

TUNING AND TEMPERAMENT

(An excerpt from Peter Williams' *J.S. Bach: A Life in Music*, Cambridge University Press, 2007, pp. 333-338)

He knew how to give harpsichords so pure and correct a temperament in their tuning that all keys sounded beautiful and pleasing. (Obituary)

When it comes to the technical matter of temperaments, the *Obituary* makes no claim that Bach engaged in 'theoretical speculation' about it, as it surely would have done if he had, but to its practice. He tuned harpsichords to sound pleasing. Despite a variety of opinions confidently expressed over the centuries, there remains nothing quite certain about what exactly the temperament was the *Obituary* was referring to, how long Bach had desired or practiced any particular form of it, and how it changed (as it surely had) during his lifetime. What is more certain is that the *Obituary* authors, his pupils, were dominated—even misled—by what was to be music's great manual of instruction, *The Well-tempered Clavier*.

Frequently referred to in performance-practice studies today, the *Obituary's* remark matches a little too closely the tastes of the later eighteenth century to be taken at face value. The earlier situation is more elusive, since the *WTC* is so exceptional: after all, roughly contemporary with the original *Book I* had been sets of *Inventions* that still did not use all twenty-four keys, only fifteen. (Significantly, perhaps, the piece associated with Friedemann's audition in the *Sophienkirche* is in G major, a good key on a Silbermann organ.) Musicians after 1750, despite what was in some ways their more limited harmonic range, wanted to be able to play in any key at any time especially on the new pianos, whose tone-production, being less immediate than the harpsichord's and less sustained than the organ's, made equal temperament less and less objectionable. G. A. Sorge's report that Bach did not like the 'four bad triads' of earlier temperaments dates from 1748 (major triads of F sharp, A flat, B and C sharp: see *Dok II*, 450) and says nothing about his earlier practice, though it does suggest they had discussed it. Sorge was an early example of the tuning enthusiast who likes to involve Bach in his own theories.

With the word 'harpsichords', *Clavicymbale*, the *Obituary* seems to be visualizing the composer tuning the instruments in everyday use, for practicing, composing, teaching, playing. Not only were the big church organs more the concern of professional builders, and much less often tuned, but they retained older temperaments for much longer and, requiring far fewer than twenty-four keys, had no need to be up-to-date. For playing continuo with only a soft stop or two, organists must long have tolerated awkward keys or learned to cope with them by avoiding the well-known unpleasant intervals they would otherwise have found in Cantatas 106 and 71. It is striking how many moments in the newer keys of E flat, A flat, F minor, C minor and B minor there are in these early works. Even in 1739, a sign of the modern aspirations of the organ-volume *Clavierübung III* was that it began and ended in E flat major, a 'beautiful, majestic key not in the head and fingers' of most organists, according to Mattheson (speaking of Hamburg? — 1731, 244). *Clavierübung III* also contained chorale-settings in F sharp minor and F minor, but they did not absolutely require organ (they have no pedal part) and suit the harpsichord

well. Hence, indeed, their use of these keys?

It is possible, on the other hand, that a rank or two of pipes in the *Thomaskirche* organ, such as the Stopped Diapason or *Gedackt* in the chair organ, were tuned close to equal temperament for the remote keys the organist needed when accompanying cantatas from a transposed part. At least since Kuhnau's time, the organ-part had had to be written out a tone lower than the other parts, to make up for its high pitch. But because this means that it had to accompany in D flat a cantata movement notated in E flat, either standards of performance made it a moot point or the tuning allowed for it, i.e. a stop or two could have been appropriately tuned. Larger organs often included a stop at lower pitch, {Footnote: This may have been what the examiners had requested at Halle (see p. 309). When the builder promised to introduce chamber pitch, he can only have intended this for a stop or two, for purposes of continuo.} and to include one instead in equal or near-equal temperament was just as feasible, in fact more so.

