How a Trumpet Is Made. II. The Natural Trumpet and Horn (Continued)

Author(s): D. J. Blaikley

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which brings one face to face with the realities of life and death, than to hear from the organ a light-hearted and irresponsible Voluntary. We have heard Handel's chorus, 'O, the pleasure of the plains,' on such an occasion: no doubt a fine chorus, but, then and there, entirely inappropriate.

In conclusion, it may be said that the organist should always bear in mind the end towards which he is working. By all means let the organ develop, becoming more and more responsive to the calls made upon it, either from tonal or technical

considerations; but when used as an accompaniment to Church music, it must still jealously guard the Church's traditions. So long as our Church instruments include their full complement of real 'organ' stops, of non-imitative character, just so long may we hope to maintain the dignity and beauty of the music of the Sanctuary; then the congregation would feel that Church music is something separate and apart, and that while within the hallowed precincts they leave the world and its cares elsewhere.

HOW A TRUMPET IS MADE.

By D. J. BLAIKLEY.

II.—THE NATURAL TRUMPET AND HORN.

(Continued from p. 16.)

As examples of the short, straight trumpet, the ancient Roman tuba and the modern coach-horn may be named. Considerations of the rigidity of the tube and the convenience of handling limit the length of such instruments to about four feet, and a consequent easy compass limited upwards by the sixth harmonic. If we would increase the compass, the necessary extra length must be disposed of by some manner of bending, and in the lituus, the Roman cavalry trumpet, the form given was that of the letter J, the bell end being turned upwards. Other instruments used in the Roman armies were, in quality, rather of the bugle and horn type than of the trumpet, and were bent into large curves.

Assuming that we have a short trumpet on which the fourth and fifth harmonics, or c'' and e' , can be sounded, and that we wish to obtain the d

between these, the addition of tubing sufficient in length to lower the pitch an octave will give the desired result. By this alteration, while all the original notes remain (but, relatively to the fundamental, an octave higher), new notes are introduced intermediate in pitch between each of the original notes on the short trumpet. In the following table is shown how the fourth and fifth notes of the short trumpet are replaced by the eighth and tenth on the altered instrument, or, in general, that certain notes are common to both, and that the ninth note is the required d'' . It may be at once stated that the eleventh and thirteenth notes do not strictly agree with any notes in the diatonic scale, and that the seventh and fourteenth are slightly flat for B flat. Some considerations arising from these facts will be dwelt upon later.

NATURAL SCALE OF THE TRUMPET.

Harmonic series } on 4-feet trumpet	1	2	3	4	5	6	7	8	9
	C	c	g	c'	e'	g'	b''	c''	d''
Harmonic series } on 8-feet trumpet	1	2	3	4	5	6	7	8	9
	C	c	g	c'	e'	g'	b''	c''	d''

The upward limit of compass is indefinite, depending chiefly upon the ability of the player, and on long trumpets the pedal or fundamental note is practically impossible; even the second harmonic is seldom used.

The short straight horn, thus increased in length and bent into a convenient form for handling, has become the typical natural or simple trumpet, which has been subjected to no material change for several hundred years. For a long time its use, apart from military purposes, was reserved for kings and nobles, and trumpeters were the aristocracy of wind-instrument players. Town bands were not allowed to employ either trumpeters or kettle-drummers, and the first recorded departure from this is a grant to the town of Augsburg by the Emperor Sigismund in 1426, of the privilege of keeping town trumpeters, for which the town paid a good sum to the imperial exchequer.

The important position held by the trumpet in former times in Court bands may be judged

from the records of those maintained by our own sovereigns. King Edward III. had five trumpeters in a band of nineteen musicians, King Henry VIII. fourteen trumpeters in a band of forty-two, and Queen Elizabeth no less than sixteen trumpeters, out of a similar total of forty-two performers.

As in former days trumpets were always pitched in D^b , and yet the part-music written for them comprised a range of three octaves, it must be explained that the difficulty of the compass was met by making the instruments on which the upper parts were played, of smaller bore. Such an instrument with small bore, and small, shallow-cupped mouthpiece, was known as the clarino or clareta, as distinguished from the tromba, or trumpet proper. The illustrations given on p. 83 show the contrast between an elementary type, and the standard model of trumpet as it has existed for three or four centuries.

African war-horn or trumpet, of ivory, in the possession of Messrs. Boosey & Co. This instrument may be regarded as an example of a natural horn, and the type from which all our trumpets and horns have sprung. The mouth-hole is at the side, in the position marked (a). (See reference to natural horns and tusks on p. 14 of January number.)

Copper trumpet with mounts in silver, handsomely embossed. The following inscription appears in raised letters on the bell-rim: 'Augustine Dudley 1651. Londini. Fecit.' This instrument, now in the possession of Mr. Alfred H. Littleton, is reputed to have been found on the field of the Battle of Worcester. The mouthpiece is missing.

For the lowest part, an instrument of rather larger bore was used, and the whole family comprised the compass here shown :

COMPASS OF THE TRUMPET.

