Bach's Invention: The Divine Trickery of J.S. Bach

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I: Prelude: All Worlds, All Times

Over 15 billion miles north of here (and counting) floats a 12" 'Golden Record'. It is part of the cargo of the Voyager I space probe launched in 1977 which having completed its planetary duties now gently hurtles through interstellar space[1]. As a record (and record) of our existence and 'special intelligence', the artefact was created to communicate to any extra-terrestrial who happens to encounter it, not just the story and objective facts of human civilization but some evidence of our accomplishments, intelligence, and lucidity. It includes images, mathematical equations, astronomical coordinates, greetings in 55 languages and natural sounds. A collection of music was also carved on the disk hoping, in the *lingua franca* of amplitude and time, to communicate something about us that is otherwise unsayable, as if perhaps the desire and ability to make music is a universal benchmark of intelligence. "To the makers of music – all worlds, all times" is hand-etched on the disk's surface.

What to include as a representative fragment of all human music was a matter of debate and concern[2], and thankfully a diverse collection of music was included. Among the usual Western Art suspects of Beethoven, Mozart and Stravinsky is included early blues, Chuck Berry, Jazz, Laurie Spiegel's electronic music and traditional music from Zaire, Benin, Australia, Japan, Azerbaijan, the Solomon Islands, India, China, and several other cultures. Inevitably perhaps J.S. Bach was suggested as a representation of our accomplishment of our species but there was some dissent, because sending his music would be just "showing off".[3]

Ultimately, a full 3 of J.S. Bach pieces were included, and this lecture, in 14 small pieces, investigates why the music of J.S. Bach might represent – devoid of words, facts, technologies – evidence not just of intelligence, but of the human spirit.

II: Brain & Soul

This vision of Bach's music floating above the Earth as a symbol of musical perfection aligns closely with a prevailing perception of Bach's music: somehow transcendent, timeless, and not of this world. His music manages to represent the pinnacle of the Baroque era's concerns with harmony, balance, proportion, counterpoint but also can be readily adopted for a wide range of instrumentations, eras and styles, from 'classical'' to jazz, pop and electronic. Bach's music, it seems, is untroubled by the boundaries of instrument, style or era.

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[1] The sister vessel Voyager II carrying a similar disc was launched in the same Summer of 1977 in the opposite direction and is currently over 11 billion miles 'south' of our ecliptic plane.

[2] Those selecting the pieces included Carl Sagan, Linda Sagan, Alan Lomax (whose ethnomusicological work we encountered in *Why Music Moves Us*)

[3] The actual quote – which precedes and is erroneously tied to the Golden Record – comes from Lewis Thomas's 1974 *The Lives of a Cell* reads: "I would vote for Bach, all of Bach, streamed out into space, over and over again. We would be bragging, of course, but it is surely a harmless form of bragging; it's just a fact: we are, as a species, an excellent thing, and things go very well with us when we listen to Bach. If I had to choose just one composer, it would be Bach, all of Bach. I would vote for that. Sending all of Bach, however, would be showing off."

Musicians and music lovers of all generations and styles rapidly run out of superlatives to describe his purported genius – which manages to achieve a technical as well as expressive zenith. To Beethoven he was “The immortal god of harmony”, to Wagner “the most stupendous miracle in all music”, to Jacqueline du Pré he is the “ultimate truth”, for Patti Smith “he transcends time, space and my own understanding of existence”, for Nina Simone “Bach made me dedicate my life to music” and “what music was all about”. Brahms declared - in a letter to Clara Schumann in reference to Bach’s *Chaconne* - “On one stave, for a small instrument, the man writes a whole world of the deepest thoughts and most powerful feelings. If I imagined that I could have created, even conceived the piece, I am quite certain that the excess of excitement and earth-shattering experience would have driven me out of my mind". Connections to the divine are never far off such as Kagel’s claim that ‘no one believes in God anymore, but everyone believes in Bach’”, or even - in the words of a contemporary atheist philosopher[4] - “The best argument for the existence of God”. The perception is that there is a marriage in Bach’s music of the two intelligences of *brainwork* (the technical skill to perceive, adapt and invent complex musical abstractions, and in fact the bodywork to perform them), and the *sensitivity* to perceive a wide range of emotion and communicate them powerfully in music.

