

THE FLUTES OF EUROPEAN ART MUSIC

Some connections between the instrument's design and musical requirements



The Flute Player, Dirck van Baburen, 1621 (?), oil on canvas, inventory no.: KFMV 291 © bpk / Gemäldegalerie SMB

Since around the 13th century, a gradual separation of folk and art instruments began to form. (Both terms are contestable, but common.) What this development actually looked like is not yet explored. It certainly did not occur linearly, and not in the same way everywhere. It apparently arose in connection with a requirement of the middle and upper classes to represent their own status in their art as well as to separate themselves from the lower classes in music. The flourishing of cities contributed to a stabilisation and differentiation of estate membership of society. The music of the upper classes was distinguished by a relatively soft, gentle sound. Hand in hand with such trends was the development of polyphony furthered by the church and the academic world, which – among others – led to an extensive withdrawal of percussion instruments in art music. This is why a melodious instrument such as the flute, with its – at least potentially – gentle sound, was given the chance to be accepted into the family of art music instruments. The requirement for this was that it possessed the pitches, demanded by polyphony. Preserved instruments and fingering charts show us that this requirement was met at the latest in the 16th century. Characteristic is



Singing Boy with Flute, Frans Hals, around 1623/25, oil on canvas, inventory no.: 801A © bpk / Gemäldegalerie SMB

a caption for the fingering charts in Martin Agricola's *Musica instrumentalis deudsch* (Wittenberg 1529): »A different, beautiful and true foundation / like three or four Swiss pipes / still accompanied by song / used together / And how the six holes / are to be fingered according to the notes.« The term »Swiss pipes« means traverse flutes. Polyphony as church music also was developed from chant, and it was unimaginable without notation. Agricola, cantor in Magdeburg, placed value in flutes not being played according to »tablature«, which are fingering charts, but »by notes« like singing. Among the requirements of the polyphony of the time was the usage of altered tones, that is tones with prescribed # or b. This means that, when possible, at least the twelve pitches in the octave customary on keyed instruments should be available on wind instruments as well. Yet the player only has ten fingers, to cover the finger holes. The recorder required only eight, and a mere six on the traverse flute. However, nearly twelve pitches were played; using so-called cross-fingering, the notes created by the finger holes could be lowered by several degrees. This occurred by closing one or more of the holes below the open one. The resulting notes sound

softer than the »normal« ones. However, to achieve a scale that contained the desired pitches, that was not too difficult to produce and contained notes that did not audibly contrast with one another too heavily, the instrument makers (who occasionally were identical to players) developed sophisticated systems. These have only been somewhat researched, also very few flutes from the 16th century have been preserved. The potential of such a system implies that certain finger holes were not exactly intonated for one of the required tones, but rather somewhat lower. For that two pitches could then be reached from this finger hole, the higher with a slight adjustment in blowing and the lower from a »single« cross-fingering. Single cross-fingering means that there is only one closed finger hole following an open finger hole downward; there were also double and triple cross-fingerings with two or three closed finger holes below the open one. Single cross-fingering was also technically simple, yet it did not suffice for the normal intonation of the finger hole for lowering the tone under some circumstances. The finger holes (and the mouthpiece on traverse flutes) were undercut for octave purity and stability, meaning they were extended inward.

The fingering chart in *Epitome musical* by Philibert Jambe de Fer (Lyon 1556) is intended for the traverse flute with the lowest note g. The following may be said about the fingering for the altered tones of the lowest octave: The G sharp, which could only be reached by the difficult, partial covering of a hole, is missing; the B that is reached with a single, the C sharp¹ with a double cross-fingering. This may be a misprint, for two neighbouring holes (those for C sharp¹ and B) remain open so that the double cross-fingering only creates a very slight lowering in tone. The E¹ flat requires a single cross-fingering. All finger holes are left open for F¹ sharp; playing an altered tone with no cross-fingering can be achieved with the highest finger hole, i.e. not through cross-fingering an even higher hole. This means in turn that F, for which only the F¹ sharp finger hole is available, must be reached with cross-fingering; double according to Jambe de Fer.

