'Thinking Through Singing'

The Strategic Significance of J.S. Bach's *A Musical Offering*

How Bach's musical intervention into the thought-process of the young King Frederick II continued Leibniz's epistemological battle against the oligarchical outlook of the Venetian-directed 'Enlightenment'

by David Shavin

Two hundred and fifty years ago, the mortal life of Johann Sebastian Bach came to an end. Bach died on July 28, 1750, having spent the last decade of his life in a most unique struggle—to make his "analysis situs" method of compositional thinking the basis of a general revolution in culture, and of a specific revolution in the leader of Prussia, King Frederick II (the Great). Bach was perhaps the most prolific proponent of G.W. Leibniz's method, both of problem-solving, and of organizing the powerful instrument of the mind.[1] Frederick the Great, the grandson of Leibniz's student, Queen Sophie Charlotte, was presiding over the destruction of the very Berlin Academy which had been a joint project in 1700 of Leibniz and Frederick's grandmother.

The story climaxes in the summer of 1747, around the circumstances of Bach's musical and scientific pedagogy for Frederick, his *A Musical Offering*. Bach's courageous intervention was undoubtedly the highest level statecraft since Leibniz himself—with the 1716 Leibniz-Clarke letters of his final year of life—made the attempt to save the court of Sophie Charlotte's brother, King George I of England, from the Venetian party encamped in London.

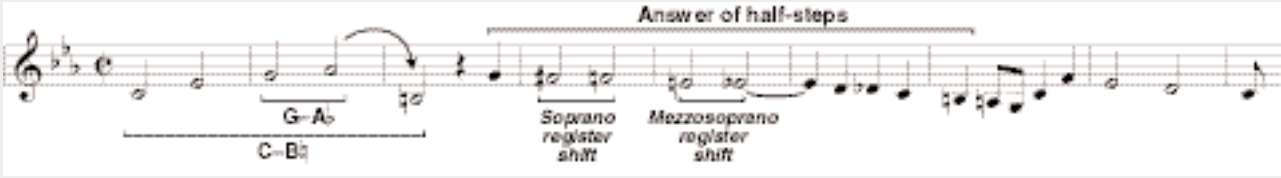
Johann Sebastian Bach plays the organ for Prussia's King Frederick II.

Like Leibniz in 1716, so Bach in 1747 would be less successful in winning the day, than in winning the century.

J.S. Bach's 'Analysis Situs' Project

Frederick II assumed the Prussian throne upon his father's death in May 1740. In 1741, at the age of 56, Bach visited Berlin for the first time, and discussed with his son, C.P.E. (Emanuel) Bach, Frederick's harpsichordist, the situation with the new king. Immediately upon his return to Leipzig, in deliberations with his key political supporter and strategist, Count Keyserling, Bach launched the intensive project that occupied his last decade—stretching dimensionalities with fugal puzzles, and pedagogically displaying the steps involved in expanding one's mind. When Bach composed his "Goldberg Variations"—named for Count Keyserling's keyboardist, Johann Gottlieb Goldberg—Bach also provided a series of canons which took the thematic idea under consideration, and explored the connectedness of the fully-developed idea, by addressing various geometrical twists and turns, rotations, and inversions, individually. For the ear of a listener, which could be caught up in the beautiful and forceful argument of the thematic development, Bach had composed a series of canonic puzzles. The process of solving these puzzles, was the process of discovering higher-order pathways of one's own mind. These pathways were known to exist, since the ear could in fact follow the argument of the music, but they had been hidden from deliberate access by the mind. This was,

FIGURE 1. *"Royal Theme" presented to Bach by Frederick II.*



in short, Bach's practice of "analysis situs."

Bach's work on his monumental "The Art of the Fugue" had commenced c. 1745 (and was published by Emanuel Bach in 1751, as a living testament to his father). In the midst of this work, in May 1747, Bach traveled from Leipzig with his eldest son, Wilhelm Friedemann, and appeared at Frederick's court in Potsdam, near Berlin. He, supposedly, had had an open invitation from Frederick from the beginning of his reign in 1740. Wilhelm Friedemann had come from Halle to accompany his father. The King halted his music-making, where he played the flute, and Bach's second son, Emanuel, accompanied him at the harpsichord. Frederick had Bach try out, for all to hear, his collection of Silbermann piano-fortes. The King then gave Bach a C-minor theme, in order to test his reputed genius for expanding on a theme upon first hearing, uncovering the manifold connectedness of the thematic idea [SEE Figure 1]. On the spot, Bach created a three-voice fugue with a wealth of ideas interwoven. Evidently, the King also requested a six-voice fugue; and Bach chose a different theme to honor this request.

Shortly afterwards, probably between that Sunday, May 7, and the following Thursday, Bach announced that he would develop the King's theme into a six-voice fugue, and publish it. Bach explained about his three-voice version: "I noticed very soon . . . that, for lack of necessary preparation, the execution of the task did not fare as well as such an excellent theme demanded. I resolved therefore and promptly pledged myself to work out this right Royal theme more fully, and then make it known to the world . . . ."[2]

Within two months, Bach produced an engraved copper masterpiece, comprising *A Musical Offering:* the original extemporized three-voice version; a fully realized six-voice masterpiece; and in-between, ten different canons. Like the "Goldberg Variations" canons, these were pedagogical aids—puzzles that presented various, individual aspects of the musical idea. Once the original thematic idea had been taken apart (e.g., examined upside down, frontwards and backwards, stretched out, and reflected against itself in different proportions), the wealth of possible connections to be developed could be integrated into a larger, more powerful fugue of greater voices. Better than a magic act, the listener was allowed to solve layers of puzzles, equipping both his mind's ear with greater power, and his mind itself with a wonderful mirror to examine how it systematically builds up its powers. Bach also provided Frederick with a dessert to celebrate the process—a four-movement trio-sonata which sings the fugal material, set for the King to play on his flute, with Emanuel Bach on keyboard. The third was a violinist—likely Franz Benda, who was also present the day that Bach had visited and extemporized on the theme.

