

# **J.S.Bach's '48'**

## **The Well-tempered Clavier Books One and Two**

### **Colin Booth**

#### **Approaching the Well-tempered Clavier**

Bach's 48 Preludes and Fugues have a unique continuous performance history of around three hundred years. The composer's title page encapsulates the qualities which led to this: they were created, he modestly says, 'for the benefit of young players keen to learn, and to give pleasure to those already accomplished in this skill'. In other words, valuable teaching material, but also satisfying music for good players. My own preoccupation with the notation used by Bach, and the performance conventions which underlay it in his day but which in many cases are only now being re-discovered, means that this recording offers a number of fresh approaches, beyond the results of any personal style. Bach provides a huge variety, not just of genre, but of mood, with emotional content ranging from soulful introspection to demonic virtuosity, and several gentle jokes along the way. Many performances are consistently serious in tone. As in an earlier CD of the Goldberg Variations, this recording, while revealing pathos where it is evident, brings into focus the playful elements of the work. Some of the performance techniques used, receive attention at the end of this booklet. Firstly, I will discuss three main preoccupations, all of which have the listener in mind.

The first may seem rather basic: it is to try to apply to each piece an appropriate tempo – a *tempo giusto*. Where the composer has left no specific instruction, today's musicians tend to regard tempo as a matter of personal choice, but Bach's contemporaries felt rather differently. Of course, where a piece begins broadly in minims, but ends with busy passages in semiquavers, the latter groups will govern how slow or fast the piece must begin. But more than this: in an age when no mechanical devices existed for setting a tempo, a composer could suggest a tempo to the player by using certain note-values within a particular time-signature – at least within certain broad parameters. To give perhaps the most basic example: for most pieces in 4/4 dominated by semiquavers, a performer's first approach would be to consider a tempo quite close to *crochet* = 60. (One must qualify this: natural musicality will encourage broken chord material to be played rather faster than melodic lines). In an age when mechanical repetition was seldom heard except in the ticking of a clock, the influence of this pulse should not be underestimated – nor should the body's own natural pulse. Even bearing in mind the comment of Bach's biographer Forkel – that when playing his own pieces Bach generally adopted a very brisk tempo – some pieces from the '48' are heard today played at twice their expected speed, drastically reducing the chance of internal detail being meaningful.

What other clues to tempo can we consider? Rhythm and dance were deeply ingrained in the 18th-century mind, and if the tempo is too slow, any rhythmic pulse may be lost. But the music can also be prevented from dancing if taken too fast. We can also refer to certain motifs which scholars have noted were used by Bach in certain emotional contexts. For example, the weighted *appoggiaturas* and chromatic yearnings of the final B minor fugue of Book One have clear parallels in the Kyrie of the B minor Mass.

Tempo, then, is bound up with mood. There are varied emotional states to be met within the Well-tempered Clavier, and a first step towards communicating these will be to find a suitable tempo. A second consideration is texture: the score itself should be allowed to suggest the

mood of a piece, and changes of mood within it. For example, large chords played on the harpsichord sound loud and dramatic, and were meant to, whereas single lines have less force. The dynamic control available to today's pianists can lead even great players to subvert this basic element of the notation, and produce the opposite of the intended effect.

The second overall aim depends greatly on the first: if the listener is to enjoy this music fully, it must be intelligible: even those with the gift of reading complicated music from score will seldom have that score before them, so they must have clarity. The music is complicated, and often intellectually demanding; details need to be heard, and extreme speed will militate against this. Fortunately, recordings allow those who only listen, to share the experience of players, through repeated performance. A century before the Well-tempered Clavier was compiled, William Byrd had commented that for full enjoyment of his music, repeated hearings were essential. How much more does this apply to Bach's fugues. As for the harpsichord, a 2-manual instrument was used for this recording (see below). However, only one or two pieces within the Well-tempered Clavier benefit from the use of two keyboards, and the octave register is not used in this performance. A limited 'palette' of just three tone-colours was used for the whole work: two contrasted registers each employing a single set of strings were used most often, and the two used together produced a brighter, more assertive tone where a more powerful sound was desirable. I felt that this allowed the counterpoint to be clearer, and contrasts between pieces were highlighted satisfactorily by the music itself.

Perhaps a short digression can be forgiven here, concerning differences of approach between harpsichordists and pianists – at least as a generalisation. This is important because most of today's listeners are more familiar with Bach played by pianists, who view their role as that of interpreter – a post-Romantic tradition very different from that in which Bach lived and worked. In Bach's time every keyboard instrument had a unique sound, and most were different in appearance. Also, the notes on the page, backed up by widely understood conventions of performance, were presented in a very simple form, with few if any indications of expression. These factors allowed every performance to be different, without any conscious desire on the part of players to impose themselves on the music. Today, every piano recital employs an instrument which looks and sounds the same. Many pianists even dress in a uniform manner, so it is incumbent on them to make their performance *sound* different – to make it 'their own'. One final observation: pianists usually rehearse what they intend to be their perfect performance. Harpsichordists traditionally enjoy playing things differently on different occasions (as Bach did, I am sure), so a recording can capture only one collection of these responses.

Finally, to the work's title. The word 'clavier' is generally translated as 'keyboard' – in other words, any keyboard instrument. Different instruments in Bach's day – harpsichord, clavichord, fortepiano, tangent piano, or organ – could draw different things from a score. His second son Carl Philipp Emanuel wrote that every piece should be explored on harpsichord *and* clavichord: for me the harpsichord, with its natural clarity and evenness of response, works best for contrapuntal music like this, although some of the most naturally expressive preludes make one miss a clavichord. But as for the rest of the title: what does 'well-tempered' mean?

The third preoccupation of this recording and its booklet notes will be tuning: advances in tuning encouraged Bach to produce this work, but, surprisingly, they have been given only superficial attention until now, by most players. Of course, it would be perverse to regard this as crucial. Only a few purists today would deny pianists (for example) the joy of this music, and they are not the only ones who will feel that whether or not they are using a tuning of the kind Bach may have expected, is of low priority. Nevertheless, I have found this a matter of

great interest, and one which has illuminated the music. Much of this booklet will therefore discuss the question of what Bach himself might have meant by the ‘well-tempered clavier’.

