double vibrations at 60 degrees Fahrenheit. In 1858 France adopted the International Pitch, Normal Pitch (diapason normal) with A equal to 870 single vibrations (435 double vibrations) at 59 degrees Fahrenheit. This pitch has been adopted all over Europe with the exception of England.[6]

Therefore, the three pitches mostly used are:



The Trumpet

The trumpet is an instrument with a distinct character of its own. Its tubing is curled but once, and the characteristic long model shape offers little frictional resistance to the air passage and gives the instrument an open, clear, penetrating tone of the heroic quality needed in symphony, opera, and other kinds of orchestral performances, as well as in

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[5]William Thieck, Daily Studies for Trumpet, p. 6.

[6]Bach, op. cit., p. 17.

dance work. The correct inside shape of a B flat trumpet consists of a nine-inch conical mouthpipe followed by a seventeen-inch cylindrical bore tuning slide and valve tubing. The bell is of conical bore. The large cylindrical bore allows a good sized column of air to vibrate, which produces a tone of great volume and good carrying power. Hence, it can be said that the trumpet is approximately one-third conical and two-thirds cylindrical.

The cornet differs from the trumpet in that it has a conical bore throughout the entire instrument with the exception of the valve tubing. Hence, the cornet can be said to be two-thirds conical and one-third cylindrical. The cornet tubing starts with a smaller receiver pipe than the trumpet and the conical bore through the mouthpipe gradually grows larger but with less taper. The cornet is usually bent in two curls and consequently is shorter than the trumpet. This double curl combined with the smaller conical bore offers more resistance and causes the tone to be more mellow and flexible. For these reasons, it is most effective in solo and band work. However, the trumpet has a majestic tone quality in fortissimo that cannot be procured on the cornet nor on any instrument without a cylindrical bore.

Trumpets are built in various bores; small, medium, and large. However, these specifications are misleading if the micrometer measurements are not furnished. "The so-called

medium bore trumpet with an inside bore of .453 inches or .462 inches throughout the cylindrical bore valve tubing is recommended for general work."[7] When the instrument is properly proportioned, sufficient volume of tone can be secured for large orchestra work. The so-called small bore trumpets do not fill the requirements of the professional artist; they may play easily so long as the inside tubing is perfectly smooth and clean but after being used for a certain time the inside of the tubing becomes covered with saliva, verdigris and other accumulations which make the bore smaller and gradually kill the tone and make it "stuffy."

No quick change from B flat to A is perfect. The inside proportions of a B flat trumpet are different from an A trumpet and by pulling out the A slide, only the length of the tubing is changed. The proportions of the inside bore have not been affected. There is the same difference between playing in B flat and in A as between playing the violin and viola. The finger spacing on the viola is larger than on the violin and a violinist will have difficulties playing in tune when using two instruments interchangeably.

Every trumpet player is aware that when he

> . . . changes his B flat trumpet to A it is necessary to pull out every valve slide, the first slide one-eighth of an inch, the second slide one-sixteenth of an inch, and the third slide about three-sixteenths of an inch. In using his instrument in straight B flat, he will lower

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[7]Bach, op. cit., p. 10.

> each open note one full tone lower by pressing down the first valve. He will lower each open note one-half tone by pressing down the second valve and will lower them one and one-half tones by pressing the third valve. When the second key is pressed down the instrument is lowered to A, exactly as if the quick change were operated. Consequently, if the first valve is used while the second piston is down the first slide should be pulled one-eighth of an inch as is done when the A change is in use. Therefore, the combined use of the two valves must make the tone too sharp. This is especially noticeable if all three valves are used together, for by pressing down the third valve the instrument is one and one-half tones lower and is turned into a G trumpet. The brass instrument manufacturer must do as the piano tuner--go to the "golden middleway" and make each individual valve slide a fraction too long so that it will not seriously interfere with the single valve tones and that the sum total of the three oversizes are partially correct and offset the particular deficiency. By using all three valves with the addition of an extension slide on the third piston, the effect disappears entirely.[8]

Since it is impossible to manufacture a trumpet which is perfectly in tune in all registers, a compromise must be made somewhere. On most trumpets, the D and E in the staff are flat. The degree which these notes are out of tune affects the way the horn plays in tune in both the upper and lower registers.

> Manufacturers today try to build a trumpet with the D and E in the staff slightly flat. By doing this, the low C sharp and the D below the staff are not nearly so sharp as they would be if the D and E in the staff were not lowered some. Also, by lowering the D and E in the staff slightly, there is not as much of a tendency for the upper register to go sharp.[9]

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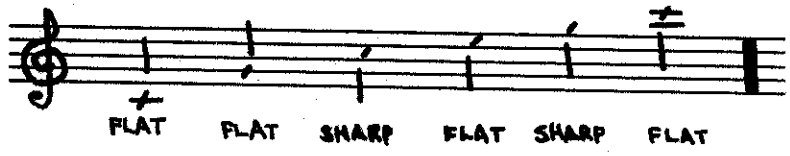
[8]Letter, Vincent Bach Corporation, New York City, July 25, 1949.

[9]Letter, Olds Music Company, Los Angeles, California, June 3, 1949.

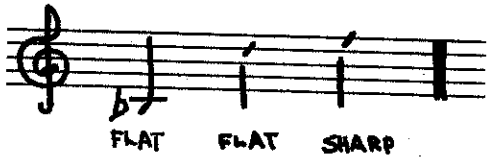
This is illustrated by the following graph which is taken from the Conn Repair Manual, Section Two, page 40:

Here, the dotted line indicates perfect intonation. Where the plotted curve lies to the left of this dotted line, the notes are flat; where the curve lies to the right, the notes are sharp. Data for these plotted curves were secured from many tests as measured by the Conn Stroboscope.

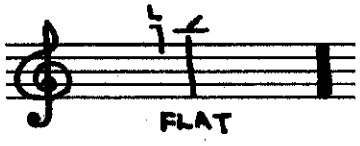
The following notes are quite frequently out of tune on trumpets and cornets:



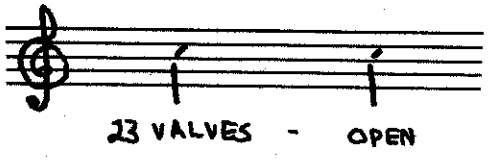
The most common defects on the first valve notes are as follows:



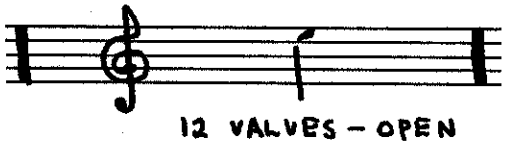
The most common defect on the second valve note is as follows:



The third position is seldom used by itself and when it is used to facilitate rapid technical passages the notes produced are invariably flat and of poor quality. For testing purposes, therefore, it is of minor importance unless used in combination with the first or second valve. To test the third piston, try middle C on the trumpet in the below manner:



This C (above) must be played in tune open, or when using the second and third valve. So the E



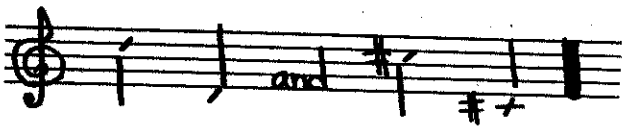
must also be in tune if played with the first and second valves, or open. Also, the G

must be in tune if played with the first and third valves, or open.

It is seldom that one finds a horn with alternate fingerings which are correctly in tune. However, if all the open tones are in tune, and the notes produced with the first valve

and the second valve are also in tune, one may consider himself lucky and proceed to learn which notes to "favor" in order to play the entire compass of the instrument in tune. If the open tones are in tune and also the tones made by the previously illustrated valve combinations, then the entire instrument is as perfect as human hands and brains can build it.

A trumpet should not be condemned because the octaves do not fully correspond.



In the above example, the low D and C sharp will be very sharp. If, however, a trumpet were built so that these octaves were in tune, then the tones between these two octaves, which were produced with the aid of the third valve or by the second and third valves, would be very flat. Today, most trumpets and cornets are built with a "kick slide" attached to the third valve tubing. This slide is thrown out when playing a low C sharp or D, thus adding more tubing through which the air column must circulate. This makes these tones in tune in relation to the other notes which are being produced on the instrument. By using this slide the entire range of the trumpet can be played well in tune. Of course, certain notes do have

to be "lipped" up (such as the D and E in the staff), but this becomes automatic after one has become accustomed to his instrument.

The Horn

> Our present-day valve horn consists of a spirally-coiled tube of brass some seven feet, four inches long. The F-crook with which it is invariably played in this country adds another four feet, four and one-half inches. The total length of the instrument is therefore eleven feet, eight and one-half inches.[10]

The horn is very narrow at one end (about one-fourth of an inch), widens as a long drawn-out cone to the other, and ends in a large bell which is from eleven to fourteen inches across. The French horn uses a funnel-shaped mouthpiece which contains no inside cup.

In all of these characteristics it differs greatly from the trumpet, which is a much shorter tube of cylindrical bore throughout its length until actually approaching the bell, with that bell much smaller in diameter. Also, the trumpet has a cup-shaped mouthpiece.

Three valves controlling as many extra lengths of tubing give the horn the practical advantage of a chromatic compass between C in the staff in bass clef and the first added C above the staff in treble clef, and the theoretical advantage of a downward extension of compass through a diminished fifth to F sharp in the last space in bass clef. Small tuning

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[10]Cecil Forsyth, Orchestration, p. 109.

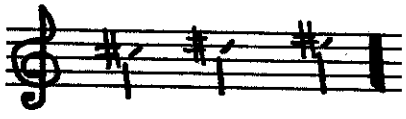
slides are attached to these extra lengths of tubing and give the player the opportunity of making some necessary adjustments in pitch. Theoretically, the bore of the horn is conical, but the extra lengths of tubing are actually cylindrical.

The horn is now a chromatic valved instrument, and every note can be taken as an open note from a fundamental. The old horn, however, still persists in the new, and the whole series of "hand" and "stopped" notes with its accompanying variety of tone color is still available.

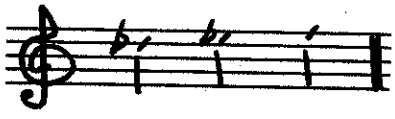
> The question of the "hand notes," however, needs a little explanation, as the student will find two diametrically opposed statements on this point in instrumentation books. They are: (1) That the insertion of the hand in the bell lowers the pitch of the instrument; (2) That the insertion of the hand raises its pitch. Incredible as it may seem, both of these statements are right. Let us see what the facts are: (1) If a horn is placed in a free position, say on its side on a table, so that no lip-pressure is possible, and if the air-column inside its tube is then set in vibration by the lips a definite note is produced. If the hand is then inserted into the bell a gradual or portamento flattening of the note is heard. It is important to notice the word gradual. Practically every sound between the extreme limits of the two notes is heard successively. Now this is in essence the method of stopping which was practiced before the days of the valve, a method which gave the artist, restricted though he was, a great variety of tone-colour. (2) After the invention of the valve-system it was found that by bringing the hand hard-up into the bell and exerting considerable lip-pressure a totally new series of muffled or stopped notes could be produced one semitone above pitch. This raising of the pitch by means of a new technique differs integrally from the old hand-lowering in that any one of the raised series of notes cannot be produced as the highest point of a portamento upwards from the lower note. On the contrary it is a definite clear-cut semitone above.

The scientific reason of this curious natural fact is still doubtful. Mr. D. J. Blaikley, the eminent authority on Wind-Instrument acoustics, explains it as being a raising "only to the ear." The harmonics are really higher numbers in the harmonic series from a disturbed lower fundamental. The notes

(Nos. 8, 9, 10) from a fundamental C natural do not become the notes



(Nos. 8, 9, 10) from a higher fundamental C sharp. They become the notes



(Nos. 9, 10, 11) from the lower fundamental C flat. From the practical side the very great difference in technique between the old and the modern series of stopped notes makes this explanation appear feasible.[11]

With the new hand technique, the player has a new series of stopped notes, over all of which he has adequate control. As he has a complete chromatic compass in open sounds, he has--with certain reservations--a second complete chromatic compass in stopped sounds. He need only read his part one

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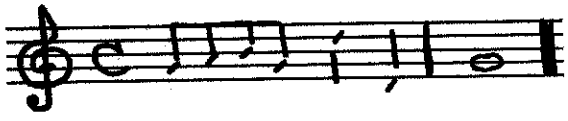
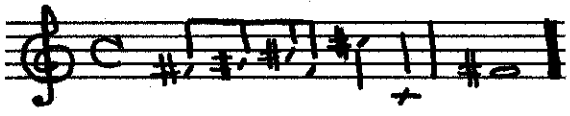
[11] Ibid., pp. 111-112.

semi-tone lower than it is written, and he can reproduce any given passage in muffled notes at its correct pitch. Thus the following passage



when played as hand-notes would be automatically read by the player as



> It is interesting to note that, in an art where innovation is looked on as madness or crime, a certain class of player persistently refused to recognize the necessary alteration and extension in technique. This was the more to be regretted as the modern hand-technique gives the player the certainty of reproducing his passages in stopped notes, while the attempt to adapt the old hand-technique to the conditions of modern music has always ended in failure. If the old hand technique had produced a different quality of stopped note from that obtained by the modern method, one could well understand the reasons for its persistence. But the results to the ear are identical. There is only this difference--that one method is certain, the other uncertain or impossible. Even a simple scale cannot be played in stopped notes by the old method. It is liable at any moment to fizzle-out in a dismal groan.[12]

It can be seen that, without the aid of any mechanical mute, the horn player is already in possession of a varied system of muffled and half-muffled tones. Their production

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[12] Ibid., p. 112.

is a matter for his judgment as an artist. At the same time, the indication of these muffled notes in a score nowadays is a necessity. Before the invention of valves certain notes had to be played "stopped." Now, however, none need be, but most can be. For this reason, the composers today mark such notes and passages in the part with "con sordino" or "stopped."

The question may be asked; what have we lost in adopting the valve system for the horn; or, have we lost anything?

> The difference is perhaps not the difference between day and night, but it is the difference between a November and a June day. An experiment which will convince the student on this point once and forever is easily made. It only needs a double-room with shut folding doors, a horn player armed with two crooks, the D and the F, in the other room, and the first three notes of the Oberon Overture. The instrument itself has changed. It has gained something and lost something. The gain is in the direction of added flexibility, and even when we sum up the loss it leaves the instrument still with a tone of great purity, beauty, and nobility.[13]

The Trombone

The trombone is like a trumpet in consisting of a tube of cylindrical bore, a moderate-sized bell, from seven to nine inches in diameter, and a cup-shaped mouthpiece. It differs from the normal trumpet in possessing, as its means of extending the tube, not valves operated by pistons, but a sliding arrangement. It also differs from the trumpet in a small but important detail: its mouthpiece is larger, giving a more solemn tone quality. Like all brass instruments, the trombone is an application of the principle of the harmonic series.

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[13] Ibid., p. 118.

The lips, in the mouthpiece, act as a vibrating reed and, according to the greater or less rapidity the player gives the vibrations, produce either the fundamental tone of the tube or a chosen one of the harmonics above this. As the harmonic series is, of course, a gapped one, what we may call the normal length of the instrument (i.e., its length with the tube at its smallest) is increased by successive extensions of that length by the sliding of the tubes, giving, for each new length adopted, a new pitch to the series of harmonics. There are seven recognized positions, giving seven fundamentals, and thus, seven repetitions of the harmonic series at different pitches a semitone apart. In this way gaps are filled and, also, many a note is attainable in several different ways--as a higher harmonic of a greater length position or as a lower harmonic of a lesser length position.

The difference between a slide instrument such as the trombone and a valve instrument such as the trumpet, insofar as the method of obtaining any desired note is concerned, is something like the difference between the violin, with its smooth fingerboard, and the viol, with its fretted one; there is nothing but the players own judgment to guide him to the point at which he should stop the motion of the slide, so that good intonation depends purely on that judgment. "And, since the movement from position to position occupies an appreciable fraction of a second, a true legato is not obtainable--though

a glissando is."[14] Although this last statement is technically true, there are many fine trombone players today who play with a fine legato. This legato is obtained through the type of tonguing which is used. A fine trombone player can play a legato passage by using this "soft tonguing," and to even the accomplished musician, it sounds as though the tongue is not being used. The art of slurring without the tongue can also be mastered on the trombone through intensive practice.

