On the musical roles of the chromatic organ in renaissance Italy

Introduction & Background

During the Renaissance various tempering schemes for tuning stringed and pipe keyboard instruments were developed, with the aim of making them as musically satisfying as possible in as many keys as possible. One line of development was to provide separate (‘divided’ or ‘split’) keys for some or all of the chromatic sharps and flats on the keyboard, producing families of cimbali cromatici and organi cromatici.

The design, construction, tuning and repertoire of the chromatic harpsichord (cimbalo cromatico) has been the subject of a number of previous articles, notably those by Christopher Stembridge [1,2,3], Denzil Wraight [3,4] and Bob van Asperen [5]. Despite the fact that the existence of some 26 Italian organs with split keys has been documented [3], with dates ranging from 1448 to 1665, the chromatic organ (organo cromatico) has received much less attention in comparison (see [6] for a somewhat isolated example).

The rationale behind the chromatic keyboard families will be set out in the next section. The following section will describe a performer’s observations of the different forms and degrees of musical expressiveness obtainable on chromatic keyboard instruments, particularly chromatic organs such as the Daniel Herz instrument of 1649 in the Frauenkirche, Brixen, S.Tyrol, compared with instruments employing various shades or extensions of mean-tone temperament alone.

In this manner we aim to synthesise a perspective of the potential musical returns on the requisite technological investment afforded by the chromatic organ, which we present in the final section of the paper.

Theoretical Considerations

The classical Greeks were well aware that 7 successive octaves are not equivalent to 12 successive perfect fifths, and the difference: \((1\frac{1}{2})^{12} - (2)^7\) is known as the Pythagorean comma. If the Pythagorean comma is allocated to only one fifth in the circle of 12 fifths, this fifth will be very narrow and is known as the ‘wolf’. In equal temperament (ET) one-twelfth of the Pythagorean comma is distributed to each of the 12 semi-tones in the octave, making fifths rather too narrow and fourths correspondingly too wide. This ‘equal misery’ solution has a 7–8-fold greater effect on the purity of the major and minor thirds (and sixths) and hence on the major and minor triads.

The syntonic or Ptolemaic comma was also well-known in classical Greece, and can be defined as the difference between 4 successive perfect fifths and two successive octaves plus a major third, or: \((1\frac{1}{2})^4 - 5\). This leaves the major third very wide. A similar phenomenon occurs if 3 successive perfect fifths are compared to an octave plus a minor sixth; the minor sixth is again very wide.

A final measure illustrating the mutual incompatibility of perfect fourths and fifths on the one hand, and pure thirds and sixths on the other, is the lesser diesis. This is embodied in the observation that a succession of 3 pure major thirds produces a very sour (narrow) octave; the difference in this case is: \((1\frac{3}{4})^3 - 2\). Thus if 2 of the 3 major thirds are tuned pure the remaining one is unserviceable (a diminished fourth).

Various shades of regular mean-tone temperament, as well as some irregular extensions, were developed during the renaissance and baroque periods by organ pioneers such as Schlick (1511), Praetorius (1619), Werckmeister (1681) and Neidhardt (1724/32) with the overall aim of distributing the syntonic comma by increasing the number of nearly-pure thirds and sixths at the expense of the tempering of the fourths and fifths, resulting in 1/6-comma, 1/5-comma and 1/4-comma shades of mean-tone, amongst others. All the regular shades of mean-tone have fifths tempered at least twice as narrow as ET, and a ‘wolf’ fifth at least as bad as ET but wide.

These developments have been lucidly described by Mark Lindley [7]. The highly unequal distribution of both the Pythagorean comma and the lesser diesis in all shades of mean-tone temperament requires that each black
key must be tuned either as a sharp or as a flat, and the only way to overcome this constraint is to split the key into two and let each half operate a different pipe (or string) tuned as a sharp and a flat respectively. This increases the number of notes per octave above 12. Initially only the most frequently used black keys were split, typically G♯/A♭ and D♯/E♭, giving a 14-note octave. Later the remaining black keys were also divided producing a 17-note octave or even a 19-note octave if an additional half-key was included between B and C and also between E and F. Going beyond 19 notes per octave allowed for double-sharps and double-flats to be differentiated from naturals.

The Daniel Herz chromatic organ of 1649 in the Frauenkirche, Brixen, S.Tyrol, was restored in 2009/10 by Jürgen Ahrend [6]. The upper manual (in Chorton) has all the black keys divided, except for B♭ in lowest octave and E♭, F♯ and B♭ in the highest octave; the undivided keys produce their notes in mean-tone temperament. In the short bottom octave the back half of G♯ produces E, the back half of F♯ produces D and the lowest key (E) produces C. The front halves of the remaining split keys are for C♯, E♭, F♯, G♯ and B♭ while the back halves are for D♭, D♯, G♭, A♭ and A♯, respectively. The rationale for this layout is that the front half-key produces the more commonly used note of each ‘enharmonic’ pair. The keys of the lower manual (in Kammerton) and the pedals (transposable between manuals) are undivided. The temperament is 1/4-comma mean-tone throughout; for a full description see [6].