The unequal temperament of most organs, impossible to miss because of the sustained tone, was not necessarily a disadvantage. On the contrary, it gave piquancy to an early chorale in F minor in the *Orgelbuchlein*, c. 1714 ('Ich ruf zu dir', significantly with the thinnest texture in the book), as it also brought a sense of excitement to modulations in the bigger preludes. Nor should it be forgotten that the traditional associations of a key, reflected in the usual old tunings, gave even the *Art of Fugue* an important allusion: its D minor recalls the 'first key' of so many collections of seventeenth-century keyboard pieces (*tonus primus*, *le premier ton*) and should have a relaxed character, distinct from the keys either side of it used over the next centuries for very different music, in C minor ('pathetic, tragic') or E minor ('elegaic, wistful').

If one assumes tunings of the day allowed keys to keep characteristics, certain distinctions become clearer in other respects too. The familiar modern key of G major with strong dominants is found in the harpsichord toccatas, suites, and *Goldberg Variations*; but the older key of G mixolydian, which tends towards the subdominant (fewer F-sharps), is found in many an organ chorale. When appropriate, these distinctions were observed between different musical genres. For example, it is quite in the nature of Bach's conception of chorale-settings to distinguish between the chorale for Trinity 'Allein Gott' BWV 676 (clear diatonic G major) and that for Ten Commandments, 'Dies sind' BWV 678 (modal G of the original chorale).

Other keys have certain characteristics of a technical kind rather than aesthetic. Thus E minor often gives the impression of avoiding or being discreet about its dominant B major, with a sharp third and flat fifth. Movements in A minor modulating to the dominant E, do so *via* an aeolian cadence F-E not *via* B major, and movements in E minor always end with a major chord even as Picardy thirds were declining. {Footnote: If E minor is the original key of Cantata 4, keyboardists today playing a minor final chord for the continuo aria (BWV 4/6) are contradicting this tradition.} F major has certain modal characteristics mentioned below (p. 363). In the mid-1730s, the composer seems to have been fond of *affektvoll* B minor arias in 2/4 time. In full ensemble music, instruments and therefore the voices will naturally observe sufficient differences between keys as to impart a distinct character to each. It is surely so that the *St Matthew Passion* does not travel through its array of keys

— major, minor, sharp, flat (G sharp minor when Jesus is betrayed) — only to have them sound all exactly the same only a little higher or lower.

Several questions are raised by the *Well-tempered Clavier*, in particular *Book I*. Three common views are, or have been, that Bach intended equal temperament; that he did not intend it; and that whichever this was, he wrote the *WTC* as vindication of it. Although in German theory 'well-tempered' was not identical to 'equal tempered', by the 1720s it could have implied this in the context of a set of pieces in all the keys, assuming that 100% equality is practical. On the other hand, 'well-tempered' could mean a tuning system in which keys are all tolerable, but different and distinctive. Many writers since have reproduced such systems, arguing that in an unequal temperament Bach allows for the less sweet keys by tactfully underplaying any awkward harmonies. But since (i) some pieces were transposed for the collection and (ii) notation does not necessarily indicate how sustained the harmonies are, neither argument is reliable.

Behind many arguments is a ruling assumption: that a single tuning was intended and that each book is a set or cycle of pieces to be played as such in the given order, and that its very title is evidence for this. Recognizing the oddity of pieces rising by semitones, some interpreters change to a more reasoned order, for instance by dominants. But today's habit of playing 'complete works' in concerts is not relevant to a group of pieces assembled for reasons best known to an habitual collector — reasons including the teaching of young players and composers in all the keys. For all one knows to the contrary, the intention in the *Well-tempered Clavier* could have been for the player to tune for each key as it was studied, something not requiring great skill. That no individual piece in *WTC* modulates very far means that no key needs to be tuned except for the piece concerned, even if theorists, who have no thought of playing all twenty-four in sequence, do not say so. The very order — major, minor, then up by a semitone — is not musically logical, nor does it make a true cycle, more a filling-in of the partial orders already familiar to composers, whose sets of pieces likewise were not cycles.

There is also some difficulty in believing that temperament was of vital importance to J. S. Bach, for is it not probable that like any composer he was more interested in the differences between major and minor? The title-page of *Book I* carefully specifies that all the major and minor keys are present, i.e. all the keys 'both with respect to the major third or C-D-E and as concerns the minor third or D-E-F' (*so wohl tertiam majorem oder Ut Re Mi anlangend, als auch tertiam minorem oder Re Mi Fa betreffend*). Thus what it says — twice, in words and note-names — is that all the majors and all minors are to be found in the book, not that the semitones are equal or unequal. (The note-names are traditional and might be referring to the title of a local treatise by J. H. Buttstedt, of 1716; see p. 385.) Indeed, one has only to think of the totally different effect and *Affekt* of the two opening preludes — a gentle C major arpeggio with double thirds (two E's), bright and open, then a rushing sound of C minor, darker, somber, agitated—to suppose that it was the promise of major/minor contrast that was important, not whether C sharp major was much like C major up a semitone.

