

**SUPPORT MATERIALS**



**BRASS INSTRUMENTS**

A brass instrument is a musical instrument whose tone is produced by vibration of the lips as the player blows into a tubular resonator.

There are two factors in changing the pitch on a valved brass instrument: pressing the valves or moving a slide to change the length of the tubing, and changing the player's lip aperture, which determines the frequency of the vibration into the instrument.

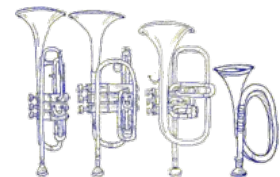
The term "brass instrument" should be defined by the way the sound is made, as above, and not by whether the instrument is actually made of brass. Thus, in exceptional cases one finds brass instruments made of wood like the alphorn or the corneet, while some woodwind instruments are made of brass, like the saxophone.

Modern brass instruments generally come in one of two families:

- **Valved** brass instruments use a set of valves (typically three or four but as many as seven or more in some cases) operated by the player's fingers that introduce additional tubing, or crooks, into the instrument, changing its overall length. This family includes:



the trumpet, horn (also called the French horn), euphonium, and tuba, as well as the cornet, flugelhorn, tenor horn (alto horn), baritone horn, sousaphone, mellophone, and the old saxhorn.



- **Slide** brass instruments use a slide to change the length of tubing. The main instruments in this category are the trombone family, though valve trombones are occasionally used, especially in jazz. The trombone family's ancestor, the *sackbut*, and the folk instrument bazooka are also in the slide family.



## Sound production in brass instruments

Because the player of a brass instrument has direct control of the prime vibrator (the lips), brass instruments exploit the player's ability to select the harmonic at which the instrument's column of air will vibrate. By making the instrument about twice as long as the equivalent woodwind instrument and starting with the second harmonic, players can get a good range of notes simply by varying the tension of their lips.

Most brass instruments are fitted with a removable **mouthpiece**. Different shapes, sizes and styles of mouthpiece may be used to suit different embouchures, or to more easily produce certain tonal characteristics. Trumpets, trombones, and tubas are characteristically fitted with a cupped mouthpiece, while horns are fitted with a conical mouthpiece.



One interesting difference between a woodwind instrument and a brass instrument is that woodwind instruments are non-directional. This means that the sound produced propagates in all directions with approximately equal volume. Brass instruments, on the other hand, are highly directional, with most of the sound produced traveling straight outward from the bell. This difference makes it significantly more difficult to record a brass instrument accurately. It also plays a major role in some performance situations, such as in marching bands.

## Materials

Brass instruments are made of a lacquered or plated **metal**. Traditionally the instruments are normally made of brass, polished and then lacquered to prevent corrosion. Some higher quality and higher cost instruments use gold or silver plating to prevent corrosion. A few specialty instruments are made from wood.

## History of Brass Instruments

### Brass Instruments and Music in Antiquity and the Renaissance

Brass instruments have been around for a long time. Some of the earliest examples of brass instruments were straight trumpets made of wood, bronze, and silver, such as the *salpinx* found in Greece, and the Roman *tuba*, *lituus*, and *buccina*. Other early brass instruments were horns made of bronze and animal horns. The Scandinavian *lur* was one such instrument, as was the Roman, *cornu*. The *schofar* is an ancient Hebrew brass instrument which is still used in Jewish ceremonies today.

### Renaissance

During the Renaissance, brass instruments began to develop what more resembles the instruments used today. Around 1400-1413 the earliest known S-shaped trumpet was developed, which was later followed by the folded trumpet and slide trumpet.

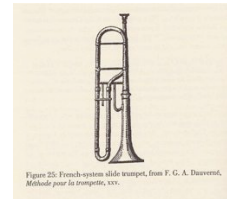


Figure 25: French-system slide trumpet, from F. G. A. Davrent, *Méthode pour la trompette*, 1810.

It was out of the slide trumpet that the trombone developed around



1450. This new instrument, commonly referred to as a *sackbut*, was a vast improvement over the awkward to play slide trumpet. Improved slide design also

allowed a practical tenor range instrument, which has become the most common instrument of the trombone family.

Also during this time, around 1500, large European courts would maintain corps of trumpeters used mainly for heralding. This early trumpet ensembles eventually progressed to include five part music, but there was little harmonic variety. Players tended to specialize in either the high range or low range.