III: Only Human

While Bach's music often perceived as embodying ‘eternal truth’ and carrying implications of divine inspiration, it’s easy to overlook the fact that such heavenly creations were the product of very human labour and struggles. By a stroke of technological luck, we have the beautiful manuscripts today, but rarely consider the real-world pressures—training, time constraints, and the messy process of quill and ink. If Bach’s genius was indeed a God-given gift, it was one that demanded repayment through decades of relentless study: pouring over Vivaldi’s scores by candlelight despite weakening eyesight, walking 280 miles to hear a single organist play, reusing compositions, adapting to shifting tastes, and navigating a whirlwind of professional demands, difficult patrons, critical voices, vain royalty, relentless deadlines, among personal hardships and bereavements.

To truly appreciate Bach’s music (which I, like many others, find breathtakingly beautiful), it helps to understand both the mechanisms behind it and the mechanic himself—putting aside preconceived notions about his reputed genius to explore his actual musical methods, and the very human – even mischievous – aspects of his character,

IV: Fingerprints

Bach was a devout Lutheran, believing that ‘the aim and final end of music should be none other than the glory of God and the refreshment of the soul”, and often initialled his sacred compositions ‘S.D.G.’ (*Soli Deo Gloria* - to the Glory of God alone). But in his behaviour and, Bach was no choir boy, while in his first job (from age 18 as organist, teacher and composer at *Neue Kirche* in the small town of Arnstadt, Germany) he was admonished in a 1706 church council meeting for a number of indiscretions including:
1) Returning *three months* late from a trip to attend a Buxtehude performance and “comprehend one thing and another about his art”.
2) Adding too many “strange tones” and *tonus contrarius* into his organ accompaniments “confusing” the choir.
3) Playing for far too long in instrumental interludes, and then when being called on it, playing extremely short.
4) Disappearing to the wine cellar during the sermons
5) Getting into fights (once allegedly a duel[5]) with students and locals
6) Inviting an unfamiliar maiden (*frembde Jungfer*) into the choir loft to “make music”

Bach’s inability to tolerate authority figures, the musical abilities and attitudes of students and colleagues, was also accompanied by some intolerance and criticism of his music by his peers. Though all (sometimes

[4] Nigel Warburton, host of *Philiosophy Bites* and a music lover, tweeted exactly that on July 9, 2012.
[5] Bach got into a conflict with a student named Geyersbach, a bassoonist, who allegedly insulted Bach, calling him a "Zippelfagottist" (a mediocre bassoon player). This led to a physical confrontation in which Bach defended his honor. While it escalated, it did not result in a formal duel with weapons, but it did cause controversy with the church authorities, racking up the disciplinary actions against Bach.

grudgingly) admitted Bach's abilities, musicians and critics implied that his music was that age-old accusation of being outdated and 'too technical'. The German composer and critic Johann Adolf Schiebe In 1737 saying that

> "This great man would be the admiration of whole nations if he did not deprive his pieces of naturalness by giving them an **artificial turgidity**, and **obscure the beauty** of his compositions by **an excess of art**. Since he judges that strict imitation should be employed everywhere, and since he places more value on art than on feeling, he **robs his pieces of their natural element** and renders them **confusing** by the **turgid** and intricate style of his harmony and the imitative texture. The listener finds **difficulty in comprehending** it, and a **certain tedium** finally takes hold, despite all the beauty and richness that one is forced to admire."
>
> Der Critische Musikus (1737)

Schiebe was essentially saying that Bach's use of counterpoint giving every voice in equal melodic weight was inaccessible, excessive, and obscured beauty. If Bach knew that Schiebe's quote – and not his music or other writing – turned out to be his enduring claim to fame, he may have brushed this off. However, his student Birnbaum launched an impassioned and lengthy defence in 1738 – likely motivated and guided by Bach himself – explaining what we all now know that it was exactly this skill of the coherence of melody, harmony and motif that was Bach's skill, artistry, and expressive purpose. It's quite stunning to think that his music fell into relative obscurity for about a century after his death until the *Leipzig circle* of composers and supporters (including Felix and Fanny Mendelssohn, Robert and Clara Schumann, Chopin, Czerny, Liszt and Brahms), performed, shared, discussed, arranged, savoured and championed Bach's surviving collection of over 1000 works reviving and solidifying his legacy.