Valve trombones have been made and used. Their tone is, however, not so good, on account of the extra convolutions of the tube. Like the trumpets and horns, they usually have had three valves. A combined slide and valve trombone has also been introduced, consisting of a slide trombone furnished with a single valve worked by the left thumb and lowering the pitch a fourth, occasionally a fifth. This facilitates certain passages by supplying an alternative to the more awkward positions, and extends the downward range above the pedal notes.

Unlike the trumpet and French horn, the trombone is not a transposing instrument. While the trumpet sounds a major second lower than what is written and the French horn (horn in F) sounds a perfect fifth lower than what is written, the trombone sounds the actual pitch which is written for the instrument. While most trombone parts are written in bass clef, there is considerable music for the instrument which has been

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[14]Percy A. Scholes, The Oxford Companion to Music, p. 954.

written in tenor clef, and occasionally one sees parts written in alto clef. This is especially so in symphonic literature.

Although the shape of the trombone is not much different than it was back in the fifteenth century, many improvements have been made to the instrument in the way of improved slides, mouthpieces, and, as is the case of all brass instruments, better materials and workmanship.

CHAPTER IV

PROPER CARE OF BRASS INSTRUMENTS

Introduction

All brass instruments should be kept dry, clean, and free from body acids. Perspiration from the hands contains certain acids which attack metal. "Among these harmful body acids are butyric, lactic, and traces hydrochloric."[1] Some perspiration is alkaline, but is just as harmful as acid. In some persons, the perspiration is such that holes are eaten right through plating and brass wherever the hands are accustomed to touch the instrument. A leather protector of some type or a cloth should be used to keep all perspiration from the instrument, and the instrument should also be wiped off after having been used.

Saliva from the mouth also contains acids which attack metal. Carbonic acid is present at all times in saliva and other acids are found in the mouth, depending on food eaten and hygienic conditions of the mouth. Soft solder is especially subject to the effects of saliva acids, and this type of solder is used on water key nipples.

Not only in saliva, but in natural well or spring water, there are certain salts that dry as a white substance on the pistons and slides and act as abrasives,

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[1]C. G. Conn, Ltd., How To Care For Your Instrument, p. 1.

> causing the action to be retarded and wearing away the precious coating of nickel and chromium. These salts are chiefly magnesium and calcium carbonates and sulphates, but there are also appreciable amounts of chlorides of sodium, potassium, magnesium, and calcium.[2]

In certain parts of the country these salts are present in the water in greater quantities than in other parts. Water which is said to be "hard"--that is, does not make a good soap lather--has a high content of these salts. Those who prefer water to oil for new piston and rotary valves would do well in such localities to use distilled water. After using the instrument, be sure that all saliva and water is wiped off pistons and slides.

Foreign matter which accumulates in brass instruments impairs the acoustical performance. A surprising amount of food, candy, and other stuff accumulates in a wind instrument if it is not systematically cleaned out. It is often referred to by professional musicians as "hamburger" or "lungs," but regardless of name, it is filth that one should get rid of and keep rid of. Not only is it unhealthful, but it impairs the acoustical performance. It collects especially in crooks, and is usually the cause of instruments becoming "blown out of tune." If one of these accumulations occurs at a "node" in the wave of a certain tone, this tone sounds sharp. If an accumulation occurs where an "antinode" falls, the tone is flat.

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[2]Ibid.

Foreign matter also affects the mechanical action. Corrosion, as well as salts and other foreign matter, accumulates on piston valves. Valves with such accumulation will not work properly. It may not seem like much, but valves are fitted tightly and a little dirt between the piston and the casing is like a speck of dirt in one's eye.

> Here is the story, as shown by a typical case of "faulty" valves. When the instrument came in, the clearance between the piston and the casing of each valve was checked while they were dirty--before cleaning. Clearance was also checked after the valves were cleaned. The clearance for the three valves before and after is shown below:
>
> | | No. 1 | No. 2 | No. 3 |
> |---|---|---|---|
> | Clearance (dirty) | .0012" | .0011" | .0013" |
> | Clearance (clean) | .0016" | .0015" | .0016" |
>
> The clearance while dirty was 12, 11, and 13 ten-thousandths of an inch, or a little more than the thickness of a cigarette paper! When cleaned, the valves had a clearance of 16, 15, and 16 ten-thousandths of an inch, or a little more than the thickness of a cigarette paper plus one-half the thickness of another cigarette paper. Since .0012" (12 ten-thousandths of an inch) is the very minimum clearance for clean valves, you can imagine how the first and second valves worked--especially the second. Cleaning took .0004" (4 ten-thousandths of an inch) off the first two valves and .0003" off the third. This is only 1/8th to 1/10th of the diameter of a hair, but it was enough to transform good working valves into valves which wouldn't work at all. Modern tight-fitting valves have to be kept clean to get out of them the light, fast action which the manufacturer builds into them.[3]

Corrosion and dirt also affect the action of other working parts, such as valve slides, hinges, pivot screws, etc.

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[3] Ibid., p. 2.

The only way to preserve and keep one's instrument in tip-top working condition is to keep it "clean as a pin" and properly oiled and lubricated.

To keep brass instruments in perfect working condition, constant care and attention is necessary. Newly purchased instruments are particularly susceptible to the development of faults if they are not given correct attention. The new instrument should be thoroughly cleansed daily for the first week and at least twice a week thereafter. Run warm water through it, starting at the bell end, and do not fail to do this every day for the first week. It will keep the instrument clean and easy to blow, besides preventing the incrustations of oil and dirt which are so detrimental to tuning. An unsanitary instrument is a source of constant danger to the player, as the germs of tuberculosis and other diseases grow rapidly in warm, wet and unlighted places such as the inside of a brass instrument.

To clean out the inside of the tubing, a little ball of sponge can be cut to about the size of the mouthpipe and inserted therein. Next, tepid water should be blown through the horn, forcing this sponge through the tubing. This should be done with all valves down, and then with all valves up. Finally, let some water run through the bell end, and wipe off the pistons (or slide) and inside casings with cheesecloth.

High grade instruments have the pistons fitted very close and at the beginning they work stiffly. The player is supposed

to work them in according to his own finger pressure and within a week's time, with a fair amount of practice, they will begin to work much better. Several drops of oil should be placed on the valves daily. Very thin oil should be used. It has been proven that "Fly-Ded" (a fly spray) is much better than regular valve oil, which is sold at music stores, because while it does contain an oil, it is very thin and does not have a tendency to clog up the valves--something which regular valve oil will do.

A light oil not only lessens the friction but preserves the pistons against the ill effects of the acid of saliva. It also absorbs all corrosion and small particles of food that may be blown into the instrument. Occasionally the valves (or slide) should be taken from their casing and wiped off to remove the coating of oil which has accumulated. Especially is this true if regular valve oil is used. If the fly spray previously mentioned is used, this need not be done so frequently.

One should never spit on the valves (or slide) of a brass instrument. This is not only an unsanitary practice, but the acid in the saliva will eat into the pistons (or slide) in a short, making them leaky which spoils the intonation and causes the instrument to become hard blowing.

A fine brass instrument is a precision instrument and should be treated as such. Care should be taken to keep the

instrument from receiving any dents or undue treatment. In order not to collect dust, the instrument should be kept in the case when not in use.

The Trumpet and Tuba

When cleaning valves, the pistons should be removed and washed with castile soap in warm water, and rinsed in clear water. The inside of the valve casings should receive the same treatment. Care should be taken in handling the pistons as they are hollow and are easily dented. The pistons should be wiped dry with clean cheesecloth and placed on another clean cloth so they will not pick up any loose dirt. Next, the inside of the casings should be swabed out with the same kind of material, using the swab which is supplied with the instrument or a weighted string. If a metal swab is used, care should be taken to prevent any damage to the casing.

After the valves have been cleaned, it is very important that the No. 1 valve goes in No. 1 casing, etc. This obvious point is stressed because it is so often a cause of trouble. The interchange of pistons 1 and 3 will still permit the instrument to be played, but it will blow stuffy and will be out of tune.

Replacing cork and felt bumpers is really a job for an experienced repairman, but in an emergency one may have to do the job himself. If regular cork bumpers are not available, one can be made from an ordinary bottle cork. A glue not

readily soluble in water should be used to keep the saliva from soaking them loose. Most valve stems are marked to indicate just how high the bumper and felt should be to allow the piston to come up so that the ports in the piston accurately meet the knuckles in the casing. If there is such a mark on the valve stem, it is easy to cut the cork so the piston will stop at the proper place when the finger releases it. Keep shaving or sanding off the cork until when you sight across the top of the valve cap, the mark on the valve stem is level with the top of the valve cap; then, it is easy to see that the cork and felt are the proper height. If there is no such mark, it is wise to let an experienced repairman do the job. It is extremely important that the height of cork and felt is correct; otherwise, the ports in the piston and the knuckles in the casing will not meet accurately, and the instrument will blow stuffy and will lack resonance.

The springs should not be too soft, as stiff springs will always give better results. When inserting new valve springs, be sure first that they will stand absolutely straight on either end when stood on a plane, level surface. A bent spring, or one with slanting ends, will bend when compressed and scratch against the spring box, thus causing constant trouble with the valve. Be certain, therefore, that the spring does not touch the sidewalls and that it stands perfectly straight.

Before placing pistons back in the casings, one should be certain that there is no lint in the ports or later this will

come out and retard the action. Also, before putting the pistons back in the casings, a few drops of valve oil (or better yet, "Fly-Ded") should be placed on each piston.

Good piston valves are very accurately fitted

> . . . with clearance from .0012" to .0018" (one and two-tenths of a thousand to one and eight-tenths of a thousandth of an inch). The clearance on a side is just half this or about .0008" (8 ten-thousandths of an inch) or 1/4 the diameter of an average human hair. This does not leave much space for the film of oil, but a fine grade of oil will work all right. Valves that wear until the clearance reaches .0025" to .003" are liable to lead. Only a heavy oil which helps close up the excess clearance will make them playable.[4]

An instrument not properly cleaned and oiled will corrode after months of disuse. Valve caps will corrode and cannot be unscrewed. One should be careful not to use "strong-arm" methods in trying to loosen them. Also, pliers should not be used because they will mark up the instrument. Sometimes, tapping with a wooden mallet will be enough to break the corrosion loose sufficiently that the cap can be unscrewed. Also, it is sometimes possible to break this corrosion by soaking the cap in kerosene overnight.

It is even more difficult to remove a corroded piston. One should not try to poke the piston out of its casing with a stick. Since the piston is hollow and its walls are thin, this force is liable to bend in the top or bottom of the piston, or buckle the sidewall. Penetrating oil or kerosene will often work loose this corrosion.

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[4] Ibid., p. 5.

Before putting an instrument away for any length of time, a little vaseline or tallow should be applied to the threads of the valve caps; also, a little oil on the pistons. This will help avoid corroded caps and pistons and will help preserve the instrument. The slides can also be pulled and only one side replaced.

The best way of removing a valve slide (not too badly corroded) is to put a piece of cloth through the slide and give it a quick jerk. If this will not do it, some kerosene should be placed on the slide and let it stand overnight. Once the slides have been removed, they should be cleaned thoroughly (with gasoline if there is corrosion). The slides should not be buffed as this will wear the metal down where the slide is blown out of the instrument when it is being played. The inside of the slides should be washed with soap and warm water, and rinsed in clear water. A weighted string and a piece of cheese cloth about three to four inches wide and three to four feet long will enable one to remove dirt from the crook of the slide which might not otherwise be reached.

Mutton tallow, vaseline, or cork grease should be put on the valve slides before putting them back in the instrument. This will prevent corrosion, make them work freely, and retard wear. After applying the lubricant sparingly, each side should be pushed in individually and at the same time should be given a rotating movement. This distributes the lubricant

evenly and thoroughly over the slide surface. Finally, both sides of the slide should be pushed all the way in and the excess material wiped off. This prevents the excess lubricant from getting into the valve slides and then into the valves, where it will literally "gum up the works."

Never try to remove or replace a slide unless the corresponding valve is open; that is, unless the corresponding piston is pushed down. This keeps a vacuum from being formed, which otherwise might cause a leak in the instrument.

The greatest single cause of damage to cup mouthpiece instruments is the mouthpiece corroded or stuck fast in the mouthpipe. In the attempt to loosen and remove the mouthpiece, braces are torn loose, mouthpiece receivers are pulled away from the mouthpipe, and the mouthpipe itself is bent and broken. If the mouthpiece becomes stuck, do not go beyond gentle methods, such as tapping the receiver with a wood mallet or applying kerosene and letting it stand overnight. When tapping the mouthpiece receiver, lay it against something solid, such as a table top or a block of wood. The mouthpiece should be kept clean at all times. The throat is the critical spot in the mouthpiece as it does not take much dirt in this narrow throat to spoil the performance. Commercial mouthpiece pullers are available for a reasonable price.

To clean the inside tubing of a trumpet or tuba, castile soap should be dissolved in warm water and poured into the bell. At the same time, the valves should be worked so that the solution will pass through the valves and valve slides.

This will loosen corrosion as well as any dirt which may have blown into the instrument. After this has been done, the inside of the instrument should be rinsed out with cold water, either by pouring it into the bell or with a hose and a reducing nozzle to fit the mouthpipe. This process of cleaning the inside of the tubing should be followed by thorough cleaning of valves and valve slides, to remove from these parts any dirt dislodged from the interior of the instrument.

The outside of a lacquered instrument can be cleaned by using a damp chamois. Liquid wax is often used to protect lacquer finish, but one should be careful to see that all wax is rubbed off the finish. For plain polished brass (not lacquered), chromium, nickel-silver, or nickel plated finish, a simple but satisfactory cleaner can be made by mixing a tablespoonful of fine grade whiting in a half glass of denatured alcohol. The whiting should be stirred well, and applied lightly to the instrument. When this becomes dry, it should be rubbed carefully. It is important that a soft cloth be used for this purpose, as other cloth is liable to scratch. For silver, a high grade of silver polish should be used. This can be obtained in either the paste or liquid form.

The Horn

The valves of the French horn must be disassembled for cleaning. First, both string set screws should be loosened and the string removed. After the rotor has been loosened

and the back head has been forced out, the stop arm retaining screw should be removed and then the valve rotor can be taken out. Many players have damaged their back head bearing by trying to pry it out by inserting a thin piece of metal between the casing and the back head, or by trying to lift the back head by catching hold of the shoulder of the back head bearing with a pair of pliers.

If the valve rotor has become corroded and stuck in the casing, a little penetrating oil placed on the back side of the valve, between the back head bearing and the short shaft bearing, may give results. It is possible that the stop arm retaining screw will have to be taken out, and the stop arm and hub removed from the long rotor shaft bearing in order that penetrating oil can be applied to the long shaft bearing and the front head bearing. If this is done, it is important to put back the stop arm retaining screw so that the screw head can be tapped instead of the long shaft. If the long rotor shaft is tapped directly, the threads inside the shaft may receive damage.

A valve should never be loosened by forcing down the valve key. If the string does not break first, the key lever is liable to be broken off.

Once the rotor is out, the valve casing should be wiped out the rotor cleaned. Also, the back head, valve cap, stop arm, and retaining screw should be wiped clean. If corrosion

resists ordinary wiping, soap and hot water or a mild metal polish should be used. If metal polish is used, one should be careful to remove all of this by the use of hot water. Before assembling the valves, the bearings should be oiled. A drop should be placed inside the back bearing and also inside the front bearing; also, a drop on each of the shaft bearings.

> In the Conn horn, the rotor is suspended between these two bearings, and the sidewall of the rotor does not touch the sidewall of the casing, by about .0015" (one and one-half thousandths of an inch), or half the diameter of a human hair. For this reason, no oil should be put on the rotor, but only on the bearings. However, on many other rotary valves the rotor itself acts as a bearing and contacts the sidewall of the casing, and oil must be placed on the rotor to relieve friction. Be as sparing with the oil as possible, as too much oil slows up action and is almost as bad as not enough oil.[5]

After placing the rotor in the casing and seating the valve back head, the rotor should be turned so that the air column by-passes through the valve and so the valve slides are closed. This should be done before the stop arm is put on. Next, the stop arm hub should be placed over the long shaft. The end of the shaft is usually square on three sides but round on the fourth side. This shape makes it impossible to put the hub on the shaft except in one position. This position puts the stop arm in between the two corks against which they stop if the rotor is set properly. If the rotor is not set properly, when the stop arm hub goes over the end

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[5] Ibid., p. 18.

of the long shaft, the stop arm itself may fall outside the arc within the cork stops. The valve, of course, will not work in this position. Once the rotor has been set and the stop arm hub slipped over the long shaft, the retaining screw should be screwed in and the valve cap screwed on. It remains only to install the string and adjust the height of the valve keys.