*Herald* - formerly, a person who carries and reads important messages and notices (e.g. from a king).

The horn had yet to develop into an instrument for strictly musical purposes yet, although curved and helical horns were commonly used for hunting.



In 1597 Italian composer Giovanni Gabrieli, then the organist at Saint Mark's Cathedral in Venice, composed the earliest known piece to call for specific brass instruments, *Sonate pian'forte*.

### Developments of the 17th Century

The 17th Century began to see some major innovations in the design of brass instruments. Around 1600 some instrument makers in Nuremberg improved the design of the natural valveless trumpet to function better in the upper overtones. Music composed for these instruments was written in the upper register where the overtone series are closer together and capable of playing more scale-like passages.



Trombones continued to be widely used during the 17th Century. Sackbuts were regularly employed in a variety of ensembles, such as court and municipal bands, where it was common to combine them with shawms.

*Shawm was a medieval and Renaissance musical instrument of the woodwind family made in Europe from the late 13th century until the 17th century. It is the predecessor of the modern oboe.*

The sackbut was also used frequently in ensembles where they were to blend with softer instruments. One of most influential situations for the trombones to be called for were in the churches, where they were frequently used to double the voices. A vocal-like style of playing developed for the trombones that was in contrast to the contemporary trumpet style. It can be in part attributed to the sacred associations of the trombone of this period for the lack of secular trombone literature for centuries later.

The horn was still not frequently heard as a purely musical instrument during this time, although hunting horns were used on stage in some operas to help depict a hunting scene. The hoop-shaped *cor de chasse* became a common feature in the French hunting tradition.

### **Developments of the 18th Century**

In the 18th Century the horn began to develop as an instrument capable of high musical expression, rather than as a mere novelty. Around 1700-1710 a Viennese instrument maker named Michael Leichnambschneider may have been the first person to put terminal crooks on horns in order to play them in different keys.

During this time horns were performed mostly in the upper portion of the overtone series and were played without the hand in the bell.

Around 1750 a hornist from Dresden, Germany developed the technique of adding pitches to the overtone series of the horn through various degrees of hand stopping, which soon became standard practice for horn players.



Composers soon began taking advantage of the new technical facility developed by horn players and instrument manufacturers. George Frederick Handel called for two horns on his 1717 composition *Water Music*. Franz Joseph Haydn composed his first horn concerto in 1762.

Composers also began writing solo works for the trombone during this time. Christoph Wagenseil, Johann Albrechtsberger, Michael Haydn, and Leopold Mozart all wrote solo pieces for alto trombone (smaller than tenor trombone, with higher pitch), which was the preferred solo trombone of the time.



With the sacred associations of the trombone from the previous century it was natural for composers to utilize trombones to help portray religious or supernatural effects in their operas of the late 18th Century. Two of the most easily recognizable examples of this were Wolfgang Amadeus Mozart's *Don Giovanni* and *The Magic Flute*.

In the first half of the 18th Century Baroque trumpet works reach its peak through the compositions of J.S. Bach, who wrote for trumpet virtuoso Gottfried Reiche. By 1760 the clarino style of trumpet playing began to decline due to changes of musical tastes and compositional styles.

### Developments of the 19th Century



The 19th Century was the period of the greatest amount of literature and design developments for brass instruments up to this time. Although there is some controversy over exactly who developed valved brass instruments it was around 1826 when a German valve trumpet was brought to Paris where it was copied and began to gain wide acceptance. Hector Berlioz was the first known composer to use this instrument in his overture to *Les franc-juges* in 1826. In 1835 Halevy's *La juive* was the first score to call for valve horns. The cornet was developed around 1828 by Jean-Louis Antoine. This new instrument quickly gained popularity for its chromatic agility.



The valve trombone was developed around 1828 and gained wide use in bands, but little use in orchestras.

In 1835 the first tuba, a five-valved instrument pitched in F, was invented by Berlin instrument makers Wieprecht and Moritz. A tenor tuba was produced by Moritz in 1838 and the euphonium was invented by Sommer of Weimar in 1843.

By around 1890 the modern form of the orchestral trumpet became established. It was around this time that the trumpet pitched in B flat became most common.



