

## Flute Miscellany (Apr 2020)

### Early Flutes

Early Flutes include: Renaissance Flutes (fully cylindrical bore); 1 keyed Baroque Flutes (cylindrical bored head, reverse conically bored body); and early Classical Flutes. Classical Flutes developed from the Baroque Flute - keeping the bore design but splitting the Flute into joints (so the bore could be engineered with more precision) and adding extra chromatic keys so the Classical instrument can have up to 6 in total (the original Eb from the Baroque design plus [short] F, G#, Bb and Low C & C#). Modern copies of all of the above period Flutes are available in old and modern pitches.

### Development of the Classical Flute in C19

Classical Flutes are Simple System Flutes - these are defined as having 6 finger holes that are covered directly by the fingers. The necessity for the fingers to be able to cover the holes, and for the instrument to have reasonable intonation over a compass of three octaves, determines the shape of the bore (typically a cylindrical head bore and reverse conical body bore). The combined influences of the size of the finger holes and the bore shape determine the tone and volume of the instrument.

The Classical Flute developed in three different directions: the Flute for marching bands; the English Concert Flute; and the continental Concert Flute.

**Marching Band Flutes:** Marching Flute bands were very popular in the European military and many examples of the Flutes used still exist. These simple system Flutes were typically six keyed instruments but with no low C or C# (the keys are Eb, short F, long F, G#, Bb, and [high] C). Marching Bands use the following system for naming the pitch of a Flute: the pitch is the lowest note produced by the instrument (which is with all 6 finger-holes covered and no keys operated). The Flutes were made in the following (descending) pitches: F (piccolo); Eb (Piccolo); Bb - also referred to as a fife (it has a slightly different bore and usually carries the melody); F Flute; Eb Flute; Bb bass Flute (but really an alto flute); F bass Flute; and Eb bass Flute. Marching bands still exist although some have converted to Boehm system Flutes and now use: (C) piccolo; G treble Flute (melody); C soprano (concert) Flute; (G) Alto Flute; and (C) Bass Flute.

**English Concert Flutes:** Concert Flutes are pitched in C. In England, by the first half of the 19<sup>th</sup> century, the 8 keyed Concert Flute had become standard; it was very similar in design to a marching band Flute but had a foot-joint with Low C & C# and was better made.

**Continental Concert Flutes:** On the continent the classical Flute developed with the addition of even more keys, including keys for particular trills and often a low B - as many as 13 keys in all. Essentially however it was still a Simple System Flute with the characteristic tone and Simple System fingering.

The naming system for Concert flutes is based on the orchestral naming system - that is what note is actually heard when the note referred to as 'C' on the instrument is sounded - so regardless of what the lowest note actually sounds - these flutes are in 'C'.

## C19 Departure from the Simple System Flute – the ‘Conical Boehm’ Flute

During the 19<sup>th</sup> century the Concert Flute was completely re-designed. The intonation and volume of Simple System Flutes is compromised by the position and size of the finger holes and so a way of improving the size and location of the holes but at the same time still allowing the player to be able to play the instrument had to be devised. Theobald Boehm led the way and produced a ground-breaking instrument.

Boehm’s **1832 system** (also known as the Conical Boehm) had the cylindrical bored head-joint and reverse conically bored body of the Classical Flute, but had slightly larger and better placed tone-holes that, by means of a sophisticated mechanism of rings and plates, the player’s fingers could cover directly or indirectly.

The intonation and volume of the instrument was improved but the tone was still similar to a Simple System Flute, however, because some tone-holes had been enlarged and re-located the instrument had to be played with a fingering pattern significantly different to the Simple System fingering pattern: on Boehm’s innovative design the G# key was sprung open and so when the three left-hand fingers were held down the instrument sounded G# (and with four sounded G) - this was the opposite of what players were used to; also the left-hand thumb was now normally required to hold closed a key and was primarily only lifted to open then key when playing C5, C#6, C6, and C#7, again this was the opposite of what players would normally do if they had a C key; the F, F#, and Bb fingerings were slightly altered; and some 3<sup>rd</sup> register and trill fingerings were different. Players were initially reluctant to adopt a new fingering pattern but with a modification invented by the player **Dorus** so that the G# key was sprung closed many players adapted to the instrument and it became relatively popular.

