
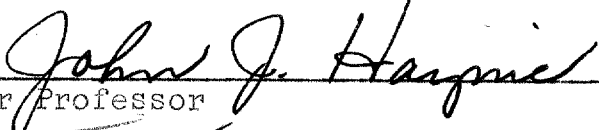


THE HISTORY OF THE KEYED BRASSES

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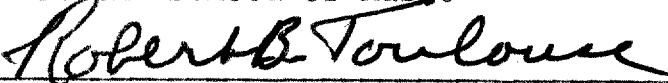
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THE HISTORY OF THE KEYED BRASSES

THESIS

Presented to the Graduate Council of the
North Texas State University in Partial
Fulfillment of the Requirements

For the Degree of

MASTER OF MUSIC

By

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Denton, Texas

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SOURCES OF PLATES

Plate

- I. Nicholas Bessaraboff, Ancient European Musical Instruments (Massachusetts, 1941) plate IV.
- II. Adam Carse, Musical Wind Instruments (London, 1939), p. 366.
- III. Francis Galpin, Old English Instruments of Music (London, 1932), p. 224.
- IV. Bessaraboff, op. cit., p. 161.
- V. Carse, op. cit., p. 367.
- VI. Bessaraboff, op. cit., plate V.
- VII. Ulric Daubeny, Orchestral Wind Instruments (London, 1929), p. 113.
- VIII. Carse, op. cit., p. 369.
- IX. Daubeny, op. cit., p. 105.
- X. Bessaraboff, op. cit., plate VI.
- XI. Ibid., p. 197.
- XII. Carse, op. cit., p. 368.
- XIII. Ibid., p. 360.
- XIV. Ibid., p. 336.
- XV. Ibid., p. 337.
- XVI. Ibid., p. 338.
- XVII. Ibid., p. 339.

ABBREVIATIONS

G. German

I. Italian

S. Spanish

F. French

THE HISTORY OF THE KEYED BRASSES

Before a history of the keyed brass instruments can be started it will be necessary to find what is meant by the terms "brass instruments" and "keyed brass instruments." A common definition of the term "brass instruments" specifies those instruments made of metal, usually brass, and played with a cup-shaped mouthpiece. However, this definition is not sufficient to define all of the brass instruments of both the past and the present time. Many of the early brass instruments were not made of metal but were built from wood or ivory and the mouthpieces often resembled a hollow tube.

Brass instruments all look back to one common ancestor--an animal's horn bored right through to the tips, and sounded by injecting a compressed air stream from the player's lips into the narrow end--a process which was greatly eased by the use of a hollow or cup-shaped mouthpiece.¹

Even our modern-day French horn mouthpieces resemble more a hollow tube than a cup-shape. A definition which will suffice for all ages of brass instruments can be stated in three words: "Lip-vibrated aerophones"² (i.e., those instruments in which the lips vibrate to set the air in motion

¹Adam Carse, The Orchestra (New York City, 1949), p. 48.

²Willi Apel, "Brass Instruments," Harvard Dictionary of Music (Cambridge, 1961), p. 96.

through an instrument of music). Keyed brass instruments, then, are those lip-vibrated aerophones with holes punched through the side of the tube, to be covered with the fingers or padded keys to raise or lower the pitch. The keys used on the brass instruments are much like those of our modern-day clarinet. As a hole is opened, the tube is shortened and the pitch rises.

The Cornett

The earliest keyed brass instrument can be traced back to around 700 A.D. where the form of a cornett was engraved on a silver dish of that period.³

Although in many books this instrument is referred to under the name of cornet, thus leading to confusion with a nineteenth-century instrument of an entirely different kind, the practice of using a different spelling for these two types is now becoming established.⁴

The cornett (G. Zink) is a hollow tube made from wood or ivory with four to six finger holes punched laterally along the tube. The mouthpiece was either built into the tube or built separately to be removable. There are both straight and curved cornetts. The straight cornetts were made by drilling a hole through the tube-shaped wood or ivory from tip to tip, then adding the four to six finger holes and

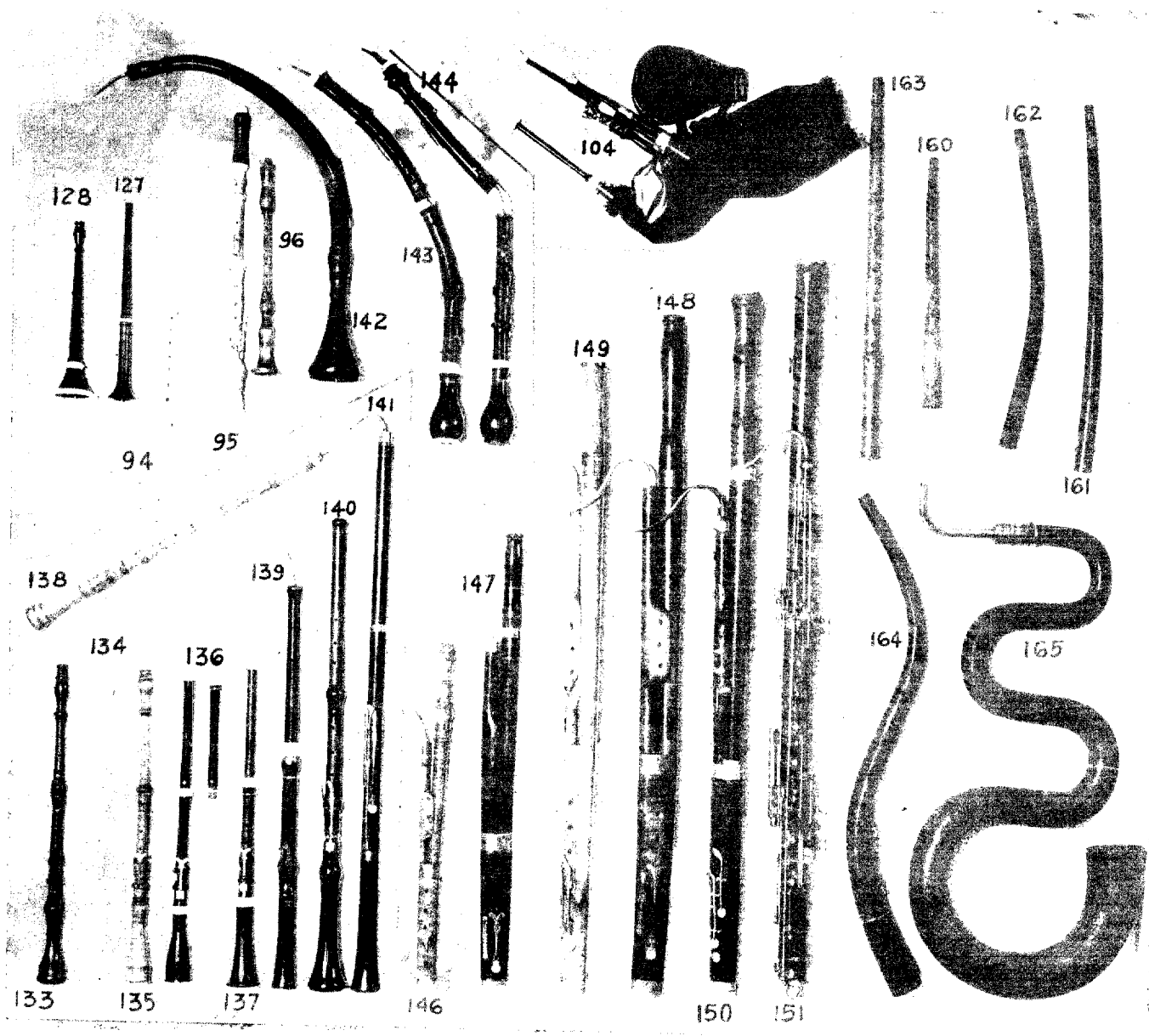
³Curt Sachs, The History of Musical Instruments (New York, 1940), p. 323.

⁴Willi Apel, "Cornett," Harvard Dictionary of Music (Cambridge, 1961), p. 188.

PLATE I

- 94--Practice Chanter
95 & 96--Hautbois De Poctou
104--Lowland Bagpipe
127--Pastoral Pipe
128--Musette Bretonne
133, 134, 135, 136, 137--Oboe
138--Grand Hautbois
139 & 140--Alto Oboe
141--Baritone Oboe
142--Oboe Da Caccia
143 & 144--English Horn
146--Baritone Bassoon
147--Bass Bassoon
148, 149, 150, 151--Contrabass Bassoon
160--Straight Cornett in C
161--Treble Cornett in A
162--Cornett in A
163--Mute Cornett in F
164--Great Cornett in C
165--Serpent

PLATE I



usually a thumb hole on the back. A leather binding was not needed for the straight cornetts, but was required for the curved cornetts (to be discussed later). There are two types of straight cornetts: one with a removable mouthpiece (I. cornetto diritto; G. gerader Zink), and one with a built-in mouthpiece (I. cornetto muto; G. stiller Zink), both pitched around A (cornetts were sometimes built a pitch or two higher or lower than the usual pitch). The cornetto muto derived its name from the fact that it produced a softer sound than did the cornetto diritto. The cornetto muto faded out of use by the early seventeenth century. Both of these straight cornetts were sopranos of the cornett family.

The curved cornetts (G. krummer Zink) ranged from high soprano down to the tenor. The cornettino (G. kleiner Zink) was the high soprano pitched around E; the cornett (G. Zink; also cornetto muto and cornetto diritto) was the soprano pitched around A; the cornone (I. corno torto; G. grosser Zink) was the tenor pitched around D. Curved cornetts were made by outlining the form out of wood or ivory then splitting it in half lengthwise and hollowing out the inside. Then it was glued back together and black leather was bound around it for strength. Four to six finger holes were then added. The alto and the bass

cornetts were built with a seventh hole which was covered by a key to be operated by the little finger. A protecting box (G. Schutzkapsel) was then placed over the key. The range remained the same as that of the six-hole cornetts. (See Plate I, Nos. 160-164.)