Musical Observations

The following compositions were performed on the upper manual of the Brixen organo cromatico:
• del Buono, Sonata Stravagante VII [8]
• Valentini, Sonata enharmonico [9]
• Gesualdo, Gagliarda del Principe di Venosa [10]
• Trabaci, Toccata Terza [11] (although it also requires E♯ and F###)

Regarding the degree of musical expressiveness achievable, after playing the super-chromatic tones the conventional chromaticism of mean-tone seemed colourless and dull in comparison. In fact, it became virtually impossible to play any of the above pieces on a non-chromatic organ in any shade of mean-tone temperament, because they sounded so ugly by contrast. Furthermore, by making use of super-chromatic tones in ornamentation it was possible to inject additional life and freshness into the music. However, a preference for playing Frescobaldi’s works on a non-chromatic mean-tone instrument was also identified, since this enables one to enjoy the expressive dissonances more, due to the feelings of pain or other negative emotions that they engender (cf. Gesualdo’s madrigals).

Frescobaldi’s attitude towards split-key instruments appears to have been somewhat ambivalent. As a pupil of Luzzaschi, he may well have been influenced in favour of playing the ‘correct’ (pure) intervals. Yet his final work, the Cento Partite sopra Passacagli [12], which needs C♯, D♭, A♭ and D♯ all to be in tune, is the only one almost certainly intended for performance on a chromatic instrument.

Only 3 of the 26 Italian chromatic organs documented in [3] were not located in ecclesiastical buildings, so they must have had liturgical uses. Their most obvious role would have been in accompanying singers or other instruments in any required key equally well. For accompaniment purposes, chromatic notes in the top and bottom octaves were not considered especially important. Furthermore, because there was a preference in renaissance Italy for pure major thirds at the expense of tempered (narrow) fifths [13], it would be deemed right to offer to God in worship those musical sounds that were considered to be the finest. This may help to account for the fact that organi cromatici were developed in Italy almost a century before cimbali cromatici [13].

However, the fact that stringed chromatic instruments were later developed in Italy alongside compositions per/sopra il cembalo cromatico [8-11] also implies that appreciation of the aesthetic beauty of pure thirds and super-chromatic tones for ornamentation eventually spread from the ecclesiastical to the secular vocal and instrumental context.

While instruments with split keys were most common in Italy, perhaps due to their later association with centres possessing a tradition of secular vocal performance, there are nevertheless examples of English keyboard music for such instruments, e. g. Bull’s Ut, Re, Mi, Fa, Sol, La [14] and Carleton’s A Verse of Four Parts [15].

Summary & Conclusions

We have endeavoured to place the chromatic organ in a technical and musical context in renaissance Italy, illustrating its dual roles of providing liturgical vocal and instrumental accompaniment in any key and of expressing solo instrumental purity with comparative performances on the Brixen instrument.

References


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В похвалу фландскому клавесину

Три века клавесиностроения – это непрерывный поиск клавесинными мастерами совершенного звука и совершенной выразительности, таких, какие видели исполнители-клавесинисты и авторам клавесинной музыки. Как в различных музыкальных языках существовали свои идеалы выразительности, так различны были и идеалы клавесинных мастеров. За всю историю были созданы инструменты, поражающие разнообразием размеров и форм, конструктивных и акустических особенностей и прежде всего – несходством национальных типов. Каждый музыкальный стиль подразумевал свой идеал инструмента.

Между тем, из многочисленных школ клавесиностроения заметно выделяется одна, характерной чертой которой явилась именно универсальность музыкальной выразительности. Нет такой исторической национальной манеры, для которой у фландских инструментов не нашлось бы своего оттенка выразительности. Будучи после итальянской исторически второй, эта манера оказала огромное влияние на поздние школы – и на французскую, и на немецкую, и на английскую. Ее опыт оказался отправной точкой для поисков мастеров позднейших школ.

Может быть, это произошло потому, что расцвет композиторской и исполнительской традиции Нидерландов был кратк, а влияние ведущего нидерландского композитора Я. П. Свелинка простиралось за пределы Нидерландов и Фландрии: в одну из старейших в Европе английскую традицию, в формирующиеся традиции северной и южной Германии. В предисловии к тому полному собранию сочинений Свелинка, содержащего клавирные и органные сочинения, Г. Леонхарт отмечает, что для композитора то произошло совершение путешествие по северной Европе – автографы Свелинка часто обнаруживались в архивах его учеников. А внимание к его музыке не могло не совпадать с вниманием к инструментам, которые композитор и его последователи сочли идеальными.

Успех первых же фландских инструментов был тем больше, что до опыта фландских мастеров клавесин в Европе был представлен инструментами уже сложившейся итальянской традиции. Как итальянские музиканты провозгласили своим идеалом ритмическую выразительность, так и итальянские клавесинные мастера создавали инструменты, ориентированные прежде всего на яркую атаку звука. Звуковение в этих инструментах было непродолжительным. Такие инструменты гар-