Canons that Mirror the Mind

While we briefly characterize the theme and the ten canons here, the reader should perform his or her own mental experiments, to discover for himself the dialogue between one's hearing, and the various geometrical transpositions that Bach shows the mind capable of. Bach himself had a humorous confidence in these matters. Evidently, as reported by Forkel (probably from Emanuel Bach), Bach responded to complaints about difficult pedagogic exercises, by offering a simpler one: "[C]omplaints were made that it was still too difficult . . . he smiled, and said: 'Only practice it diligently, it will go very well; you have five just as healthy fingers on each hand as I.' [This . . .] was the real spirit of the art." Bach obviously thought that working as hard as he worked, was a pleasure to be sought after.

In brief, the theme itself poses a bold hypothesis in the sudden drop from A♭ to the B♮, a diminished seventh below; and then it suggests that every half-step in that span has its part in fully accounting for the bold assertion [Figure 1]. Secondarily, just before the bold assertion of the A♭-B♮, there is the provocative half-step, G-A♭. Finally, this half-step idea suggests the implicit half-step, C-B♮, forcing the mind to consider the work of the entire five-note phrase (and not from one note to the next note).

The answer, initially stated, is a series of half-steps that fill out the span of A♭-B♮. The effect of the jarring B♮ coming at a strong position in the poetic line, is echoed in two particular half-steps of the answer: the F♯ and the E♮ in the two succeeding down-beats. Both are resolved downward, F♯-F♮ and E♮-E♭. Since these are the precise changes from the second to the first registers for the soprano and mez-

zosoprano voices, respectively, the suggestion of a resolution process is wedded to the sound of the change in voice register.[3] This beautifully unites the idea of a search for an answer for the bold hypothesis, with the unique generation of the species of human voices.

Let us examine the opening of the first canon, the "Canon perpetuus," in more detail, and then indicate Bach's educational program in the following nine canons.

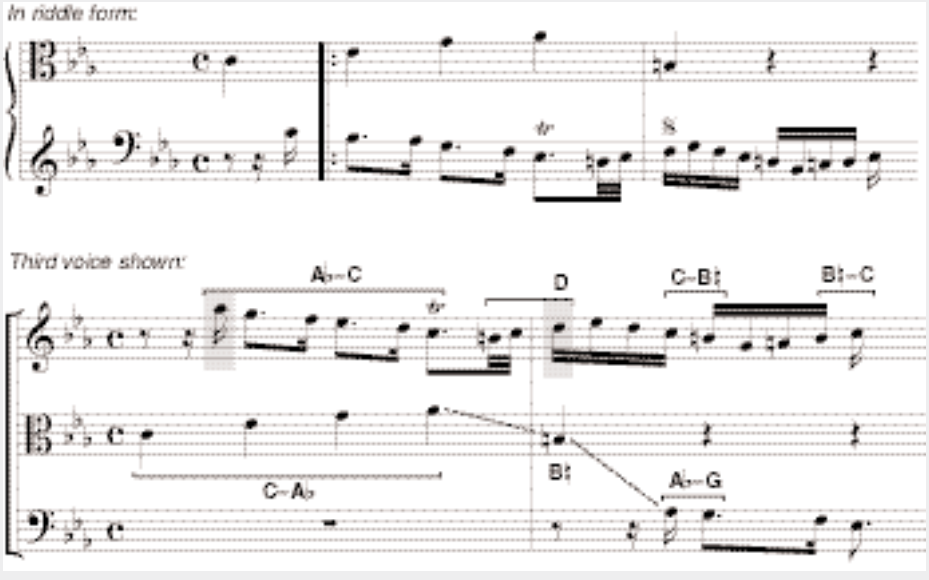
In the "Canon perpetuus" [SEE Figure 2], three voices are indicated, with the middle voice singing the theme. In contrast, the two outer voices proceed two octaves apart, with the lower voice repeating the same material exactly one measure later. The theme's climb from C to A♭ is contrasted with step-wise motion going in reverse, downward from A♭ to C. Just at the point that the original theme plunges from the A♭ down to the B♮, the upper voice also reverses direction, but only up to the D. Hence, the theme's accomplishment of going a half-step down, from the first note, C, to the fifth note, B♮, is contrasted with the motion upward from C to D—this emphasized with a trill between C and D. A second contrast occurs simultaneously, with the comparison of the second voice's A♭-D Lydian interval (highlighted in Figure 2), to the original theme's surprising drop from A♭ to B♮. So, the rather staid, upward fifth (C to G) achieved in the first three notes, now has two relatively controversial neighboring ideas (the plunging diminished seventh, contrasted with the Lydian interval). And these controversial neighboring ideas pose a paradox: they seem to be both wedded to each other, and also so close and so far away from the original rising fifth.

Further, just at this point, the third voice enters with the "same" material as the second (going stepwise down from A♭ to C), but two octaves lower. When its entry, A♭-G, is heard departing stepwise from the B♮ that the original thematic voice had boldly stated, the suggestion is made that the listener can begin to make sense of the bold assertion, A♭-B♮, by considering the A♭ from the other direction. The large plunge, heard from the "other side" (simply by the entrance now below the B♮), appears as a strangely-large step, B♮-A♭, part of the downward motion, again reversing the steps of the original C to A♭ rise.