A recent theory on behalf of *WTC I* as a tuning-demonstration is that it indicates the

temperament not in its title but in a decorative line at the top of the autograph title-page (Lehman 2005), i.e. a continuous row of varied curlicues expresses graphically the fifths: three pure, five slightly narrow, and three less narrow. Points in favor of this hypothesis are:

the line, unique on a Bach title-page, is otherwise puzzling

the size of each curlicue varies as tempered intervals do

dividing the ditonic comma (qv) this way was familiar from Werckmeister's *Orgelprobe* of 1698 and particularly via a treatise of 1724, *Sectio*, by J. G. Neidhardt (an acquaintance of J. N. Bach in Jena)

instrument-makers relied on wordless lines and yardsticks; why not a composer?

Points against the hypothesis are:

five slighter curlicues appear as letter-ornaments on the title-page of the first *Anna Magdalena Book*, also dated 1722, and almost certainly in her hand. (In fact, did she, not the composer, add the curlicues to the *WTC1*?)

a line of similar curlicues appears on each title-page of F. Suppig's treatises *Labyrinthus musicus* and *Calculus musicus* of 1722 (see Rasch 1990), with no apparent significance beyond (possibly) expressing the circularity of keys

the *WTC1* line has to be viewed upside down, but the user is not told this

if a small curving line looking like 'C' does indicate where the note C falls in the series of curlicues, it has to be read the right way up
 {Footnote: But it could be a flourish on the letter 'C' of 'Clavier' immediately below, like the 'C' of 'Concerto' heading the *First Brandenburg Concerto* in the autograph fair-copy score.}

no other instance is known in copies of *WTC1*.

One early copy (B. C. Kayser, a pupil) has a line with fewer curlicues, i. e. Kayser was not alerted to any significance

whether this temperament is implied is hypothetical; others can be inferred

The line might, after all, be a decoration, matching the flourish at the bottom of the page, even a suggestion for an engraver. A related question is whether the book received its title only later as the composer worked further on it. Since both the curlicues and the four words *Das Wohltemperirte Clavier oder* look like additions made after the full title-page was written, the line, the words and the date might all result from afterthought.

{Footnote: At least, down to the words 'Johann Sebastian Bach' and the flourish. The remaining lines, including the changed date of 1722, look later, such that 'p.t.' represents the composer's Cöthen title 'at the time' the MS was compiled. '1732' added at the end of the MS records some revisions?}

The title-page's 'P' for 'Praeludia and Fugen ...' is written with a flourish, as if it was the first word of the title, making it possible that just as the *Orgelbüchlein's* title need say nothing about original intentions, nor need *WTCI's*.

To return to the Obituary: note that the authors do not mention equal temperament and nor, with their words 'pure and correct' (*rein and richtig*), do they betray any expert grasp of the niceties of tuning, since too much hangs on such words. (In post-Renaissance music a 'pure' interval would not be 'correct'.) *Rein* was also Emanuel's description of his father's violin- playing but is equally vague and relates only to tone; presumably his violin fifths were purer than his harpsichord fifths. Kirnberger, another pupil, is also less than fully reliable when he wrote in 1769 that no work of Bach can be put into another key without 'deforming' it (*verunstalten: Dok III, 201*). Did he not know the composer did exactly that with several pieces, both in *WTC* and elsewhere, and occasionally more than once? More plausible is Emanuel's remark that his father did his own harpsichord tuning and quilling, and did not thank others for doing it (*Dok III, 295*. Was 'others' Emanuel himself?). Clearly, remarks of this kind aim to fill out the picture of a composer capable and knowledgeable in practical matters, as no doubt he was. But it is a picture drawn by a younger generation of composers of whom few, I imagine, could re-leather a piano hammer or would expect to be called upon to do so.