Each cornett was built to produce a compass of two octaves with chromatic tones obtainable from cross-fingering and half-holing. The range could be extended by the performer by liping the lowest note, the fundamental, three or four notes lower. The range of these notes, or false tones, varied with the capabilities of the performer. The wide bore of the cornett allowed it to sound notes diatonically from its fundamental tone to two octaves above it. A few notes higher could be sounded by a trained performer. Only a few harmonics were available on the cornett because of its bore/length relationship and the lack of a bell-shaped end.

When musical tone is produced from a tube by means of a hollow mouthpiece, it is necessary to have a bell-shaped end to the instruments . . . It is not satisfactory to open holes in the side of the instrument in order to produce notes which fill the gaps between the harmonic sounds.⁵

The tone produced from the cornett was rather dull and airy and irregular in quality, yet it was a gentle sound and

⁵John Borland, The Instruments of the Orchestra (London, 1943), p. 25.

it blended well with voices. It was less brilliant than that of the trumpet. Mersenne describes it as being "similar to the brilliance of a sun's ray, which appears in the shadow or the darkness, when one hears it among the voices in the cathedrals or chapels."⁶ Roger North in his Memoirs, says "Nothing comes so near or rather imitates so much an excellent voice as a cornett pipe; but the labour of the lips is too great and it is seldom well sounded."⁷

Mersenne says:

Many remarks can be made on this instrument, which are not common to the others, one of which is that some are such masters of the use and practice of them that they produce all sorts of tones by blowing through the end C, [the large end] with which they imitate the soft flute; and the other consists of the dispensing of the wind, which they blow so softly and manage so dextrously that they sound a song of eighty measures without drawing another breath, the experience of which Mr. Quiclet, musician to the King, has revealed to many.⁸

Up to around the sixteenth century, the cornett was a widely used solo instrument, especially in vocal music, but "the golden age of cornett playing came to an end when, after

⁶Marin Mersenne, Harmonie Universelle, translated by Roger Chapman (Hague, 1957), p. 345.

⁷Francis Galpin, Old English Instruments of Music, 3rd ed. (London, 1932), p. 192.

⁸Mersenne, op. cit., p. 346.

1600, the thorough-bass style disposed of the old polyphony in which the cornett had often played the treble, and gave the first role to the violin."⁹

Three other cornett-shaped instruments have been in use for signaling and for folk music. In Russia, the Rozhok was a cornett with five finger holes and a thumb hole. It was in use up to about 1923. In England, the harvest horn (I. cornettino recto) was a straight cornett pitched in C; and in Northern Europe, the Bukkehorn was a cornett made from a goat's horn with four finger holes punched through the side. (See Plate VI, No. 159.)

The Serpent

Around 1590 Canon Guillaume of Auxerre invented an instrument called the serpent (I. Serpentone; G. Schlangenrohr) which became the large bass instrument of the cornett family. It is not certain if the "Italian serpents," dated before c. 1590, were really early serpents or large cornetts in forms similar to that of the serpent. Curt Sachs states that Guillaume only introduced the serpent to France,¹⁰

⁹Sachs, op. cit., p. 324.

¹⁰Curt Sachs, Real-Lexikon (France), p. 343b.

while R. Morley Pegge says that they were only large bass cornetts and not to be confused with Guillaume's serpent.¹¹

The serpent derives its name from its curved shape, resembling that of a snake.

There can be no doubt that the peculiar shape of the serpent was the result of endeavouring to make a bass cornett in a form which would bring the finger-holes within convenient reach of the player, and would reduce the instrument to a reasonable size;¹²

Adam Carse says:

Originally the serpent was held vertically in front of the player, the lower end reaching a little above his knees; when it became a regular constituent of the military band and was played on the march, a more convenient way of holding the instrument had to be found. The bends of the tube were compressed a little, and the lower end was then held rather to the player's right side, so that the instrument was out of the way of his legs. As held originally, the fingers of both hands lay on the upper side of the tube, but later on, when the instrument was held to one side, better support was secured by placing the R. hand under the tube, and in so doing the fingering for that hand was reversed. The rather precarious grip of the serpent was eased to some extent by hanging it on a ribbon or strap which was passed round the player's neck, or else attached to a button on his clothing.¹³

¹¹R. Morley Pegge, "Serpent," Grove's Dictionary of Music and Musicians, 5th ed. by Eric Blom, VII (London, 1954), 715.

¹²Adam Carse, Musical Wind Instruments (London, 1939), p. 269.

¹³Ibid., pp. 271-272.

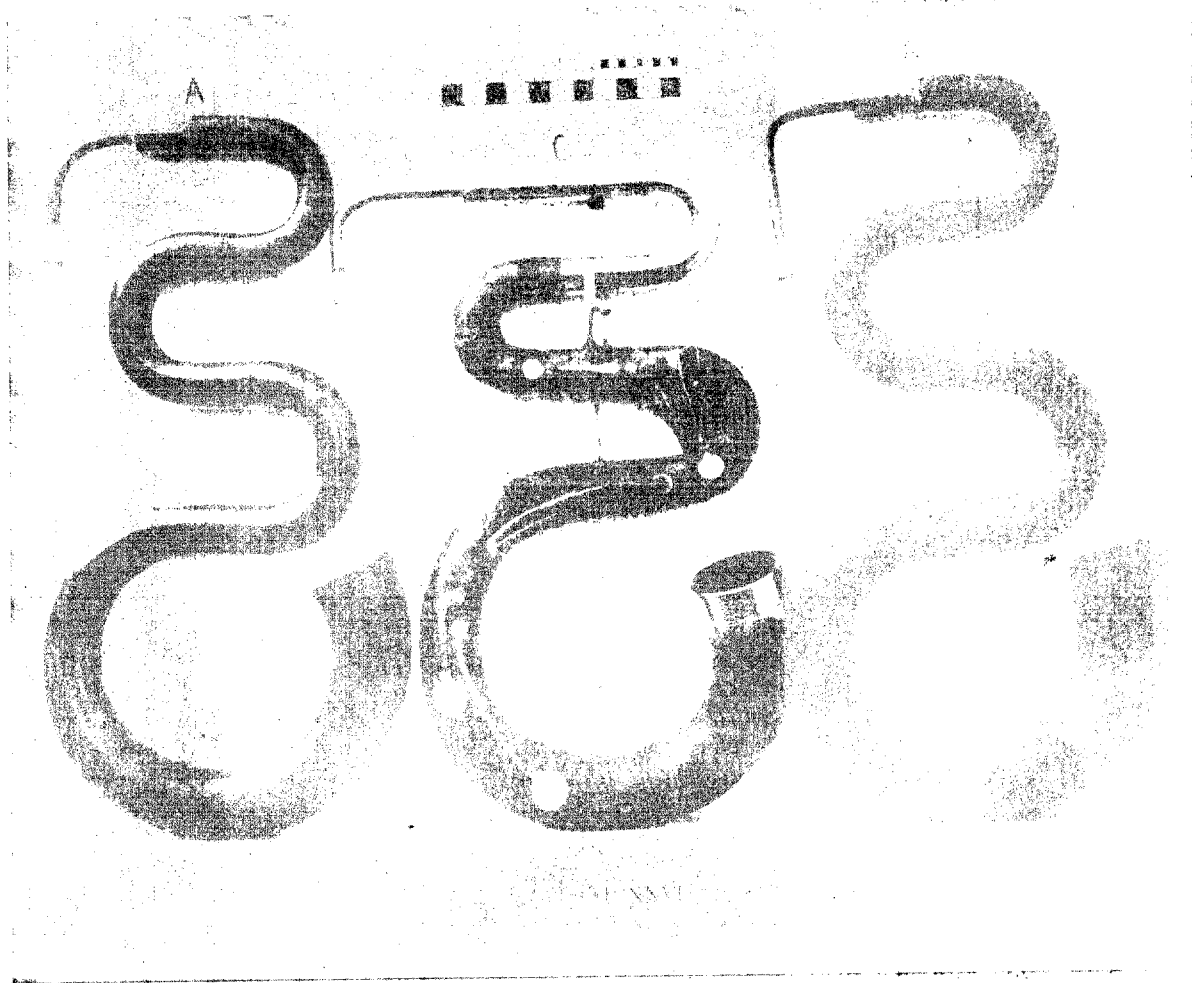
PLATE II

A--Serpent, no keys, eighteenth century.

B--Serpent, 3 keys, early nineteenth century.

C--Serpent, 13 keys, c. 1840.

PLATE II



The serpents were made by the same process as that of the curved cornetts; by outlining the form in wood, then splitting it in half lengthwise and hollowing out the inside. Black leather was used for binding, and sometimes metal bands were placed on the tube to further strengthen the instrument. Two sets of finger holes, with three finger holes in each set, were drilled into the tube about a foot apart.

Mersenne claims:

It is thirteen inches from the beginning A [the mouthpipe end] to the first hole; secondly, the two holes which follow are two inches from one another; in the third place, the fourth hole is a whole foot away from the third; and finally that the diameter of each hole is six lines or thereabout.¹⁴

Adam Carse further explains:

The six finger-holes are in two groups of three, those for the L. hand being situated just before the third U-bend, and those for the R. hand almost at the top of the final curl. The finger-holes are about one-half an inch in diameter, and lie about one and three-quarters inches apart from centre to centre.¹⁵

The serpents were made in three sections; the wooden body; the crook; and the mouthpiece, which was made of wood or ivory, and had a large, deep cup. Serpents were usually around eight feet long and pitched in C. Some of the earlier serpents were only about six feet long and pitched around E.

(See Plate II.)

¹⁴Mersenne, op. cit., p. 351.

¹⁵Adam Carse, Musical Wind Instruments (London, 1939), p. 270.