Multiple connections appear. For example, when the original G-A♭ is heard reversed, as A♭-G, the mind asks whether the other half-step, the C-B♮, is also going to be closed off with B♮-C. Bach has the second voice's continuation intimate this action also, with the quicker motion (sixteenth notes) answering C-B♮ with B♮-C.

This is merely the first six beats or so; and only a few of the strongest ideas have been sketched. But what the eye and mind can work out with the dancing of planets in our solar system, the ear and mind can work out with the multiply-connected ideas of a theme, and lawful projections of that theme, or portions of the theme. Now, consider what changes when Bach, in a following canon (not displayed), puts the original theme in the lowest voice, with two similar upper voices playing the same contrasting material, but with the second upper voice entering *earlier* than before, half-way through the original theme's five notes, instead of at the pause *after* the theme's five notes. Or, consider the "Canon a 2 per Motum contrarium" [SEE Figure 3], where the theme is in the top voice, and one of the two lower voices mimics the other, but with "contrary motion" from one note to the next; one voice goes in exactly the opposite direction, but with the exact same interval of action. What is the listener's mind challenged to accept, in considering these two contrary motions, as the same motion but in opposite directions? Is the action completely reversible? Bach uses this device of reversing the tonal direction, to provoke a paradox: The mind wants to hear a simple mirroring, but instead the reversal throws into relief new ambiguities in the original theme. The reader will be left this

FIGURE 2. *J.S. Bach, "A Musical Offering," Canon perpetuus.*



experiment for himself or herself.

Then, Bach, in the "Canon a 2 per Augmentationem, contrario Motu," adds a sort of stretching of the material [SEE Figure 4]. In the earlier canons, one voice always repeated the same material, only entering a short time later—like an echo singing with its source. But this was not a mere acoustical event. One voice mirrors, or acts on, part of itself, examining itself; and if the material is constructed properly, it will be appropriate to bringing out otherwise hidden, internal relations in its construction. But now, Bach presents an upward, stepwise figure, reversed and proceeding at a rate twice as slow as the source. ("Augmentation" refers to the doubling of the musical time for each note.) Certainly, this is a different type of method for the voice to investigate itself. How should the lower voice act, if each step it takes comes back to it delayed, twice as slow, and reversed in tonal direction, and its own future steps will co-operate with this delayed transformation of its own past? Bach advises Frederick as to what mental capacities will allow for Prussia to grow, writing for this canon: "Notulis crescentibus crescat Fortuna Regis" ("And as the notes grow, so may the King's Fortune").

FIGURE 3. *J.S. Bach, "A Musical Offering," Canon a 2 per Motum contrarium.*

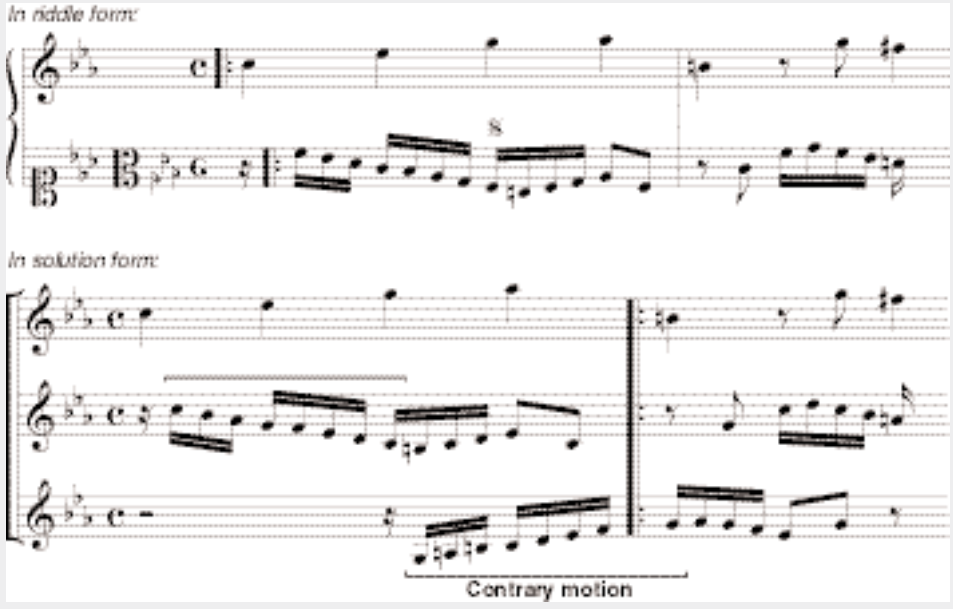
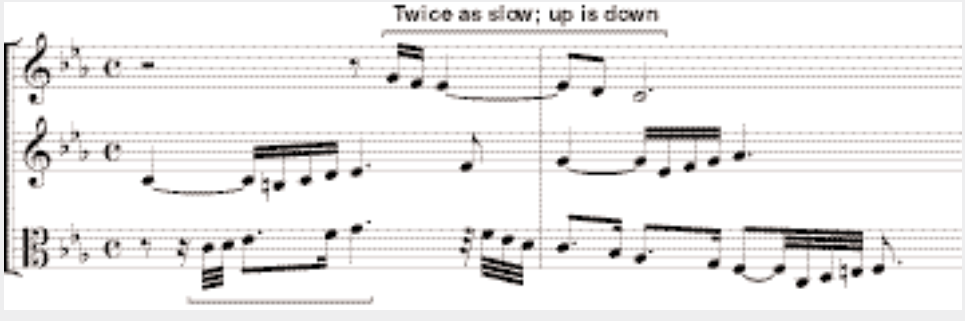


FIGURE 4. *J.S. Bach, "A Musical Offering," Canon a 2 per Augmentationem contrario Motu.*



The only other canon for which he inscribes a message in words to the King is the "Canon a 2 per Tonos," where, when the canon comes back around to its beginning, it has moved one whole step upwards. When this cycle is itself repeated six times, the canon will have modulated through the entire octave (C-D-E♮-F♯-G♯-B♭-C). The two contrapuntal voices, a fifth apart, also follow this modulation, with the second voice carving out a completely different space (G-A♮-B♮-C♯-D♯-F-G). Between the two progressions, all half-steps are sung. Additionally, the listener might smile broadly upon discovering that the quickly-stated, half-step *descent* of the original theme, has now found a greatly expanded, whole step *ascent* over the entire, extended canon. Bach achieves this, in part, by welding elements of the half-step response from the original theme, into the opening of the fugal theme [SEE Figure 5]. Instructs Bach: "Ascendenteque Modulatione ascendat Gloria Regis" ("And as the modulation rises, so may the King's Glory").