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## **Bach and The Well-tempered Clavier**

J.S. Bach’s title was *Das Wohltemperierte Klavier*: it is a collection of preludes and fugues for which all the twelve notes visible on a keyboard within an octave were to act as tonics (keynotes) for pieces in major and minor keys: 24 in total. He compiled the first set before leaving the court of Cöthen for his new, final post at Leipzig, and dated it in 1722. He had a serious concern for it, adding S.D.G. (to God alone be the glory) at its conclusion: although used frequently, this was not a purely habitual practice for Bach. Some two decades later he assembled a second book of the same kind: a sort of supplement. We now know that the two books, as it were, overlap. Some of the material used in Book Two was written at least as early as that in the first, and Bach continued to revise many of the pieces for some time after they were first assembled. When we talk today of Bach’s ‘48’, this refers to both books together.

What were Bach's motives for producing this large-scale work? As the title page makes clear, his primary aim was to provide his pupils with teaching material. Throughout the history of music, great teachers have left collections of pieces created for this purpose. Bach’s students were expected to copy out much or all of the work, and to play from their own score. Although Book One formed a carefully integrated whole, the second volume allowed Bach to present those young players with some different technical challenges, and to explore moods not incorporated in the first.

From Andreas Werckmeister, writing in 1698, we learn how important it was becoming to play in remote keys – not because there was much new music written in them, but because good keyboard players were expected to be able to transpose at sight – a skill still taught today, particularly to organists. Among the reasons why such a skill was required in the Germany of Bach’s time, was a difference in pitch between organs and other wind instruments. Bach’s set of pieces went beyond helping the development of a normal keyboard technique. It offered music which was rewarding (and often demanding) to play, but also a subtle aid to being able to play fluently and creatively in all the keys. The preludes are often like the keyboard studies of a later era: beginning with various methods of writing and playing broken chords, they go on to develop a student’s ability to make jumps and stretches, develop skilled fingering (although, infuriatingly, we lack evidence from surviving manuscripts, of the sort of fingering which Bach may have recommended), and to embellish and project melodic lines effectively – all designed to empower students ultimately to compose for themselves. How remarkable it seems to us today to learn that Bach actively encouraged his pupils to make their own constructive alterations even to some of his more ‘finished’ music!

The variety of contrapuntal techniques to be found in the fugues complements the preludes by offering the most artful and satisfying exploration of this skill. Most of the fugues are three or four-voiced, but there are two in five voices and one in just two. They are varied in style in an unprecedented way, and naturally employ a full range of contrapuntal devices. For those who love or admire fugal writing, they are perhaps its ultimate exposition: as much as the preludes, they convey varied emotion, from grave introspection to joyful celebration. One aspect has

been a surprise to many: it would be natural to expect fugues to follow their preludes in a similar mood, but contrasts between a prelude and its fugue are actually more common.

As teaching material, it was not simply technical proficiency which was involved. Even when an audience was not present, emotional communication, which many Baroque commentators claimed was the fundamental objective of music, underlay many of the pieces, and students could use these as exempla for their own composition. It is simplistic to apply single words, but pathos, excitement, joy, triumph, despair, and even rage, can be discerned in this music. In Bach's time a single piece usually restricted itself to one of these. Some of Bach's preludes transcend this, by a dramatic change of pace halfway through. It was to become fashionable in his sons' time, to present frequent violent changes of mood, sometimes within a single line.

Bach's life after the move to Leipzig, as his correspondence reveals, was far from leisured. Nevertheless he was moved to compile a second volume, most of which required new compositions. While some of these echoed the first volume (the preludes in c sharp minor, for example) most deliberately offered something very different. Particularly noteworthy is the composer's attention to the final pieces of each book. One suspects that he originally had no intention to follow the last fugue of the first book: its extended, introspective, spiritual quality, together with the inclusion of all twelve notes of the chromatic scale within its subject, is a clear finalisation of the work. When he came to complete the second, his mood became increasingly lighter and more witty through the few final keys, and its twenty-fourth prelude and fugue show Bach 'tongue in cheek': it is almost as if he decided to 'send up' the key of B minor.

### **The '48' in context**

Beyond the use of his own students, the title page talks of "those already skilled in this practice". This suggests that Bach may have had publication in the back of his mind, under the influence of the success of the work's precursor, a far more limited collection by Fischer. The carefully worded title page itself has the ring of the frontispiece of a published work. Bach kept refining this music over the years, but we cannot assume that the continuing need to make alterations was a barrier to publication: the composer's own copy of the first edition of the Goldberg Variations contains many 'second thoughts' in red pen, in Bach's own hand. Nevertheless, he did not publish the Well-tempered Clavier, deciding to issue works of more fashionable appeal: publication was expensive and Bach was typical in submitting to the engraver only a small part of his large creative output. The Well-tempered Clavier depended for its circulation (which was wide, even in Bach's lifetime) on manuscript copies. We might suspect that the enormous number of these made Bach regret his decision against publication! Printed editions were not made until 1801, and these too, quickly circulated among composers of the first rank, who later included Mendelssohn, Schumann and Brahms. Haydn and Mozart had already found the work valuable, working from manuscript copies. We know how quickly most of Bach's music fell out of fashion after his death, making this all the more remarkable.

The pairing of a prelude and fugue, almost synonymous with Bach today, was not a widely-used form of long standing. Older German composers like Bach's mentor Buxtehude had written *Praeludia*: less formal pieces alternating sections of counterpoint with free material. These owed their inspiration to Toccatas by Froberger from the first half of the 17<sup>th</sup> century, and as a young man Bach composed a set of six toccatas in the same manner. Carefully composed pairs of prelude and fugue were increasingly common, however. In particular, Fischer's considerable contribution to this form led Bach to produce the Well-tempered Clavier. Here, as in his organ music, Bach followed his customary practice of developing an

existing musical form to a level not previously attained by anyone else – another characteristic of unconscious motivation.