PLATE III

- 1--High treble cornett (1518)
- 2--Treble cornett (c.1600).
- 3--Cornon or tenor cornett (c.1600).
- 4 & 5--Mute cornetts, seventeenth century.
- 6--Serpent (c.1780).
- 7--Military basshorn (c.1800).
- 8--Ophicleide (c.1825).
- 9--Keyed or Kent bugle (c.1820).

PLATE III



French fingering charts always show the open notes and natural scale of the serpent one tone higher than the real sounds, that is, in D instead of C. Mahillon explained that the customary pitch used in French Churches in the eighteenth century was a tone below normal, and that the notation was therefore a tone above the real sounds. This probably explains why Berlioz and others state that the serpent is in B Flat.¹⁶

Each serpent was able to produce eight harmonics, and by fork-fingering and half-holing, a chromatic compass of three octaves from large C to C2 was obtainable. The playing of false tones, produced by lipping the fundamental tone down or the highest note up, was common practice among serpent players. Consequently, out of eight fingering charts published between c1760 and c1835, no two agree to fingering or to compass.¹⁷

As each hole was opened in succession, the first seven notes of the C diatonic scale were produced with a flat seventh. In order to produce the B Natural between the fundamental and the first harmonic, it was necessary to lip the open B Flat a half step up, since no cross fingering was available for the B Natural in the first octave. Because of

¹⁶Adam Carse, Musical Wind Instruments (London, 1939), p. 271.

¹⁷R. Morley Pegge, "Serpent," Grove's Dictionary of Music and Musicians, 5th.ed. by Eric Blom, VII (London, 1954), 714.

PLATE IV

Figure

28--Oliphant

29--Serpent

30--Bass Horn

PLATE IV

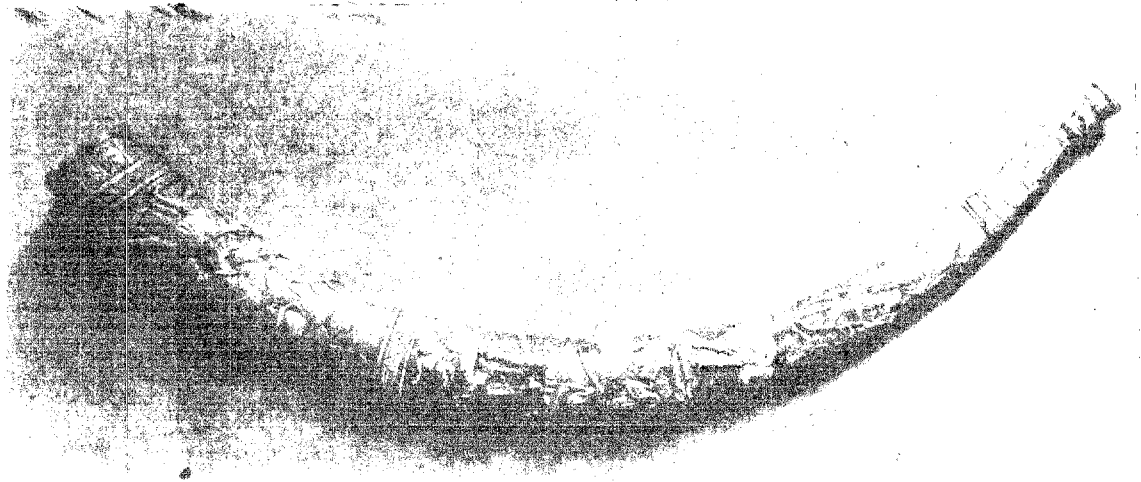


FIG. 28. OLIPHANT (No. 166)

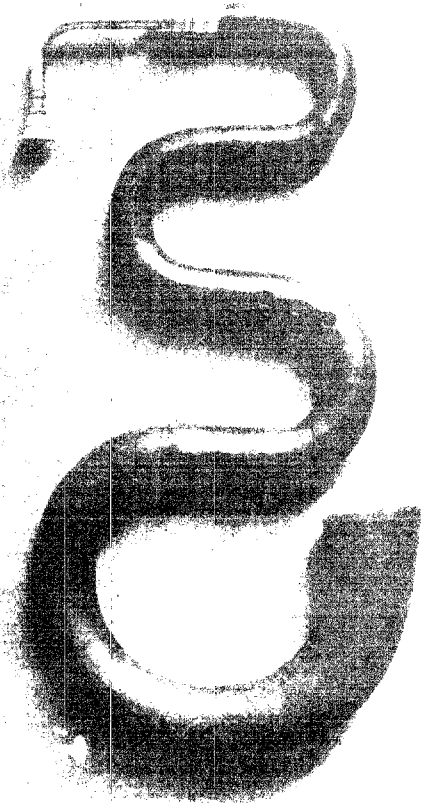


FIG. 29. SERPENT (No. 165)

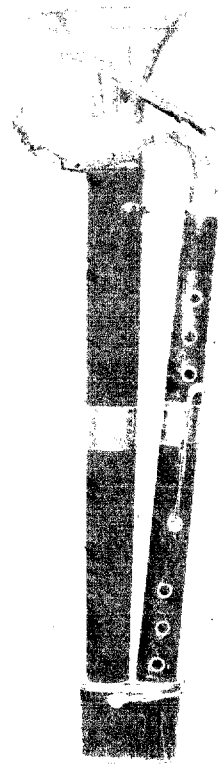


FIG. 30. BASS HORN (No. 167)

the relation between the length of the serpent and the small, closely-placed finger holes, the serpent suffered in intonation. Much lipping and a good ear were required by the performer to play the serpent in tune. As the holes were opened, the tone diminished in quality causing each note of the scale to be of unequal timbre. "If the tone is to be clear, even and resonant, a lip-reed instrument must employ the full sounding-length of the tube for every note of its scale."¹⁸ The serpent had a coarse and woody tone.

The essentially barbarous quality of tone which distinguishes this instrument would have suited better the rites of the sanguinary Druidical worship than those of the Catholic religion; [The serpent often accompanied plainsong in the Catholic Church after the art of serpent playing had been lost, around 1800. The serpent was then called serpent de l'eglise.] wherein it always figures as a monument of the want of intelligence, and of the coarseness in sentiment and taste which, from time immemorial, have marked in our temples the applications of Musical Art to Divine Service. Exception must be made in favor of cases where the serpent is employed, in masses for the dead, to double the terrible plain-chant of the Dies Irae. Its frigid and abominable blaring doubtless then befits the occasion; it seems invested with a kind of lugubrious poetry, when accompanying words expressive of all the horrors of death, and the vengeance of a jealous God.¹⁹

¹⁸Adam Carse, Musical Wind Instruments (London, 1939), p. 30.

¹⁹Hector Berlioz, Modern Instrumentation and Orchestration, translated by Mary Clarke, edited by Joseph Bennett (London, 1882), p. 177.

The serpent could play both loud and soft dynamics well.

Mersenne claims:

This instrument is capable of supporting twenty very strong voices; it is so easy to play that a child of fifteen can sound it as loudly as a man of thirty. And the tone can be softened so that it will be suitable to join with the soft voices of chamber music.²⁰

The seventeenth century saw the height of the serpent's popularity. By the nineteenth century the art of serpent playing had almost disappeared. (Some composers still were writing for the serpent in the nineteenth century. Among them were: Beethoven--March in D for military band, 1816; Mendelssohn--Meeresstille Overture, 1832, and Saint Paul, 1836; Wagner--Rienzi, 1842; Verdi--Les Vepres, 1855; Bennett--May Queen, 1858; Rossini--Le Siege de Corinthe; and Berlioz, Dies Irae). The fall of the serpent can be attributed to two factors: the addition of from two to fourteen keys, which made the performers more conscious of virtuosity than of intonation and tone; and the common practice of writing serpents parts in the extreme high register of the instrument.²¹

²⁰Mersenne, op. cit., p. 352.

²¹Pegge, op. cit., p. 714.

The Basshorn and Russian Bassoon

In France, around 1780, Regibo reshaped the serpent by bending it back upon its self, in a shape similar to that of the bassoon.

The object of straightening and doubling the tube of the serpent was evidently in order to make the instrument more convenient to hold and play while marching, and also to make it generally stronger and more compact, for the curved serpent was neither comfortable to handle, nor strong.²²

This newly shaped instrument, called the Russian bassoon, was made of wood, with a bell-end made of metal and shaped in the form of a dragon's head. (See Plate V, Nos. A & C.) The Russian bassoon was made with six finger holes and a few key holes, and was fingered similarly to the serpent. It had the same pitch and range as the serpent and the same intonation problems. The tone was slightly different because of the unusual shape of the bell, which allowed the timbre to have a better equality throughout the scale. Later, in c.1800, Alexandre Fricot, in England, invented the basshorn, which was a Russian bassoon-shaped instrument made of metal with the same six finger holes, but with a few more key holes added, and without the dragon-shaped bell-end. (See Plate V, No. B.)

²²Adam Carse, Musical Wind Instruments (London, 1939), p. 277.

PLATE V

A--Russian bassoon, 3 keys, c.1820.

B--Basshorn, 4 keys, 1840.

C--Russian bassoon, 3 keys, 1820.