V: Signatures

Figure 1: A recreation of Bach's monogram, constructed from J.S.Bach's initials overlaid in mirror form.

Bach was a craftsman but crafty in another sense - within his music and life - and adored puzzles, games, and general mischief. His monogram on his wax seal and his goblet, was his own design, and it at first glance looks like an ornate decorative symmetrical crest of interlocking swirls. It is in fact built up from his initials JSB overlaid and mirrored - apt as his music uses mirror-like reversals, and is, like the monogram something immediately beautiful but with hidden meaning.

But Bach not only hid messages in decorative shapes but sometimes also *within* his music itself. His name in the German notation system - which unlike the rest of the Western world runs from A to H - happens to spell out a haunting chromatic melody. Bach enjoyed embedding this motif (Bb-A-C-B-natural - or its truncation B/Bb A C) in his music – particularly in the use of key collections. Generations of composers from Liszt to Brahms to Schoenberg to Arvo Pärt have written homages to Bach using this melody.

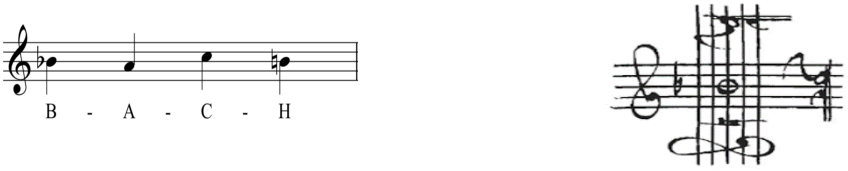

Figure 2: The BACH motif

These four notes can even be represented as one at the intersection of four clefs (perhaps include in parenthesis the names of the clefs, treble, bass etc.), in a crucifix symbolisation.

Bach, who was deeply interested with numerology took the codification of his name further, and by adding up the alphabetic placement of these letters (A=1, B=2, C=3 etc.) came up with the 'Bach number' of 14 (2 + 1 + 3 + 8). As well as the translation of 'J.S.Bach' (41 - a neat mirror of 14) and 'Johann Sebastian Bach' (158). Numbers that would recur encoded in many of his compositions through bar numbers, section and page numbering.

VI: Harmony, Proportions and Parallelism

Bach was not the first to invent such musical translations of letters – *musical cryptograms* can be found as early as the 1436 'Philip cipher'[6] as a way of embedding sacred symbology or the names of patrons directly into the fabric of the music. These devices might be seen to belong in the broad category of *parallelism* where material in one domain (e.g. letters, numbers and even the cosmos) might be echoed in another (such as musical notes and features) and vise versa. Such ideas are ancient and found in Ancient Greece, Rome, Mesopotamia and the Indus Valley before Baroque thought., and they imply not just that we can translate material between domains but that the arts from poetry, architecture to music could (and should) reflect the order and harmony of the divine. We (or at least Bach, his contemporaries and philosophical ancestors) saw such order in the tuning of notes and scales – for example a 1:1 harmonic ratio is a unison, 1:2 (one half of a string) produces a *perfect* octave, 2:3 a *perfect 5th* 3:4 a *perfect* 4th, 4:5 a major third, 5:6 a minor third. The closer (or farther) we are to a mathematical simplicity the closer (or father) we are from a divine harmonic order.