### **How original was Bach's work?**

Although the Well-tempered Clavier was the first collection of fully worked keyboard pieces in all 24 keys, this kind of idea, in a general sense, was of long standing. Even after the advent of 'modern' tonality in the late 17th century, composers including Georg Muffat and Johann Speth had produced sequences of pieces for organ in all seven modes. Modes, the age-old system preceding keys as we know them, were still very much in the consciousness of musicians, even into the 18<sup>th</sup> century. Again, for some two hundred years before Bach's time, something like equal temperament had been employed on fretted instruments, like the lute, theorbo, and viol, resulting in several collections of pieces in all keys. These, too, were designed to develop an unrestricted facility on instruments so frequently used for accompaniment, rather than promoting the use of remote keys for solo performance.

J.C.F. Fischer's was the most immediate and most ambitious precursor to Bach's collection. Fischer was some 15 years older than Bach, and had a profound influence on the younger man's music. Some preludes within the Well-tempered Clavier are refined versions of preludes within keyboard suites by Fischer. As a more direct inspiration in the pairing of prelude and fugue, his *Ariadne musica neo-organoedum*, published in 1702 and reissued in 1715, is a set of 19 pairs in ten major and nine minor keys, together with the Phrygian mode, plus five chorale-based ricercars. Bach borrowed some of its themes for fugues within the Well-tempered Clavier, most notably the E major fugue of Book I: this even uses the same key, as a clear tribute. Bach would surely have observed that Fischer had already demanded an acceptable tuning in the keys of A flat, F sharp, and C sharp major, since he concluded some minor-key pieces with sustained major chords in these tonalities.

Other Bach contemporaries experimenting with collections of pieces in a sequence of keys (interestingly, they are all German) include Johann Mattheson, Christoph Graupner, Friedrich Suppig, and apparently Johann Pachelbel (now lost). Bach's, however, was the first keyboard work to devote equal creative excellence to all 24 keys, at a time when many were never used as tonics for composition. David Ledbetter pointed out how novel it would have seemed to someone approaching Book One in 1722, to see, on turning the page after the second fugue in C minor, a piece in the alien tonality of C sharp major.

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### **HARPSICHORD PHOTO**

incorporating the following text on the same page

The harpsichord used for this recording was made by Colin Booth in 2016. With an extension of the compass, it is based on the design of an original instrument signed Nicholas Celini 1661, purchased and restored by Colin during 2013. This instrument appears to have been built by a provincial maker, probably of Italian extraction, working in Narbonne in southern France.

It is strung in brass, and apart from an individual beauty of tone, its use was encouraged by its ability to project all the lines within a dense contrapuntal texture with unusual clarity. The 'copy' has strong similarities to some German instruments, such as those by Mietke, but is of

a rather more intimate character. There are two keyboards, offering two sets of strings at 8 foot pitch and one at 4 foot pitch on the lower, and one at 8 foot pitch on the upper.

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### **How to tune for Bach's Well-tempered Clavier?**

*Johann Sebastian Bach, who was well versed in mathematics, did not follow a book of rules in these matters – he followed nature. Mathematics was not capable of producing an acceptable temperament. Bach's biographer Forkel, 1771*

*.....The Tempered Clavier in 2 parts...Each part contains 24 pieces, a prelude and a fugue in each key. The title implies that a keyboard instrument must be tempered, or usable in all keys, if one wants to play these pieces on it. Bach's pupil Adlung, 1758*

Like most discussions of tuning, this one will begin with mention of Equal Temperament: the tuning system used today for most mainstream music, applied to orchestral performance, pianos, and modern organs. It was once widely assumed that Bach had equal temperament in mind. Bach (the argument went) was a unique genius, more advanced than his peers in many respects, who wrote the Well-tempered Clavier explicitly for all twenty-four keys. Surely one could equate the word 'Well' with 'Equal'? – in which case Bach must have endorsed, perhaps even promoted the advanced tuning system which is in general use today.

The two passages quoted at the start of this section suggest that equal temperament was not what Bach himself had in mind. If we play the Well-tempered Clavier on an instrument tuned in equal temperament, then all the keys sound equally acceptable, because apart from a difference in pitch they all sound exactly the same. This is because all the intervals themselves are equal: all semitones, all whole tones, all thirds, and so on. For some musicians (particularly pianists, whose instruments are always tuned in this way), this implies that Bach would have had this system in mind. Others, knowing that this modern tuning was not the norm in Bach's day, but considering Bach to be ahead of his time, have asserted that even if he did not himself tune in equal temperament, he would have approved of anyone who did. Some scholars point to the growing use of equal temperament in Germany during Bach's latter years. There are, however, both practical and musical reasons for doubting this convenient approach.

We know that 'well-tempered' tunings were not the same as 'equal-tempered', and the difference was held to be important in Bach's time. A considerable list of leading musicians, then and even considerably later, regarded equal temperament as a theoretical tuning which produced unsatisfactory music. The list includes Handel (who left his own slightly vague instructions for tuning the harpsichord – unequally), in France, François Couperin, and, tellingly, Bach's own sons and students. There were two main musical considerations: firstly, the richness which was heard when the most common keys were tuned in something based on the old system of Meantone (or something close to it) would be lost. No intervals are tuned pure in equal temperament (all thirds, for example, are equally wide). Secondly, the particular characteristics of different keys, audible in an unequal tuning, were recognised as attractive and useful. There were no fundamental differences of opinion about these qualities, and all agreed that any audible characteristics of different keys are completely removed in equal temperament. The question of key character will be given more detailed attention later.