In the second "Canone perpetuo," instead of the contrapuntal voices simply mirroring each other two octaves apart (as they did in the "Canon perpetuus" [Figure 2]), Bach now has the theme itself mirror itself, and in contrary motion. Having the theme turned on its head (now downwards G-E-C-B, and up to A♭) is one of the most powerful sections of the entire pedagogical exercise [SEE

Figure 6(a)]. All of the delicious implications of the original five notes appear in this *tour de force*: now C-E♭-G-A♭-B♮ is heard with multiple connections, including C-G, A♭-B♮, C-B♮, G-A♭, C-A♭, and B♮-G; but also the pairs-of-pairs, C-G/A♭-B♮, C-Ab/G-B♮, and so on. (And this simplification excludes the deeper role of the E♭ "fulcrum.") Also, in this canon, the A♭ is finally taken upward by half-step to the C, using the only section of the scale not yet sung in half-steps, A♭-A♮-B♭-B♮-C [SEE Figure 6(b)]. Significant portions of the argument for a six-voice canon now has been accomplished by Bach.

Bach now takes up a riotous extension of the main theme being turned on its head [SEE Figure 7]. Not only does he pose the puzzle of the initial five notes being heard backwards and forwards, but he requires a solution where, once the whole of the original theme is heard, the whole of the theme is heard in reverse; and the con-

FIGURE 5. *J.S. Bach, "A Musical Offering," Canon a 2 per Tonos.*

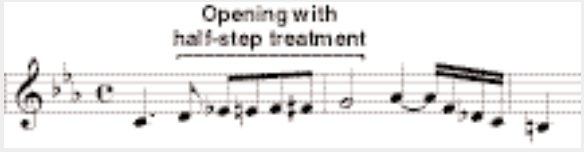


FIGURE 6. *J.S. Bach, "A Musical Offering," second Canone perpetuo.*

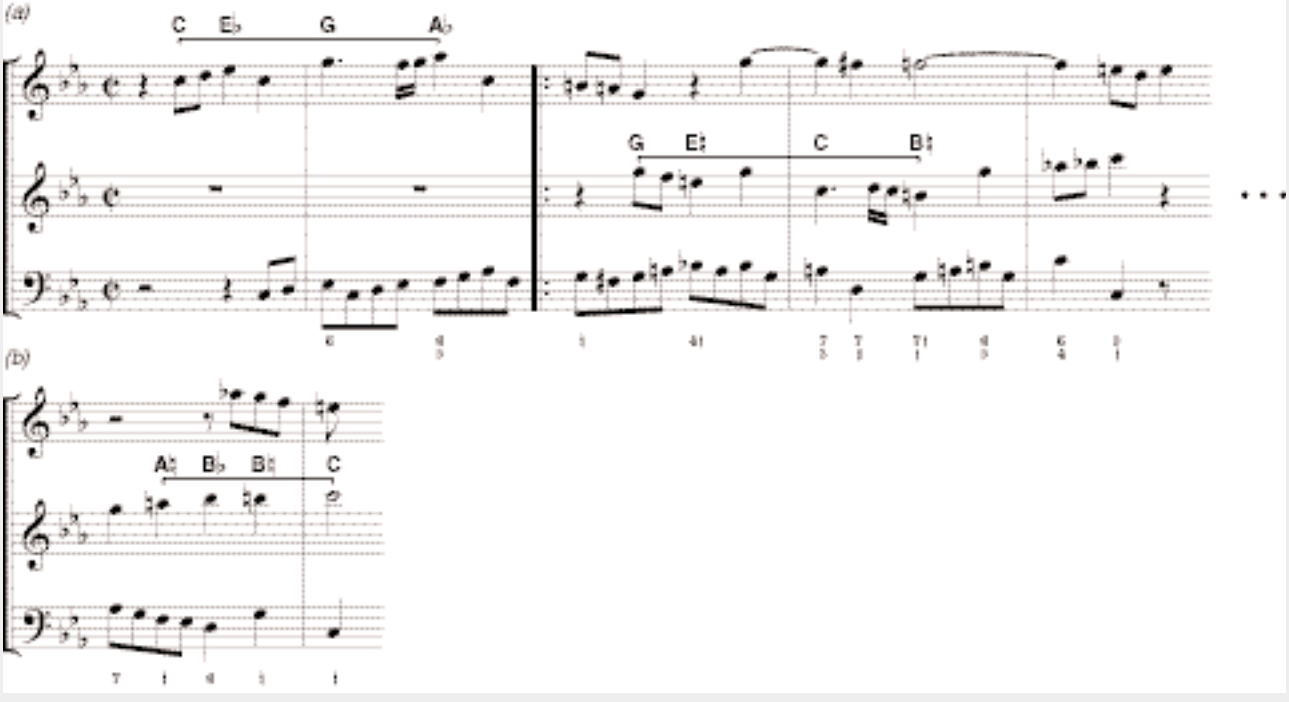
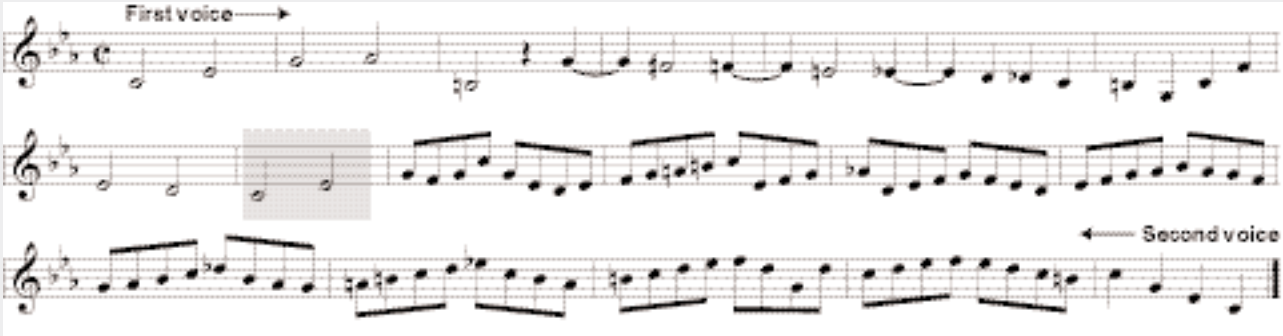
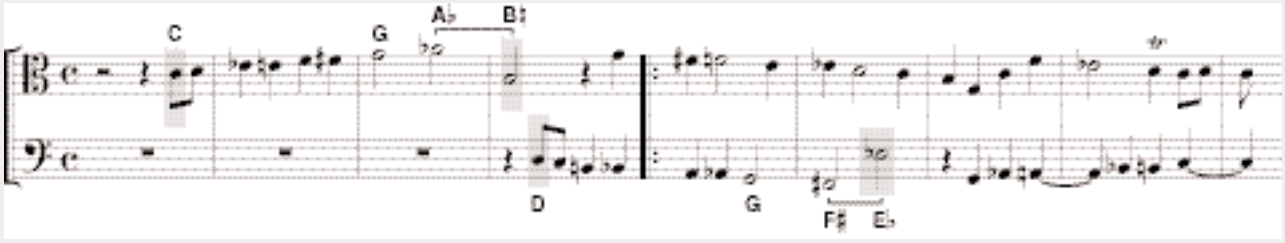