If the divine, eternal and God were associated with balance, ordering, simplicity, proportionality, completion and such geometric perfection, and Bach's music was all for "the Glory of God alone" – we should expect to see such characteristic in his music, and indeed we hear endless inversions, rotations and reflections of motifs, interlocking rhythms, balanced phrases and where deviations from harmonic purity or a central motif are always beautifully resolved however exotic their departures. Bach it seems went further still not only forging such harmony in the music, but creating a hidden *unsounded* harmonic layer: Bach scholar Ruth Tatlow has argued that many of his pieces strive for such geometric perfection on the extra-musical layer. Favouring bar counts in the multiples of 10, 100 (as well as the Bach numbers of 14, 41 and 158), and 'harmonic proportions between sections, movements and even complete collections. For example the *Six Solos for Violin* (BWV 1001-6) have a notational bar count of 2400. The *Six Sonatas* (BWV 1014–19) have the exact same bar count - they are in a 1:1. Not only that but four of the movements in each collection add up to 1600, creating a 2:1 with the remaining movements, and the B-A-C key pattern is interwoven – in order – in each collection. The examples of such hidden proportionality across his works stretch the bounds of coincidence, particularly as they achieved by Bach with devious – and inconsistently applied – notational tricks. These devices include partial bars, hidden bar lines and crucially the flexibility of placement of the navigational symbols (DC, DS and Coda). If these proportions and unsounded harmonies are real, then they are likely intended - if not manipulated.

VII: A Harmonious Scroll

Another example of Bach's *decorative encoding* might be found in the title page of his 24 Preludes and Fugues for the *Well-Tempered Clavier* (the first prelude of which is included on the Golden Record). Often this series of (perfectly proportioned) works (one for each major and minor key) - is mistakenly taken to have been written for the now ubiquitous *even*-tempered system - where the pitch interval between each chromatic note is identical. [perhaps spell this out for the non-musical by mentioning the pitch difference between adjacent notes on a modern piano] A *well-tempered* system however has gaps set up to provide sonorities in some keys closer to those that emerge from the 'natural' harmonic series. Choirs, string ensembles and other instruments unfettered by a fixed pitch system tend to converge upon these more 'pure' intervals in performance – a violinist gets a feel for what sounds right in a particular key, which might differ slightly from the precise intervals on an even-tempered instrument such as the modern piano There are countless well-tempered systems possible, and several at Bach's time, however it was a question for centuries which system Bach used for the WTC, and how each of those keys would have sounded. It was

[6] In fact Bach's immediate predecessor in the post of Thomaskantor at Leipzig, Johann Kuhnau (1660-1722), was the inventor of an elaborate letter-musical symbol system.

not until 2005, a quarter of a millennium after its composition that musicologist Bradley Lehman made a convincing argument that the decorative symbol at the top of the page, which for generations had been dismissed as an ornamental 'meaningless' series of loops, contained instructions for how to construct the temperament, an instructional guide perhaps, hidden in plain sight for two and a half centuries.

Figure 3: *The decorative swirl on the title page of the Well-Tempered Clavier, its various loops are suggested to describe the tuning temperament employed.*

VIII: **B**ach and **C**ontrapuntal **H**armony

J.S. Bach is rightfully held up as a master of *counterpoint*. This is most evident in his canons and fugues but is infused in all his work. Counterpoint engages directly with three interwoven core musical concepts (and challenges). Anything notated in a Bach piece is likely meeting all of these qualities, meaning that a musical object for Bach has a particular ***multiplicity -*** a musical parallelism allowing it to act as theme, line and harmony.

Motivic Cohesion*:* Themes, phrases, rhythms and other musical objects have an identity, so that not only can they be recognised when they repeat but they have a malleability – a familial connection – that ties a piece together.

Horizontal Cohesion*:* Any and every 'voice' has an independent direction and logical passage through time. Even heard in isolation every layer makes sense in its temporal journey. For example chords are not simply blocks of notes but made up of multiple melodies.

Vertical Cohesion*:* At any point there is a harmonic balance, when dissonances occur (let's see complex ratios) which they do with great intensity in the work of Bach, they are justified by elegant resolution.