When cleaning the inside of a French horn, the same procedure is used as when cleaning the inside tubing of a trumpet or a tuba. However, it should be emphasized here that in the horn it is doubly important to keep the tubing free of dirt because of the small size of the tubing. The same amount of dirt will do greater harm to the playing qualities of the French horn than it will to the playing qualities of the cornet or trumpet.

Cleaning the valve slides and keeping them clean and free-working is very important to the horn player because, having no water key, the slides are constantly being removed to empty out the water. When cleaning the valve slides of a French horn, the same procedure is used as when cleaning the valve slides of a trumpet or a tuba.

The mouthpiece of a French horn should also be cleaned in the same manner as the mouthpiece of a trumpet or a tuba.

Most rotary valves are rotated with string, and since this string wears out, it has to be renewed occasionally.

The first step is to loosen the string set screws. There are two of these: one is on the key extension lever and the other is on the stop arm. All old string should be removed, and a new piece the same length should be cut. As a rule, this is about six or seven inches long. A good grade of linen fish line with about a twenty-seven pound test makes a suitable string.

A knot should first be tied in the end, and the string should be started through the hole in the key extension lever, leaving the knot on the side of the lever away from the valve. The string should be given a strong but steady pull to seal the knot in the hole. Next, the string should be pulled around the stop arm hub and placed around the second string set screw. The direction of the encirclement of the set screw should be clockwise, the same direction in which the set screw should be turned when it is tightened. The return loop around the set screw should be underneath the other string. After the string is properly threaded, the string should be pulled taut throughout. Then, the string set screw No. 1 (the one on the key extension lever) should be tightened. If a key lever is worked now, the string simply slides around the string set screw No. 2 and the valve does not rotate. The next thing which should be done is to lower the valve key to the height to which one is accustomed and finally tighten the string set screw No. 2. Often, the string has been pulled a little too

tight for the rotor to turn freely. If this be the case, the string set screw No. 1 should be loosened part of a turn or just enough to slacken the string a trifle. When the rotor turns freely, the screw should be re-tightened.

Some players leave about one and three-quarters of an inch of string extending beyond string set screw No. 1 so that they have a good hold on the string in case it needs retightening later. After several days the string may stretch enough to be too loose. If so, by loosening the No. 1 set screw and pulling string taut and then re-tightening the screw, the right amount of tension can be acquired.

The outside of the French horn is cleaned in the same manner as the different finishes of trumpets and tubas are cleaned.

The Trombone

The slide of the trombone is delicate and requires careful handling.

> The brass outside slides have a wall thickness of from .011" (11 thousandths of an inch) to as little as .006" (6 thousandths of an inch), on the lightweight models.
>
> Since an ordinary human hair is about .003" (3 thousandths of an inch) in diameter, the thickness of the outside slides wall is equivalent to the combined diameters of about three fine human hairs. Consider a tube which is over four feet long made of brass which is only three hairs in thickness and sometimes is only two hairs in thickness. Further consider that this tube must fit over another tube so that the outside diameter of the inside slide is only .006" less than the inside diameter of the outside slide; that makes the clearance on each side between the stocking of the inside slide and the

inside of the outside slide only .003" (3 thousandths of an inch) or about the diameter of a human hair.[6]

These thicknesses and clearances are emphasized because too few trombone players realize how delicately their hand slides are made. When one thinks of hand slides in these terms, he will have more consideration and give more respect to them.

To clean the inside of the slide, a trombone cleaning rod should be covered completely with a piece of clean cheesecloth from six to eight inches wide and from five to six feet long. The cloth should be wrapped on the rod in a spiral direction, so that the metal rod does not touch the slide at any point. This keeps the inside surface of the slide from being marred. This is especially important, for the inside of this outside slide is the bearing surface for the stocking of the inside slide and any scratch or nick will impair the slide action. With this cleaning rod so prepared, grasp one side of the slide and clean that same side. Do not grasp one side and clean the opposite side, as this tends to spring the slides. Then, the other slide is cleaned in the same manner. The cloth should be run through the slides several times until the inside becomes clean.

In cleaning the inside slides, the weight cord is recommended, as most good trombones have a delicate mouthpipe inserted inside the mouthpiece receiver and the rod may damage

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[6] Ibid., p. 9.

this mouthpipe. If the dirt inside the slides has become dry and hard or if there is considerable corrosion, the inside should be washed with soap and warm water or with gasoline. Cheesecloth is recommended for these operations as it has very little lint. After the inside and outside slides have been thoroughly cleaned, it is a good idea to run cold water through them in order to remove any lint or dust which might have collected there.

To clean the outside of the inside slides, a piece of cheesecloth dampened with a little gasoline should be used. The slides should be wiped until dry. The use of abrasives, in order to remove any discoloration, should be avoided as this removes the precious protective shell of nickel or chromium.

> Wearing through the chromium or nickel in nine cases out of ten has been caused by buffing or use of abrasives to remove discoloration. Actual use in playing is seldom the cause. If you happen to get a dent or crimp in the inside slide, have a repairmen take it out with a dent ball or bar; don't let him dress the slide down by buffing or using an abrasive.[7]

It is very important that the cork barrel be kept clean. The dirt which accumulates inside this barrel should be cleaned out with a small brush and gasoline. If the dirt is not kept out of this part of the instrument, the outside slide will gradually draw it out and will foul the action. This is often the cause of mysterious slide trouble. This also applies to a trombone with a spring stop instead of a cork stop.

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[7] Ibid., p. 11.

The slides of a trombone should not be worked when dry. This causes small scratches and will harm the surface of both inside and outside slides, especially outside slides. There are many fads about lubricating the trombone. Some players swear by Cuticura ointment (a salve for skin disease). They say that it is especially good for breaking in a new instrument. Others prefer ordinary cold cream. They apply the cold cream to the dry slide, then add water. Other trombone players use a good grade of slide oil to keep the instrument in good playing condition. Since any of these work satisfactorily, it is up to the individual to experiment and find out what he likes best.

The mouthpiece of the trombone is cleaned in the same manner as the mouthpiece of the trumpet or the tuba.

Cleaning the outside finish of the trombone is done in the same manner as cleaning the other finishes on the trumpet or the tuba.

CHAPTER V

PRINTED METHODS OF INSTRUCTION AVAILABLE FOR BRASS INSTRUMENTS

The Trumpet

There are numerous books of instruction written for the trumpet, some of which are complete methods and others which are concerned with the development of only one or a few factors of trumpet playing.

The purpose of this chapter is to divide the methods of instruction for the selected brass instruments into different categories, and within each category classify each book or method according to how difficult it is, and at the same time attempt to show what factor or factors of playing are supposed to improve in connection with study of this particular book. The publishing company and the price of each book will also be given.

The trumpet literature chosen will be divided into the following five categories: (1) complete methods; (2) special studies which pertain to only one or a few phases of trumpet playing; (3) etudes and exercises which include most or all phases of trumpet playing; (4) excerpts from orchestra and band literature; and (5) miscellaneous works.

Complete Methods

Method for Cornet or Trumpet, by Joseph Arban (published by Carl Fischer and sells for $4.50).--This is a good general method and contains studies which touch upon most phases of playing. Even the advanced musician can use this book to good advantage. It is not recommended for the beginner because it advances too rapidly. This book would be ideal for some person who has played about two years. Even though this book can be used to good advantage by even the professional musician, this book alone does not present enough advanced material to prepare one for professional work.

World's Method for Cornet or Trumpet, revised and augmented by J. S. Seredy (published by Carl Fischer in Volumes I, II, and III, and each volume sells for $2.50).--Volume I contains studies which are in Arban's method. Volume II contains many good duets and also some excellent etudes. Volume III contains mostly etudes. Most of the etudes in this method are a little more difficult than those in Arban's method. This method also touches on most phases of playing. While this method in itself is not sufficient to produce the "finished" product, it can be used to good advantage by any trumpet player.

Complete Method for Cornet or Trumpet, by Saint-Jacome (published by Carl Fischer and sells for $4.50).--This method is not as good as the preceding two as far as basic fundamentals

are concerned. It does not deal individually with such phases as lip slurring and flexibility or different types of articulation. However, it does contain some very difficult etudes and exercises as well as some interesting duets. More technique is required to play through this book.

Special Studies

Setting-Up Drills for Trumpet, by H. L. Clarke (published by Carl Fischer and sells for $1.00).--This book concentrates on the development of good, clean single tonguing, along with breath control. These exercises are in a scale pattern and are taken through all ranges in all key signatures. This is a very good book for the development of dexterity of the fingers and tongue.

Daily Studies for Trumpet, by William A. Thieck (published by H. Belcher, and sells for $2.00).--This book contains some excellent information concerning mouthpiece pressure, attack, and breathing. This book mainly concentrates on developing a good attack and flexibility. Easy slurs are introduced first, and they gradually become harder. An excellent book to work some out of each day.

100 Original Warm-Ups for Trumpet, by Charles Colin (published by Charles Colin, and sells for $1.50).--Although called 100 Original Warm-Ups, this book actually is a study on lip flexibility. Some of the first exercises could be used to good advantage for a warm up, but the rest would do

more harm than good if they were used for warm-up purposes. Notes are marked with alternate fingerings in order to produce as much lip flexibility as possible. This book could be used in connection with the following one to produce much lip flexibility.

Lip Flexibility for Trumpet, by Charles Colin (published by Charles Colin, and sells for $1.00).--This book will not only produce flexibility, but range as well. This group of exercises is recommended for some person who has already acquired quite a bit of flexibility as well as a fairly good range. Some exercises in this book are written up to high F. If properly studied, these exercises will add to one's range.

Artistry in Trumpet Technique, by Charles Colin (published by Charles Colin and sells for $1.50).--This book introduces short studies based on a scale pattern, and these are written in every key. An etude appears at the end of each section of studies which incorporates all problems of the previous studies. This is a good book to study because it does not proceed like the orthodox methods do. It contains very difficult fingerings, whole-tone melodies, and covers the entire range of the trumpet.

Lip Flexibility for Trumpet, by Walter M. Smith (published by Carl Fischer and sells for $1.25).--For developing flexibility, this book is probably better than the one written by Charles Colin. Both books used together would produce

wonderful results. This book not only contains studies on slurring intervals, but introduces the lip trill as well. Very difficult studies on the lip trill are to be found on the last page of the book.

Advanced Daily Studies for Trumpet, by Charles Colin (published by Charles Colin and sells for $1.00).--This book contains seven studies, with thirty exercises written under each separate study. The objective of the entire book is to develop the range to high F. This is done by the use of all types of studies. All types of slurs and articulations are found in the thirty exercises under each study. The highest note in study number one is G on the staff; the lowest note, G below the staff. When all exercises in this study can be played, the pupil is then supposed to transpose everything up one-half tone. When this has been accomplished, the pupil is ready for the second complete study of thirty exercises. The entire book advances in this manner. A very excellent book for helping attack in the upper and lower registers.

Daily Drills and Technical Studies for Trumpet, by Max Schlossberg (published by M. Baron Company and sells for $2.00).--Contains eight parts: (1) long note drills; (2) intervals; (3) octave drills; (4) lip drills; (5) chord drills; (6) scale drills; (7) chromatic scale drills; and (8) etudes. The purpose of the book is to take a few exercises under each part and play these each day. In other words, advance through

each part systematically, working on all parts simultaneously. This book touches upon many phases of playing and contains some very difficult material.

General Studies, Etudes

Selection of Concone Studies, by Donald S. Reinhardt (published by Elkan-Vogel and sells for $0.75).--Technically, this book is very easy. However, it does contain studies which are to be played in a slow, legato manner. This is an excellent book to develop a smooth, legato type of playing, and could be used to good advantage to develop better tone quality and phrasing.

60 Selected Studies for Trumpet, by C. Kopprasch (published by Carl Fischer in Book I and II and each book sells for $1.00).--This is an all-around good book of etudes. It contains studies which include tonguing, flexibility, and fingering exercises. These exercises are not technically hard, but they are not easy to play correct at sight.

60 Etuden fur Cornet a Pistons, by Wilhelm Wurm (published by D. Rahter, Leipzig, Germany).--All exercises in this book are practically identical with those in the 60 Selected Studies by Kopprasch.

24 Modern Virtuoso Studies for Trumpet, by E. Paudert (published by Carl Fischer and sells for $1.50).--This book of etudes is not technically difficult but does contain excellent material for the development of style, tone, intonation,

fingering, and surety of attack. Some of the etudes are intended to be used for practice in transposition. This is a good all-around book to have.

Practical Studies for Trumpet, by Edwin F. Goldman (published by Carl Fischer and sells for $1.50).--Each study in this book is intended to develop a certain phase of playing. There are studies which are written for the development of all kinds of articulation, as well as for lip flexibility, endurance, and general technique.

Twelve Technical Studies for Cornet, by Herman Bellstedt, Jr. (published by Fillmore and sells for $1.25).--Practically all material in this book is devoted to the slurring of intervals. The harmonic series is used in groups of notes which are slurred, through the use of false fingering. Some of the exercises which deal with the slurring of intervals compare to those found in Thieck's Daily Studies for Trumpet.

Selected Studies for Trumpet, by H. Voxman (published by Rubank and sells for $1.50).--This volume contains advanced etudes in all keys as well as all scales and arpeggios, both major and minor. No key is neglected in this work. This is a good book to use to become used to playing in all keys. Some of the exercises contain difficult fingering as well as awkward intervals. This book will develop one's technique in general.

20 Etudes Difficiles pour Cornet a Pistons, by Guillaume Wurm (published by D. Rahter, Leipzig, Germany).--This book

contains legato studies as well as studies which require a crisp, clear tongue. Most key signatures are used and the exercises are rather difficult. Double sharps and flats are frequently used. This book would help to develop all the phases of playing and introduce to the student some more difficult material.

Studies for Orchestral Trumpeters, by W. Brandt (published by Russian-American Music Publishers and sells for $1.50).--The main purpose of this book of etudes is to develop an orchestral-type style of playing trumpet. Considerable space is given to exercises which contain tonguing. This book should help develop a good clear attack as well as a fast, precise type of tonguing.

Sixteen Modern Etudes, by John F. Huber (published by Theodore Presser Company and sells for $0.75).--This book of etudes is aimed at developing a legato style of playing as well as a trumpet style of playing. Slurred intervals and staccato tonguing are in each exercise, and each exercise contains some difficult fingering. This book will also develop speed of the fingers, breath control, and tone.

Twelve Special Studies for the Trumpet, by John F. Huber (published by Carl Fischer and sells for $1.00).--The purpose of this book is to offer original etudes for the development of the student's technical equipment. These studies will produce a more flexible embouchure, a cleaner type of tonguing,

and a clearer tone. Some of these studies contain very difficult fingerings, especially in the whole-tone studies.

24 Modern Studies for Trumpet, by William Freitag (published by David Gornston and sells for $1.75).--These studies are very fine for range, freedom of tone, and flexibility. One should have a fairly flexible lip and a good register before attempting these studies. These studies present problems which are not found in most books, and for that reason alone this book should not be overlooked.

Six Studies, by J. Levy (published by Carl Fischer and sells for $0.50).--These studies cover the entire practical range of the trumpet and are excellent for producing a better legato and staccato type of playing from one register to another.

12 Etudes for Trumpet, by Johannes Brahms (published by Mercury Music Corporation and sells for $1.25).--Some of these studies are in awkward keys and present difficult fingering problems. Staccato and legato types of playing are not overlooked. This set of studies gives practice in various styles of melodic playing. A very good book for developing breath control.

Trumpet Studies with Modernistic Rhythms, by Albert Mancini (published by A. G. M. Music Publishers and sells for $1.75).--An excellent book for developing playing ability in the upper register. Here, the player not only gets to reach

up and hit a high note, but he also gets to actually play in this high register. This book is also good to acquaint the student with the various unusual rhythms.

48 Studies for the Advanced Trumpeter, by Harry Glantz (published by M. Whitmark & Sons and sells for $3.00, complete). --An excellent book for developing flexibility and tonguing, as well as general technique. Flexibility is introduced in most all exercises in various manners. This book covers most phases of playing and one must "get around" on his instrument to play some of these exercises.

Technical Studies for Trumpet, by Herbert L. Clarke (published by Carl Fischer and sells for $2.00).--An excellent book for the development of breath control, endurance and elasticity of the lips, high tones, and technical perfection in general. Very difficult fingers are to be found in this book.