The following two short extracts from Kappey's 'History of Military Music' show the manner of writing for trumpets in four parts, with kettle-drums :

FLOURISH FOR TRUMPETS.

GRAND TRUMPETER MARCH.

AUFZUG, FEIERLICH (MARCH, SOLEMN).

In orchestral compositions the trumpet has held its place since the time of Monteverde, and it is remarkable that some of the old trumpet parts were carried upwards to a degree that is now never attempted. The following passage for trumpets in D natural occurs in J. S. Bach's 'Christmas Cantata':

in which the 'top C,' sounding D, is the sixteenth harmonic, and even higher notes were written by this master.

Although D was the generally recognized key or pitch of the trumpet, we find that Prætorius (*Syntagma*, 1618) shows a crook, or additional bent tube, to lower the pitch to C. In the middle of the 18th century the general use of crooks was introduced, and F became a customary key for the trumpet, with crooks to lower the pitch through the different keys to B flat and even to A natural. If crooks—other than the crook to lower the D trumpet to C—were known in Handel's time, he did not use them, as his trumpet parts are always for instruments in D or C. His method of writing was to show the actual pitch of the notes as sounded, but the more usual plan is to write for the trumpet as a 'transposing' instrument, that is, its pitch note, or 'doh,' is almost always treated as C, the fourth natural harmonic being written as middle C. The exception to this rule is in the use of the modern high-pitched trumpets in B flat and A, for which instruments middle C represents the second harmonic.

It has been stated that certain notes, especially the eleventh and thirteenth harmonics, are not in agreement with any notes in the diatonic scale. In the hands of good players, the pitch of the notes can be modified by the lips, but other means have been attempted without having recourse to keys or valves. In 1780 a trumpet was introduced by Michael Wögel having the bell curved round sufficiently to allow of the introduction of the hand, by which means the inaccuracy of intonation of these upper notes could be corrected and other notes introduced. The true trumpet quality was, however, so greatly impaired that the invention was in use for only a short time.

Our attention may now be turned to a brief consideration of instruments of the horn class—that is, instruments chiefly conical in form, being without the large proportion of cylindrical tubing which is the main factor in giving to the trumpet its brilliant, characteristic tone.

Of these, the various small hunting and coach-horns may be dismissed as being without musical value. The army bugle, however, is worthy of notice, as it is from it that many of our modern brass instruments have sprung. It was formerly pitched in C, with a crook for B $\flat$, but is now made in B $\flat$ without crook. For military calls, notes from the second to the sixth harmonic are used, written thus:

but a few higher notes are practicable.

The French horn, which in some ways may be considered the most important brass instrument in the orchestra, is generally regarded as the connecting link between the 'wood-wind' and the 'brass,' for its tone blends well with the flutes and reed instruments. Its quality is mellow and plaintive when *piano* or *mezzo-forte*, but in *forte* passages it can give tones suggestive of anguish and even despair. This valuable instrument has been evolved from the Waldhorn or Cor de chasse used by the mediæval foresters and huntsmen, and, as now known, has a widely expanding bell, small tubing, chiefly conical, and a mouthpiece with a deep, funnel-shaped cup about five-eighths of an inch in diameter at the rim.

In the sequence of tones the French horn follows the law of natural harmonics as explained in the description of the trumpet, and indeed this is the fundamental principle which must be understood in its application to every brass instrument. The horn, however, is relatively an octave lower than the trumpet: the length which determines the horn as being in B flat alto is the same as that of a trumpet in B flat basso, and the horn in F (its most usual pitch), with its twelve feet of tubing, is twice the length of the trumpet in F. Hence the common chord as written in C for the fourth, fifth, sixth, and eighth harmonics sounds thus:

For convenience of handling, the instrument is coiled in such a manner that, when firmly held in the left hand, the right hand can rest in the bell-mouth. The object of this, so far as the natural horn is concerned, is that by the greater or less closing of the bell-mouth, semi-tones and even whole tones can be introduced between the natural harmonics. This manipulation is known as 'hand-stopping,' and although the modern valve-systems have lessened its importance, it has afforded a valuable means of increasing the capabilities of the horn. For further details the reader may consult a lecture by the writer on 'The French horn,' published in the 'Proceedings of the Musical Association' for 1908-1909 (thirty-fifth Session).

(To be continued.)

Occasional Notes.

The degree of Doctor of Music, *honoris causâ*, was conferred upon Mr. W. H. Hadow by the University of Oxford during last term, on his leaving for Newcastle. The Vice-Chancellor (Dr. Warren) presided at the meeting in the Sheldonian Theatre, and Mr. Hadow was presented for the degree by the Professor of Music, Sir Walter Parratt, in a eulogistic Latin speech. Every Oxford musician who could be spared from duty was present. Mr. Hadow was entertained at lunch the same day by the members of the Musical Club, when he was presented with a complete set of Bach's works. The Professor of Music presided, and warmly praised Mr. Hadow's work during his many years' stay in Oxford.