Let's see how these three threads interweave in one of Bach's mastered musical forms of the *fugue*. The term means 'to flee' or 'to chase' and its a form - though variable in tempo, meter, duration and harmony - follows a set 'narrative'. At its centre is a single melodic phrase (the 'subject') which forms the basis of the fugue's thematic material, across multiple independent musical voices (or 'parts') - a motivic cohesion. The first voice starts alone stating the subject and then continues with 'counter-subject' material complementing a second voice which re-introduces the subject (usually at a different interval). This pattern continues until all (commonly 3-4 voices) are introduced and the piece develops, exploring more distant harmony and variations - extending, shortening and reworking the thematic material while maintaining a familial connection (motivic cohesion). Finally the voices return to the original key and restate the subject to conclude. This conversation between multiple and equal voices, independently coherent are linked by thematic material and mutual harmonic agreement in service of an overarching structure. Again we see here the *motivic coherence* of the fugue's subject in its multiple variations and contexts, as well as the *multiplicity* of each voices which act both as independent and equally important melodies (horizontal coherence) and as accompaniments and harmonisations of each other (vertical coherence).

IX: A Portrait of Bach

One can also learn something of Bach from his portraits, or in fact their scarcity - given his lack of time and reluctance to engage in self-aggrandizement. Artists complained that he never stayed still for long enough to capture a likeness, and the few portraits we have of him say more about his music than about his appearance and character: he is a prop to hold up a fragment of a work, or to wear a hidden musical code on his clothing (in his 1748 portrait where he wears 14 (unnaturally close) buttons on his waistcoat. The biblical number of 7 on his coat are also unlikely to be accidental. Indeed, Bach's engagement with

numerology has invited furtive (and often overzealous) hunting of numerical meaning throughout his music. - the music is in the foreground rather than the musician.

Figure 4: *Bach's 1746 and 1748 displaying the Canon Triplex and 14-button waistcoat respectively.*

In an earlier 1746 portrait by Hausemann, he holds a short piece 'Canon Triplex in 6 Voices', which was his entry piece to the Society of Musical Sciences - a collective of elite composers which included Handel and Telemann who believed that music was deeply linked with the sciences and the cosmos, a sentiment shared by Pythagoras's concept of the 'Harmony of the Spheres'. Bach was of course accepted, but allowed Handel to take his place before him, so that Bach could be the 14th member. The piece itself is from his *Goldberg Variations* (one of his three 'summation works' and an important contribution to keyboard repertoire) published in 1741, an aria with a set of variations. After their completion Bach - the constant tinkerer - could not resist adding on the last page a set of canons based on the aria's bassline. How many of these canons did he write? 14 of course.

X: The 14 Goldberg Canons

The three short lines in the portrait are not a fragment or cartoon of the work - they are in fact - the entire piece. To understand better why a piece can fit in a handful of bars and Bach would pose proudly and submit it to his esteemed peers requires a little understanding of canonic principles. That he could embody his complex musical thoughts in such an economical way reveals his technical and musical mastery.

The simplest form of canon is known as a round - or 'perpetual' canon - think "Frère Jacques"). It involves a melody played identically in multiple voices (instrumental layers), starting at different time intervals. This 'phasing' of one melodic line builds a more complex texture and interaction from this simple component. Its underlying mechanics are shown in an example below. The first voice sings a looped melody made up of 3 phrases (A-C), the second and third voices sing the 3-phrase melody but displaced by one and two phrases respectively.

This results in all the phrases being heard together, distributed between the voices, in a theoretically infinite loop. To compose such a simple canon might involve starting with Phrase A and then composing material for additional layers above it. However some more sophisticated reverse engineering could be employed: If we start with the complete stack of complementary phrases which work together well in terms of rhythmic interest and harmonic agreement, then we can slice up the constituent phrases and rejoin them in a preferred linear order. The voices then rebuild this stack through the canonic process. However, the craft of canonic writing - and particularly in the case of Bach - runs much deeper than this simple example. Some canons involve phrases that when delayed are transposed to different intervals or stretched rhythmically. They can be turned upside down (inverted) or run backwards (as in Bach's 'crab canons') or even both as in 'table canons' which can be read simultaneously from one stave by musicians at either side of a table – without mentally turning the music back the other way. Multiple canons can even be superimposed upon one another and even played simultaneously - even on a single (usually keyboard) instrument. These offer greater compositional complexity and constraint than the simple round presented above, and Bach revelled in such challenges. Take Bach's 'Canon Triplex in 6 voices' from the portrait.