Characteristic Studies for Trumpet, by Herbert L. Clarke (published by Carl Fischer and sells for $2.00).--This volume contains twenty-four studies in all major and minor keys, as well as fifteen of Clarke's solos. The etudes are difficult to read and to play because of unusual keys and fingerings. A good book to advance one's general technical ability.

22 Virtuosity Studies, by H. Pietzsch (published by Albert J. Andraud and sells for $2.00).--These exercises contain all forms of articulation, including double and triple

tonguing up and down on scale patterns. The entire practical range of the trumpet is used, and these exercises are technically difficult.

Top Tones for the Trumpeter, by Walter M. Smith (published by Carl Fischer and sells for $1.50).--A very excellent book for developing playing ability in all ranges, the upper range especially. This book omits no keys, even having etudes in the keys of A# and G# minor. Much flexibility and technique is required to play these exercises right.

72 Etudes Melodiques for Trumpet, by J. D. Artot (published by Schott Freres, Bruxelles, and sells for $9.00).--These studies are not technically difficult, but are excellent for developing a better, stronger tone and more endurance. Some of the studies require a delicate type of tonguing, while others are written in legato, song-like manner.

Ecole Moderne Du Cornet, by P. Clodomir (published by Alphonse Leduc, Paris, and sells for $20.00, complete).--This volume contains six separate books: Petits Exercises, Vingt Etudes Chantantes, Vingt Etudes Mignonnes, Douze Etudes Caracteristiques, Vingt Etudes De Mecanisme, and Heures Musicales (A et B). Most of the etudes in this volume are not difficult. In fact, the first two or three books in this series could be used for beginning people; that is, people who have played about one year. Much of the work in this series requires a delicate type of tonguing. Practically all

of the studies are written in the middle and lower registers. These studies would also do a lot toward developing a better style of playing.

Etudes Pratiques, by Rene Laurent (published by Alphonse Leduc, Paris, in Volume I, II, and III, amd all three cost $8.50).--These exercises contain many technical passages and hard fingerings. They cover lip flexibility, tonguing (all forms), and other phases of playing. They were primarily written to develop a more precise, fast, light style of playing. These etudes would do much toward developing a better style of playing, as well as advancing one's general technique.

15 Etudes Techniques et Melodiques, by A. Petit (published by Alphonse Leduc, Paris, and sells for $1.75).--These etudes are simple, yet contain much good material for the development of flexibility and general ability to "get around" over the instrument.

Grandes Etudes, by A. Petit (published by Alphonse Leduc, Paris, and sells for $2.50).--The exercises in this book are rather difficult if they are played correctly. Fast slurs and tonguing are written in fast tempo while playing from one register to another. Much flexibility, a good clean staccato-type of tonguing, and a fair amount of technique are needed to benefit from these studies.

Seize Grandes Etudes, by A. Petit (published by Editions Salabert, Paris, and sells for $3.00).--These studies are much

the same as those in the Grandes Etudes by Petit, the main difference being that these studies are a little more difficult.

Etudes Characteristiques, by A. H. Chavanne (published by Alphonse Leduc, Paris, and sells for $2.50).--The etudes in this book include most phases of trumpet playing, but seem to concentrate on tonguing. Double and triple tonguing on scale and arpeggio type studies appear in many of these exercises. This is an excellent book for furthering one's general technique.

Etudes de Virtuosite, by A. H. Chavanne (published by Alphonse Leduc, Paris, and sells for $3.25).--Contains much of the same type of material as the Etudes Characteristiques, but seems to concentrate more on the slurring of intervals.

Etudes Transcendantes, by Theo Charlier (published by Alphonse Leduc, Paris, and sells for $4.50).--An excellent book of studies which includes all types of tonguing and all forms of flexibility. Awkward keys are used and many difficult fingerings and passages are to be found. Many whole-tone passages are scattered throughout the book, and the tonality of most of these etudes is completely different from most orothodox studies. This is one of the best books to be found for developing all phases of playing, especially that of general technique.

Heuzeitliche Studien fur Trompete, by Ernft Auguft Friefe (published by Carl Merseburger, Leipzig, Germany, and sells

for $5.00).--Probably the hardest book of etudes ever written for the trumpet. Irregular time signatures are used and many irregular time patterns are to be found. These exercises cover the entire range of the trumpet and are technically very difficult.

Orchestra, Band Excerpts

Orchestral Studies for Trumpet from Classical and Modern Works (published by International Music Company in three volumes and each sells for $2.50).--These three volumes together contain most of the standard orchestral literature. An excellent set of books to have in order to work on transposition and an orchestral style of playing.

Orchestral Studies for Trumpet from the Works of Richard Wagner (published by International Music Company in two volumes and each sells for $1.75).--

Orchestral Studies for Trumpet from the Works of Richard Strauss (published by International Music Company and sells for $1.75).

Bandsmen's Studio for Cornet or Trumpet, compiled by Edwin F. Goldman (published by Carl Fischer in five volumes and each sells for $2.50).--This set of books contains practically all of the old standard works for band. The solo cornet part of each piece is given.

Miscellaneous Works

Duets in Treble Clef, by Arthur Amsden (published by C. L. Barnhouse and sells for $2.50, complete).--Musically, these duets are written in a poor style; however, duet playing can be very beneficial and much can be learned from playing through this book. All the duets in this book are written in an easy, playable register, and the keys used are simple ones. Some of these duets, however, are not easy if played correctly in a proper tempo. This book would be very useful in developing style of playing, sight-reading, and general technique.

Ten Duets for Advanced Players, by Louis Katzman (published by Carl Fischer and sells for $1.00).--These duets are similar to the ones in the above book, but probably are not quite as technical.

Six Melodious Duets, by J. Forestier (published by Carl Fischer and sells for $0.50).--These duets are written in a better musical style than the two preceeding books, but are not as difficult. This book contains excellent material for developing style, intonation, tone, and attack.

Modern Transposition Method, by Ernest S. Williams (published by Ernest S. Williams School of Music and sells for $2.00).--While this book is essentially a method for the learning of transposition, it contains twelve excellent duets. These duets contain practically every phase of playing:

flexibility, different types of articulation, etc., are all required to perform them correctly. They are written in very hard keys and double sharps and flats are not at all uncommon. A very excellent book for furthering ones technique.

100 Etudes for Trumpet, by Ernst Sachse (published by M. Baron Company and sells for $2.50).--The studies in this book are intended for transposition; however, much benefit can be derived even from playing these studies as they are written.

Modern Method for Trumpet, by Ernest S. Williams (published by the Ernest S. Williams School of Music in three volumes, and each volume sells for $2.00).--Volume One contains the rudiments of music. Also in this volume are ninety easy solos. Piano accompaniment to this volume is published and sells for the same price as the book for trumpet. Volume Two covers scales, intervals, flexibility, lip trills, upper register, etc. This volume concentrates mainly upon developing technique. No piano accompaniment is published for this volume. Volume Three contains etudes, concertos, solos, duets, trios, and quartets. Piano accompaniment is published for this volume and sells for $3.00.

The Trombone

Many books of instruction have been written for the trombone, some of which are complete methods and others which are concerned with the development of only one or a few factors of trombone playing.

The trombone literature chosen will be divided into the following four categories: (1) complete methods; (2) special studies, etudes; (3) excerpts from orchestral and band literature; and (4) miscellaneous works.

Complete Methods

Modern Universal Method, compiled and arranged by Aaron Shapiro (published by Cundy-Bettoney and sells for $5.00).--This method can be used to good advantage by all trombone players. It contains much easy material and is a good method to use for beginning students.

Method for Trombone, by Ernest Clarke (published by Ernest Clarke and sells for $2.50).--This book contains material which would be good for the beginning trombone player.

The New and Modern Method for Baritone, by Leroy S. Kenfield (published by Cundy-Bettoney and sells for $1.50).--The material in this book is fairly easy, but would be good for the beginning student.

Method for Slide and Valve Trombone, by Joseph Arban (published by Carl Fischer and sells for $4.00).--This is a very fine method. It contains all types of slurs and articulations and makes use of all key signatures. Contains easy as well as difficult material.

The Trombone Virtuoso, by Simone Mantina (published by Carl Fischer and sells for $3.00).--This method contains some easy material; however, it contains much difficult material

and is more of an advanced method. This method contains exercises which make use of the three clefs used in trombone playing.

Imperial Method for Slide Trombone, by R. N. Davis (published by John Church Company and sells for $1.25).--This is a very old method, and contains mostly songs and simple material. This book could be used to good advantage in developing tone and would also be good for beginning students to work in.

Modern Arban-St. Jacome Comprehensive Course for Trombone, by Harvey S. Whistler (published by Rubank and sells for $1.25).--This book contains mostly simple material and is recommended for beginning students.

Complete Method for Trombone, by Dieppo (published by Carl Fischer and sells for $2.50).--This is an easy method which contains mostly songs. A very good book for developing a legato style of playing as well as developing tone.

Cornette Method for Trombone (published by Cundy-Bettoney and sells for $1.50).--This is an excellent all-around method and contains material good for both advanced and beginning players.

Special Studies, Etudes

Sequences, by V. M. Blazevich (published by Carl Fischer in two parts and each part sells for $0.60).--A very fine set of studies which combines various tonalities and rhythms.

This book contains exercises written in the three most commonly used clefs.

36 Studies for Trombone, by O. Blume (published by Carl Fischer in three volumes and each volume sells for $0.60).--This book contains some etudes which are good musically but not too difficult technically.

36 Celebrated Studies, by N. Bousquet (revised and rearranged by Paul de Ville; published by Carl Fischer and sells for $1.00).--These are excellent studies and are technically difficult. These are the same studies which appear in the back of the St. Jacome Method for Trumpet.

24 Studies, by Seidel (published by Carl Fischer and sells for $1.75).--A nice selection of etudes. This set of studies is not technically difficult, but it does contain important phases of technique and is interesting.

60 Studies for Trombone, by C. Kopprasch (published by Carl Fischer in two books and each book sells for $1.00).--These exercises include most all types of legato playing as well as different types of articulation. An excellent book for developing all-around technique, attack, and style.

Melodious Etudes for Trombone, by Joannes Rochut (published by Carl Fischer in three books and each book sells for $2.50).--The etudes in these books are excellent. This set of books contains exercises which develop most all factors of trombone playing.

32 Celebrated Melodies for Trombone, by E. Vobaron (published by Carl Fischer and sells for $1.25).--A very fine book for developing all-around technique, tone, and style of playing.

22 Progressive Studies, by Jaroslav Cimera (published by Belwin and sells for $1.00).--These studies are simple and easy but are very good for developing tone and style. They are also nice musically.

Advanced Trombone Studies, by Russell Harvey (published by Belwin and sells for $1.00).--These studies are good, but are not technically difficult.

Modern Pares Foundation Studies, by Harvey S. Whistler (published by Rubank and sells for $0.75).--This book contains all scales and all the studies in the book are based on some scale pattern. An excellent book for developing finger flexibility and tonguing.

Pivot System, by Donald S. Reinhardt (published by Elkan-vogel Company and sells for $2.00).--An excellent book for the teaching of range and the use of less pressure. Also good for flexibility.

66 Studies, by Anton Slama (published by Carl Fischer and sells for $1.25).--These studies are very good for developing an all-around technique. They are not difficult, yet they offer a challenge if they are played correctly.

Advanced Daily Studies for Trombone, by Charles Colin (published by Charles Colin and sells for $1.00).--This book for trombone is the same as Colin's Advanced Daily Studies for Trumpet. The idea of the two books is the same. A wonderful book for developing range and all types of articulations and flexibility.

Orchestra, Band Excerpts

Orchestral Studies for Trombone from Classical and Modern Works (published by International Music Company in three volumes and each volume sells for $2.50).

Orchestral Studies for Trombone from the Works of Richard Wagner (published by International Music Company in two volumes and each volume sells for $1.75).

Orchestral Studies for Trombone from the Works of Richard Strauss (published by International Music Company and sells for $1.75).

Bandsmen's Studio for Trombone (published by Carl Fischer in five volumes and each volume sells for $2.50).--This set of five books contains practically all of the old standard works for band. The first trombone part of each piece is given.

Miscellaneous Works

Duets in Bass Clef, by Arthur Amsden (published by C. L. Barnhouse and sells for $2.50, complete).--Musically, these

duets are written in a poor style; however, duet playing can be very beneficial and much can be learned from playing through this book.

34 Duets, by E. Vobaron (published by Cundy-Bettoney and sells for $1.25).--An excellent book of duets. This book would be beneficial in developing reading ability, intonation, and style of playing.

Konzertduette, by W. Blazewitsch (published by Staetsmusikverlag, Moscow, Russia).--A very fine book of duets. These duets are written in three clefs.

The French Horn

Many books of instruction have been written for the French horn, some of which are complete methods and others which are concerned with the development of only one or a few factors of horn playing.

The French horn literature chosen will be divided into the following three categories: (1) complete methods; (2) etudes, exercises; and (3) orchestra and band excerpts.

Complete Methods

Scientific Method for French Horn, by Eby (published by Walter Jacobs, Inc., and sells for $4.00, complete).--This method contains a variety of excellent material for the beginning student as well as for the advanced musician.

Foundation to French Horn Playing, by Eric Hauser (published by Carl Fischer and sells for $1.50).--This is an excellent book for beginners.

Complete Method for Horn, by Franz (published by Cundy-Bettoney and sells for $2.25).--This is a fine method which contains many excellent etudes and studies. This is a more advanced method.

Etudes, Exercises

Primary Studies for the French Horn, by Horner (published by Elkan-Vogel Company and sells for $1.50).--This book is intended primarily for the student who has played for a short time, but it can be used to advantage by any horn player.

Modern Pares Foundation Studies, by Whistler (published by Rubank and sells for $0.75).--The exercises in this book are all based on scales and arpeggios. This is a wonderful book for developing different types of articulation and attack.

212 Selected Melodious Progressive and Technical Studies for French Horn, compiled by Pottag and Andraud (published by Albert J. Andraud in two books and each sells for $2.50).--These two books contain much valuable material for the more advanced horn player. These studies are excellent for developing all factors of horn playing.

60 Selected Studies, by C. Kopprasch (published by Carl Fischer in two books and each sells for $1.00).--The studies in these books are fine for developing attack and release, types of articulation, tone, and breath control. These studies are recommended for the more advanced horn player.

Orchestra, Band Excerpts

Orchestra Studies for French Horn from Classical and Modern Works (published by International Music Company in three volumes and each volume sells for $2.50).

Orchestral Studies for French Horn from the Works of Richard Wagner (published by International Music Company in two volumes and each volume sells for $1.75).

Orchestral Studies for French Horn from the Works of Richard Strauss (published by International Music Company am sells for $1.75).

Bandsmen's Studio for French Horn (published by Carl Fischer in five volumes and each volume sells for $2.50).--This set of five books contains practically all of the old standard works for band. The first horn part of each piece is given.

The Tuba

Among the books of instruction which have been written for the E flat and BB flat tubas, some are complete methods while others are concerned with the development of only a few factors of tuba playing.

The tuba literature chosen will be divided into the following three categories: (1) complete methods; (2) etudes, exercises; and (3) orchestra and band excerpts.

Complete Methods

Method for Tuba, by Kuhn-Cimera (published by Belwin and sells for $1.00).--This book is recommended for the beginning player.

Scientific Method for Tuba, by Eby (published by Walter Jacobs, Inc., and sells for $3.00, complete).--This is a very complete method which contains material which can be used by both the beginning and advanced student.

Method for Tuba, by William Bell (published by Carl Fischer and sells for $1.50).

Modern Method for Tuba, by Gieb (published by Carl Fischer and sells for $1.50).

Carl Fischer's New and Revised Edition of Celebrated Tutors (published by Carl Fischer and sells for $1.25).--This is an excellent book for beginning tuba players.

Rollinson's Modern School, by T. H. Rollinson (published by Oliver Ditson Company and sells for $1.25).--This book contains much good material but advances rather rapidly for the beginner.

Etudes, Exercises

Pares Scales Studies for Tuba (published by Carl Fischer and sells for $0.75).--An excellent book for developing

attack and release, as well as different types of articulation. All the studies in this book are based on scales and arpeggios.

Newest System of Scale Studies, by D. Shmuklovsky (published by Carl Fischer and sells for $3.00).--This book is written for double bass, but can be used to good advantage by the more advanced tuba player. This book makes use of different clefs and contains excellent material built on scales and arpeggios.