FIGURE 7. *J.S. Bach, "A Musical Offering," Crab canon.*



Both parts work toward each other from both ends, going "through the looking-glass" at the highlighted measure.

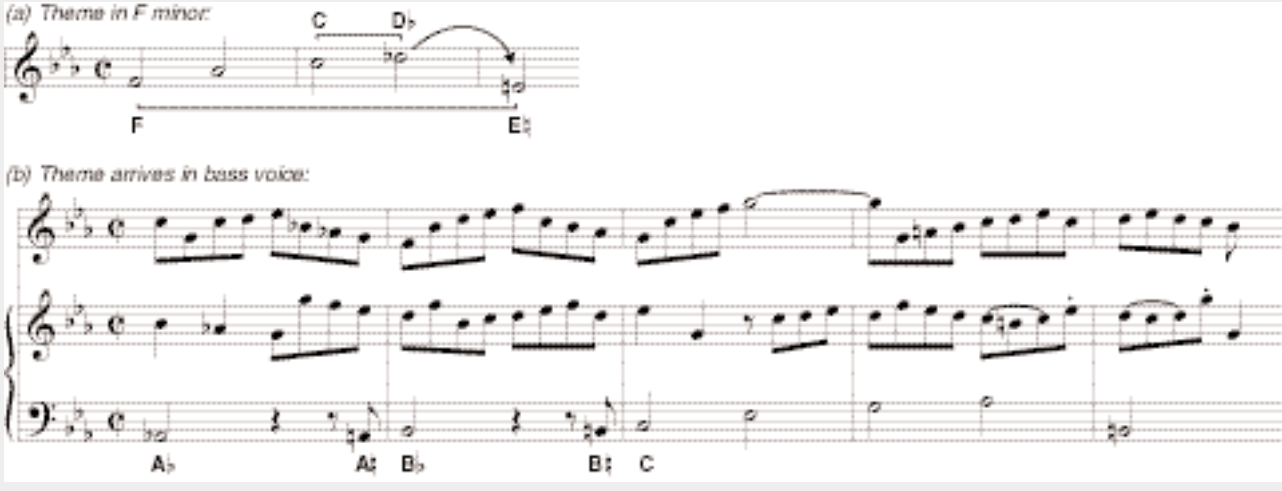
FIGURE 8. *J.S. Bach, "A Musical Offering," Canon in contrary motion.*



trapuntal voice must be designed to do likewise, simultaneously. Or, one voice sings the theme and the new solution material, one after the other; while the second voice starts at the end of the solution material, and does everything the first voice does, but in reverse. They cross each other at the middle, exchanging a C for an E♭ (and *vice versa*). Its colorful name is the "Crab Canon," since it is said that one cannot distinguish from the way the crab walks, whether it is proceeding forwards or backwards! For the King to hear both voices from "beginning" and "end" simultaneously, would be to allow a small taste of the point of view of God—something later powerfully expressed in a remark by Mozart, where, in reflecting upon his relationship to his worked-out composition, he posed that he heard the whole work at once, in a single moment.[4] While the "Crab Canon" occupies a half-minute or so of measurable time, the hearer is invited to concentrate on that which moves forward and backward simultaneously, an action that takes the hearer outside of time altogether. While not the same as Mozart's sublime moment, nonetheless a unique glimpse of such is engineered by Bach's provocative composition.