PLATE V

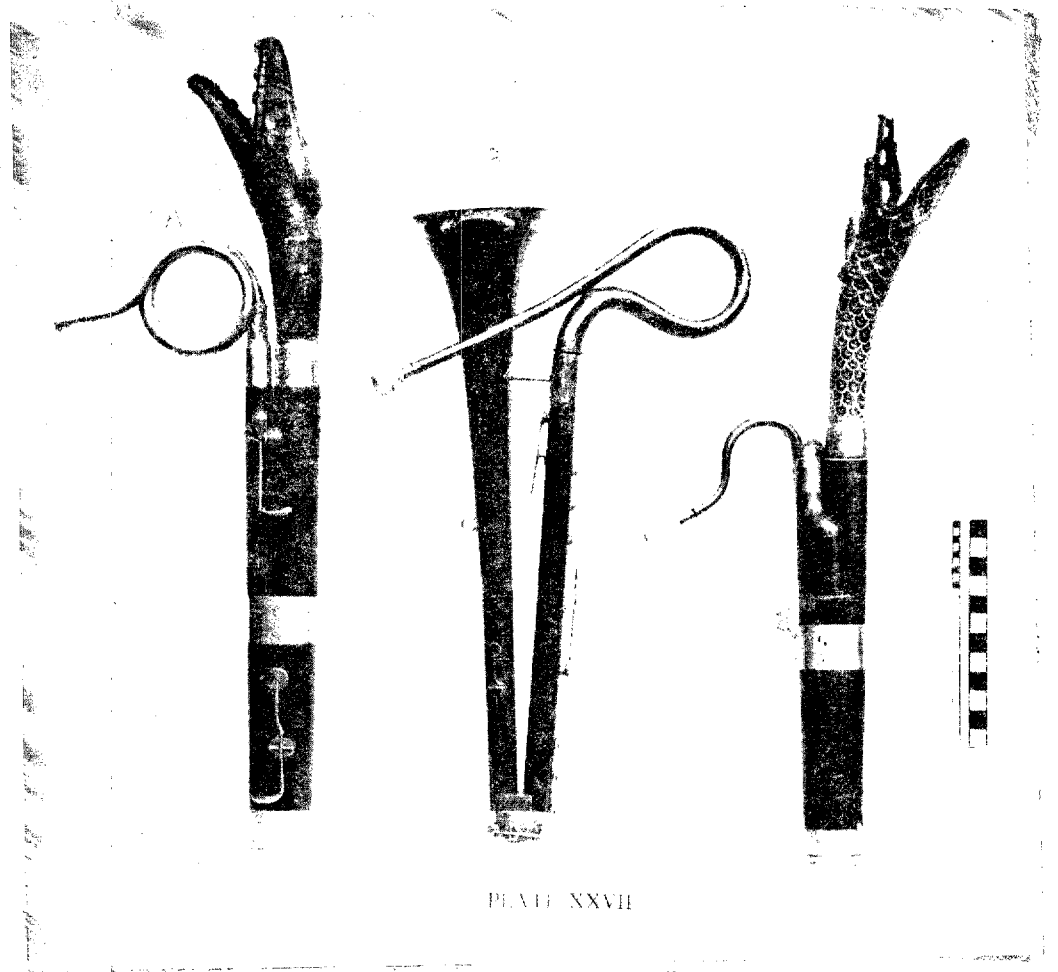


PLATE XXVII

Berlioz had not a good word to say for the Russian bassoon or basshorn; in his opinion it might be withdrawn from the family of wind instruments without the smallest injury to Art.²³

Streitwolf, in c.1820, made an instrument in the same bassoon shape, of metal, with six finger holes and around eleven key holes, and called it a chromatic basshorn. Throughout England, France, Belgium, and Germany, in the first half of the nineteenth century, these bassoon-shaped instruments were constantly being made and improved upon, while at the same time being made under different names.

As there was never any standard design, it is hardly feasible to describe fully every one of the various models of bass-horns turned out by a number of makers and "inventors" who worked during a period when so many wind instruments were being made more or less experimental with the object of finding out the most practical design. The bass-horns, however, may be roughly divided into two types, which may be distinguished as "English bass-horns" and "Russian bassoons." On the former, the two straight tubes emerge like a narrow V from a small butt; on the latter the two tubes lie close together in a parallel formation, and are either partially or wholly bored in the same piece of wood.²⁴

Serpent droit, serpent bassoon, serpent forveille, serpent anglais, ophibaryton, ophibaterion, ophimonokleide, English

²³Adam Carse, Musical Wind Instruments (London, 1939), p. 281.

²⁴Ibid., p. 278.

bassoon, basse-cor, and military serpent were all forms of the basshorn, the Russian bassoon, and the chromatic basshorn. All of these instruments were usually pitched in C with crooks available from low F to high E Flat. Fricot also invented a somewhat different type of instrument around 1810; the basse-trompette, which was an instrument pitched in C, and in the shape of the basshorn, with six finger holes and four keys, producing a complete chromatic compass of four and one-half octaves. To play it in the low register a serpent mouthpiece was used; in the middle register a horn mouthpiece was needed; and in the upper register a trumpet mouthpiece was used. A contrabass basshorn, called a Hibernicon, was made in England in c1823, by Joseph Cotter. It had two finger holes and eight keys and was pitched in D. This sixteen-foot five-inch monster was used in the York Festival Orchestra in 1835, then it faded out of existence.

The Ophicleide

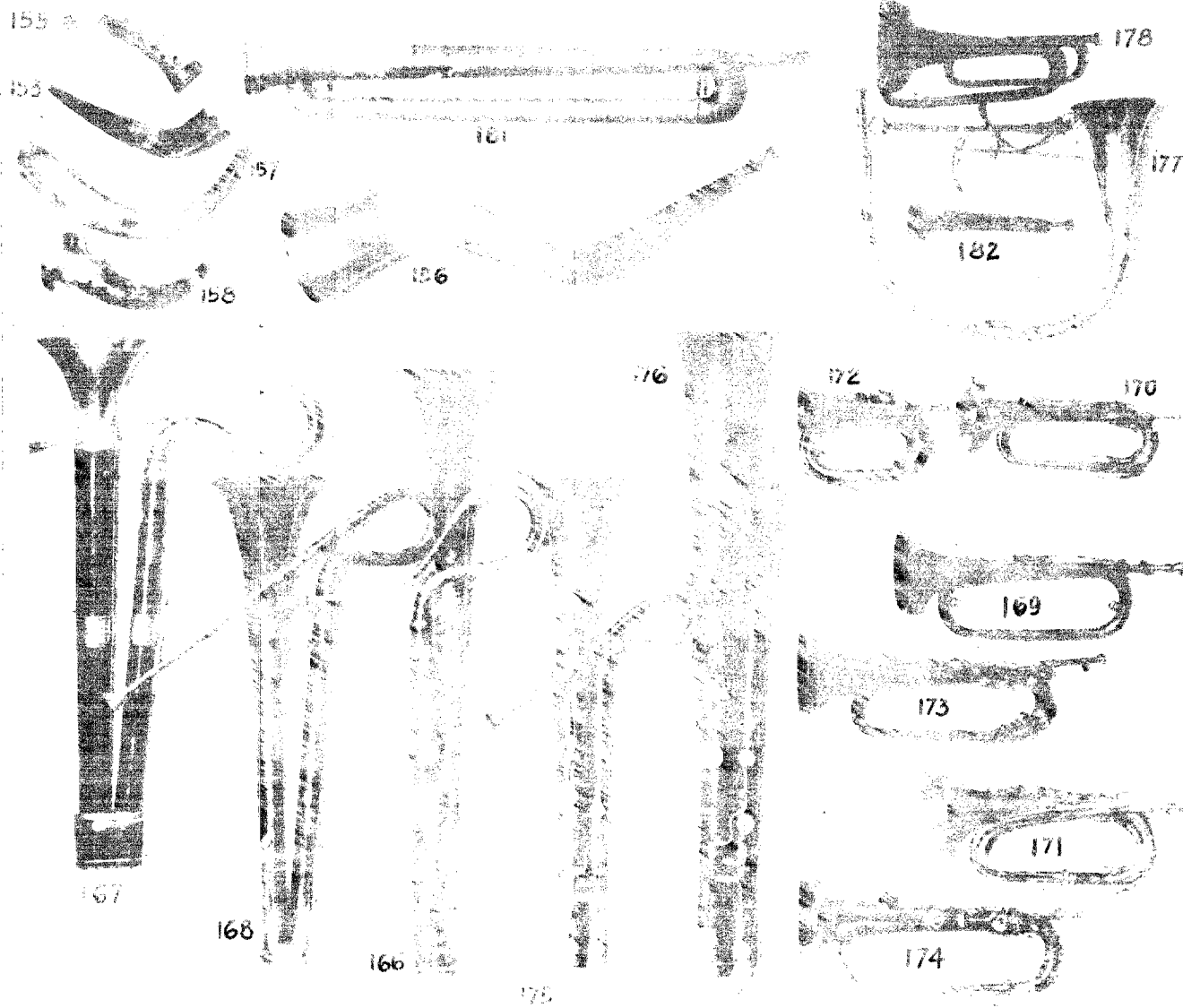
The bassoon-shaped instruments were all transitional instruments between the serpent and the ophicleide which was invented around 1817, by the Parisian instrument maker Jean Aste, sometimes known as Halary. The word ophicleide

²⁵R. Morley Pegge, "Hibernicon," Grove's Dictionary of Music and Musicians, 5th ed. by Eric Blom, IV (London, 1954), 272.

PLATE VI

- 153--Shofar
- 156--Watchman's Horn
- 157 & 158--Forester's Horn
- 159--Bukkehorn
- 166--Russian Bassoon
- 167 & 168--Basshorn
- 169--Keyed bugle, soprano in B Flat
- 170--Keyed bugle, sopranino in E Flat
- 171--Keyed bugle, soprano in C
- 172--Keyed bugle, pocket model, soprano in B Flat
- 173--Keyed bugle, soprano in C
- 174--Keyed bugle, soprano in B Flat
- 175--Alto ophicleide in E Flat
- 176--Baritone ophicleide in B Flat
- 177--Bugle, soprano in C
- 178--Bugle, alto in G
- 181--Alphorn
- 182--Post Horn in B Flat

PLATE VI



(I. cimbasso; S. figle; F. basse d'harmonie) means keyed serpent. It was made in the form of the earlier basshorns and Russian bassoons, but unlike its predecessors, it had all its tone holes covered by keys, allowing the holes to be properly spaced and not restricted to the fingers' sizes. (See Plate XIII.) The ophicleide was made of metal, with from nine to twelve keys for a chromatic compass of three octaves, from large C to C₂, and it was capable of sounding from six to eight harmonics. The ophicleide was a delicate instrument.