66 Etudes, by Anton Slama (published by Carl Fischer and sells for $1.25).--The studies in this book are very difficult. They are also intended to be played by bassoon and double bass.

Orchestra, Band Excerpts

Orchestra Studies for Tuba from Classical and Modern Works (published by International Music Company in three volumes and each sells for $2.50).

Orchestra Studies for Tuba from the Works of Richard Wagner (published by International Music Company in two volumes and each sells for $1.75).

Orchestra Studies for Tuba from the Works of Richard Strauss (published by International Music Company and sells for $1.75).

Bandsmen's Studio for Tuba (published by Carl Fischer in five volumes and each volume sells for $2.50).--This set of

five books contains practically all of the old standard works for band. The tuba part of each selection is given.

CHAPTER VI

PEDAGOGICAL PROBLEMS INVOLVED IN THE TEACHING OF BRASS INSTRUMENTS

Introduction

Once the vital factors of technique have been learned on one brass instrument, these factors can be applied to any of the other instruments belonging to the brass-wind family. For instance, the position which the tongue plays in the development of range not only applies to the trumpet, but to all other brass instruments as well. It may be well to point out that by "technique" we mean not only the technical ability one acquires in the form of tonguing, flexibility, etc., but also the information of knowing how this technique is performed and applied.

For this reason, the brass instruments will not be considered separately in this part except when some unusual problem arises which is not in common with the pedagogical problems of the other brass instruments. If this be the case, the particular problem under discussion will be treated in full in connection with the instrument to which it applies.

Posture

The simplest and most vital of all rules is the importance of an erect body position in both standing and sitting. It

is not necessary to be a medical scientist to understand that the human body was created to grow in its natural erect stature. Anything in reverse to this infringes on the laws of nature, and everything unnatural is apt to develop. In order to have health in the lip muscles, it is essential to get the body out of a lazy, slouchy appearance.

Faulty posture, caused by sitting against the back of a chair with the complete spinal bone structure in a barrel-shaped curved fashion, brings on round shoulders and head stooping. This throws the entire weight of one's body on the spine, which overtaxes the spinal column. This over-relaxation gradually causes a chronic, tired (listless) mind and body. Faulty-dropped head position is also a hindrance, because it over-tightens the tongue structure, thereby impairing the air column.

For a simple illustration, observe the action of a partly bent paper straw in which the suction is impaired when the straw is bent. This same action holds true of the air column as it passes through the throat and over the tongue. For example: thrust your chest forward (not upward), extend the diaphragm outward (not inward), straighten out your shoulders, and lift your head up and back in a militaristic stature. Then count from one to ten and listen to the vibrancy of the voice. Now do just the opposite: bend head down, round the shoulders, sink the chest inward, and lean

inward against the spine and count to ten. Now, the difference can be clearly seen. The former response is clear and vibrant, whereas the latter response is choked and muffled. This same test can be applied to the open tones on the brass instruments, and it is interesting to note that the results are identical with the above results.

By edging towards the back of a chair for support while playing, or by pushing inward against the spine while leaning on the diaphragm muscles, one invariably becomes confused as to whether he is breathing from the stomach or the diaphragm area. However, those who have an habitually erect body experience no such difficulties. When the body is erect, there remains but one alternative and that is to lean forward on the diaphragm muscles for support. The body will then be in its rightful, natural position and will distribute and carry its weight in all the proper places.

Leaning on the diaphragm muscles in a slouched position squashes the lower lungs, impairing its added expansion. Slouching down in the position where the left elbow rests on the thigh not only hampers good breathing but slows down the normal heart action and the natural circulation of the blood being pumped throughout the entire body, because undue weight is pressing on the heart. It is because of such reverse normal action of the blood circulation and pressure that brings on dizzy spells, lightheadedness, choked tonal quality,

impaired range, lack of endurance, and unnecessary pressure on the lips. Faulty posture also slopes the angle of the trumpet or trombone in a downward position, deadening the tone quality as the tone vibrations hit the music stand or the floor. This makes one waste twice the amount of energy which gradually reduces the health in one's lip, endurance, tone, range, power, etc.

Embouchure

"The French word 'embouchure' means 'setting on' (German: Ansatz); and, as the word applies to brass instrument playing it means the position of the mouthpiece on the lip."[1]

Brass men have more varied theories about the working embouchure and lip placement than about any other single phase of their playing. Among the many formulas used to get more or less lip into the mouthpiece are: (1) red part of the top lip on rim, not in mouthpiece; (2) two-thirds of the mouthpiece on top lip; (3) half top lip, half bottom lip; (4) red of both lips rounding around mouthpiece; and (5) top and bottom lips curled in the mouthpiece. The most sensible group, however, advocates that wherever the mouthpiece feels most comfortable and the lips vibrate most freely, that is the correct placement. Lip formations of every player are as different as the individuals themselves. Therefore, it is obviously foolish to say that the best placement is "half and half."

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[1]Vincent Bach, The Art of Trumpet Playing, p. 25.

A command often heard by beginners is "smile slightly." This can be magnified too greatly. Instead of unnecessary lip stretching, if the lips are puckered and pressed more firmly together, more of the meaty substance of the lips is instinctively absorbed inside the mouthpiece, resulting in much more security in the embouchure. The vibrating tissues should be used solely for the purpose of vibrating--not for vibrato, pressure, or for shifting registers.

Puckered lips have a strengthening effect, but lip stretching spreads the muscles in opposite directions and in so doing tends to weaken the lips. To insure strength in the lips they should at all times be closed and puckered. "By keeping the chin firmly set the needed vitality for a healthy embouchure can be drawn from all the facial muscles. These are the eye, chin, upper lip, and muscles in the corners of the mouth."[2]

In ascending from the low to the high register, the lips should be drawn together. This is done by raising the bottom lip slightly, thus tightening the muscles in the corners of the mouth. It also has a direct bearing in controlling the air stream. The process is in raising and lowering the air stream, and thus controlled resistance reverts back to the tightness of the embouchure. The technique is to lower the bottom lip for a slight opening, which gives both wider vibrations and a resonant bottom register. The compression of the lips results in a smaller opening the thus higher range.

[2]Charles Colin, Lip Flexibilities, p. 18.

Notes above high C, which are so generously handed out by modern dance band arrangers, are cues for the embouchure to take on added punishment. Actually, however, the embouchure does not take much punishment if enough energy is mustered up within the body (and also within the air stream which comes from the diaphragm) for counteraction against these injurious forces. Do not press the mouthpiece against the lips, but play towards the mouthpiece. Have the embouchure vibrate against the mouthpiece rather than the mouthpiece digging into the lips. Here is a possible exercise for such a formula: upon an intake of breath, lock the air stream within the mouth in readiness for each attack. Of course, this is done with the tongue. Foreclose the tongue by having the air forcefully push behind it. As this is taking place, the embouchure will have sufficient time to release itself away from the mouthpiece.

Edging away from the mouthpiece has a three-fold purpose: (1) it relieves the pressure on the embouchure; (2) it puckers the embouchure for a better contact; and (3) a timely descent upon the mouthpiece for a more spontaneous attack. The lips vibrating against the mouthpiece, instead of pressure, keep the mouthpiece stationary so that the lips have an opportunity to emerge away every time a breath is taken. This relieves and rests the embouchure.

Air pockets in the embouchure are used to resist the mouthpiece from pressing the lips against the teeth. It pushes the lips outward away from the teeth, relieving pressure and drawing the embouchure closer together for a better contact, this resulting in a more responsive vibrating embouchure. "I do not advocate the type of playing which uses air pockets in the embouchure, but since no two embouchures are alike, should a student naturally have these qualities and obtain good results, I definitely would develop rather than discourage air pockets."[3]

There is a great difference in air pockets and blowing out of the cheeks. Air pockets resist the air stream and mouthpiece pressure. Correctly applied it is a revelation for warding off all unnecessary mouthpiece pressure and stimulating a better contact within the embouchure. Ignorantly puffing out cheeks can be extremely dangerous, for it will undo all or any muscles originally formed. Any good taste in playing will be lost and eventually distort an embouchure to a point where it may become very short-lived or paralyzed. To uphold under forced cheek bulging, lip pressure and punishment will inevitably lead a sick embouchure to becoming a dying one.

A shifting and floating embouchure is a lip placement that temporarily might feel good. However the feel is most inconsistent, for if it is allowed to bother one, this feel

[3]Charles Colin, Vital Brass Notes, p. 8.

becomes so foreign and disturbing that it becomes magnified in the mind one thousand times what it really is.

Another menace that unbalances one's senses is a sliding embouchure. This brings on a condition that grips one with internal fear. One of the many causes which this results from is that the lower register might give comfort. But when the upper register presents itself, the upper lip muscle pulls the top lip away from the other, leaving an enlarged separation between the contact in the lips. Such pulling away in opposite directions tightens and stiffens the lip muscles, thereby losing both lip and chin flexibility. There are many cases where the placement is dropped so low on the top lip that the mouthpiece is tucked underneath the top lip, hanging onto just the thinnest red portion of the lip. This gives a sense of insecurity because of the fear that the mouthpiece will slide off the lip onto the teeth. Those who are confronted with such problems should take inventory of themselves and cure the causes in order to build muscles strong enough to withstand the average routine that a brass man must exercise daily.

Meeting the mouthpiece with closed lips and tonguing behind the teeth is vitally important because when ascending to the upper register the lip muscles draw together, strengthening and feeding vitality to counteract any mouthpiece pressure that the vibrating tissues are subjected to.

The higher the range, the more all the muscles should be drawn together. The lower the range, the more relaxed these muscles (embouchure, tongue, and diaphragm muscles) should become. In order to obtain a closed embouchure, it is necessary to meet the mouthpiece not with the tongue but first with sealed lips. The tongue should meet the roof of the mouth to seal and compress the pressure of the air for perfect attack and breath control. The advantage of releasing the air pressure this way is to acquire a sensation of playing "offensively" by playing forward into the mouthpiece. This pushes the lips against the mouthpiece and away from the teeth. "Defensive" playing, the opposite of above, pushes the mouthpiece into the lips which, in turn, are cut by the teeth.

Whether tonguing for the low or high register, the tongue placement should absolutely be the same. It is true that different syllables are used for tonguing in different registers (this will be taken up under tonguing), but the tongue placement remains the same. In slurring from one register to another, the mouthpiece should not shift from one muscle to another or from a lower placement to a higher placement, nor should the lips be moved in any great distance. Lip movement should cooperate together with the tongue and diaphragm muscles in proportion to the degree of range desired. To concentrate on these facts alone will eliminate fussing with the lip and set only one comfortable placement on the

embouchure. The common fault of most brass players is that they place the blame of confusion onto everything but themselves.

Some brass players allow themselves to become exceptionally conscious of their delicate lips. This state of mind brings about a sensitivity so keen that the lips are usually used for everything but their main and important objectives. Some misuse their lips for vibrato, stretch their lips for range, and wiggle the corners of their lips for trilling and slurring. This responsibility should never be taken on by the lips, for this practice will eventually reduce any possible chance of endurance. To be constantly fighting the instrument also brings on an added strain that reflects the quality and mastery of performance. If the entire responsibility of the mechanisms of playing were shifted to the powerful strength-giving anatomy of the human body, this would relieve any and all overburden of one's sensitive lip tissues. The lips should be allowed to take on only one single duty: that of vibration. All other factors should be distributed to the muscular parts of the body. Inactive muscles such as the diaphragm, throat, neck, and face, when combined and coordinated, could naturally bring forth and create an abundance of much needed help.

Under no circumstances should the lips ever become subjected to press, pull, squeeze, stretch, wiggle, smile, roll

up, dig in, or be dependent upon so many of these faulty and commonly accepted and unfounded theories. There are no muscles within the lips themselves. The muscles that contribute the final support toward the lips are situated in the corners of the mouth.

Diaphragmatic expansion applied correctly and intelligently removes all unnecessary pressure away from the lips. This transformation acts with immediate results, for it takes all unnecessary pressure away and shifts the responsibility on to muscles that could easily accept this stimulation. A co-mingling of exacting breath syllables interwoven within the air column brings about a coordinated degree of a well regulated and assimulated muscular coordination. This formula brings about a better degree of intonation, surety, relaxation, bigness of tone, and range free from any possible strain. Confidence can become a part of one's personality when the entire sensitivity is finally freed from the lips and transferred to the other more protective working mechanisms of the body; then will pitch, range, and flexibility become a reality.

All these ingredients, so vitally necessary for one's continued progress, can become a part of one's assets when the entire responsibility is placed on the air column. The helpful contributing support of the body's stronger muscles are an important source of contributing a greater degree of

strength to those muscles protecting, surrounding, and supporting the tender lip membranes.

The common phraseology of brass instruments is deceiving. The player is under the illusion that it is his embouchure that does all the work. As has been pointed out previously, this is not the case. For example, if you place your lips together inside the cup of a mouthpiece, the lip tissues that make the contact form an opening with a total diameter about the size of a ten-cent piece. This portion of the lips, the part in the mouthpiece, draws its support and is governed entirely by the strength of the muscle fibres surrounding it. The part of the lip that is gripped by the mouthpiece does not move around inside the mouthpiece, but remains stationary and is there solely for the purpose of vibration and contact. The reaction is the same as that of a vibrating sax reed. It must not be forgotten that the tighter one contracts the muscles surrounding the embouchure, the closer is the "reed" or the brass man's vibrating lip tissues, which come together making the opening smaller. The smaller the vibrating surface, with a penetrating steady controlled air-stream, the faster the lip vibrations, and the higher the pitch.

> To begin with, I state most emphatically that embouchure does not mean lip strength nor to be able to play high, nor to have power and endurance. A cornet player may have all the lip strength to play high tones and may also have endurance, but his embouchure may be such that as a soloist he would utterly fail. Various reasons may be the cause. What good would a strong lip be if one lacks the sureness of attack and has to feel for every tone in

order not to miss it? What good is it to have all the power and endurance in all registers if the lips will not respond in a "pp?" Many otherwise good players are unable to play a legato or slur, especially in bigger intervals. If one is perfect in sureness of attack but the lips fail to respond in a legato, the development of the embouchure has been neglected. That is, the muscular elastic quality of the lips lack flexibility, due to incorrect training of the lip muscles.

Embouchure is the ability to produce all tones within one's compass or range flawlessly. The lips must respond to the softest "pp," and must not lose tonal quality in "ff." They must be infallible in legato and have sureness of attack in "pp" or "ff."[4]

Mouthpiece Pressure

Practically every music school, or teacher, nowadays claims to teach the non-pressure method. Mechanical devices have been put on the market to learn to play without pressure. Some teachers say they are worthless, claiming that no attachment will help you; others indorse such foolishness. I would like to hear a brass band composed of non-pressure artists only, play the "Stars and Stripes," for instance, on a street parade, every member using a mechanical non-pressure attachment. I'll bet my pet rabbit that Sousa himself would not recognize his march. I would also like to hear a trumpet section of a symphony orchestra play "Ein Helden Leben" (Life of a Hero), by Strauss, using a non-pressure devise on their instruments. What a bunch of dead heroes there would be.

I would like to hear a non-pressure artist play Herbert Clarke's "Bride of the Waves," Liberati's "Pyramids" or "Inflamatus," or Walter's "Prize Song," musically and with proper tonal quality, using a non-pressure attachment. No doubt some non-pressure advocates have the right idea, but express themselves wrong by saying "learn to play <u>without</u> <u>pressure</u>" Playing trumpet <u>without</u> <u>pressure</u> is the biggest nonsense, and I don't fear anyone in making this rather drastic statement.[5]

Pressure is definitely the missing link between a mediocre and the top brass man. There is a right and wrong approach

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[4]William Thieck, <u>Daily Studies for Trumpet</u>, p. 10.

[5]<u>Ibid</u>., p. 11.

to everything, and so it is with pressure. For example: strong arm pressure pushes the mouthpiece into the lips and forces them against the front cutting teeth. Decidedly, this is the wrong approach for it is injurious and retarding. Pressure of the mouthpiece should never be put against the lips in order to feel each and every note. Such practice is the surest way to stop blood circulation. It not only saps the natural energy but also the reserve energy that would otherwise contribute strength to the vibrating tissues within the embouchure.