Bach now constructs a canon for two voices, moving in contrary motion [SEE Figure 8], but hinged at the G—that is, the first voice sings the five-note opening upwards from C to the G (then A♭ down to B♮), while the second voice in contrary motion, goes down from the D to the G (then F♯ up to E♭). This choice poses the original "B♮ question" against a new "E♭ question." That is, it is designed so as to exploit the pair-of-pairs, D-E♭/C-B♮ (highlighted in Figure 8), instead of the original pair-of-pairs, G-A♭/C-B♮. So, the half-step D-E♭, which emphasizes the overlooked E♭ from the original theme, is brought out. Now, the double pairs emphasize the higher-order comparision of the F♯-E♭ leap with the A♭-B♮ leap, putting, in the mind, two actions: E♭ against B♮. The two diminished-sevenths, A♭-B♮ downwards and F♯-E♭ upwards, being contrasted, emphasize the higher-order comparison of the two half-steps, B♮-C with E♭-D. Recasting the contrasting pairs of helf-steps so as to exploit the overlooked E♭ (from the original theme's five notes), gives Bach a wholly new way to move through the fugal material.[5] Powerful developments ensue, as Bach geometrically transforms previously heard relationships.

FIGURE 9. *J.S. Bach, "A Musical Offering," Fuga canonica in Epidiapente.*



The listener can compare the power, and efficiency, and beauty of this E♭/B♮ hypothesized way of traversing the musical relationships, against that of the previously-developed A♭/B♮ hypothesis. Perhaps even a monarch could do as much.

The next-to-the-last canon (not displayed) pulls together much of what the listener has heard, here presented rather gracefully. Each of four voices enters only after the preceding voice has finished its thought. So, at the end of four presentations of the original thematic material, there are three other songs going on, pulling from the relationships of the other canons.

Finally, in the "Fuga canonica in Epidiapente," Bach has two upper voices sing the original theme, unaltered, but with the second voice following both a fifth above the first voice, and also after the first voice finishes the whole eight-measure theme (plus two measures of a "bridge"). The second voice, being a fifth above, replaces the A♭-down-to-B♮ assertion, with E♭-F♯—pulling together in a different way the E♭/B♮ relationship from two canons ago. Meanwhile, a lower voice plays a contrapuntal part. For the second go-'round, Bach has the theme enter in F-minor, the subdominant, so the A♭-B♮ leap-idea is now D♭-E♮ [SEE Figure 9(a)]. (And the treatment of the pair of half-steps, D♭-C versus E♮-F, picks up on the last of the unresolved suggestions from the original fugue's half-step answer.) Now, when the second voice responds a fifth above, it is singing in the original C-minor key, identical to the original first voice (but an octave higher). The mind hears inversions—inversions of the fifth (C-G up, C-F down), inversions of the two voices, even inversions as to how half-steps are treated (relative to the original fugue's presentation of half-steps). The mind has a manifold of choices to make in hearing the voices, and conceptualizing the geometry. Fortunately, the arguments made by Bach throughout the canons have equipped the mind to function with much greater connections, *different kinds of connectedness,* and so, with higher dimensionalities. The third and final go-'round of the theme in this canon [SEE Figure 9(b)], has the finality of the lowest voice seizing the theme away from the upper two voices, and entering in C-minor, an octave below the original (instead of the octave above just heard). Importantly, the two measures of "bridge" material leading into this, have the lowest voice broadly articulating the A♭-A-B♭-B-C—the half-step sequence, upward from A♭ to C—that was left untreated from the original fugue. Relative to the original five notes, what was heard "through a glass darkly," is now heard mind to mind. A glorious conclusion ensues.

Now, may the "Ricercar a 6" commence. A musical work titled "ricercar" implies both a work that is learned (the verb "ricercare" meaning "to search"), and an instrumental work thought of in terms of vocal motets. This nicely refers to Bach's lifelong polemic for the unification of the mind working and the emotions singing. But, further, the acrostic Bach wrote on the word "Ricercar" conveys his hint to the King regarding the reason for the pedagogy of the canons. He explains: "**R**egis **I**ussu **C**antio **E**t **R**eliqua **C**anonica **A**rte **R**esoluta" ("At the King's

J.S. Bach's American Legacy

The American Revolution of 1776-1789, was made possible by the growing political influence of a cultural revolution spreading throughout Europe. This was the so-called Classical revolution, led by the avowed defenders of the legacies of Gottfried Leibniz and Johann Sebastian Bach, the leading cultural opposition to the French and British Enlightenment of that time.

The scientist, and leading then-influential advocate of Leibniz's work, Göttingen University's Abraham Kästner, Gotthold Lessing, and Moses Mendelssohn, were the central figures in this revolution. Without the direct and effective intervention of these leaders of the Classical-Greek resurgence, there would have been no Carl Gauss, no Bernhard Riemann, no Josef Haydn, no Wolfgang Mozart, no Friedrich Schiller, no Johann Goethe, no Ludwig van Beethoven, no Franz Schubert, no political liberation of the Jews in Central Europe, and so forth and so on. It was this Classical upsurge, to which Benjamin Franklin was personally and directly linked, which viewed the American republican cause's victory over the British monarchy as the hope for the cause of freedom inside Europe itself.

If we trace the Classical influence into the Seventeenth-century North America around the Winthrops and Mathers, and the role of Mather follower Benjamin Franklin, it was the influence of Leibniz, through these and related channels, which is chiefly responsible for the political philosophy and economic thinking of the 1776 Declaration of Independence, the Preamble of the 1789 Federal Constitution, and the 1789-1791 economic policies of U.S. Treasury Secretary Alexander Hamilton.