The ophicleide, for all its robust sound, was by no means a physically strong instrument; the rather thin sheet brass is easily crushed, and the projecting key-work almost seems to invite damage These instruments [the keyed bugle and the ophicleide] do not suit an open air band. A few particles of dust (may) put them out of action.²⁶

The intonation was much improved over the serpent and over its predecessors the basshorn and the Russian bassoon. The tone was coarse and hollow, especially at the forte dynamic, but it sounded well in legato passages.

The tone of the ophicleide, when properly played, is full, resonant, and not unlike that of the euphonium; the instrument is also capable of giving forth quite pleasant and gentle tones, and should not be supposed to be a roaring barbarous monster as is suggested by many who have described it after the period of its decline.²⁷

²⁶Adam Carse, Musical Wind Instruments (London, 1939), p. 291.

²⁷Ibid., p. 291.

PLATE VII

- 1--Serpent by F. Pretty, late eighteenth century
- 2--Ophicleide by T. C. Lewis of London, early nineteenth century
- 3--Euphonium in B Flat, by Rudall, Carte and Co.
- 4--Bombardon in E Flat, by Rudall, Carte and Co.

PLATE VII



It was made in a family of three instruments; the alto (Quinticlave), pitched in F; the bass, pitched in C; and the contrabass (orphicleide monstre), pitched in C. All three had crooks to lower the pitch one whole step.

Up to around 1848, the bass orphicleide was the chief bass instrument used in the military bands in Europe. It was eventually replaced in all bands by the valve tuba around 1900. A later improvement of the orphicleide was called a serpentcleide, which was made from both wood and metal, and had an improved tone, especially in the upper register. The orphicleide was used by Spontini in his opera Olympia, in 1819; and by Mendelssohn, in his A Midsummer Night's Dream, in 1826.

The Horn

With the entry of the horn into the symphony orchestra around the beginning of the eighteenth century, horn players had to use many differently-pitched horns in order to fill the demands of the composers. Since each horn was limited to its natural harmonics, different key signatures required different horns. Around 1715, crooks were invented to insert into the mouthpiece end of the tube in order to change the pitch of the horn without changing the main body of the instrument. Believed to have been first made in Vienna,

PLATE VIII

A--Ophicleide in C, 11 keys, 1820-1870.

B--Ophicleide in B Flat, 11 keys, 1820-1870.

C--Ophicleide in B Flat, 11 keys, 1820-1870.

D--Ophicleide in C, 11 keys, 1820-1870.

PLATE VIII

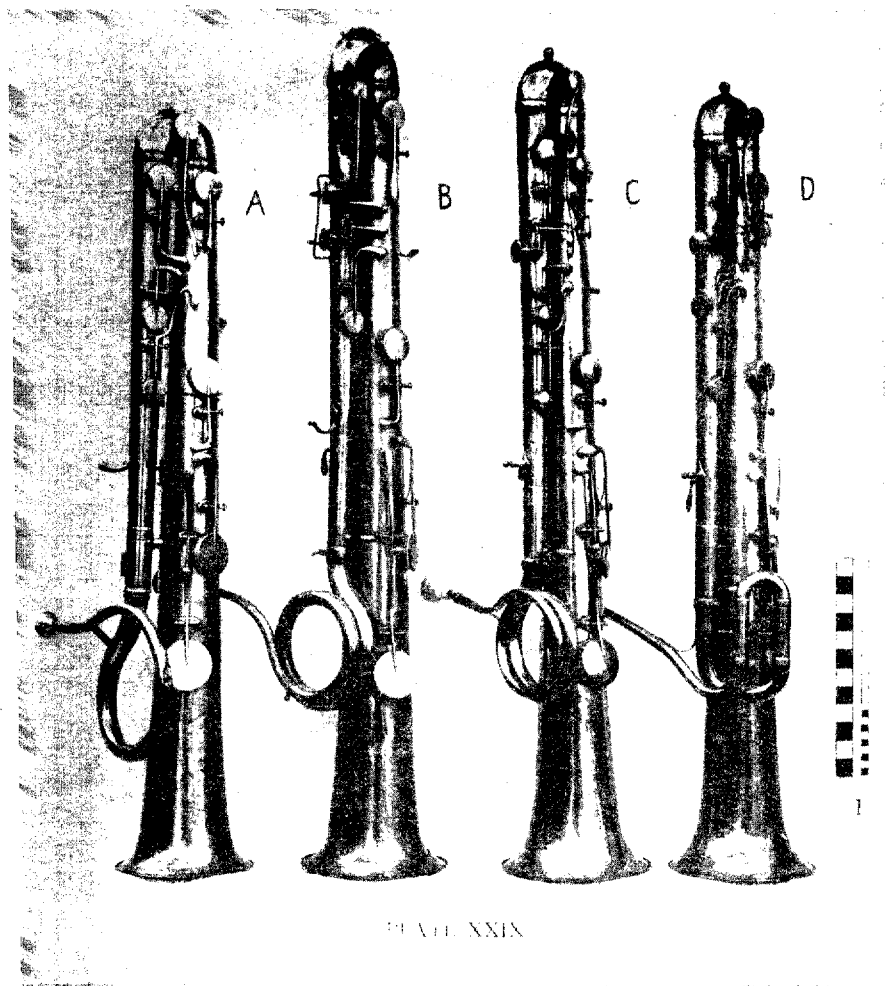


PLATE XXIX

these were called Vienna crooks. Vienna crooks came in a set of six, with two master crooks and four couplers, and could change the pitch chromatically from B Flat basso up to B Flat alto. A tuning bit, an extra length of tubing inserted between the master crook and the mouthpiece, was also used for the final fine tuning. A problem with the use of the Vienna crooks was the varying distance between the mouthpiece and the main body of the horn with each change in pitch, causing small changes in the playing positions.

A. J. Hampel, a horn player from Dresden, began experimenting with the use of the hand pressed into the bell to raise or lower the pitch of each note.

Anton Joseph Hampel, a horn player in Hasse's famous orchestra at Dresden, is said to have initiated the practice of stopping the bell of the horn with the R. hand, by means of which device the notes in the middle register of the instrument could be lowered or raised a semitone.²⁸

This new device, discovered around the middle of the eighteenth century, was called hand horn playing. Hampel found the Vienna crooks impractical for this new device, and developed a way to insert the crooks into the middle of the

²⁸Adam Carse, Musical Wind Instruments (London, 1939), p. 216.

PLATE IX

1--Treble Cornett in ivory, early seventeenth century

2--Keyed bugle and keyed trumpet, c.1820

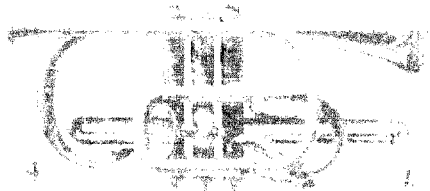
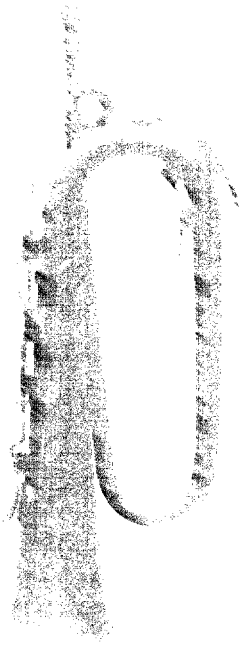
3--Cornopean, c.1835

4--Cornet (Modern) in B Flat

5--Cornet (Pocket model) in B Flat

PLATE IX

PLATE IX



1 2 INCHES 5 6

horn, leaving the mouthpiece in one fixed position. This new horn was now called an inventions-horn. (See Plate X, No. 193.)

The missing tones of the natural series were produced by inserting the flat hand into the bell and closing it one-fourth, one-half, or three-fourths. This gave a continuous scale mostly of diatonic tones, which, however, was not very satisfactory as the stopping changed the timbre of the tone.²⁹

This horn was finally replaced with the invention of the valves in the nineteenth century.