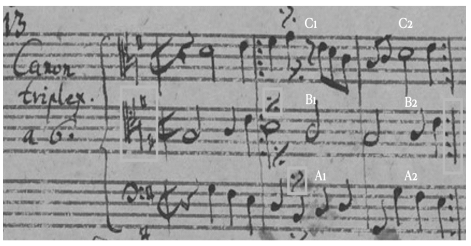

Figure 5: An annotation of Bach's hand-written manuscript of the Canon Triplex. Some notational clues to the solution of the puzzle are shown in yellow, and phrase fragments labelled in white.

Here, although only three voices are notated, Bach sneaks in some 'decorative clues' as to how they are to be manipulated into a canon. Some of these 'hacked notations' are outlined below, and show additional key signatures, phrase re-entry points, upside-down suggestions and a hint that each voice is doubled. Why is Bach so obtuse in his instructions? This is an example of a 'puzzle canon' or 'riddle canon' where the 'solution' to the canon has to be deduced from clues in the score, or solely from the reader's invention. The musician is not simply given the music, it has to be earned.

The music depicted in the Canon Triplex portrait is not just one canon, where one melody is overlaid against itself, but three simultaneous canons. In addition, each of these canons isn't a simple delay of material but involves 'inversions' turning the melody *upside down against a delayed version of itself.*

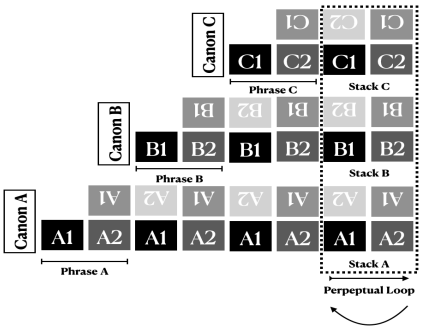

Figure 6: The canonic structure of Bach's '*Canon Triplex a 6*'

Unlike in a simple round, here each canon obliges an internal consistency (e.g., A1 and A2 make a pleasing phrase, and A1 and A2 work together if either is inverted). Furthermore, this collective stack, must work with two other similarly constrained stacks. While we should marvel at Bach's skill in achieving such canonic delights and communicating these musical ideas with such elegance and understand why he proudly presented the Canon Triplex to his peers and on canvas, we should also acknowledge that the piece involved some careful tinkering even though it stays entirely in one key and is structurally static (or infinite). Musical output is somehow limited by the constraints imposed but this short piece reveals fundamental concepts which run counter to general musical understanding.

XI: A Musical Meeting

Bach was a master of such contrapuntal juggling act and selected or designed subjects which had melodic identity and interest, as well as being malleable enough for their multiple functions. In so doing he produced with a staggering industry many sophisticated fugues - each one a highly expressive musical work as well as a logical solution to self-imposed puzzle. In the W*ell-Tempered Clavier* (1722) alone, he completed a fugue (with sometimes up to 5 voices) for every one of the 24 major and minor keys and then some twenty years repeated the entire exercise again in a 2nd Book. Bach develop gained such experience, skill, and fluency in fugal writing that he was even able to improvise them.
It was reports of Bach's prowess that led King Frederick II of Prussia repeatedly to invite Bach to his palace. Frederick 'the Great', was a keen flautist who employed Bach's son Carl Phillip Emannuel as the harpsichordist in his private orchestra, and had a genuine passion for music, composing many works for himself and for his ensemble, reportedly practising four hours a day and taking his flute (and a collapsible harpsichord) with him on military campaigns. As is often the case with those privileged with wealth and

power, he liked to surround and associate himself with the finest musicians, artists, and poets. Despite several requests for Bach's company, they met only once and for a matter of hours, late in Bach's life on May 7, 1747, when Bach made the 200-mile journey from Leipzig to Frederick's magnificent town palace *Stradtschloss* in Berlin. Bach was always keen (and was offered some respite in his gruelling work schedule) for patronage and used the opportunity to see his new grandson for the first time.