### **What does 'well-tempered' mean?**

‘Well-tempered’ systems responded to the problems posed by meantone in a changing musical environment. The term first appears in the writings of Andreas Werckmeister in 1691, who defined it as the process of modifying meantone, to make it more flexible. Meantone, devised early in the 16th century, produced rich sonorities derived from pure thirds, in some half-dozen keys, but unacceptable dissonances in more remote ones. Modulation involving remote keys remained pretty irrelevant until around 1700, after which it became increasingly important to composition.

During the 17<sup>th</sup> century, with the pure thirds of meantone seen as the basis of good tuning of keyboard instruments, many harpsichords and organs were built with a number of accidental keys (‘sharps’) split front to back, providing two notes within the length of the key, and extra strings (or pipes) to provide those notes – thus extending the number of keys in which meantone could be tuned. The most common arrangement was to have split keys to provide both e flat and d sharp, and g sharp and a flat, since these were distinctly different notes. After 1700 this system disappeared, but many of the new well-tempered systems remained close to meantone, retaining several pure thirds, and many tended to favour either ‘flat’ or ‘sharp’ keys.

As the 18<sup>th</sup> century proceeded, music underwent radical changes, and ever more flexible tuning systems were devised. Despite this, even in the century's final quarter some authorities continued to promote tunings quite close to meantone. And alongside the work of theoreticians, throughout Europe perhaps the majority of practising musicians employed a modified form of meantone known as ‘ordinary temperament’, since this was as flexible as most music continued to demand. Inevitably this was a subtly varied system: *tempérament ordinaire*, as generally understood, is not really flexible enough to work for Bach's Well-tempered Clavier, unless one selects, for the most part, only pieces in the more common keys. The Well-tempered Clavier, of course, unlike most of Bach's keyboard music which only explores remote keys in passing, bases many of its pieces in remote keys. Can we imagine Bach re-tuning his instrument when playing such pieces? This remains possible, but his title suggests a single tuning of a specific type, able to deal with all the keys. We know, though, that Bach was conscious both of different key-characters, and of particular harmonic richness connected to unequal tunings. These musical features will be considered later.

### **The practical considerations**

Bach's student Kirnberger, his first biographer Marpurg, and his most famous biographer, Forkel, all supply anecdotal evidence for Bach the practical musician. He is described as tuning with great ease and speed. One account mentions that he employed a system where all the thirds were wider than pure. Another commented that as he played, it was hard to immediately differentiate by ear, one key from another: an important indication that Bach's tuning was sophisticated, but clearly unequal.

On a practical level, one thing is clear: if Bach was using a tuning which was quick and reasonably easy to apply, then it was not perfect equal temperament. A practical musician like Bach had to tune often and fast; today's piano tuners (trained in their art for several years) will confirm that to tune perfectly equally is a skilled and more lengthy procedure than the methods used to tune unequal systems, and it is far easier to ‘get it wrong’. Bach's tuning of his harpsichord – if indeed he restricted himself to one system most of the time – may have been one in common use, or subtly adapted to his own taste: a perfectly normal occurrence in an age of non-standardisation. Apart from this, we have no documentary evidence for Bach's personal tastes in this area.

Even after 1700, most clavichords were fretted, so that the temperament (normally meantone) was 'built into' the instrument. Harpsichords had separate strings for each note, and presented no such restrictions. New temperaments, aimed in many cases at the practising harpsichordist, began to be devised: Johann Georg Neidhardt, a major figure in the development of tuning, had, by 1732, published directions for no fewer than 21 tunings varying from one of a conservative nature (which he called the 'village' temperament, aimed at unsophisticated musical environments), through ever more flexible tunings, culminating in ones designed for 'big city' and finally 'court' use, the latter ultimately being a slightly differentiated form of equal temperament – presumably a theorist's 'perfect' tuning, due to its internal consistency and total flexibility.

Bach compiled the first book of the '48' when well-tempered systems were still quite a New Thing. We can assume that he engaged fully with current changes of thought and practice, but as tunings became more flexible, they demanded ever greater skill and time to apply. Had Bach chosen a really 'advanced' system for his own use, then, apart from the extra difficulty of using it (and teaching it), this would have had other disadvantages. If he wrote music which depended on such a system for effective performance, he would be composing, as it were, for idealised rather than real musicians. We may reject the idea of Bach being deeply concerned for the limitations of some who would play his music, but can easily imagine him enjoying the challenge of composing so skilfully as to make all the keys work within a tuning system which was either already in common use, or which he himself was actively promoting among his students – one which remained quite easy to tune.

From a practical standpoint, therefore, my own conclusion is that Bach created Book I of the Well-tempered Clavier to allow an entire performance on a single tuning. This had to be easy enough to tune, so that the player could repeat the exercise without much trouble, but also flexible enough to accommodate all the music without much unpleasant disharmony.

### **Musical considerations revisited: key characters in a changing environment**

Despite all this, some will be reluctant to abandon the concept of equal temperament – or something close to it – and it is worth exploring further, the musical arguments against this as Bach's choice for the Well-tempered Clavier. Owen Jorgensen, in the course of several articles from 2003-4 for the Piano Tuner's Journal, asked: "what purpose would there have been for Bach to compose in keys like c sharp major if he was using equal temperament, where the Prelude and Fugue in c sharp major sounds identical to its transposition into c major? In c sharp major, music is significantly more difficult to read and play, and there is nothing to be gained by using c sharp major in equal temperament". In fact, as we have seen, there were two purposes: one was to complete the cycle of 24 keys, and the other, to develop the up-to-date skill of being able to play well in all those keys. On the other hand, Jorgensen also pointed out that in 1722 equal temperament, which was still recognised more as a theoretical system than a practical one, had an accepted name in Germany: *Die Gleichschwebende Temperatur*, a term used by Neidhardt in 1706. Bach could have employed this, had he desired it, on his title page. This, however, was tuning as science, whereas 'Well-temperament' was tuning for practical convenience – and, as we can now examine, as art.