Wherever there is contact there is pressure. No one can contradict this, because it is a law of physics. This principle should be applied to the degrees of support that the lower lungs have against the diaphragm muscle. Next in importance is the tongue muscles. Here, support and pressure are gained by contact of the rear of the tongue against the top teeth (molars). This condenses and directs the air stream. The third important group is the set of muscles, which surround the embouchure. When the tongue and diaphragm muscles come into play in even proportion, the lip muscles, too, must cooperate.

The embouchure always draws its support from its surrounding muscles, which gives a definite contact in the vibrating tissues themselves. This contact results in a "reed-like" manner, bringing the vibrating tissues into closer

contact within the mouthpiece. The degree or range desired is dependent on the amount of support the lip muscles give toward this closer contact, thereby feeding added strength to the vibrating tissues.

The student absolutely should avoid the injurious practice of mashing the lips against the sharp front teeth. The embouchure should always be left free to vibrate, unhampered by stoppage of circulation of the blood. Binding the lip muscles stops blood circulation, thereby numbing the lip tissues into lifelessness, as that of a tourniquet applied to an arm. The gentle drawing together of lip tissues in a natural helpful working order is pressure. Pressure does not mean force. Forceful pushing is unnatural, creating a tendency to bind, obstruct, and retard. Natural pressure can be used most helpfully in building correct muscle structure toward a solid foundation. However, it must be used correctly, sparingly, and only when needed.

It is the cooperative pressure and contact of the above-mentioned muscles, functioning together, that offsets any force which may be caused by the mouthpiece being forced into delicate lips. Also, it counteracts any possibility of the lips being cut and bruised because of hard metal pressing against the front teeth. Therefore, pressure correctly used among the already developed muscles and not against the lips is the source of the brass man's strength.

Here is a pressure plan submitted to counteract pressure. In the process of taking a breath, release the pressure of the mouthpiece away from the cutting teeth, so that circulation can be immediately drawn to and through the part of the lip that vibrates. No matter how slow or fast the breath is taken, should it be a fraction of a second to a half-minute, the mouthpiece immediately should be released away from the lips. It is not necessary to take the mouthpiece completely away, for there may not be enough time for the lips to get set to receive the mouthpiece. While inhaling, relax the pressure of the mouthpiece away from the cutting teeth without relaxing the embouchure setting. Only between long rest periods should the instrument be taken completely away from the lips, otherwise there might not be enough time to get the lips adjusted for the next attack. Should this rule be followed it will become habitual; consequently, there would be very little chance of the lips becoming numb and swelling. The vibrations would come more freely, and the tone quality more brilliant.

> Most players make the mistake of pressing against the lips before the lip muscles are properly contracted for the individual tones, especially in playing from a low to a high tone "ff" in fast passages. In loud playing the lips vibrate in a wider range, and these more intense vibrations would almost throw the mouthpiece away from the lips if the necessary pressure were not applied. If one would play G above the staff starting the tone "pp" and without pressure, then make a long crescendo to a "ff," a decided increase in pressure will be necessary in order to produce the "ff" with ample tonal volume. This pressure will be absolutely harmless

since the contracted muscles easily withstand the same, but should the lip muscles become weak or relaxed while playing the long crescendo, then the lips will be pressed against the teeth, which not only would be harmful to the lips but also impair the sonority of the tone.

The principles for developing lip muscles require correct contraction and relaxation. Pressure correctly applied will not be detrimental. Playing trumpet without pressure is nothing but imagination.[6]

Breath Control

There has always been a great deal of speculation regarding breath control; yet, those who derived the most of its benefits are very few. For this reason, a sense of secretiveness has attached itself to this issue.

There is no mysterious formula regarding this phase of performance. From the most simple deductions, it stands to reason that the puspose of a wind instrument is to create sounds through breath or wind. It is the push on the breath that sends a vibrating column of air through the lip, and then through the instrument. The opposite effects take place when one relies solely on the lips. Allowing one's physical progress to be concentrated on lips rather than wind misguides one's progress.

In order that clearer tones eminate from the end of a brass instrument, it is necessary to feed every inch of that tubing with a constant, direct and penetrating column of breath--the reason being that all these important qualities

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[6] Ibid., p. 12.

are concealed within the bell of the tubing of the instrument. To offset this, one's entire concentration should be centered in directing a continuous and penetrating air column. Not only will every inch of the instrument be filled with breath, but the forceful velocity of the breath will throw a far reaching, carrying sound far into the air waves.

A revolutionary change can be brought about through complete reliance on breath control. The breath is endowed with unlimited power in the body to control every muscular activity. All other activity should gradually step aside, standing guard as contributory or supplimentary aid in making room for this all important factor.

There is nothing complicated about breathing. It is a natural attribute. The workings of the diaphragm muscles affect the throat and neck muscles, especially its alliance with the tongue muscles. The grouping of all these muscles act as one part of a machine, working in perfect harmony with the other, all for the express purpose of maintaining a perfectly controlled air stream. There should not be any half way measures where one becomes dependent on both the lip and breath control. Both activities drawn together will war against each other. Through a radical reliance on the breath, it soon becomes a dependable and natural reflex. When the practice of technique has been found not to be the solution for the most advantageous results, then the study of breath

should be considered. An exacting group of daily exercises strictly adhered to, along with one's daily practice routine, will be the answer to many discordant problems.

Many players breathe from the chest, which is incorrect, and in some instances have the muscles of the diaphragm so cramped with belts or tight trousers that they cannot be used sufficiently for correct breathing. The air pressure, while a performer is playing, should not rest on the muscles of the chest but on those of the diaphragm. The chest should be expanded, although not unnaturally blown up, and the lungs sufficiently filled with air so that the diaphragm muscles can push against it; therefore, the diaphragm must have perfect freedom. Do not inhale too much, for this can cause a cushion of dead air in the lungs which in turn will cause dizziness.

> I do not deem it practical to inhale to the utmost capacity for a short phrase, since it would be necessary to hold back a certain amount of air force from the lungs in order not to overburden or overtax the air vibrations (within the tubing) with too great an amount of air force, which would impair the tonal quality desired, although the loudness demanded must be considered. A great deal also depends upon the register in which a phrase has to be played.
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> A phrase in the upper register requires a greater air force than the same phrase played in the middle register on account of more contracted lips, which may be experienced by playing a middle C pianissimo and then a high C pianissimo. It is therefore desirable to have more than atmospheric pressure within the lungs when playing in the upper register even in a "pp."
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> The increase in the circumference of the chest is even of greater importance, since the action of the diaphragm is independently natural. Contracting the diaphragm excessively will prevent the lower ribs from expanding sufficiently at the point where the lungs are the

widest. In making breathing exercises, attention should be drawn to the lower part of the chest. When the lower ribs are expanded, the diaphragm is easily contracted or pressed downward and the lungs will be inflated at the point where the expansion and capacity is the greatest. It takes considerable effort to raise or expand the very upper ribs and great care should be taken not to raise the shoulders while breathing. In playing trumpet or any brass instrument, it should become a habit to maintain the lower chest expanded while playing.

If the lower ribs collapse at the moment of the attack of a tone, it is a sign that breath was taken insufficiently or was wasted before making the attack. An advantage in keeping the chest expanded while playing is that it keeps reserve of air within the lungs which will equalize the air pressure, so important in playing long tones or phrases as in song playing.[7]

The benefit of diaphragmatic development is: pressure that is taken away from the mouthpiece is transferred to the diaphragm muscles. These muscles, developed, will give ease and relaxation in every register, and lead to added endurance, more power with a sizzling brilliance, which all go to build up much needed confidence.[8]

Attack and Tone Quality

The attack on brass instruments has invariably been a sign of confusion. Teachers of all schools of training advocate a wide scope of thought in striking a tone. Although most theories bring results, there is one genuinely tried and tested approach, that developed by Arban in 1850. His instructive comments found in the preface of his undisputed and outstanding trumpet method is a masterful work of logic. He emphatically states, "The tongue does not strike."[9] He

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[7]Ibid., pp. 8-9.

[8]Charles Colin, Vital Brass Notes, p. 8.

[9]Joseph Arban, Method for Trumpet, p. 4.

insists the procedure is just the reverse. The only purpose of the tongue is to act as a valve in order to resist the onrushing column of air. This is done by pressing one's column of air forward against the sealed valve or tongue. In order to attain such an effect, the tongue should be placed against the teeth of the upper jaw. Then a definite breath pressure is summed up and pressed forward against this sealed valve. By simultaneously supporting the air with both the diaphragm and resisting the air column with the sealed tongue, the synchronization develops power and pressure within both breath and body. With such control of power prepared to back up a forceful air column, the next step required is to release or draw back only the most centered portion of the tip of the tongue. This is created by means of forcing a small portion of the tongue out of the way with a powerful continuous and unobstructed column of air. This action does not mean that the entire structure of the tongue takes on any action as the tip of the tongue is making an unobstructed opening for the air passage. On the contrary, the center, rear, and back of the tongue plays its major important part by not moving at all. Its importance remains in keeping a staunch, fixative, permanent placement in controlling the column of air as it originates from a well supported diaphragm.

The tongue placement up and above the top teeth has a very specific effect. It directs the placement of the mouthpiece

and sets the lip muscles. It also develops the vital and essential muscles in and around the placement of the mouthpiece and embouchure. This is especially noteworthy for it then creates a freer flow of blood circulation from one's entire circular facial anatomy.

> By drawing together every possible facial muscle and by molding them closer together results in a keener sensitivity directed towards the combined mental and physical awareness. By harnessing every possible combined energy into one direction, the attack will become free from obstruction and artistically controlled.[10]

Since playing a brass instrument is an unnatural procedure, it is necessary to create an air column of such power as one desires in his type of practice or work. As has been previously stated, the centered tip of the tongue forms a valve and furnishes the necessary resistance as the air column pushes against it. In this way, less air needs to be released to get just as much air pressure as could be had from tonguing between the lips with a resulting loss of more air and control. The result of conserving all possible air is power, brilliance, intonation, and much reserve.

It is most important not to obstruct the air passages with a lazy, dangling tongue. After the release of air, the tip of the tongue should descend immediately and remain stationary behind the bottom teeth until ready for the next attack. By releasing the air close to the gum, the tongue has

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[10]Charles Colin, Vital Brass Notes, p. 2.

a shorter distance to travel. These short releases of air give a better staccato, and cleaner, surer tonguing.

The tongue proper does not start the tone but acts only as a valve, which may abruptly or gently open the lip passage. This causes the air to ascend upward from the lungs. The air stream forced up from the lungs is controlled by correct use of the muscles in the diaphragm area, which strikes the lips at any regulated force. This should be followed instantaneously by a free and uninterrupted air column. There is only one correct mental conception used in all types of tonguing, and that is "the stressing of tone quality with every attack." Tone quality should prevail whether a thirty-second or a sixty-fourth note, regardless of how small or fast the note may move; they all have their importance and should not be treated lightly. The old masters' advice, "Do not sacrifice tone for technique" still remains as the brass man's golden rule.

In staccato attack, a sixteenth or thirty-second note must at all times have the same amount of tone quality as with a slow legato. Many erroneously insist on using two distinct, different types of tonguing. One for fast staccato and another for slow legato. In attacking with air, an extremely fast tongue is vitally important, and this is most predominant in legato tonguing. To acquire a smooth flowing clarity of tone, the front minute centered tip of the tongue must not

intervene with the air stream, but must be placed directly and immediately behind the bottom teeth, in order to send the air through the vibrating lips uninterrupted. The drastic effect of this portion of the tongue dangling in mid-air is decidedly injurious, resulting in splitting notes and creating a dull fogginess in tone quality.

Some instructors persist in having beginners "spit out" tones by passing the tongue between the lips. This is meaningless because it contains no body and breath resistance. This deception keeps the lips perpetually apart causing the upper register to be dangerously fragile and most difficult to vibrate. A normal wide spread of the centered embouchure should be used only for wide vibrations (middle and low registers) and not for fast vibrations (upper register). In the upper register, it is imperative that one use a more tight and closed embouchure.

Passing the tongue between the lips subjects one to a continuous strain, impelling difficulty in producing the normal high range. This style of attack creates only a senseless "thud." This type of attack, coupled with the archaic method of lip stretching, brings on the "strong arm" or "pressure" method. Such insecurity in excessive lip pressure ultimately develops a case of nervous prostration, especially when every phase of playing is taken out on the embouchure by constantly digging the mouthpiece into the lips.

The type of tone that the professional ultimately strives for is the big, vibrating, clear, crystal ringing, brilliant tone. To attain this degree of perfection, regulation must take place between the controlled diaphragmatic breathing and the proper tongue contraction. The three main factors which work together to produce not only this type of tone but also the other factors of brass technique are: (1) correct diaphragmatic breathing; (2) the "pucker system" applied to the embouchure muscles; and (3) the control of the air stream by means of the tongue. The first two have already been discussed, and the third one will be discussed in the following chapter.

Air Stream

The air stream passing over the tongue is controlled and regulated by the base or back of the tongue. Simultaneously, the sides of the rear of the tongue are stationed against the sides of the top teeth. This contact creates perfection in controlling the air stream. This particular portion of the tongue plays an important part in determining the type of tone and resonance desired. It also has a direct bearing on the freeness of the air column. All this is done with the help of the bottom lip which works together with a free moving jaw, thus generating the correct amount of resistance.

The tongue, acting as a valve, plays the most important part in controlling the air passage. Low notes call for less

tensity in the diaphragm because of the wider vibrations, while high notes call for more tensity in the diaphragm. This forceful stream of air is controlled by the arched tongue. The tip of the tongue, in releasing the air stream, makes the lips vibrate faster, and this automatically pushes the range upwards.

Resonance is formed by vowel singing, which in turn is only the controlling of the air stream by means of an arched, flexible tongue.

> This narrows down to the different syllables which are formed inside the mouth. Three distinct ranges are created by employing these syllables: "AA," "OO," "EE," put in two word form. We use "Army" for "AA," "Two" for "OO," and "Tea" for "EE." In speaking the word "Army," notice the position of the tongue. It is almost flat on the bottom of the mouth. Doing this opens the throat. In speaking the word "Two," notice the rear of the tongue is flexed. This does not close the throat, but automatically contracts the stream of air, thus making it possible for the lips to vibrate faster than the previous syllable. In speaking the syllable "Tea," the rear of the tongue is raised so that the back teeth feel the spreading of the tongue. This contracts the column of air so fine that the drive is more forceful. Therefore, the lips vibrate with extreme rapidity. In these three positions, there is ample room for the air stream to pass over the arched tongue unhampered. Notice particularly that the air stream, when raised from a protruding, tense diaphragm, ascends in a straight line. As it gets behind the tongue it does not curve and pass in a round-like manner over the tongue. The force of the air stream shoots up from a tense diaphragm, directly straight through the throat until it finally hits the roof of the mouth, which acts as a sound chamber.
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> Run your finger up against the walls of the roof of your mouth and notice how much space the air has to circulate around. Therefore, the theory of the arched tongue disapproves what is said about this system closing the throat. Incorrect breathing, i.e., breathing from the chest and not taking in enough air, will surely choke the

> tone and tighten the throat muscles, not the arching tongue. The sound chamber (or roof of the mouth) is likened to that of a violin sounding board. The air stream with its pressure, when it ascends to the roof of the mouth with the desired amount of velocity (speed), is held back by placing the tip of the tongue against the top teeth. This stores up added intense power and as soon as the tip of the tongue (valve) is immediately released in an unlike fashion, the air stream shoots up in a fiery spirit, forcing the lips to vibrate at any controlled speed. When released, the tip of the tongue descends to a stationary position behind the bottom teeth to make room for the air pressure passing through the lips. This results in the lips vibrating automatically, and creates a sizzling brilliance with bigness of tone in every range.[11]

The power behind the air column is governed and controlled by the action of the rear tongue near the thyroid cartilage, or Adam's apple. The directness and force of the air column as it passes over this muscle produces faster lip vibrations, which in turn produce higher range with added brilliancy. Control of the air stream through the proper use of the tongue not only adds to one's range and bigness of tone, but also is the controlling factor in the development of lip flexibility (to be discussed later). The stabilization of the entire tongue muscle is one of the most important essentials in producing these factors, and depends on three principles: (1) the use of the back and rear position of the tongue for control and condensation of the air stream; (2) the use of the center position of the tongue for flexibility for the purpose of trilling thirds and slurring; and (3) the use of the

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[11]Charles Colin, Lip Flexibilities, p. 1.

centered tip of the tongue to release a compressed air stream for the purpose of attack.