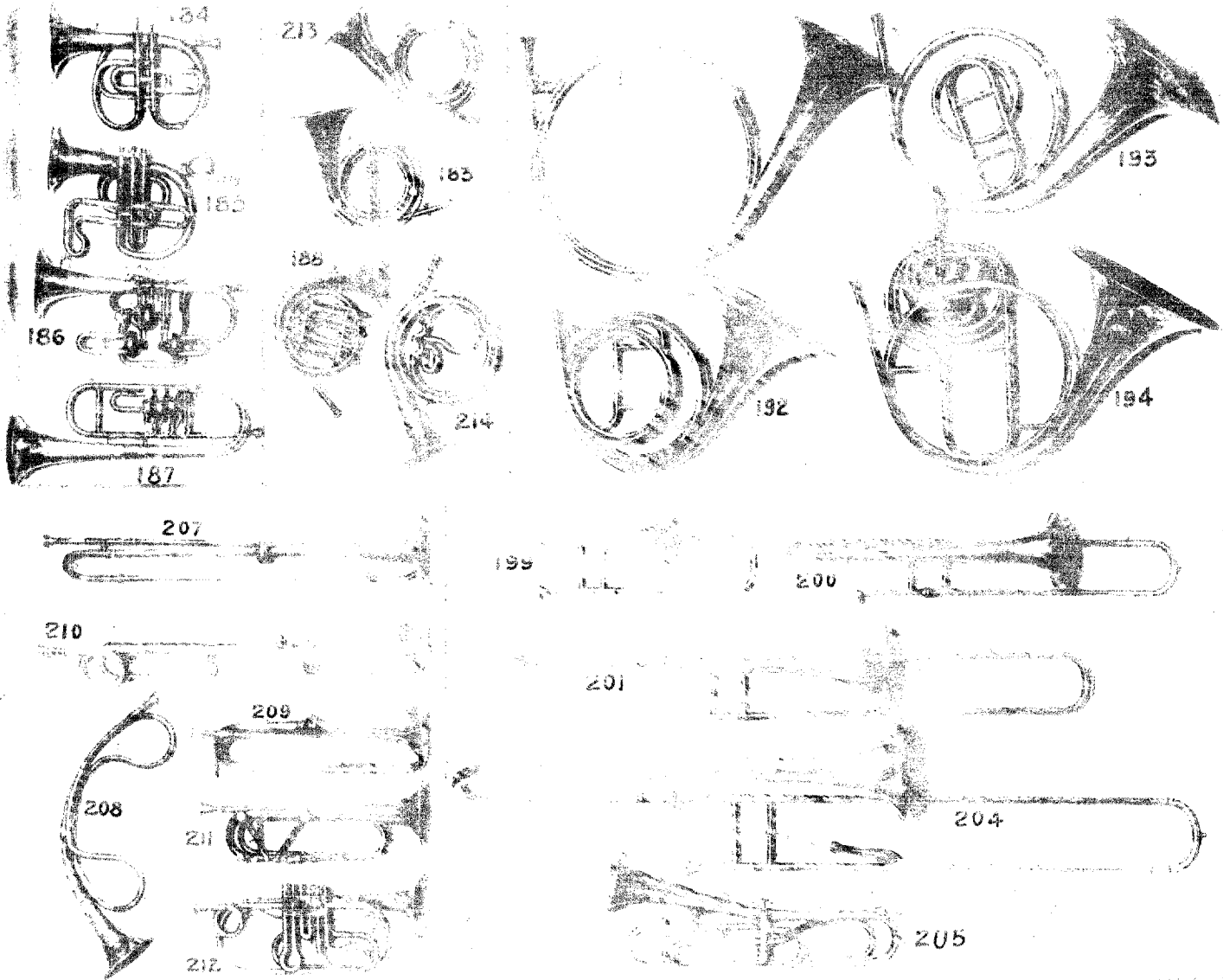
Kölbel, a horn player from the Russian Imperial Orchestra at Saint Petersburg, applied the system of keys to the horn around 1760 (Kölbel also applied the keys to the trumpet). Keys had been in use on woodwind instruments up to this time. Kölbel placed two keys towards the bell-end of the horn, which allowed the horn to produce notes chromatically from the fifth harmonic up. This new horn, called the Amorschall, found limited success only in Russia. The Amorschall had a small bell which was covered with a perforated lid in order to minimize the difference in tone color between the bell tones and those produced when the keys were opened. (See Plate X, No. 183.)

²⁹Willi Apel, "Horn," Harvard Dictionary of Music (Cambridge, 1961), p. 340.

PLATE X

- 183--Keyed Post-horn, 5 keys, c.1830.
184 & 185--Cornopean
186 & 187--Cornett sopranino in E Flat
188--Cornett, soprano in B Flat
190--Hunting horn
192--Hand horn
193--Inventionshorn
194--Omnitonic horn
199--Discant trombone
200--Alto trombone
201--Tenor trombone
204--Bass trombone
205--Tenor trombone
207--Trumpet
208--Stopped-trumpet, soprano in A Flat
209--Cavalry trumpet
210--Slide trumpet, c.1810 by Astor
211--Keyed trumpet, 5 keys, alto in G
212--Valve trumpet
213 & 214--Post-horn

PLATE X



Charles Clagget, from London, took out a patent on August 15, 1788, on several new improvements on musical instruments, which read in part,

My Sixth New Improvement of Musical Instruments relates to the French horns or trumpets in such a manner that the same mouthpiece may be applied to either of them instantaneously during the time of performance, as the music may require.³⁰

Francis Galpin tells us:

Just below the mouthpiece a rotary valve was fixed, and its action was twofold: by turning it, either to the right or left, one or other of the trumpets was brought into use; and by an extra turn, right or left, the same trumpet was lowered a whole tone: thus a chromatic compass of twenty-seven notes was obtainable.³¹

Clagget gave several concerts in England demonstrating his new instruments. In 1792, Joseph Haydn wrote him a letter in which he expressed his full approval of Clagget's improvements of the pianoforte and the harpsichord.³² According to Carse,

There is nothing to show that Clagget's device [his uniting of the two horns and trumpets] was anything more than an unsuccessful experiment; no instruments made according to his plan are available for examination, and there is not the slightest sign that either players or composers took advantage of an

³⁰Adam Carse, Musical Wind Instruments (London, 1939), p. 63.

³¹Galpin, op. cit., p. 229.

³²William H. Husk, "Clagget," Grove's Dictionary of Music and Musicians, 5th ed. by Eric Blom, II (London, 1954), 313.

invention which, if it had been of any practical use, would surely have been further exploited.³³

Two more attempts to make the horn chromatic were made after the turn of the century. In c.1812, Christian Dickhut, from the Mannheim Orchestra, applied the principle of the trombone slide to the horn. Then in c.1818, J. B. Dupont, of Paris, invented the omnitonic horn, which was a horn with enough tubing built in so as to be changeable into many different pitches with the use of sliding shutters, plungers, rotary taps, and valvelets. "It may be that the added weight of so much extra tubing contributed to the lack of success of the cor omnitonique, but in any case the scheme was predestined to failure, because the valve system was already at that time being applied to the horn."³⁴ Neither the slide horn nor the omnitonic horn found any success with the performers or the composers. (See Plate X, No. 194.)

The Keyed Trumpet

The development of the trumpet into a chromatic instrument follows much the same path taken by the horn. With the

³³Carse, op. cit., p. 64.

³⁴Carse, op. cit., p. 219.

development of crooks, stopped trumpets, keys, slides and eventually valves, the trumpet evolved from the limits of only a few harmonic tones to a complete two and one-half octave chromatic scale. (Some modern-day performers are capable of extending the upper range an octave or more.)

Towards the end of the seventeenth century the trumpets were quite frequently used in operas, cantatas, etc., for scenes of a military character or for the expression of joyful triumph (Purcell, Buxtehude). 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 fanfare-like motives only are possible.³⁵

The art of clarino playing reached its height in the first half of the eighteenth century with such composers as Johann Sebastian Bach and George Frederic Handel. After 1750, with the decline of the polyphonic style, the art of clarino playing also declined and soon faded out of existence, leaving the trumpet to produce only a few notes from the harmonic series. Such composers as Joseph Haydn and Wolfgang Mozart wrote only small supporting parts for the trumpet, while other composers omitted them completely from their scores. Thus the search to discover a way to make the trumpet a chromatic instrument began. Shortly after 1750 A. J. Hampel's method of hand horning was tried on the trumpet, but it proved to be too hard to blow and

³⁵Willi Apel, "Trumpet," Harvard Dictionary of Music (Cambridge, 1961), p. 771.

the difference in tone color was too great to be of practical use. Kölbl's application of the keys to the trumpet, c.1760, also saw no success. Charles Clagget's uniting of a D and an E Flat trumpet together with a rotary valve, c.1788, was the first real chromatic trumpet developed. However, this invention seems to have gone unnoticed by the performers and composers of the period. The first successful chromatic trumpet was invented around 1796, when Anton Weidinger, from Vienna, expanded Kölbl's system by applying from four to six keys to the eight-foot trumpet. (Weidinger also added from four to six keys to the horn to make it almost a completely chromatic instrument.) It is interesting to note the differences of opinion among the scholars as to the date of Weidinger's keyed trumpet. Curt Sachs (The History of Musical Instruments, New York, 1940, p. 422), A. Buchner (Musical Instruments Through the Ages, London, p. 30), U. Daubeny (Orchestral Wind Instruments, London, 1920, p. 16), and H. Schwartz (The Story of Musical Instruments, Elkhart, 1938, p. 172) give c.1801 as the date of invention. F. Galpin (A Textbook of European Musical Instruments, London, 1937, p. 227) gives c.1791; and N. Bessaraboff (Ancient European Musical Instruments, Cambridge, 1941, p. 165) gives c.1800

as the date of invention. Joseph Haydn's trumpet concerto, written for Weidinger's keyed trumpet, was composed in 1796.³⁶

Adam Carse says:

Altenburg clearly had some knowledge of keyed trumpets when he published his book in 1795, [J. E. Altenburg, Versuch einer Anleitung . . . Trompeter und Pauken-Kunst, Halle, 1795] but it was not till 1801 that shortening-holes and keys were applied to the trumpet with any success.³⁷

This prompts the question as to whether Haydn would have composed a concerto for an instrument which was not yet of practical use. The answer could be that Haydn did write for an instrument not yet of practical use or that the keyed trumpet was a practical instrument in 1796 or that Haydn wrote his concerto at a later time or that Haydn wrote his concerto for another instrument, perhaps Clagget's chromatic trumpet of 1788. All of these possibilities are left unanswered except by Adam Carse, who says that the keyed trumpet was invented before the end of the eighteenth century and exploited by Weidinger in c.1801.³⁸ Weidinger's keyed trumpet was made by Riedl, of Vienna, and it continued to be manufactured as

³⁶Anthony Hoboken, Joseph Haydn-Thematisch-bibliographisches Werkverzeichnis, Band 1 (Mainz, 1957), p. 536.

³⁷Adam Carse, Musical Wind Instruments (London, 1939), p. 233.

³⁸Adam Carse, The Orchestra from Beethoven to Berlioz (New York, 1949), p. 411.

late as 1840. The keyed trumpet was usually pitched in the high keys, G and A Flat, with crooks available for F, E, E Flat, D, and C. (See Plate IX, No. 2.)