In Bach's time musicians retained the idea of different key characters. The French composer Charpentier had in 1682 given a selective list of the emotions attached to keys. But as late as 1806 Christian Schubart, building on the writings of his German predecessor Mattheson (who proposed 17), gave a list of such qualities for all 24 keys. He described, for example, d major as a key displaying triumph and rejoicing (hence its use for marches etc.) and d sharp minor as containing brooding despair. A small number of such associations persists even today.



Of course, one can overstate this. The *conscious* exploitation of temperament by a composer involved writing in different keys to utilise the character of those keys. As Bach's contemporary Johann Mattheson made clear, the application of this idea to instrumental music was an extension of the concept of musical rhetoric – a central concern in the creation of vocal music, and opera in particular. However, while common keys like d major and c minor carried accepted implications as to the nature of the music presented, little music was normally composed in remote keys in Bach's day, and any accepted character implications tended to be restricted to more commonly-used keys. To complete his collection, Bach could and did transpose previously composed pieces into remote keys, in some cases possibly undermining, in the cause of this new requirement, any enhancement of character which their original keys might have given.

Perhaps for this novel project Bach was ready to set aside anything to do with key-character, at least where it proved convenient. On the other hand, some associations between key and mood are striking, although there is no space here for a proper study of these. To give just two examples: the d major prelude of Book II is martial and triumphant, and the g minor of Book II soulful and sombre. As one explores the '48' it is easy to conclude that Bach was conscious of established key-characters for many keys where players could expect and enjoy them – in other words, in pieces written in 'normal' keys. Finding a conventional association of this kind would encourage performances which were in the 'mood' which the composer may have had in mind. Today, scholars have noted that even remote keys tended to make Bach write in a particular way. David Ledbetter has pointed to an association between the key of f sharp minor and a mood of melancholy.

Johann Mattheson (an important and influential figure whose music I have recorded and about whom I have written elsewhere) was a musical trendsetter. By 1731 he was writing, as an accomplished organist, that although it was a matter of regret that key-characters would have to be, in a real sense, discarded, equal temperament was the ideal system, at least for organs. But in his earlier published writings he had stressed the disadvantages of equal temperament, while in 1719 issuing 48 test pieces for thorough-bass – in all the keys. Mattheson and Bach were aware of each other's creative activities. One could view Mattheson's offering of 1719 and Bach's of 1722, as illustrating how individuals separated by space but nevertheless part of a creative continuum, could share ideas – even unconsciously – and produce creative output, as it were, in a common cause.

### **Can conservative tunings work for the '48'?**

In the Well-tempered Clavier, whole pieces were to have as their tonics, c sharp, f sharp, and a flat. If Bach favoured an unusually advanced, highly flexible tuning system, we could look for points within these complex works (which often modulate to an extreme degree), where a more conservative tuning simply won't work. In fact, I have found no such instances. Even the most exploratory fugues, like the d sharp minor and a flat major from Book One, and those in c sharp, not only work well throughout in a relatively extreme tuning – arguably the tensions built deliberately by Bach through the use of successive dissonances in pieces like these, actually gain from the use of extreme intervals within a less modern tuning system. The dense five-part fugue in c sharp minor, Book One, offers a dramatic example.

Towards the end of the 20th century, internal analysis of this music was undertaken by several scholar-musicians. John Barnes, for example, used his data to construct a tuning, which has since been shown to be similar to more than one system devised by Bach's contemporaries.

Barnes doubtless recognised the extraordinary facility in modulation which Bach employed in his fugues, and, perhaps with this in mind, concentrated his attention upon the preludes, where chords and more static harmonies occur more frequently. In the preludes we often meet chords in the relevant key, as it were, head-on at the start of the piece, where any unintentional shock value would be greatest. Even here, however, unequal tunings work. It has to remain a subjective matter, to decide how extreme an opening chord like that of the prelude in a flat, Book I, can be. If played immediately after the closing resonant g major chord of the preceding fugue, the extremely wide third a flat-c, which is present if the tuning is conservatively unequal, coming as it does quite high on the keyboard, makes this an arresting moment, which can enhance an attractive change of mood.

### **Can we guess Bach's tuning system?**

Although well-tempered systems were relatively novel when Bach compiled Book One, there is a gap of nearly three decades between Werckmeister's early work and the first book of the Well-tempered Clavier, and during this time ideas about tuning were evolving fast. Werckmeister himself changed in the last few years before his death in 1707, to a conviction that equal temperament was the best theoretical system, although he continued to recommend something more practical, and differentiated, for actual application. Neidhardt had described and named equal temperament in 1706, but went on to explore tunings on a practical rather than theoretical level for several more decades. Mattheson's change of heart has already been mentioned. My personal feeling is that Bach, while still working in a relatively isolated environment at the court of Cöthen in 1722, remained very conscious of meantone, and will have gone already through the stage of modifying his tuning system on the basis of Werckmeister's work in his younger days, rather than branching out into entirely new realms of thought. Scholars have suggested that Bach's use of key within Book Two of the 48 hints at a shift in his thinking about temperament; they associate this with the increasing popularity of equal temperament in the last two decades of Bach's life. If, as I suspect, Bach and his students continued to use for their own convenience, a tuning or tunings which were quite conservative, because they were faster and easier to apply, then perhaps some of the time he may have had equal temperament in his head, even if not in his instrument.

We now need to examine the potential evidence of the diagrammatic loops to be found at the very top of Bach's 1722 Book One manuscript:

*Here insert photo: squiggles*

It is generally agreed that if these squiggles mean something, it must be a code for a tuning system. There is no space here for an adequate survey of all the scholarly analysis of them which has taken place, but here is a brief summary.

The first scholar whose interpretation gained widespread notice was Bradley Lehman, in an article for OUP Early Music in 2005, and two other journals. Lehman suggested a tuning system more flexible than most, but one which implied a completely different mindset for its creator, from that of Bach's contemporaries: it seemed to have no tangible relationship to meantone, or the tempered systems derived from meantone. Lehman's article prompted a vigorous response, and others offered alternative interpretations, including Mark Lindley, John O'Donnell, Daniel Jencka, Graziano Interbartolo, and Luigi Swich (whose views formed an article in Early Music six years later, in 2011). The differences between them ultimately made it clear that forming a definitive view was likely to be impossible – at least for the present. A general point of agreement, though, was that the system thus codified must be an unequal one. Views differed only as to the degrees and nature of the inequality.