With better designed brass instruments and improved technical abilities of brass musicians many composers began writing works that included more brass or solo works for brass instruments. Ludwig von Beethoven was the first major composer to include trombones in his symphonic works, scoring for three trombones in his 5th and 9th symphonies. This influenced other composers to add trombones to the brass section in their symphonic works. Carl Maria von Weber wrote his *Concertino for Horn* in 1806. The *Concertino for Trombone* was composed in 1837 by Ferdinand David. Richard Wagner and Hector Berlioz begin to champion the use of the tuba in their works.

## The 20th Century and Beyond

Brass music and instruments continued to develop in the 20th century. The Belgian firm of Mahillon produced a high pitched piccolo B flat trumpet around 1905, developed to assist trumpet players with Bach's 2nd *Brandenburg Concerto* and other works intended for clarino trumpet playing.

Around 1950 American bass trombonists began experimenting with adding a second valve to eventually produce the standard double trigger bass trombone.



Major composers continued to write solo works from brass instruments. Richard Strauss composed his *Second Concerto for Horn* in 1942. In 1954 Ralph Vaughan Williams composed his *Bass Tuba Concerto*.

Brass musicians began to establish their instruments as major solo instruments as well. English horn virtuoso Dennis Brain brought the horn to the forefront. French trumpeter Maurice André began to popularize solo trumpet music and Swedish trombonist Christian Lindberg has developed a career as a trombone soloist.



Dennis Brain



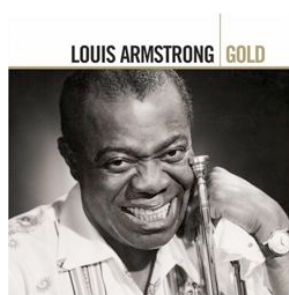
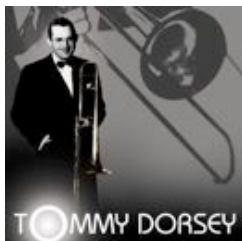
Maurice André



Christian Lindberg

Beginning around 1920 the jazz styles of trumpet and trombone playing became popular and began to influence how European art influenced composers began writing for brass instruments. Trumpeter Louis Armstrong and trombonist Tommy Dorsey are only two of the jazz brass players whose technical abilities astounded classical musicians and helped to raise the standard of technical ability for brass musicians.

Performers, composers, and instrument designers continue to innovate brass music today. New instrument designs come out each year, new works are written for brass instruments, and many performers continue to stretch the boundaries of what is considered playable on the brass instruments. In spite of improvements in electronically produced sounds brass music continues to grow and thrive.



## Ensembles

Brass instruments are one of the major classical instrument families and are played across a range of musical ensembles. Brass instruments can fit anywhere: orchestra, brass bands, big bands, pop groups – you name it! The brass family adds a huge amount of power to the orchestra sound.

Orchestras include a varying number of brass instruments depending on music style and era, typically:

- Classical symphony orchestra:
  - two to five trumpets
  - two to eight horns
  - two tenor trombones
  - one bass trombone
  - one tuba



- Baroque orchestras may include valve less trumpets or bugles, or trumpets/cornets playing these parts.
- Romantic, modern, and contemporary orchestras may include larger numbers of brass including more exotic instruments.

British brass bands are made entirely up of brass, mostly conical bore instruments.

Typical membership is:

- one soprano cornet
- five to ten cornets
- one flugelhorn
- three to five tenor horns (alto horns)
- two to three tenor trombones
- one bass trombone
- two baritones
- two euphoniums
- two E  $\flat$  tubas
- two B  $\flat$  tubas

Quintets are common small brass ensembles, a quintet typically contains:

- two trumpets
- one French horn
- one trombone
- one tuba or bass trombone



Big Bands and other jazz bands typically include:

- three to five trumpets
- three or four tenor trombones and sometimes a bass trombone (smaller jazz ensembles may include a single trumpet or trombone soloist)

Concert bands have similar brass instrumentation to an orchestra, typically:

- two to four trumpets or cornets
- two to four french horns
- two to three tenor trombones (and occasionally an additional bass trombone)
- one or two baritones or euphoniums
- one or two tubas



Single brass instruments are also often used to accompany other instruments or ensembles such as an organ, or a choir.