Tonguing

The actual commencement, or attack, of a tone was fully discussed under "Attack and Tone Quality," a previous chapter. The fact should be recognized then, that all the factors which go together to produce a fine attack will apply to the correct method of tonguing. In other words, the advice contained in the chapter "Attack and Tone Quality" will apply fully to this chapter. However, the actual commencement of the tone will not be discussed here since it has been treated fully in a previous chapter. This chapter will deal more with the actual types of tonguing.

> In my Elementary Studies, First Series, I state that there is no set rule for cornet playing, except by playing naturally; consequently there is no set rule for tonguing. Each player must discover the most natural and easiest way for himself. There is any amount of experimenting necessary, before one really feels the proper way. Use of the syllable "Tu," not "Thu," in the middle register, seems to be the most natural way to express the attack.
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> As a matter of argument, when the muscles of the lips are contracted for high tones, one would necessarily pronounce "Te," and when relaxed for low tones, "Tu;" consequently it would be unnatural, and almost impossible to use the same syllable for tones in all registers on the cornet.[12]

Of course, this not only applies to the cornet or trumpet, but to all other brass instruments as well.

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[12]Herbert L. Clarke, Characteristic Studies for Cornet, p. 6.

Inasmuch as perfect single tonguing is difficult to perform, used in every musical composition, and of the utmost importance for the player's musical advancement, he should endeavor to gain exact control over it from the very beginning of his studies. Brass instrumentalists are judged principally by their quality of tone and their ability to single tongue (this also includes the attack). In rapid staccato passages, use single tonguing wherever possible and triple or double tonguing only when the passages are so extremely fast that it is impossible to play them otherwise.

"There are as many different articulations on the cornet as bowings on the violin, and every cornetist should acquaint himself thoroughly with all of these to be a good player, as they are used frequently in all kinds of cornet playing."[13] The syllable "Ta" (pronounced "Tah") is used for the lower register, the syllable "Tu" (pronounced "Two") is used for the middle register, and the syllable "Te" (pronounced "Tea") is used for the upper register. As stated in the chapter on the "Air Stream," these syllables are used for single tonguing because they cause the tongue to become arched in such a manner as to force the air stream in the needed direction. There are other syllables which can be used, but since these seem to cause the tongue to direct the air stream in the right direction, and since the air stream plays such an

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[13] Ibid.

important part in connection with the other factors of brass instrument playing, these syllables seem to be the most natural ones.

Double tonguing is produced by articulating or pronouncing the syllables "Te-Ke" for the upper register, "Tu-Ku" for the middle register, and "Ta-Ka" for the lower register.

> The player must have acquired proficiency in single tonguing before attempting to double tongue, and as each syllable, to be accurate, must be pronounced distinctly, it is absolutely necessary to produce as equal a staccato effect with the use of "Ke," "Ku," and "Ka," as with "Ti," "Tu," and "Ta." Therefore, it is advisable to control the "Ke," "Ku," "Ka" attack. This form of articulation is usually overlooked by a majority of players, whose double tonguing, as a result, is never correct. In using this form, practice the exercises therefore, slowly and distinctly, in order that the result will be exactly as with the single tongue attack.[14]

To develop the syllables "Ke," "Ku," and "Ka," they should be substituted for the single tongue syllables, "Te," "Tu," and "Ta." Exercises should be played in this manner until the second-half of this double-tongue articulation resembles the single tongue articulation.

> In order to invest this to-and-fro motion with perfect regularity, it is necessary to practice slowly, so that the tongue, like a valve, may allow the same quantity of air to escape at each syllable. If this system of articulation is perserved in, no passage will be found difficult; the tone-production on the cornet will be as easy as that on the flute; but to reach this end, the pronunciation must be perfectly pure.[15]

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[14] Ibid., p. 8.

[15] Arban, op. cit., p. 153.

It is as important to master single and double tonguing before attempting triple tonguing as it is important to master single before double tonguing. If this is not done, the player has a much harder time in reaching a point of perfection as far as triple tonguing is concerned. As far as directing the air stream is concerned, the principle of articulation is the same. However, the actual syllable used is slightly different. "Te-te-ke" is the syllable used in the upper register; "Tu-tu-ku" is used in the middle register; and, "Ta-ta-ka" is used in the lower register. If one practiced the "Ke," "Ku," and "Ka" enough to make them sound like the single-tongue articulation (and this was supposed to have been accomplished when practicing double tonguing) before taking up triple tonguing, then this type of tonguing would be comparatively easy. The principle here is the same as in the double tonguing in that the last part of the syllable should give the same effect, or sound, as the first part of the syllable. In other words, the "Ke," "Ku," and "Ka" should sound as much as possible like the syllables "Te," "Tu," and "Ta." When this has been accomplished, then both double and triple tonguing becomes only a matter of speed. And once speed has been attained, one is able then to produce a clear, crisp, staccato, double or triple tongue, no matter what the tempo is.

Lip Flexibility

Although the expression "making his instrument talk" is a common phrase, it does carry weight. Lifetimes have been devoted to its development, and singing into an instrument has become an art. The playing of brass instruments is identical to the technique of great singers. There are many varied singers with good tones and techniques, and there are brass players endowed with the same basic qualities.

Most trumpet books suggest the use of syllables "tu-ee" or "ta-ee" in ascending for intervals of the same valve or slide combinations, and the reverse ("te-aa") in descending. This method is indespensable to brass players in slurring intervals of thirds and for fast lip trills. Employing this system is the basis for the use of singing into the instrument. These syllables should not be employed for only a selected few slurred intervals; they should be used for every and any possible type of slurring or tonguing.

The speaking or singing voice sounds clearer and more resonant when the vowel syllables, i.e., "a, e, i, o, u" are clearly pronounced. "Another point to be noted by the conductor is that one sings upon vowels and not upon consonants; that most of the consonants are in fact merely devices for interrupting the vowel sounds in various ways; and that good tone depends largely upon the ability of the singer to select the best of several different sounds of the vowel and to hold

this sound without any change in quality during the entire time that the tone is prolonged."[16] This is identical to the articulated sounds used in brass instrument playing. Singing on the vowel syllables while playing extracts quality and carrying power.

As the ear registers pitch, the workings of the diaphragm, vocal, and tongue muscles immediately should be synchronized by tensing or relaxing in proportion to the pitch desired. This coordination supports the velocity of the air column necessary to transform a column of air into vowel sounds identical to those of the human voice. Coordinated support both guides and regulates these vowel sounds so that in its completion the hum within the air column throws off the sound via the vibrating lips. The air column then is molded into a steady hum within the mouth before it leaves the lips. Its syllables for clarity and openness of tone quality are "hiss" for the top register, "hoo" for the middle register, and "haa" for the lower register. These phoenetics interwine within themselves in sliding from one interval, full tone or chromatic, into the other. For attack, use articulations "tee" for the upper register, "too" for the middle register, and "taa" for the lower register.

Singing on the syllables should be so flexible that it should be applied to an attack of even a sixty-fourth note.

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[16]Carl W. Gehrkens, Essentials in Conducting, pp. 134-135.

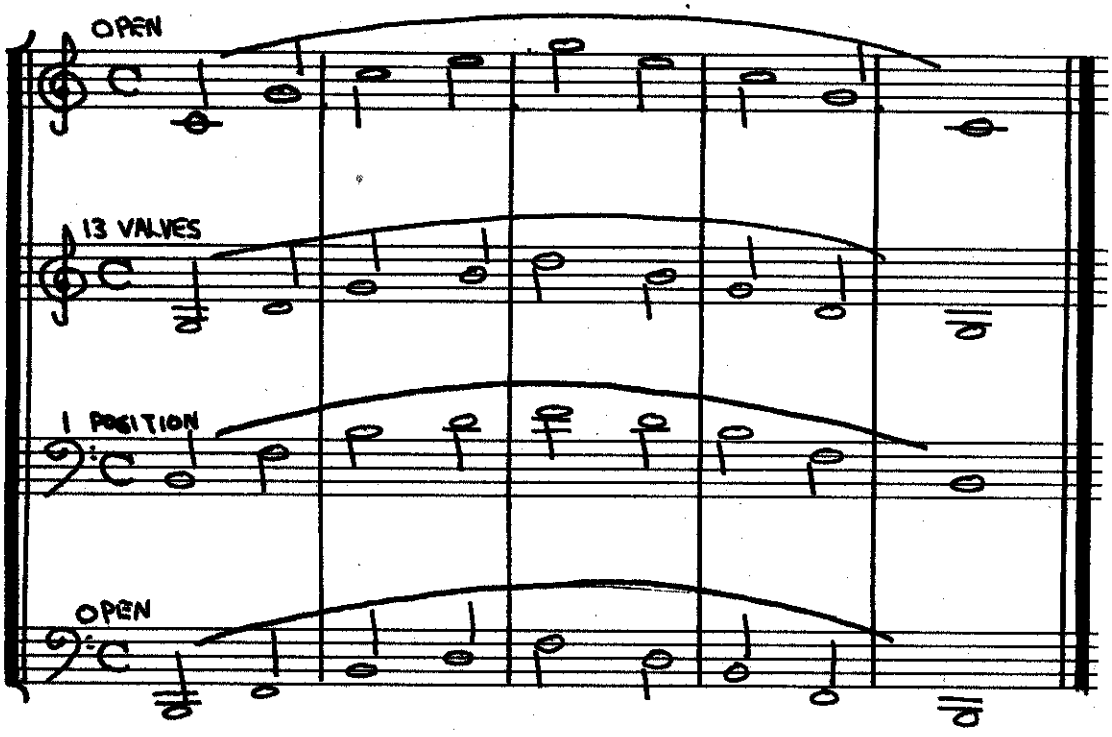
Take yourself away from the mechanics of the instrument, try to forget you are pushing behind a brass instrument, and apply yourself to one objective: to sing into your instrument. The thing that counts is the singing of each note, regardless of how slight the change in interval might be. Through this medium can perfect intonation be acquired.

Actually, what one is doing when he sings syllables into a brass instrument is controlling the flow of the air stream by means of the arched, flexible tongue. The higher the arched tongue is raised in the roof of the mouth, the higher the air stream is thrown. The purpose of directing this air stream through the use of the tongue (or singing on the syllables) is to add to ones range, to improve intonation, to improve tone quality, to improve the attack and tonguing in different registers, and to add an amazing amount of flexibility to one's technique. As has been stated before, this system of controlling the flow of the air stream by means of an arched, flexible tongue, along with the system of playing with "puckered" lips and the use of diaphragmatic breathing is the entire basis of development and advancement of a brass instrument.

> The fingering marked should of course be followed, as the sole object is to build a movement of the lips and tongue, not the fingers. Observe also the crescendos, as it is necessary to swell the tone in ascending, and to diminish in descending. The back of the tongue should rise slightly toward the roof of the mouth with each successive step upward, as though pronouncing the letter E, and the lower lip should be at the same time drawn upward

and into the mouthpiece very slightly, while the wind force is also increased to make up for the narrowed opening between the lips. These muscles should of course be relaxed again in descending. Do not attempt to play without pressure, but try to play with a light and uniform pressure throughout. The student should perform these exercises daily.[17]

An example of these exercises follows:



To a certain extent the name "lip trill" is a misnomer, inasmuch as this ornament, although seemingly performed with the lips, is in reality produced by the movement of the back of the tongue. The student should strive to perform these type studies without movement of lips or diaphragm, relying solely on the movement of the back of the tongue to produce and carry the trill. The motion is much the same as in whistling a trill, and a great deal of painstaking practice is necessary to adapt this motion to the mouthpiece instrument, nevertheless, when by perseverance and practice the "knack" of doing this is obtained, lip trilling becomes vastly easier and surer than any other form of trill.[18]

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[17]Walter M. Smith, Lip Flexibility for Trumpet, p. 3.

[18]Ibid., p. 17.

Controlling the air stream results in a natural and permanent development whereas the air stream is governed by a flexible, arched tongue. This knack of lip trilling is not forced; therefore, it is consistent. It is necessary for vowel syllables to be shaped into unobstructed air-streams penetrating from well-controlled diaphragmatic breathing.

As previously stated, the position of the tongue in whistling is the correct tongue formation. Visualize the rear of the tongue being edged close to the upper molars. This condenses the air column and controls the velocity of air. Unobstruction in the air stream is bitally important. Therefore, the tip of the tongue must descend behind the bottom teeth.

For correct lip trilling development, the first objective is to become conscious of the working mechanisms inside the mouth. Sense the activity of the air stream simultaneously with the placement of the rear, center, and forward sections of the tongue. For control, the tongue is molded in arched-form so the air column can produce vowel syllables in the form of "hissing," "hooing," or "harring." Since the tongue is connected with the jaw, as soon as the rear tongue is pressed up against the top molars the jaw ascends with it. Consequently, this drawing together of the embouchure constructs the necessary resistance. The tenseness of the rear tongue against the top molars is in proportion with the rising jaw,

thus the embouchure is either compressed or relaxed, according to the intended registers.

A simple test in sensing the correct tongue position is whistling thirds repeatedly, at the same time feeling the position of the tongue as it rubs in an up and down motion against the top molars. Coordinately sense the condensed air as it passes over the tongue. Thus, both a fast moving tongue and jaw supply the embouchure with an open-closed resistance.

"For attaining the higher register, the simultaneous use of the stretching back of the lips and cheeks and the raising of the diaphragm is of prime importance."[19] Lip stretching is the backward method handed down from the old school. Such teaching requires from six months to a year before a student is able to show any sign of lip trilling. Slurring by way of stretching the lip tissues across the teeth weakens the lips and thins out the tone. The same thing applies to trying to develop range in this manner. Increased lip development can be obtained by the use of an arched tongue.

The mastery of lip trilling is the complete mental visualization of the position of the tongue. Refrain from lip stretching and use a closed puckered lip. Tongue behind the teeth to release the air stream. Practice G below middle C with false fingering (first and third valves). Raise the air

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[19]Max Schlossberg, Daily Drills and Technical Studies for Trumpet, p. 1.

stream to B by the use of the same valve combination and lower the air stream back to the G by slightly easing the tension of the tongue against the top molars. Note the resistance created by the puckered embouchure. It is always best to start slowly and softly in an easy register, and gradually ascend. For the horn, this exercise would consist of the notes C and E in the staff, played open; for trombone, F and A in the staff, played in sixth position; and, for B flat tuba, F and A at the bottom of the staff, played with first and third valves.

Lip trilling by flexible arched tongue develops and stabilizes the embouchure. The base of the tongue riveted to the top molars raises the jaw enough to make a natural contact in the embouchure, thereby forming the correct amount of resistance for the vibrating embouchure. All these forces brought together not only create an amazing amount of flexibility, but also increase one's range. An extended full diaphragm creates vacuum pressure by locking the air behind the tip of the tongue, which is placed firmly against the top teeth. This stimulates an unlimited air pressure as it prepares to be released.

Upon release, a definite contact of the top molars against the flat surface of the rear tongue molds a tube-like affair through which the air passes. This originates a controlling device for the air stream by means of either

tightening or relaxing the tongue against the upper molars. Simultaneously, the tongue in an up and down motion makes the resistance in the embouchure extra flexible. As the air passes freely over the tongue, the speed in which one wags the tongue (or whistles) determines how fast and clean the trill will move.

Range

> It is a fact that the average player, even after attaining a splendid degree with Arban's, St. Jacome's, and other methods and studies, is nevertheless completely exhausted by the demands made upon him when he first enters the field of professional playing--and particularly so the somewhat appalling use of the upper register as found in most of the methods, but the notes from high C up, which are found in modern orchestral compositions scattered about with the greatest freedom. Small wonder, then, that the average student, upon entering an engagement of this kind, is overcome by the realization that his study, however good a musician and player it may have made him, has fallen short of preparing him for the work he must do, in that it has not trained him to play the parts that are set in front of him.[20]

Like many other factors of brass instrument playing, range is another important factor which can be developed by air control. The tongue-controlled air stream will increase range in every form of slurring and tonguing. Correctly applied, glissandos up to C above high C are possible without employing any freak methods. Add puckered lips and diaphragmatic breathing to this, and power will be surprising. Without realizing it, added strength will be gathered from other

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[20]Walter M. Smith, Top Tones for the Trumpeter, p. 3.

muscles in the face, and these will be directed toward the embouchure. Should one be more conscious of this fact, muscles not yet developed will be put into use for strengthening results.