More recently Dominic Eckersley came to a rather different conclusion. While pointing out that it was perfectly possible that the loops were added by someone other than Bach himself, he established a relationship between them and a less advanced, less flexible system, very close to that described by the French theoretician Rousseau in 1775 (who referred to earlier musicians, including François Couperin).

The coincidence between the message of the graphics (asserted Eckersley), and the ‘ordinary’ system of Rousseau, is striking. Eckersley related this system to some by Werckmeister, and was thus able to claim that this tuning, or something close to it, was widely used throughout Europe, concluding that such a system was what Bach had in mind. In Eckersley’s opinion, it is more natural to place Bach within the mainstream of cultured European practice than to imagine him creating something personal and esoteric, as Lehman’s suggested tuning implies. My own work on Bach’s use of *notation* supports this view. He exploited existing conventions of notation to their limit, but did not choose to invent anything new.

The fact that Bach (or someone close to him) applied this code to his manuscript, suggests the use by his sons and students of a temperament different from that which they might have used in different circumstances – presumably one or more in common use. The suggestion, therefore, was a specific system, which the codified loops may reflect. Why no mention of the code was ever made by any of these individuals before or after Bach’s death, remains a mystery, and perhaps supports the idea that it was added later, by someone other than Bach. The loops do appear to have been squeezed into an unsuitably small space – after the work’s title had been written. Had the work reached publication, one wonders how the title page would have appeared.

It is hard for most of us today to accept Bach recommending a tuning system close to that of Rousseau. This system was still closely related to meantone, and contained the rather extreme practice of making some fifths actually wider than pure; Rousseau surely did not envisage much use of accidental keys as tonics. It may be, of course, that modern ears (including my own), brought up in a world of equal temperament, remain unconsciously biased against extreme tunings. Perhaps Bach really did specify such a system – because it brought to the ears of those listening in 1722, the maximum variety of timbre which the music could tolerate, or exploit.

### **Choosing a tuning system**

Since there is no consensus as to the meaning and even the origins of the title page ‘loops’, it is possible (even convenient) to set them aside and consider other recognised tuning systems. A choice of tuning is ultimately bound to be a leap in the dark, so we might begin by eliminating some less credible candidates, such as much later systems, like those of Young or Vallotti, from the final quarter of the 18<sup>th</sup> century. Apart from the late date, Vallotti’s has f major as its richest-sounding key. Such tunings are convenient for orchestral use, rather than for producing colourful keyboard music, springing outwards from the ‘home’ key of c.

One could tune an easy-going system: unequal, but flexible – perhaps one of Neidhardt’s more ‘advanced’ offerings, but only if we can imagine J.S. Bach regularly taking the trouble to do so. I have little doubt that Bach will have tried tuning in something close to equal temperament at times, but with the time factor involved, we cannot say either how often this may have been, nor how close to true equal temperament he will have got. And of course, the other considerations explored here might suggest that he did not expect it to be normally

practised by his students. If, on the other hand we accept the value of differentiated keys, then the more unequal the system, the greater this differentiation will be.

Before moving on, we must return to organs. As mentioned above, many or most organs, which work so effectively for a large number of pieces within the Well-tempered Clavier, in Bach's day employed a more conservative tuning than those which a harpsichordist could readily apply. Bach would have welcomed performance of the work on organ, but players would have to select pieces which sounded acceptable on the instrument which they were using at the time. Even if the transposing facility demanded of organists increasingly encouraged the introduction of something like equal temperament for organs, for the harpsichord player it remained essential to be able to tune quickly and easily. As a skilled tuner himself, Bach may well have 'tweaked' his tuning over the years so that it remained easy for him to carry out, but became increasingly 'modern'.

### **A tangible link to J.S. Bach?**

Harpsichordists have always tended to tune their own instrument. Johann Philipp Kirnberger was one of Bach's most important pupils, and according to Marpurg, Bach's teaching of keyboard skills included tuning. When writing on tunings late in life in the 1770s, Kirnberger, alongside discussion of equal temperament, also published three unequal tunings. These seem to reflect an attempt to re-discover something forgotten, rather than an ideal solution clearly recalled: the first is primitive, the second modified but still unrefined. Although some scholars reject the idea, the third, now known as Kirnberger III, might reflect something of Bach's own system, even at a distance of more than thirty years. Kirnberger arrived to study with Bach in 1739, aged 18, and developed a lifelong reverence for his teacher as the greatest of musicians. Unlike most of his colleagues he seems to have retained an allegiance to an unequal, conservative tuning system. If this in no way reflected the practice of his esteemed teacher, one might ask what his motives for such conservatism were. Kirnberger III is similar to Rousseau, but with a few stretched fifths rendered pure instead, reducing the extreme nature of some 'flat' keys. Rather tellingly, Marpurg mentions that "Kirnberger's famous temperament was highly praised but not used by anyone." Of course not, since by 1770, an highly unequal temperament was an anachronism in Germany. For some, a reason for rejecting this harmonious yet characterful system has been the pure third c-e at its heart. But the Well-tempered Clavier begins in the key of c, and a particularly rich tuning in the 'home' key is highly appropriate. Tuning a pure third c-e is the starting point when tuning in meantone. It is probable that for keyboard-players of Bach's time, a subconscious feeling about the key of c remained deeply rooted.