The meeting - for which we have an eyewitness report and supporting documents - gives a rare insight into Bach's compositional process and to both the extent - and *limits* - of his craft. After sampling Frederick's collection of keyboards, the King arrived at what was clearly a planned attack. As much as Frederick had a genuine admiration and earned appreciation for musical skill, he also enjoyed demonstrating his power and putting his subjects in their place. Voltaire said of him "if Frederick says to you 'you are my friend' he means 'you are my slave' "and that an invitation to dinner was Frederick saying, "I feel like making fun of you tonight". Enquiring after Bach's reported skills he asked the master if wouldn't mind improvising a fugue on a subject of the King's own creation, and immediately presented him with the following theme.

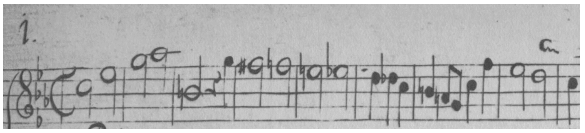

Figure 7: *The 'Royal Theme' in J.S.Bach's manuscript*

This is a cunningly crafted theme. It fulfils the overt features of a fugal subject, with a clear tonal centre, and logical phrasing - it is melodically coherent. However, in all other ways it is fiendishly challenging: the use of chromatic notes and their rhythmic placement across its long duration make them a beast to negotiate in a contrapuntal setting, requiring significant sophisticated harmonic skill. Frederick may well have conspired with musical experts (perhaps even Bach's son) to set this trap, and so the request to extemporise a 3-part fugue was probably born as much from mischief as from innocent curiosity about the limits of Bach's compositional genius. Despite being weary and unrested from the long journey, and under the gaze of the King and a company of distinguished musicians, Bach somehow managed to corral this knotty melody into a beautifully crafted 3-part fugue, introducing the 3 voices with the devilish subject and then letting them fly independently while collectively exploring yet more distant and labyrinthian harmonies. He even - under all this constraint - employed melodic and rhythmic features of a more 'pop' late Baroque style which Bach knew Frederick enjoyed.

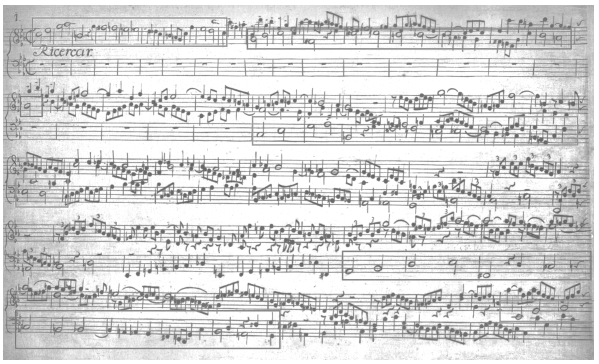

Figure 8: *The first page of J.S.Bach's Ricercare a 3 (3-part fugue) on the Royal Theme with complete statements of the subject annotated at the tonic (red) and dominant (blue)*

Perhaps as much irritated as impressed, the King was not satisfied with this remarkable performance. He immediately demanded that Bach now concoct a six-part fugue on the same subject. This was no small ask - in both books of the *Well-Tempered Clavier* Bach only occasionally used as many as 5 voices - and these were with far more accommodating self-selected fugal subjects, and with the luxury of composing at leisure rather than extemporising in front of an audience. Instead of accepting this challenge, Bach instead improvised a 6-part fugue on a theme of his own choosing. Bach's 'failure' to fulfil the King's requests is a significant and profound moment in music history. A composer with a hotline to divine musical insights and inspiration would struggle no less with a 6-part than a 3-part fugue, and it is not that the task was impossible: Soon after his return to Leipzig, Bach himself found one stunningly elegant 'solution' to the 6-part puzzle on the Royal Theme. It was beyond his inspiration and real-time skills in the moment, but gave way to a studious industry and tinkering, relying on years of harmonic experience, transcription, and

scholarship. Bach's inability to meet the task on the 7th of May 1747 in fact brings all his musical achievements into sharper definition, the convenient myth of the muse dissipates to reveal the real-world and hard-won craft. Craftsman not vessel.

