



Brass Instruments

Changing Key and Pitch

Murray

The next big step was the development of the slide which seems to have happened around the 15th century and which allowed the trombone type of instruments to develop.

Arnold

This instrument here is the trombone or sackbut as it was often called and this is a development of the trumpet, which has a longer tube length. This enables it to play notes in the bass and tenor register whereas a trumpet is more of a soprano instrument.

And the other important difference is the moveable slide, which enables the player to adjust the sounding length of the instrument...

Murray

...that then allowed you to fill in the gaps between the harmonic series in a completely chromatic way.

Caption

filling the gaps
cornett cornetto

Arnold

This is a different solution to the problem of getting a complete range of notes from a brass instrument. The cornett has a mouthpiece just like a trumpet mouthpiece.

Murray

So in that sense it's very similar to the trumpet of the Renaissance but the tube is very much shorter, and that's the crucial difference I think. It's a relatively rapidly expanding but quite short conical tube.

Arnold

And it also has the finger holes, familiar from wood wind instruments.

Murray

And the technique involves shortening the tube by opening the holes...

...rather than either just using the given harmonics as with a natural trumpet or lengthening the tube as on a trombone.

The fact that the tube is so short means that the influence of the lips is even more of a dominant partner relative to the resonances of the air column than is the case on the trumpet. The consequence of that for the player is that it's very easy to lip notes up or down by a large extent on the cornetto.

It's a very useful added flexibility but of course for a non-expert player it's a pitfall and I think that's given the cornetto a reputation as being a particularly difficult instrument to control.

Caption

crooks and bits
changing the key and altering the pitch

Arnold

A natural instrument such as the trumpet or the French horn produces a series of notes, which correspond to the harmonic series. The longer the tube length the lower each note in this series is. This short crook here allows the instrument to play in a key of B flat. To produce a series of notes lower than this a longer crook can be used. And this was the standard way of making orchestral French horns in the 18th and early 19th centuries.

The same principle was applied to the trumpet where trumpet crooks were inserted between the body of the instrument and the mouthpiece.

Trevor

Crooks effectively change the key of a brass instrument but there was also a need to meet local pitch standards.

Arnold

The pitch of music making in the Renaissance and Baroque period was not standardised through out Europe so for a particular instrument to be used in different orchestras or in churches, the players had to insert small pieces of tubing, know as tuning bits, to bring the instrument into tune with the rest of the orchestra.

A later development was to introduce the tuning slide into French horns, to enable a horn player to play in tune.

Caption

filling the gaps
hand stopping and lipping

Murray

The horn players actually used an additional technique, which involved inserting the hand into the bell of the instrument.

Arnold

And by moving the hand in the bell, can change the pitch of the note.

Murray

That has the effect of lowering the resonance frequencies of all the natural resonances of the air column and therefore it's possible to take one of the harmonics which are a little bit out of tune and flatten it to bring it in to tune. That is also possible on the trumpet.

Arnold

And this demilune trumpet was built in this shape to allow the player to place the hand in the bell of the instrument.

The other technique which the players had, to produce a more musically useful series of notes was to develop their technique for playing in the higher register of the instrument the so called clarino register.

Murray

One of the things that the clarino players had to develop was the ability to lip particular harmonics because not all of the harmonics actually form notes of the diatonic or chromatic scale - some of the harmonics are a little too sharp or a little too flat. But the crucial thing here is the strength of the player's lips in interacting with the brass instrument. It's possible for a good player to pull a note down, by lowering the resonance frequency of the lips a little bit, or to push a note up, by increasing the resonance frequency - tightening the lips.

So the clarino players were able to play pretty well in tune and to play tunes completely with out altering the length of the instrument at all. 7