The instrument was grasped by the R. hand, and was held "flatways," so that the L. hand fingers lay over the ends of the key-shanks; the latter were brought together in a group on the L. side of the instrument, so that they lay within reach of the fingers of the L. hand. The lowest note-hole was situated about six inches from the bell-mouth, and the remainder were pierced in the expanding part of the tube at such distances (a few inches apart) as would shorten the sounding-length, and consequently raise the pitch of the open notes by semitone stages when the keys were raised in successive order.³⁹

The tone's quality suffered increasingly as each key was opened, the tone becoming muffled and producing fewer and fewer overtones. Intonation was also a problem with the keyed trumpet. Two well-known composers wrote concertos for Weidinger and his keyed trumpet: Joseph Haydn, in 1796; and J. N. Hummel, in 1803. Meyerbeer wrote a keyed trumpet part in his opera Robert, in the "Infernal Waltz," Act III. Rossini used it in his opera William Tell. The keyed trumpet gained popularity in Austria and Italy when the military bands of those countries adopted them into general use. The keyed trumpet continued in popularity until the middle of the nineteenth century, when valves became accepted.

³⁹Adam Carse, Musical Wind Instruments (London, 1939), p. 234.

Another attempt to make the trumpet chromatic was made in c.1810, by John Hyde, of England, when he used the principle of the trombone slide on the trumpet. Slide trumpets actually date back to the seventeenth century where,

. . . the slide was at the mouthpiece which was provided with a long "throat," long enough to be pulled out so that all the gaps in the natural scale could be filled up. It is this instrument which Bach prescribes under the name *tromba da tirarse* (Cantatas nos. 5, 20, 46, 77).⁴⁰

Hyde's slide trumpet was constructed so that "the U of the upper coil was transformed into a movable slide, similar to that of the trombone, and provided with springs to bring it back into its normal position."⁴¹ Carse says:

The U-bend connecting the middlepipe with the bell-pipe was so contrived that the two arms of the U would slide inside the main tubes, and could be drawn out (towards the player) by the second and third fingers of the R.hand; when released, the slide returned to the normal position by the action of a spring The slide served not only to correct the faulty intonation of the eleventh and thirteenth sounds of the harmonic series, but could also be extended so far as to increase the sounding-length of the instrument sufficiently to lower the pitch of all open notes by a semitone, and to a limited extent, by a whole tone.⁴²

⁴⁰Willi Apel, "Trumpet," Harvard Dictionary of Music (Cambridge, 1961), p. 771.

⁴¹Ibid., p. 772.

⁴²Adam Carse, Musical Wind Instruments (London, 1939), p. 237.

PLATE XI

Figure

33--Slide Trumpet

34--Spitzharfe

35--Clarsech

PLATE XI

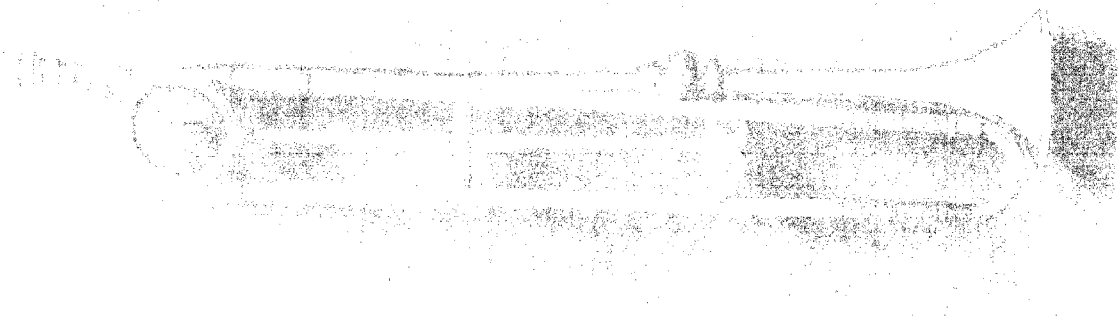


FIG. 13. SLIDE TRUMPET (No. 110)
By Astor. English, c. 1810

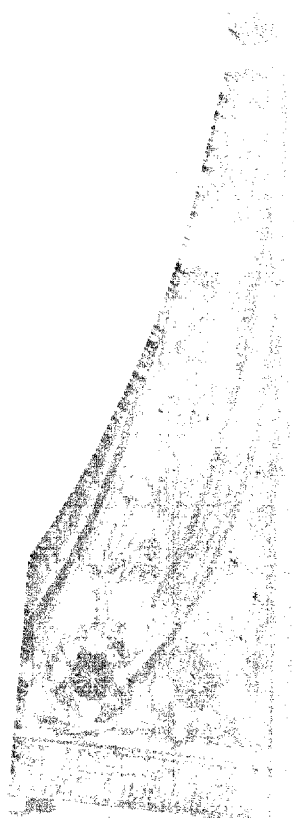


FIG. 14. MOUTHPIECE (No. 111)

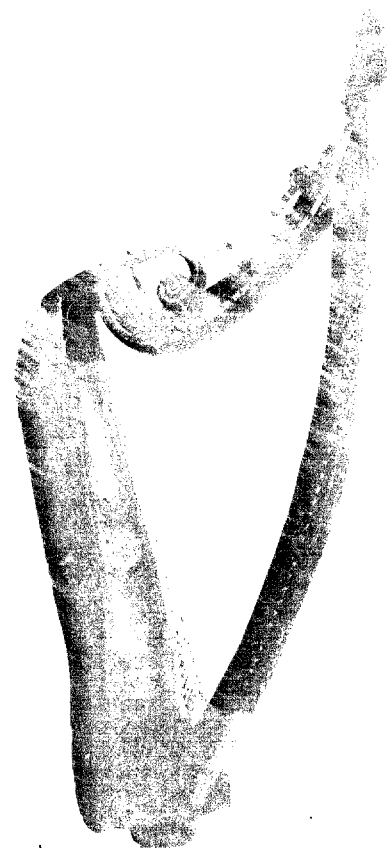


FIG. 15. BELL (No. 112)

The slide trumpet gained fast popularity in England and continued in use up to the twentieth century. (See Plate XI, No. 33.)

The Keyed Bugle

In 1810, another chromatic instrument was invented, the keyed bugle. John Halliday, an English band master from Dublin, used Weidinger's system of keys by applying a set of five keys to the four-foot bugle which had previously been in use by the military for signaling purposes. (See Plate XII, Nos. A, B, and C.)

Most of the blackened and battered keyed bugles which are still to be found scattered about in this country, are six-keyed instruments made of copper, with brass keys and fittings. Instruments entirely of brass occur less commonly. These bugles are in four feet C, and were usually provided with a small circular crook which lowered the fundamental pitch to B Flat.⁴³

This was the first systematic and successful attempt at putting keys on a brass instrument.⁴⁴ It was called the Kent Bugle, being named after the Royal Regent, the Duke of Kent, then Commander-in-Chief of the British army.

⁴³Adam Carse, Musical Wind Instruments (London, 1939), p. 283.

⁴⁴Mary Rasmussen, Hummel's Trumpet Concerto (North Easton, 1959), Preface.

The basic defect of the keyed bugle was much the same as that of the keyed trumpet, but to a lesser degree. The soft padding of the keys impaired the resonance of the brass tube and thereby the quality of the tone. The acoustical characteristics changed drastically as more keys were opened. The middle register had a tender and woody tone, while the low register sounded reedy and the upper register was weak and without tone color. However, the four-foot conical bore of the bugle allowed it to be superior in tone quality and intonation over that of its predecessor, the eight-foot keyed trumpet. It had a large bore and bell-end, and was usually played with a deep cup mouthpiece. The keyed bugles were pitched in C and B Flat and could produce a range of a little more than two octaves. Because of its ability to play legato and its agility of execution, the keyed bugle soon became popular in England, and the military bands adopted it as a solo instrument. Jean Aste, the Parisian instrument maker, copied Halliday's keyed bugle and soon it became popular all over Europe. Later, from six to ten keys were applied to the bugle to improve the fingering techniques and intonation. The keyed bugle lasted in England until the turn of the century, but in Europe, it lasted only until c.1850,

PLATE XII

A--Keyed bugle, 6 keys, 1810-1850.

B--Keyed bugle, 7 keys, 1810-1850.

C--Keyed bugle, 8 keys, 1810-1850.

D--Soprano saxhorn, 1850.

E--Flugelhorn, c.1870.

F--Saxhorn, high E Flat, 1860.

G--Koenighorn in C, 1890.