—Lyndon H. LaRouche, Jr.,
from "Call Them 'The Baby Doomers,'"
Executive Intelligence Review, July 21, 2000

Command, the Song and the Remainder Resolved with Canonic Art"). If the king desires to hear an example of the reputed, amazing powers of the extemporizer Bach, then the monarch should sum up, or integrate, the different parts into the whole, and so, deliberately make his own mind grow. Just as the word itself, "ricercar," the six-part ricercar becomes, in Bach's hands, a metaphor for this project.

Bach's Strategic Offensive

Bach was clearly on an offensive. In the dedication of *A Musical Offering,* he established a public standard for the King to live up to: "... it has none other than this irreproachable intent, to glorify, if only in a small point, the fame of a monarch whose greatness and power, as in all the sciences of war and peace, so especially in music, everyone must admire and revere." Frederick had surprised Europe at his military prowess in his first five years as king. However, Bach clearly knew from his son Emanuel, that Frederick's musical sensibilities betrayed a monarch who was, as yet, still a work in progress.

Further, shortly after returning to Leipzig, Bach's offensive included an invasion of C.L. Mizler's "Societät der Musikalischen Wissenschaften," a group that was at least as conflicted as the Berlin Academy. Mizler had been a student of Bach, and of the University in Leipzig, between 1731 and 1734. In 1738, he had initiated his society, to inquire into the science of music, and they circulated papers among their twenty or so members.[6] Bach avoided membership in this association until June 1747, when he sent the members an offprint of the six-part canon from the 1741 "Goldberg" series. Further, he wrote his canonic variations on the theme of a well-known Christmas song, "Von

The Criss-Crossing Paths of Leibniz and Bach

The sixteen-year-old J.S. Bach was likely present and active in the court of Celle in 1701, at the same time that G.W. Leibniz was there, concluding the successful negotiations with Queen Sophie and the English ambassador, John Cresset, over the succession to the English throne. Leibniz had just designed the commemorative medal for the coronation of Sophie's son-in-law as King Friedrich I of Prussia. And Sophie's daughter, Queen Sophie Charlotte of Prussia, had just established Leibniz's Academy of Sciences in Berlin. During this whirlwind of successes by Leibniz in 1700/1, Bach had begun study at Lüneburg in Brunswick. His voice scholarship allowed him to study Latin, Greek, and arithmetic.

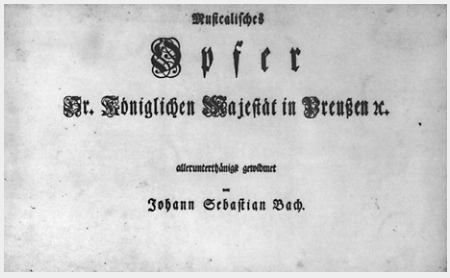
Bach is believed to have accompanied a dancing master, Thomas de la Selle, to musical events in the court of Celle, where Leibniz was then carrying on the negotiations. Further, when Leibniz worked in Lüneburg, he took his meals at the school where de la Selle was employed—a school for nobles, adjacent to the school for commoners attended by Bach. At the very least, the budding musical genius cannot have failed to take note of the acknowledged, leading scientific and political genius of the courts of Brunswick, where he was being educated.

It is also possible that the genius Leibniz might have taken notice of young Bach. Bach's first organist position after his schooling began at Arnstadt, where the cultural life was overseen by Augusta Dorothea. She had brought to Arnstadt the theatre plan modeled on that of her father, Duke Anton Ulrich of Wolfenbüttel—Leibniz's close associate for decades. Leibniz visited and strategized with him at Wolfenbüttel repeatedly, and became his librarian. Leibniz proposed that Anton Ulrich head a society to revive the German language, and the Duke requested Leibniz pursue projects on re-unifying Christendom! Later, Leibniz would become Councillor to the two courts, Russia and Austria, into which Anton Ulrich's granddaughters were married.

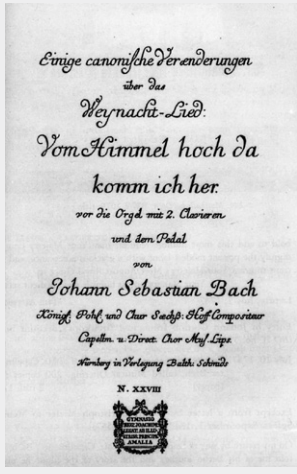
Although it is recorded that Leibniz attended concerts with the Duke, it is not known whether Leibniz accompanied the Duke, when he attended a concert at his daughter's Arnstadt, in August 1700. (The poet for the cantata they heard, Salomo Franck, would later work closely with Bach.) When Bach began at Arnstadt, in August 1703, Leibniz was visiting with Augusta Dorothea's uncle in Brunswick. Of note is that the generous terms offered to the young organist Bach, suggest that his reputation might have preceded him. One real possibility would have been that Anton Ulrich or Leibniz had heard Bach, either at the Celle court, or at the Lüneburg school.

—DS

The Granger Collection



By the mid-1740's, Bach was on a musical/scientific offensive. For entry into the Societät der Musikalischen Wissenshaften, he wrote canonical variations on the Christmas song "Vom Himmel Hoch" (right), and submitted a portrait in which he displayed a six-part canon based on the theme of the "Goldberg Variations" (left). **Above:** *Title page, "A Musical Offering," dedicated "to His Royal Majesty in Prussia."*



Himmel hoch," for the society. And, the painting of Bach sent to the society has the six-part canon based on the "Goldberg" theme presented in puzzle form. Since Hausmann's painting is from 1746, it would appear that this intervention was planned no later than then, probably about the same time as he began his *Art of the Fugue*.