> Range is achieved when the diaphragm muscles are tightened as they extend outward and simultaneously the tongue muscles are tightened to give more control to the air-stream and the air-stream is sent through the tightened embouchure. The application of the lower register is vice versa--a diaphragm contraction and relaxing of tongue and lip muscles.[21]

The general illusion is that by blasting at high C, or higher notes, a good high range is obtained. Not until one becomes a seasoned brass man does he realize that range is not the all important factor. No doubt range is a vitally important requisite and extremely essential in modern brass instrument playing, but when the struggling student becomes obsessed with the mastering of one sole objective, he forsakes all other important requisites that play an even greater part towards the development of a fine brass man. The average student is not born with a good range. He must work for it patiently, conscientiously, and above all, intelligently. Force is not the way! By using force, lips become numb and refuse to vibrate, and instead of tone, nothing but air emanates. Fatigue has set in and one must stop and rest--then begin all over.

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[21]Charles Colin, Vital Brass Notes, p. 15.

Fast tonal vibrations not only penetrate in and around an open accoustical area, but also vibrate through one's body. When the high range is attained correctly, without strain or force, one's entire physical and muscular structure is brought into perfect coordination. It is due to this coordination that the physical faculties develop balance and control in performance.

In regard to stimulating body energy, keyed up air pressure is withheld by the tongue acting as a valve controlling the pressure of the air. In order for synchronization, perfect coordination of the diaphragm muscles must expand in accord with the play upon the tongue and throat. Hesitating for timing while attuning the ear for pitch gathers up the correct amount of energy to be released. This is then easily converted into perfect pitch, resulting in clear, vibrant, and well-controlled tones.

In conclusion, it can be said then that range is dependent upon three things: (1) correct diaphragmatic breathing; (2) control of the air stream by means of an arched, flexible tongue; and (3) the "pucker" system applied to the embouchure.

Lip Development

> Unforeseen complications which result in "lip reactions" are a dreaded menace to trumpeters. Such conditions are the result of negligence, untimely contentment, and being gullible. These evils when least expected blossom to a definite crisis. "Reactions" are appreciated most when the damage has finally taken serious effect. Ironically, misjudged situations due to ignorance

result in unnecessary setbacks. Naturally, no one can afford a relapse to a healthy embouchure.

The serious student who practices diligently might find his lip going from worse to impossible. Such a distorting experience affects clear thinking, usually resulting in a slight case of nervous prostration. Where the more one tries and the worse his playing becomes (until embarrassment causes him to give up declaring it an "off-night"), situations such as these can be timely checked. Lip reactions cause a fearful state of mind, hampering confidence and necessary ego.

Those harboring a pet dislike of their mouthpiece get but a temporary satisfaction when the sacrifice of changing mouthpieces occurs; the next step is to blame the instrument. This mouthpiece and instrument phobia "unstabilizes lip and internal muscles" that for years have been developed and become used to resisting any complications. It also "unstabilizes free open throat playing." The cornet style using the throat to articulate may find just the opposite effect, unbalancing a different type of freeness.

Health plays an important role. The lips are part of the body, and should be treated as such. It is not a man made mechanism that can be wound and stopped at any given time. Inflated egos lead many to believe that they are lord and master of their lip and can abuse it as they see fit. When least expected, such empty vanity is caught up with, and the abused lip causes untold uncomfortableness.

The miraculous phenomenon about the human structure is the amount of punishment the body can take before it actually breaks down. The lip being part of the body is gifted with similar qualities. Wear and tear on the physical structure takes in the help of the entire body, whereas the lip draws its lifeline only from the facial muscles which directly depend upon the rest of the body. Lack of sleep, dissipation, and a nervous stomach also take its toll. The exhaustion of normal energy gradually eats up one's reserve energy. When one's resistance is lowered, it has a retarding effect on both the mind and body and directly affects a healthy embouchure.

Brute force has no place in trumpet playing. This evil impairs many brilliant careers. It seems a pity that those talented do not center their intelligence on their embouchure. Causes for brute force emanate from simple fundamentals learned and forgotten or probably never learned. Since important work calls for accuracy, no one

> can afford instability in his embouchure. Unwise and untimely tension leans towards brute force.[22]

Regardless of a brass man's years of study and seasoning, the most sought after phase is security in rising above constant hours of fundamentals before getting into a good-playing groove. The answer to such security is the balanced embouchure, and it can be attained by developing the lip muscles the correct and most beneficial way. To have muscles and to know how to train them for the best results are two different things. Muscle fibers surrounding the embouchure should be centered in a pointed direction. This stimulates an immediate contact in the embouchure, and prevents unwarranted pressure. For a healthy embouchure, brass players must store a reserve of energy as insurance against any unexpected lip reaction.

Reserve is built by concentrating on correctly applied lip building exercises. For a basic example, slur a middle C to E a third above on the trumpet. Regardless of lip placement, slur with puckered and drawn together lips. Notice that the slur becomes easy and the tightening of the muscles forms a protecting barrier against pressure of the mouthpiece. The higher in range, the more puckered and drawn the lips become, and simultaneously the more protection against fatigue and prevention of the inside lip being cut. This example can be tried on any of the brass instruments by application of the harmonic series.

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[22]Charles Colin, Lip Flexibilities, p. 20.

When one is developed above the normal playing requirements, playing is reduced to a most relaxed state--so, that when one is called on to exert added power, range, and endurance, the embouchure will counteract all lip, mental, and physical strains. To perfect this, certain requisites are necessary. First, the lip muscles must be equally balanced. When lips are stretched they become weakened; by bunching them together, they become strengthened. Developing the bottom lip and neglecting the top, or vice versa, is a hindrance and no help. The theory that the bottom lip muscles should have more strength than the top lip proves that the top lip muscles were never given an opportunity to develop, because they were never exercised with the thought in mind that it could be developed with even strength. Anything centered is direct, and so should it be with an embouchure. Another fact: wherever there is contact, there is pressure. As soon as the lips meet for contact there must be some measure of pressure of the mouthpiece against the lips in order to stimulate vibrations. The formation of rigid muscles surrounding the embouchure counteracts pressure and acts as a barrier against the teeth biting into loose lips.

When the lips become taxed and do not vibrate freely, that is the danger sign. The inside of the lips should be examined. This may reveal the indentation of teeth sunk into the flesh. Then is the time to take inventory, for the outside

lip may not show signs of such an indentation. Bruised lips and forced playing sap one's reserve energy, and consume it even before there is a chance to feel comfortable and get a grip on one's normal energy. Such a condition, if not checked and corrected, can cease to become permanent. It is all-important to learn to work on only normal energy, for when this is exhausted, one would be left in a state of struggling without any support. To be thrown in such a state of mind holds one in bondage regarding the physical functions, whereas the simplest fundamentals of the instrument become gigantically difficult. This would never occur if energy had been intelligently stored up.

Endurance

A vitally important problem confronting most brass men is their desire to secure more endurance. It is not why one gets so physically exhausted and the embouchure so fatigued; the question is how one can develop a cure for such an evil. A conscientious teacher first searches for the cause, then finds the cure.

In the study of endurance the major issue is how long one can work before fatigue sets in. To an outstanding brass man, this is past experience successfully accomplished. But to those who make music their livelihood or to those who play for extra money, and are caught in this cycle of difficulties, guidance is needed.

The average brass man plays to hear himself, irregardless of knowing what he is doing, and is not conscious of all the major points of playing and their co-ordination. Only a few have studied to the point where they consider the lip a delicate mechanism composed of lip tissue, blood vessels, veins, and muscle substance. Through these substances flow a natural supply of blood. It stands to reason that in placing any kind of metal against the lip tissues the blood supply spreads in every direction away from where the mouthpiece is set. No matter how lightly and delicately the mouthpiece is centered, the vibrations force the blood cells to be drained, awaiting a refillment. This refillment is vitally essential for refreshing the embouchure. In order for the lip tissues to feel comfortable, it is necessary to edge the mouthpiece very slightly away from the lips, so that the lips can be refreshed by the blood rushing back to its proper cells.

The embouchure is that portion of the lip texture that is fed within the cup of the mouthpiece. This portion of the lips is so comparatively small that both top and bottom lip together make up the varied size of an ordinary ten-cent piece. The purpose of the embouchure is solely used for vibration. Vibrations are buzzing sounds emanating from closed, puckered lips by directing a column of air through them. Consequently, we can have sound effects of either high squeeks or low buzzing sounds, according to the closing or a slight

opening in the embouchure. This can be compared to stretching the nozzle of a filled balloon to formulate different pitches. The part of the lip that gives off these vibrations must be refreshed by continuously refilling the empty blood cells or else the lip tissues will become numbed. This numbness stops the vibrations because the lip takes on a swelling, then a paralyzing effect. The swelling closes the lip too tightly so that it impairs the freeness of the air stream. Because of this, the embouchure becomes so difficult to function that the air stream is impaired, resulting in forcing the air from either the chest or diaphragm.

In this stage, a tight grip on the instrument subconsciously pushes the mouthpiece against one's teeth; apparently obvious by the bulging of one's forehead veins. Second by second, minute by minute, enough tension and energy is consumed during an hour of such internal punishment to equal the physical energy of a hard working laborer completing a heavy day's work. Such a contrast is far from being exaggerated, and those who have had similar experience will appreciate this. This, then, is the cause.

The cure is but a simple procedure once the cause is known. Should the reader be subjected to such an ailment, he must understand that the lips have no bone substance. The only bone substance is the teeth which keep the lips in front of it. Regarding the finer brass men who do the finer work,

after long hours of playing they seem to come out stronger than when they started. The reason is that they treat their embouchure with the greatest of care and never allow themselves to keep the mouthpiece to the lips for any unnecessary length of time. One rare pointer is: when taking a breath between phrases, always remove the mouthpiece from the lips. Not totally off the lips, but enough so that it relieves the pressure, so that the blood can rush back to a refreshed stimulated embouchure.

Pushing the mouthpiece away from the lips is the brass man's greatest asset. Not only between taking breaths but also when music calls for a sixteenth, eighth, or a quarter rest. In this case, the mouthpiece should not come off the lips in its entirety. Those who are diaphragm-conscious and observe the breathing of leading vocalist and dramatic stars should also become pressure-conscious, and observe in what manner the great brass men romance their cultured lips.

Every student should make a study of how and why these great brass men can hold up for hours at a time in comparison to their own thirty minutes of playing and then be ready to "throw in the sponge." It is the importance of knowing what to do with the embouchure and has nothing to do with the knowledge of music or how much talent one has stored within one's self.

Warm Up and Routine

The true significance of warming up confuses and misleads many brass men. Some are under the impression that by tearing off a couple of hot jazz licks, or by blowing warm air through a cold horn, that they are warmed up.

Correct daily workouts, routines, and setting up exercises all have their definite purpose. When adhering consistently to a set formula, the lips will react in strength and surity of confidence. Lip reactions are a delicate subject. Those who do not stick to sound procedures invariably become subject to mouthpiece and horn phobias. Then there are those who are gullible enough to swallow everybody's advice on various commercial and speed-up systems in order to become a virtuoso, and eventually become subject to bad lip reactions. In this whirlpool they get so befuddled that natural talents become stiffled, lessening the chance for proper development. If one realizes the meaning of lip reactions, the sensitiveness of the lips will never wear on their nerves, and in the course of time give peace of mind.

At the beginning of a practice session it is important to make the lips vibrate with the mouthpiece, as they do in playing the instrument. Practicing "PP" with the instrument should be stressed in both middle and low register until the lips respond easily. Concentration should then be centered on all the essential factors: (1) correct intensity of the diaphragm; (2) a free blowing air stream; (3) correct tongue positions; and (4) minimum lip pressure.

Due to the average brass man's limited lip flexibility and register, the importance of playing harmonics should be stressed. This will bring exceptional results. Harmonics for the trumpet and trombone are the close intervals which begin on the space above the staff: G for trumpet, F for trombone. They are the close delicate intervals ascending upward. The fingering and the slide positions that are used are the seven position combinations descending chromatically from any open tone on the trumpet or first slide position on the trombone. On trumpet the fingerings are (ascending chromatically) open; 2nd; 1st and 2nd; 2nd and 3rd; 1st and 3rd; and 1st, 2nd and 3rd. On trombone the same combinations descending chromatically are 1st, 2nd, 3rd, 4fh, 5th, 6th, and 7th.

Exercising harmonics in the upper register develops controlled flexibility, and creates a sureness of feeling for the close intervals in the upper register. It should be noted that "false" fingering for harmonics is important, and similar to the "false" slide positions on trombone.

> The use of the seven positions (valve combinations) encompasses the entire range for both trumpet and trombone. Harmonic practice provides for excellent ear training. Professional performances will be gained from the mastery of these critical intervals in the upper register.
>
> Students not realizing the importance of a good foundation often get discouraged with what they call "dry" scale and interval practice. Little do they realize or appreciate the importance of intelligent "warming-up" and how vital it is for development and future progress.[23]

Besides warming up correctly, one should spend a little time each day working on the more important factors of brass instrument playing. For instance, after having correctly warmed up, one should spend some time each day on such important things as lip flexibility, attack and release, tone quality and production, range, and all forms of tonguing. The tongue, fingers, diaphragm, air stream, and embouchure should all work together in trying to develop each of these factors.

> In quoting Herbert L. Clark on intelligent practice, "A few drops of medicine will cure, whereas a teaspoonful will kill." This can be said of unbalanced practice where no thought is given to dividing one's practice routine. Neglecting all registers for the upper register taxes and retards the lip by becoming overtightened (Charley-horse). To counteract this best is to relax the lip with low register practice. Too strenuous practice is worse than none at all. Then again neglecting practice is, as the great teacher Max Schlossberg used to say, "Missing a day's practice is like committing suicide."
>
> Schlossberg's statement, of course, is grossly exaggerated. On the other hand, if one day's loss of practice brings about injurious results, what should be expected if one neglects practice for an unlimited period of time? All these factors could be easily foreseen and counteracted before any serious effects take place by intelligent thinking. Reactions can be checked by retracing,

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[23]Charles Colin, Lip Flexibilities, p. 21.

> step by step, our innermost selves. In the final analysis, it is not the mouthpiece, instrument, or the teacher, but the individual himself.[24]

There are some very important essentials in a well-balanced brass man's diet which are usually neglected, such as: breathing and its distribution; the tongue (its use, placement, and direct influence towards an unobstructed free vibrating embouchure); the control of the wind from the larynx and the base of the tongue; training the ear for perfect intonation; co-ordination of the lip muscles and internal organisms; flexible, arched tongue and the moving jaw, together forming a free, unobstructed, and vibrating embouchure.

For the best results it is imperative that a combination of all these factors be developed along with the fundamentals and essentials.

Phrasing

> An artist passes through three stages of musical development. First he studies tone, then technic and finally phrasing. He cannot start with phrasing as his defective tone production and faulty technic will not permit him to express his individuality through his playing. A thorough musician, therefore, has to acquire a certain degree of technic in order to be able to phrase correctly. He must to a certain extent be, as is said in painting circles, "free from his palette."[25]

The most natural and perfect instrument is the human voice, string or wind instruments being only imitations of it and any melody or technical phrase should be played as a

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[24]Ibid., p. 20.

[25]Vincent Bach, The Art of Trumpet Playing, pp. 34-35.

singer would sing it. In order to properly interpret a song, a vocal part should be studied and the places marked where a singer would breathe. Breath should never be taken in the middle of a word or verbal phrase, but either at the end of the phrase or the end of the sentence. Soft tonguing should be used when playing songs. A simple artistic effect is obtained by making a slight crescendo and accelerando when the melody goes up and a decrescendo and ritardando when the melody goes down. Too much vibrato should not be used, for it is decidedly unmusical if it is overdone; but, give preference to a simple, even tone.

CHAPTER VII

CONCLUSIONS

The main idea in mind while preparing this work was to write a thesis which not only would meet all specified requirements but would, at the same time, present a collection of material which would be of some practical value to the brass instrumentalist.

The later has been accomplished by the actual presentation of facts and descriptive advice which, after reading, can be applied immediately in connection with performance on a brass instrument. This does not mean that by merely reading the last division of this work that one can have a complete mastery of the different factors which make up a brass player's technique. However, as said before, the knowledge obtained in the last division of this work can be applied immediately, and with diligent practice and perseverance these combined factors which go together to make up technique on a brass instrument can be developed to a high degree.

The problems discussed in the last division of this work are ones which brass players are confronted with every day. Yet, it is surprising that so few of them understand not only that a problem does exist, but are also completely unaware of how to correct it. Playing an assigned exercise or an

etude will not correct a fault--the player must first be shown what he is doing that is not correct and then must be shown how to correct this fault. When one does this, he is then teaching.

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