This is, of course, educated guesswork. How unfortunate, from our point of view, that Kirnberger did not mention Bach as connected to his third tuning system. But, rather as Carl Philipp Emanuel Bach paid tribute by writing that all his knowledge came from his esteemed father, Kirnberger acknowledged his teacher as the source of all his. Despite its late date, the nature of Kirnberger III reflects a 'transitional' phase in the history of tuning – one which, although still diverse, was gaining ground in Germany in 1722. If we seriously consider Kirnberger's tuning as a candidate, we might be led to doubt that Bach's own feelings about the tuning of harpsichords had changed much during the twenty years separating the two books of the '48', since the second book appeared around the time of Kirnberger's stay as a student in Leipzig.

Some claim that Kirnberger only produced his third tuning system to respond to criticism of his second, but even if true, that need not remove its validity for the present exercise. Conservative his system may be, but it is flexible. As a means of obtaining this flexibility,

two kinds of richness are obtained by different means: when playing triads in the most commonly-heard major keys (c, g, and f in particular), thirds which are pure or nearly pure are offset by distinctly reduced fifths – as happens in meantone. For the remaining keys, however, sharpened thirds (some are very wide indeed) are compensated for by pure or almost pure fifths. This latter compromise is akin to that which today's ears accept when hearing equal temperament, where the uniformity of all the keys is a significant help. The two 'kinds' of key just described have very different characters. Those keys closer to meantone produce elements of directness and repose derived from rich-sounding thirds; those with very wide thirds deliver a notable brightness and vivacity. Bach could have followed the example of others, and arranged the pieces following a cycle of fifths, which would have reduced the impact of each shift of key. In fact, by moving chromatically up the scale from one tonality to the next, he ensured that a strong contrast of character is automatically presented by most such transitions. One of Bach's pupils, H.N. Gerber, told his son how Bach had played Book One through to him on no fewer than three occasions, but such extended performances in Bach's household must surely have been rare. Even so, such contrasts can be easily enjoyed when playing even two pieces consecutively.

Presenting a recording of this mighty work is a challenge and a privilege for any keyboard player, and for most of us, making only a single recording is an unfortunate necessity. This demands a choice of tuning system. Most recordings of the Well-tempered Clavier have employed either equal temperament or a relatively 'modern' tuning system. There is no claim here that the tuning used is the one which Bach specifically had in mind. Indeed, I suspect that he would have been happy for a number of well-tempered systems to be used. However, my own performance features the use of Kirnberger III: a tuning felt to be appropriate to the approach Bach himself may have still had, even at the time of completing Book Two of the Well-tempered Clavier. The conservative nature of Kirnberger's tuning, if we choose to link it to Bach, suggests that Bach's approach to harpsichord-tuning may have not changed very significantly from that of 1722, when he assembled the first book. Kirnberger III is a very useful system for the practicing harpsichordist, but above all it is the musical effect which counts. For sheer harmonic interest, and the enhancement of character and mood, I have found Kirnberger's system to be revelatory.

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### **Notation, touch, and other aspects of performance**

How approaches to tempo in the 18<sup>th</sup> century differed from those of our own time, is a matter discussed at the start of this booklet. This and many other matters of interpretation can only be touched on here, and I have covered them more fully elsewhere (see *Further Reading*). The conventions underlying Baroque notation are a major preoccupation of mine. Paradoxically, a performance which tries to follow Bach's score literally, will be less faithful to early 18<sup>th</sup> century practice – and, by extension, to what Bach might have expected – than one which seems to depart from it. A few examples:

- 1) In most music, but particularly in music written before 1800, one cannot play all notes to their literal length. Many notes written long must be dropped before their written length has expired. Apart from the well-documented tendency in Bach's day, and later, to normally 'play short', this is often necessary for contrapuntal clarity, particularly on the organ. On the other hand, Bach prescriptively indicated many instances of 'over-holding', particularly within arpeggiated chords, to emphasise harmonic richness, but he did not specify all the places where this would be beneficial, and many notes need to be held down longer than their written length. Again, he extended many long notes in the score for so long (sometimes for

several bars) that unless one is playing the organ, the documented practice of re-striking notes which have died, must come into play. If this is not done, important dissonances may be lost, or the contrapuntal texture may be incomplete. In this recording, the harpsichord possessed an unusually long sustain. Nevertheless, more re-striking will be heard in this performance than is common. The player, of course, can see the whole thing on the page, but recordings are for listening.

Taking this one step further: Bach followed the example of his model, Fischer, in making extensive use of 'pedal points'. These long bass notes, often lasting several bars, occur frequently in the '48'. On the whole, Bach ensured that these could be played by the little finger of the left hand, and re-striking is often required. Only in the monumental A minor fugue of Book I is this impossible. Bach himself would have had a pedal harpsichord at home, on which to re-strike the bottom A to make the climax suitably grand. On this recording a second player, Pamela Booth, took on this small but important part.

2) Articulation of rhythm is a contentious matter. Approaching Bach's music from a literalistic modern perspective can result in an anachronistically mechanical result, caused by an unstylish succession of notes of identical length. Following a pan-European Baroque practice of applying a lilt or slight 'swing' to much music, to differentiate between what were considered 'good' and 'bad' notes (or naturally strong and weak ones), grace and interest can be increased when the pace is slow, and where it is faster, liveliness can be maintained at a rather slower tempo than might otherwise be felt necessary. We now recognise that the practice was more universal than its formalised treatment by the French (known as *notes inégales*). But in my view, if the practice is heard by the listener as an intrusive element, disturbing the natural flow of the notes, then its execution has been insufficiently subtle. In fact, although there are a few very noticeable applications, I hope the listener may not be particularly aware of the fact that almost all my playing involves an element of inequality (often very slight), and only an immediate comparison with a 'straight' performance will bring this into focus.