XII: A Musical Offering

Bach quickly collated a transcription (or adaptation) of his 3-part improvisation and the 6-part fugue, alongside a staggering collection of ingenious canons, pieces crafted for Frederick's playing ability, taste, and ensemble. all revealing the pluripotency of the awkward Royal Theme. This 'Musical Offering' demonstrated mirror structures, endlessly rising or lengthening canons (to reflect the growing glory and fortunes of the King), intricate puzzles, deep fugal craft, biblical and numerological references, and encoded acronymic messages within the titles of the works. Layers of external and musical meaning co-existing and entangled in an elaborate fugue of fugues.
Within weeks of their meeting, Bach dispatched to the King the 'Musical Offering', but - as is often the case with those of privilege of power - we have no record of the King thanking Bach, acknowledging receipt or performing or in any way engaging with this extraordinary work. Still, we get to enjoy and admire it to this day, and the gift of Frederick's trap is not just in provoking one of the last of Bach's major works, but a uniquely valuable insight into Bach's craft - a frozen moment of his process and not just its inscribed remnants.

XIII: Signing Off

The Musical Offering also formed the impetus to Bach's last (uncompleted) work the 'Art of the Fugue' - a similar thesis of motivic pluripotency in canonic and fugal forms, but this time on a theme of Bach's own choosing. By this time, Bach's eyesight and writing arm were in poor shape from years of constant work, and a succession of eye surgeries (one shudders to imagine) left him with intermittent blindness until his death from a stroke on the 28th of July 1750.
The Art of the Fugue was left unfinished, but it leaves us with one last remnant of Bach's craft. In his last fugue (here termed 'Contrapunctus') the independent fugal voices come to end abruptly, not together but in succession, hinting at his compositional process. An inscription below the fugue translates as 'At the point where the composer introduces the name *BACH* [for which the English notation would be B ♭ –A–C–B♮] in the countersubject to this fugue, the composer died.' A profound silence is experienced when the fugue is heard in this (in)complete form, and this is confounded by one more detail.

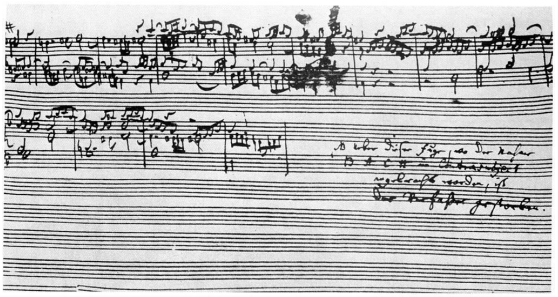

Figure 9: *The last (unfinished) page of J.S. Bach's Contrapunktus XIV from the Art of the Fugue.*

This conceit of Bach returning to the Lord as he entraps his own name into his 'divinely-inspired' music is too beguiling to resist retelling. However, it's a version of events which does not withstand scrutiny well. The manuscript is clearly in Bach's own hand so predates his final deterioration of health and eyesight, and not - as we may be led to believe - dictated to Carl Philip Emmanuein his blindness. This may well be a 'staged' profundity. Other eye-raising but frustratingly non-definitive clues appear, the fugue appears as the **14**th Contrapunctus, and is **41** bars short of a harmonic proportion in the collection (a **158**0 bar implications).[7] Is this a profoundly perfect return to the divine, or one more trick of Bach to inform, mislead to inspire the listener.

[7] See Tatlow's *Bach's Numbers*, and the work of *The Bach Society* for the ongoing (counter) arguments to these numerological hypotheses.

XIV: Coda

Perhaps we should hold the greatest admiration (and draw the most inspiration) not from Bach's considerable musical gifts, but from the hard graft and constant tinkering he humbly and consistently dedicated himself to in pursuit of the musical sublime, and his constant constraints which he subjected himself to for the sake of unsounded harmony, creative challenge or pure mischief. Perhaps it is this trinity of **brainpower**, emotional **sensitivity** and a mischievous ***joie de vivre*** that is the mark of a complete intelligence and meaningful existence, recognisable by even the most worldly of extra-terrestrials.

With thanks to Keita Onishi for the use of his wonderful animation: *Goldberg Variations: 14 canons visualized* https://youtu.be/wW7ys03hgBw

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