PLATE XII

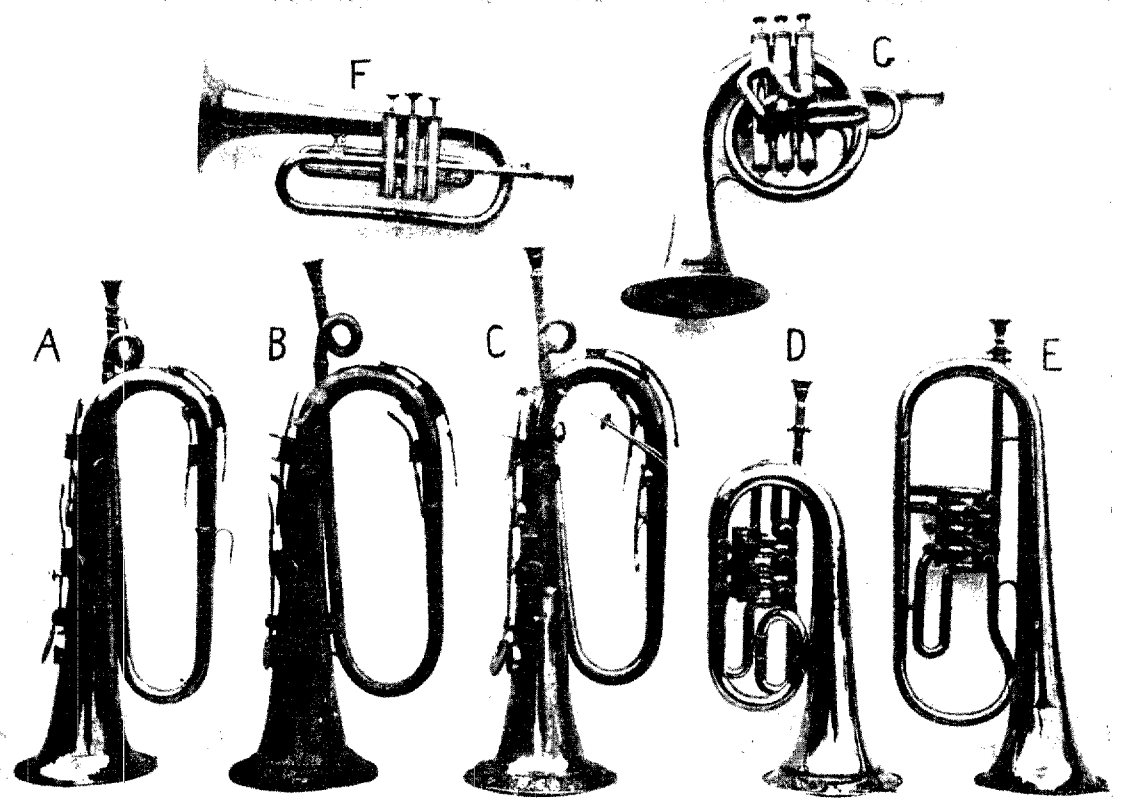


PLATE XXVII

PLATE XIII

- A--Keyed trumpet, c.1800-1830.
- B--Two-valved trumpet, 1840-1850.
- C--Two-valved trumpet, c.1840.
- D--Three-valved trumpet, c.1840-1850.
- E--Rotary valve trumpet, c.1860.
- F--Three-valved trumpet in F, c.1880.
- G--Straight trumpet, c.1880.

PLATE XIII

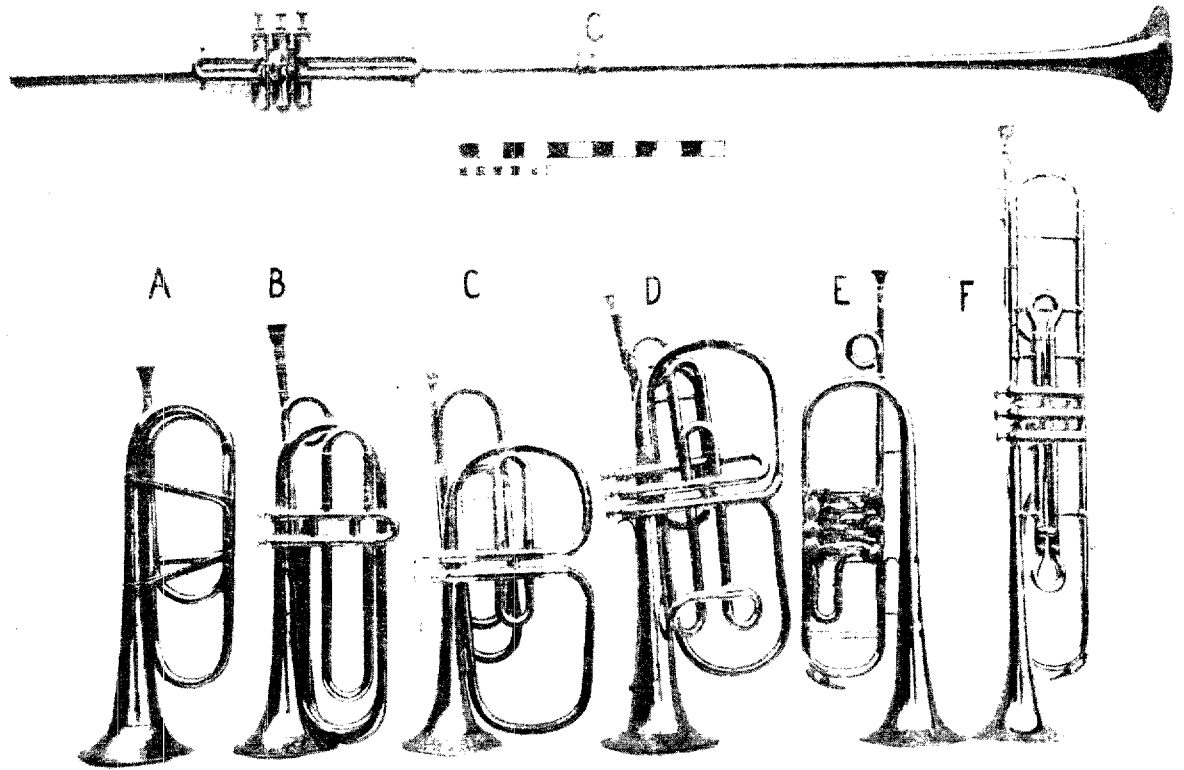


PLATE XX

when valves became popular. Although the keyed bugle was mainly a solo band instrument, Henry Bishop wrote a solo for it in his opera Guy Mannering.

Summary

The development of the keyed brass instruments, from the cornett to the keyed bugle, can be attributed in part to the development and decline of the polyphonic style of composition. With the development of polyphony from the fourteenth to the seventeenth centuries, the cornett and the serpent grew in demand. The ability of the cornetts to execute the treble line of polyphony and the serpent's agility on the bass line gave these instruments principal roles in the compositions of the polyphonic era. Clarino techniques used on the horns and trumpets in the fifteenth and sixteenth centuries also reached its height toward the end of the polyphonic period, giving these instruments an esteemed place in the orchestras of that period. When the classical style of composition began in the seventeenth century, the cornetts and the serpents were no longer needed for the melodic line, which the violins now had, and because of their limitations for harmonic blending, these instruments began their fall from the symphony orchestra. Likewise, with

the fall of polyphony, clarino techniques, used on the trumpets and the horns, were no longer in demand, causing the trumpets and the horns to go back to their lower harmonics. This limited their usefulness to augmentation of chords, fanfares, and percussion effects in the compositions. Many of the composers completely omitted the trumpets from their scores. What was now needed to fill the demands of the homophonic style of composition was a fully chromatic trumpet and horn. Therefore, the search and experimentation began, starting with Kölbel's keyed horn and ending with the invention of the valves after the turn of the nineteenth century.

PLATE XIV

7--Fingering chart for bassoon, Eisel (1738).

8--Fingering chart for keyed trumpet with 5 keys.

PLATE XIV

7. BASSOON. EISEL (1738)

Musical notation for Bassoon Eisel (1738) with fingerings for L. hand (1, 2, 3), R. hand (1, 2, 3), F key, G# key, R. Thumb, D key, L. Thumb, and Bb key.

8. SCALE FOR A KEYED TRUMPET WITH FIVE KEYS.

Musical notation for a scale for a keyed trumpet with five keys, with fingerings for Trumpet in D, Eb, F, G, and C.

Trumpet in D	0	1	3	4	5	0	1	2	4	0	1	2	0	1	2	0	1	0	3	0	3	0	5	4	0
" " Eb	0	1	3	3	5	0	1	2	4	0	1	2	0	1	5	0	1	0	3	0	3	0	5	4	0
" " F	0	1	2	3	4	0	1	2	3	0	1	2	0	1	4	0	1	0	3	0	3	0	5	4	0
" " G	0	1	2	3	4	0	1	4	2	0	1	2	0	1	4	0	1	0	3	0	3	0	5	4	0
" " C	0	2	3	4	5	0	1	3	3	0	1	2	0	1	2	0	5	0	3	0	3	0	5	4	0

Keys are numbered, counting from the bell.

PLATE XV

9--Fingering chart for cornett, Speer (1697).

PLATE XV

9. ZINCK ODER CORNET. SPEER (1697)

The image displays a musical score for a Zinck or Cornet. At the top, the title "9. ZINCK ODER CORNET. SPEER (1697)" is centered. Below the title is a single staff of music in treble clef, containing a sequence of notes with various accidentals (sharps, naturals, flats). Below the staff is a detailed fingering chart. The chart is organized into two main sections: "L." for the left hand and "R." for the right hand. Each section includes a "Thumb" row and three numbered rows (1, 2, 3). The chart uses a grid of circles to indicate finger placement: solid black circles represent fingers that should be pressed down, and open circles represent fingers that should be lifted. Vertical dashed lines connect the notes on the staff to their corresponding positions in the fingering chart.

PLATE XVI

10--Fingering chart for the serpent, c.1816.

PLATE XVI

10. SERPENT. HERMENGE, TABLATURE GÉNÉRALE DU SERPENT ORDINAIRE (c. 1816).

The image displays a musical score for a serpent, consisting of a melodic staff and two systems of tablature. The melodic staff is written in bass clef and contains a sequence of notes with various accidentals (sharps, naturals, and flats). The first system of tablature has three lines for the left hand (labeled L. 1, 2, 3) and three lines for the right hand (labeled R. 3, 2, 1). The second system of tablature is similar but includes a bracketed section at the end labeled "Notes peu usitées" (less used notes). The tablature uses solid black dots to indicate fretted notes and open circles to indicate open strings. Vertical dashed lines connect the notes in the tablature to the corresponding notes in the melodic staff above.

PLATE XVII

11--Fingering chart for the Kent bugle, c.1835.

PLATE XVII

II. TULLY'S TUTOR FOR THE KENT BUGLE (c. 1835)

The image displays a musical score for a bugle. At the top, a single treble clef staff contains the melody, consisting of a sequence of notes with various accidentals (sharps, naturals, and flats) and rests. Below the staff, a fingering chart is provided for both the left and right hands. The left hand (L.) is indicated by a bracket and includes a 'Thumb' row and a '1' row. The right hand (R.) is indicated by a bracket and includes 'Thumb', '1', '3', and '4' rows. Each row in the fingering chart consists of 24 columns, each containing a symbol (a solid black circle or an open circle) that corresponds to a specific note in the melody above. Vertical lines connect the notes in the staff to their respective positions in the fingering chart.

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