The fact that a double cross-fingering is required for F¹, yet only single for E flat¹, suggests that neither the finger holes for F¹ nor for E¹ were intonated for these exact notes. Because of the long tube a double cross-fingering is otherwise used more for lower pitches than for higher ones. Not only the preserved flutes, but also at least the flute school of Hotteterre (1707), show that certain finger holes deliberately were intonated too low in the 18th century. This stipulates for the D¹ flute that the flute must be »turned out« for F sharp¹ and C sharp², whereby the lower lip unblocks up a larger part of the mouthpiece, raising the pitch. This means, in turn, that the corresponding finger holes were intonated too low. This made it easier for the player to get by with a double cross-fingering for C² and single cross-fingering for F¹ (G sharp¹ and B¹ flat required triple cross-fingering).

The F¹ can only be blown by the flutist with single cross-fingering, because there were no more finger holes below this key.

The way the disposition of the finger holes may have individually been conditioned, it facilitated the voluble creation of all notes, with the exception of half notes over the note of the lowest and second lowest finger hole. These half steps could not be reached with cross-fingering, as there were no, or not enough, holes available below the lowest finger holes; this meant that only the partial covering of the finger holes is to be considered, whereby reaching the desired pitch was difficult and the resulting sound was unsatisfactory. One such tone for the D¹ cross flute was the E flat¹, and F sharp¹ and G sharp¹ for the F² traverse flute. Blowing adjustments were not as possible on the recorder as they were on the traverse flute, as the air blows through a windway; only single cross-fingering could be achieved for G sharp¹, which did not sufficiently lower the pitch.

A woodcut by Hans Burgkmair, *Die Geschicklichkeit in der Musik* from Weißkunig (around 1516) depicts a traverse flute (presumably an instrument in D¹) with a seventh finger hole somewhat to the side below the row of the remaining six finger holes. It could be sealed with the pinky finger, and upon opening produced the E¹. This is certainly an exception, for only after 1650 did the finger hole for E flat¹ / D sharp¹ appear, with a key. This was sealed when idling and was opened by pressing with the finger. Only now was the full chromaticism possible with no half-covering of finger holes.

However, the demands of the musician went beyond the twelve pitches of the octave. If one wanted to intonate pure thirds, E flat and A flat were higher than D sharp and G sharp, for instance. In 1654, Gerbrand von Blanckenburgh stipulated the technical differentiation of such »enharmonic« pitches, yet continued to utilise the half-covering of finger holes; furthermore, the fingerings only differ in certain details: For instance, a note suffixed with # means the finger hole is more than half covered, and a little less than half for the neighbouring (somewhat higher) flat-suffixed tone.

On the traverse flute it was possible to achieve these fine differences in pitch with various methods of blowing: The player could – unlike with the recorder, in which the air blows through a windway – modify the airflow with their lips and/or more or less cover the mouthpiece with the lower lip. And yet we are met with Hotteterre's (1707) approaches to make the enharmonic differences accessible in the truest sense of the word: He stipulates various fingerings each for F sharp¹ and G flat¹ / F sharp² and G flat², as well as for C sharp² and D flat², and he requests blowing adjustments for the remaining enharmonic pitches. There were likely such differentiations in fingering techniques before Hotteterre.

Quantz, the flute instructor for Frederick II (the Great) of Prussia, subsequently followed this line: He stipulated various fingerings for a large number of enharmonic pitches; and when this was not possible – namely at the

lower end of the flute – he incorporated a second key onto the only one previously existing on the traverse flute: one for E flat, the other for D sharp.

In the 17th century the traverse flute was in D¹, the most important instrument in the family being turned into the »D major flute«: Should the player open up one finger hole after another, this produces (partially with slight blowing adjustments) the D major scale. This was not the rule up to that point, based on the fingering charts of Mersenne (*Harmonie universelle, Traité des instruments*, Paris 1636): The sequence of finger holes produces the notes with no chromatic inflection, i. e. the »natural« notes. The later D major flutes, generally spoken those from the second half of the 17th century up to Theobald Boehm, thus simplified voluble playing in the major pitch that had the lowest note of the instrument as a tonic. This corresponded to both the development of virtuous, soloistic instrumental music as well as the major-minor system of church notes. From the beginning of the 18th century onward a specific type of traverse flute music started to form. However, the highly precise intonation of the finger holes for the D major notes meant that other notes had to be reached with triple cross-fingering (G sharp¹, B¹) or drastic blowing adjustments (F¹); these notes sounded relatively dull and uncomfortable to play. (Triple cross-fingering could also be dependent on other, downward changes in the construction of the cross flute.)