3) I have written at length elsewhere on the subject of the notation of triplets. When used as a repeated rhythmic motif, these tended, for Bach and his contemporaries, to subsume adjacent material written in a different way. Bach was scrupulous in his observation of notational 'rules'. There were many occasions when what was in his head was hard to convey without breaking these. A good example, in my view, is the F sharp minor prelude of Book Two. Triplets dominate the piece, but episodes written in what I call 'square notation' are interspersed with the triplets. It seems clear that Bach intended something more subtle than the effect which he would have obtained by writing the whole piece in the compound time signature of 12/8, and this would, in any case, have caused him different notational problems. The 'square' material needs to be bent or stretched at times, to avoid both rigidity and unpleasant rhythmic clashes between the right and left hands. But further, Bach had to find a way to represent two triplets with the last and first notes tied. Although his pupils apparently were willing to use it, Bach's own notation did not contain this device, and he reverted to 'square' notation at such points. The result is fundamentally different – more gentle and unified – than a literal reading produces. If a score is available, observe the first beat of bar 8.

4) Bach followed convention by indicating ornaments in this work very sparingly. This was a rare area where Bach allowed himself to give an initial hint of the treatment which he expected throughout a piece. Some fugal themes are given ornaments at the start, which are not indicated thereafter. In such cases, at least some entries demand similar ornamentation, which helps to draw attention to them. It was not only at the start of fugues that Bach may have hinted at a more consistent ornamentation than he expressly indicated. The g sharp

minor fugue of Book Two has an odd grace-note in its closing phrase, which I have applied from the start of the piece, on the assumption that it was in Bach's head more than appears on the page. The argument here, is that this is more credible than that Bach would have really intended just one odd ornament in this particular place.

The application of ornaments to a fugal subject, where **none** appear in the score, can help to give appropriate weight to a strong beat – particularly on the harpsichord, where dynamic emphasis is limited, and articulation alone may be too subtle a method, particularly for a listener. Bar hierarchy and rhythm often demand this kind of emphasis. The rhythmic structure of a fugue starting (as so many do) on the second (weak) beat of the bar, can be subverted if played as if it began on the first (strong) beat. See, for example, the g sharp minor fugue of Book One.

In a few pieces in the collection, Bach left such lavish ornamentation that it seems probable that the piece as we have it is the result of a teaching process, rather than a considered final offering. The most striking of these is the c sharp minor prelude of Book Two. From this score I have omitted a few ornaments. However, we can use this prelude (as we can, the Goldberg Variations, discussed elsewhere: see *Further Reading*) as a virtual tutorial for the application of ornaments where Bach indicated few or none.

Of course, ornamentation must not be applied for its own sake: many pieces, particularly those which move fast, don't call for much at all. In most pieces, however, where ornaments are beneficial, spontaneous decoration from the player would have been expected, and Bach's students would have enjoyed the teacher's guiding hand. The g minor prelude of Book Two, for example, seems to me to demand such treatment, and a particularly notable example is the wonderful e flat minor prelude of Book One: some sources in fact give more ornaments here than appear in most modern editions, but the melodic line calls for significant use of decoration, imitating a solo instrument in the slow movement of a concerto. Bach wrote out significant lengthy flourishes, but to achieve its full rhetorical effect, the melodic line calls for many grace-notes and appoggiaturas which, following the custom of the time, do not appear in the score. Bach's son Carl Philipp Emanuel was to devote many pages within his great tutorial, to the appropriate application of appoggiaturas.

5) Finally, a little more about Bach's use of trills.

Firstly, mordents or inverted mordents can have one or several repercussions. When repeated, two or more such signs may require different treatments. In the f sharp major prelude of Book Two the rhythm is enhanced if the trills on the second and third beats of the bar (which use the same sign) are treated differently. Since they look the same on the page, this is rarely done.

Secondly, Bach had a liking for French-style extended trills, which had to be lifted – momentarily paused – before the customary termination. This rather paradoxical treatment was clarified in at least one French ornament table, one by André Raison in 1681. The effect is, again, rhythmic enhancement – its origins lie in a singer's taking a quick breath before continuing onto the next strong beat. On rare occasions Bach, unlike other German composers, made this explicit. He did so in the e minor prelude of Book One, by actually writing into the score the little rest caused by this treatment. Undoubtedly, he would have welcomed a similar treatment of many other trills. Apart from the rhythmic benefit, this can inject air into the texture, and may allow another part to be clearly heard, where a long trill may only cause confusion.

It is generally admitted that this work was, for Bach, always a ‘work in progress’. It may well be that he would never have achieved a completely final version. In ornamentation, in particular, it is likely that Bach would have been more prescriptive had he prepared the work for publication. This allows players more freedom, and helps to make each individual's presentation more distinctive. For those who do not themselves play, it makes it all the more fascinating to hear a variety of treatments of this wonderful work.

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### **Further reading:**

Colin Booth: *Did Bach really Mean That? - Deceptive Notation in Baroque Keyboard Music*. Soundboard 2010.

*Bach's Use of Single-Note Ornaments in the Goldberg Variations*. OUP Early Music, May 2014. \*

*Mattheson's Suites of 1714: Clues to the Execution of Rhythm in German Baroque Suites*. The Consort, Summer 2015. \*

*Bach's most-played piece: An introduction to Prelude One of the Well-tempered Clavier*. \*

David Ledbetter: *Bach's Well-Tempered Clavier; The Forty-Eight Preludes and Fugues*. Yale University Press.

- Can be found on the *Read* page at [www.colinbooth.co.uk](http://www.colinbooth.co.uk)

Colin Booth has combined the careers of harpsichordist and harpsichord-maker for 40 years. In addition to concert-giving in the UK and Ireland, he has performed as soloist and continuo harpsichordist in a number of countries, from Denmark to South Africa. He taught and played annually for 25 years at the Dartington International Summer School. In addition to this recording of Bach's Well-tempered Clavier, he has previously recorded 12 CDs of solo harpsichord music.

His book *Did Bach Really Mean That?* is an investigation of the conventions upon which the notation used by early composers of keyboard music is crucially dependent. The book, and a number of published articles, form the written basis for countless musical decisions which are demonstrated in his recordings. *Did Bach Really Mean That?* is available for sale online. This and all aspects of Colin's work can be explored at [www.colinbooth.co.uk](http://www.colinbooth.co.uk).

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