Boehm’s 1832 Flute and further developments in key design by other engineers such as Auguste Buffet, inspired other makers to continue on this path of development. Critically makers kept the same bore shape to retain the tone of the instrument but selectively relocated and enlarged some tone-holes using rings and/or plates to cover the holes indirectly. The fingering of these instruments tended to be similar to Simple System Flutes but not exactly the same. There were many different designs, the simplest perhaps being one of **Siccama’s** early flutes, which relocated the 3<sup>rd</sup> and 6<sup>th</sup> finger-holes so they were closed indirectly by plates, but was otherwise a standard 8 keyed Concert Flute; a famous C19 Flute player **Robert Pratten** endorsed Siccama’s Flute and later went on to produce his own Flutes likewise with a similar bore and near Simple System fingering. German makers took this approach to the extreme to produce the **German reform flutes** which have very complicated key mechanisms.

## The creation of the modern Boehm Flute

Boehm’s second major re-design of the Flute was his **1847 system**; the fingering pattern was similar to the 1832 model but the bore of the instrument was radically changed to improve intonation and volume further although this also changed the tone of the instrument.

The new instrument had a foot-joint, body, and head-joint made of metal (although later Boehm preferred a wooden head-joint); the head-joint had a parabolic bore while the body and foot-joint had a cylindrical bore; and the left-hand fingers 2 & 3 and right-hand fingers 1,2, & 3 operated key plates with centre holes (perforated plates). The radical change in bore design also necessitated a re-design of the mechanism (but not the fingering pattern). Like the 1832 system, the 1847 system also initially had an open G#, but soon a modified 1847 system with a closed G# became the popular model (although the 1832 model was still manufactured because some players preferred the sweeter tone that was closer to the old Simple System Flutes).

Boehm’s innovative bore design inspired yet two more paths of development: Flutes with a cylindrically bored body but fitted with a mechanism enabling a fingering pattern closer to the old Simple System fingering pattern such as **Richard Carte’s 1851 system** and **Radcliff’s 1870 system** and some of Pratten’s later Flutes; and Flutes with a cylindrically bored body fitted with a mechanism enabling fingering patterns considered superior to the Boehm system such as **Rudall Carte’s 1867 system** which incorporated elements of Boehm and Simple System fingering patterns.

## Further development of the Boehm Flute

Boehm himself manufactured several versions of his 1847 system, and manufacturers in France, Germany, and Britain, experimented with his basic design - refining, improving, and adding to his system over decades. Different manufacturers added new pieces of mechanism and keys that did not get adopted in the long run, but two additional keys have become standard: firstly the **Bricaldi key** - which is an extra thumb key to play Bb (the standard location of the touch-piece for this key is above the B key touch-piece closer to the Head-joint, but sometimes it located below the B key touch-piece); and secondly the **Bb trill key** operated by the side of the right-hand first finger.

A manufacturer's standard model today has covered holes (holes covered by key plates with no centre holes) and a closed G# but the closed G# compromises the intonation of some of the notes and so manufacturers usually offer another model with additional mechanism to help alleviate some of the intonation problems - the most common additional mechanism is the **Split E** which helps achieve a good 3rd register E (but at the sacrifice of the 3rd register G/A trill).

## The Db Piccolo

This instrument is worth mentioning because it highlights the transition from Simple system instruments to Boehm instruments.

Renaissance and Baroque flutes were available in many slightly different sizes (and therefore pitches) to function in Consorts and Wind bands and this tradition continued with Classical flutes as used in Military Marching Flute bands (see above) where there were, amongst other sizes of flute, 3 soprano flutes (Bb, F, and Eb). In contrast, orchestral music required only 1 soprano flute, however like the Military Marching bands the Orchestra did use 2 piccolos - the C and Db piccolo (under the orchestral naming system) this was because the simple system Piccolo was particularly difficult to play in certain keys - parts difficult for the C Piccolo could be played on the Db Piccolo (the difficulty was less for flute players an octave below and so only the C concert flute was required).

Note that confusion often arises when considering the 'Db' Piccolo because there are two naming systems - the Marching band system and the Orchestral system. The very same instrument is called a Db piccolo in the orchestral naming system (because it is a transposing instrument that produces the pitch Db when the note called 'C' is played) but called an Eb piccolo in the Marching band system (because its lowest note is Eb). All Boehm instruments use the orchestral naming system

The Boehm system C piccolo made both simple system piccolos (C and Db) obsolete however there were still a great many orchestral scores in existence with parts transposed to be played on the Db piccolo - and whilst the Boehm piccolo could be used to play the C piccolo parts straightaway - it was necessary to rewrite the parts transposed for the Db instrument so they could be played on the C piccolo - therefore in this period of transition it was useful to have a Db Boehm Piccolo so the piccolo player could play old Piccolo parts still transposed for the Db Piccolo. Once all orchestras were using piccolo parts in C then the Db Boehm system piccolo became obsolete in Orchestras. From today's perspective this seems bizarre - but the relative costs of music printing and musical instrument manufacture were very different in that period.