The next step in the development was drilling finger holes for notes not included in D major. As there were not enough fingers to close them all, they were equipped with valves pressed onto the holes with springs. The D sharp hole was already regularly present since the 17th century. With the second half of the 18th century, there came more closed keys, primarily with the work of Johann Georg Tromlitz (1791). Such keys were generally widespread during the early 19th century. This eliminated the need to inwardly intonate the remaining finger holes in the cross-fingering. The fact that the flutes of this time cannot be played with the fingerings of the earlier age is yet another strong indication that the cross-fingerings were previously made possible by a special drilling of the finger holes. The formerly one-piece flutes were generally produced in multiple parts from the second half of the 17th century onward. Not only could the instruments be better packed up this way, but they were also easier to produce. In the 16th/17th century flutes were furnished with a tapered (i. e. they narrowed on the inside to the lower end) bore instead of a cylindrical one. This tapered bore generated pure octaves, during overblowing for instance, and the notes A and B of the first and second octaves could be played with the same fingerings – a great relief for the flautist. This can likewise be understood in terms of the development of virtuosic, soloistic instrumental music. Through (as of yet little researched) changes in the bore and mouthpiece, the sound of the flutes from the



from left to right:

traverse flute in C, J. Hotteterre le Romain, Paris, 3rd quarter 17th century, cat. no. 2670, photo: Jürgen Liepe; traverse flute in C with C-foot, Heinrich Grenser, Dresden, 1796/1806, cat. no. 4019, photo: Oliver Schuh; recorder, Peter Bressan, London, around 1700, cat. no. 2801, photo: Jürgen Liepe; tenor recorder from the Wenzelskirche in Naumburg, after 1634, Deutschland, cat. no. 660, photo: Jürgen Liepe © MIM

16th to 18th centuries onward became generally brighter or »more robust«.

It must be noted here that today's seemingly quite modern, great shapes of the traverse flute, like the alto and bass instrument, already existed in the 16th and 18th centuries. The piccolo was more common in the 18th century. The recorders were produced in entire families at a much greater extent as of the 16th century (Praetorius mentions nine different sizes in 1619).

In the first half of the 18th century recorders and cross flutes balanced out each other in terms of importance. On the recorder, the cross-fingering sounded less strong in their »normal« notes than on the cross flute; the windway was cleverly double rounded, length- and crosswise. Among other things, this simplified refined articulation supported by dynamic nuances. However, such possibilities did not suffice to ensure that the recorder could maintain its importance at a time when the increase and decrease of tones as a natural expression was becoming more significant. The recorder withdrew from art music in the 19th century. The windway too heavily impaired the free creation and expansion of sound.

The traverse flute, on the other hand, was adjusted to the demands of high romantic music by Theobald Boehm (1794–1881). The development of the Boehm flute, which shall not be described here in detail, is considered by experts to be more of a revolutionary than an evolutionary event in the history of the flute: that is how different it is from its predecessors. Large tone holes amplify the volume; a key system that also links multiple keys together ensures equality and easy reachability of all chromatic notes; the cylindrical tube and the modified, tapered (parabolic) narrowing of the tip of the upper end influence the intonation and articulation in the same way. The keys allow the tone holes to be placed in any desired location, regardless of the reach of the fingers; this is, among other things, important for broadening the ambitus upward, as the desired pitches must be achievable during overblowing as well. A broad, brilliant path to virtuosity had been laid; and yet many techniques on the nuancing and ornamentation of tones, as Fürstenau still described them in his *Kunst des Flötenspiels* (Leipzig, around 1844) were lost. The innovative, timbral »consistency« of all notes, which actually ensured more freedom in the dynamic shaping of longer melodic lines, was initially contentious. The flute's uniquely airy sound remained preserved; Debussy probably was the first great composer to intensively utilise the fascinating, universal possibilities of this new instrument.



Ivory traverse flutes in their etui, from the flute collection of Friedrich II., Butzbach, Johannes (II) Scherer, before 1722, cat. no.1531 © MIM, photo: Jürgen Liepe