The Db Boehm Piccolo still had a function in Military Concert bands. The Db Boehm piccolo was superior to the Db simple system piccolo used in Military Concerts bands (where it was known as an Eb piccolo). Not only do Military Concert Bands play arrangements of Orchestral favourites (some with transposed Piccolo parts) but they also play a great deal of music from the Marching bands repertoire which has been arranged for the various pitched wind instruments of traditional marching bands including the Eb Piccolo (orchestral Db) and although all these parts could be played on the new Boehm C Piccolo, the transposed parts also needed to be re-written and the conversion process for these bands took even longer than it did for orchestras.

## Left-handed Flutes

The vast majority of Flutes are 'right-handed' in the sense that the alignment of the player's body is towards the right-hand side and this may feel uncomfortable to left-handed people. There is only one commercial manufacturer of left-handed Flutes – 'Viento' based in Germany. Their website (<https://www.viento-querfloeten.de/en/>) makes several interesting claims to support the use of these flutes including

- as an occasional corrective for left-handed players experiencing back, shoulder, or neck pain
- as a useful teaching tool (if the teacher plays the instrument the beginner student see a mirror image of what they are playing themselves)
- as a useful tool for advanced players to help improve technique
- as a musical brain exercise.

## The Complete Boehm Flute Family

Piccolo in Db -6 fingers sounds Eb; lowest note Eb referred to as D sounding Eb5. Replacement for Db orchestral Piccolo and when this became obsolete functioned as equivalent of Eb simple system piccolo in early C20 military concert bands - no longer made.

Piccolo in C -6 fingers sounds D; lowest note D referred to as D sounding D5. Has also been known as the 'Ottavino' – due to role of doubling flute & Violin parts at octave in orchestra.

Treble flute -6 fingers sounds A; lowest (standard) note C referred to as C but sounding G(4) above middle C; Boehm version of marching band flute and now common in marching bands that have converted to Boehm system flutes and A=440. Also can be used in modern Flute choirs to fill gap between Soprano flute and Piccolo.

Soprano flute in Eb -6 fingers sounds F; lowest (standard) note C referred to as C but sounding Eb(4) above middle C; common in 1940s US bands as alternative to Eb clarinet; can now used by Alto sax players wanting to use same scores as for their saxophones.

Soprano flute in C -6 fingers sounds D; lowest (standard) note C referred to as C; sounding middle C(4) can have extension down to B or even Bb (Haynes flute, scored by Mahler); also referred to as *the concert flute*.

Flute d'amore in Bb -6 fingers sounds C; lowest (standard) note C referred to as C but sounding Bb(3) below middle C; normally transposing instrument; rare historical instrument sometimes called Bb tenor flute in England (D'amore flutes are effectively the mezzo-soprano of the family).

Flute d'amore in A -6 fingers sounds B; lowest (standard) note C referred to as C but sounding A(3) below middle C; normally transposing instrument (the traditional minor third of d'amore instruments) widely used historical instrument but also currently made commercially.

Flute d'amore in Ab -6 fingers sounds Bb; lowest (standard) note C referred to as C but sounding Ab(3) below middle C; normally transposing instrument; rare historical instrument.

Alto (in G) -6 fingers sounds A; lowest (standard) note C referred to as C but sounding G(3) below middle C (this is sometimes erroneously called a Bass G flute); sometimes written as transposing instrument; straight or curved head-joint. Scored for by Stravinsky and Holst, works well with microphones, several commercial manufacturers.

Bass (in C) -6 fingers sounds D; lowest (standard) note C referred to as C; sounding an C3 (octave below middle C); several commercial manufacturers.

Contra-alto (in G) -6 fingers sounds A; lowest (standard) note C referred to as C but sounding G3 an octave below alto flute; currently made by Kingma, and Kotato & Fukushima.

- Contra-bass (in C) -6 fingers sounds D; lowest (standard) note C referred to as C; sounding C2 two octaves below middle C; sometimes called 'Octobass'; made by Kingma, and Kotato & Fukushima.
- Sub contra-Bass in G -6 fingers sounds A; lowest (standard) note C referred to as C; sounding G2 an octave below Contra-alto; would be best referred to as sub contra-alto flute (see Alto above)
- Sub contra-Bass in C -6 fingers sounds D; lowest (standard) note C referred to as C; sounding C1 three octaves below middle C; sometimes called double contra-bass or Octocontra-bass; made by Kingma, and Kotato & Fukushima.
- Hyperbass- (in C) -6 fingers sounds D; lowest (standard) note C referred to as C; sounding C0 four Octaves below Middle C.

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