There was much to concern Bach about Mizler's group, and about Frederick's court, at this time. In particular, starting in 1745, with Frederick's appointment of Pierre de Maupertuis to head the Berlin Academy, true scientific pursuits were being put aside, and the extirpation of Leibniz's methods and memory were the order of the day. Bach's *Musical Offering* intervention came at the peak of a heavy-handed Academy contest, staged to dispense with Leibniz's philosophy and methods. Bach's display of the power of mind was undeniable. The attempted execution of Leibniz was not successful, and the next major attempt was not launched until after Bach was buried.

However, even though Frederick indicated, years later, that he was powerfully struck by the power of Bach's method, there is no evidence that the King gave the canons the sustained thought required. The King would give the copper-engraved *Musical Offering* to his sister, Princess Anna Amalia, who would later establish the crucial repository for Bach's works.[7] She would appoint Emanuel as the "Kapellmeister" of her court. Emanuel, who played music with Frederick almost daily, would offer most succinctly the proper encapsulization of Frederick's problem: "If you think the King loves music, you are wrong; he only loves to play the flute. But if you believe that he loves to play the flute, you are wrong again; he only loves his flute."

'Such Mice Are We'

The mental and emotional health of leaders of nations is a matter of state. The methods of Venetian intelligence warfare involved identifying and exploiting the weaker, or more immature, aspects of the leaders and their followers.[8] Republicans had to employ powers of truth and beauty to bring the mental and emotional capacities to maturity. In Frederick's case, it was Voltaire who had suggested to him years earlier, in 1738, that the Newtonian Maupertuis should head the Academy founded by Leibniz. Let us pick up the battle for Frederick's mind and soul there, in the years just prior to his becoming king in 1740, before returning to the battle in 1747.

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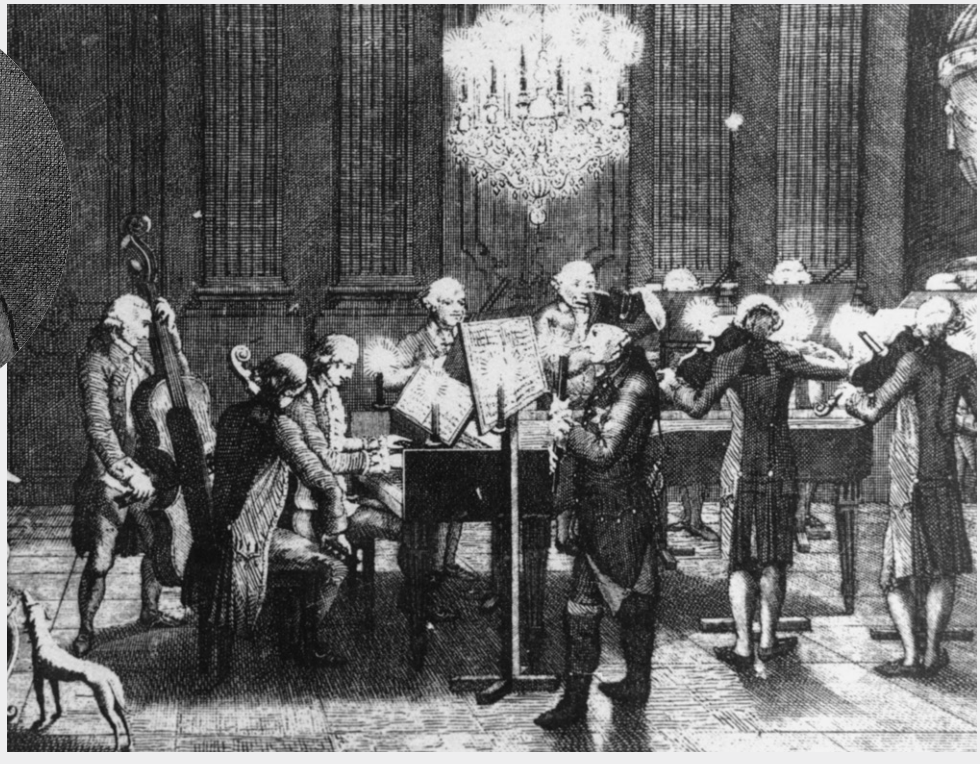

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C.P.E. (Emanuel) Bach was appointed to Frederick's court in 1738, serving there for thirty years. He played music with the King almost daily. **Right:** *Emanuel Bach, at the harpsichord, accompanies Frederick II, on the flute.*

Frederick was a struggling and confused prince in 1736. He sympathized with the persecuted Professor Christian Wolff, who claimed to be an exponent of the ideas of Leibniz, thinking Wolff's defense of the morality of Confucius, and the "close geometrical sequence" of his metaphysics, worthy of admiration. A pseudo-revival of Leibniz had begun in Berlin in 1736, with the founding of the "Societas Alethophilorum," by a former Saxon minister, Graf von Manteuffel. (The new society's commemorative medal featured Leibniz on one side, Wolff on the other.) Another Saxon Minister, Suhm, made Wolff more readable for the prince, by translating the material into Frederick's preferred French.[9]

Frederick's first letter to Voltaire (1736), citing his admiration for Voltaire's "Henriade" (on Henry IV), upheld Wolff's defense of the Leibnizian tenet of the coexistence of reason and God. Voltaire responded: "It does not seem likely that the First principles of things will ever be known. The mice that nestle in some little holes of an immense Building know not whether it is eternal, or who the Architect, or why he built it. Such mice are we; and the Divine Architect who built the Universe has never, that I know of, told his secret to one of us."

In November 1737, when Prince Frederick wanted to investigate what Voltaire and his mistress, Emilie du Chatelet, were doing at her estate in Cirey, France, he sent his close aide, one Colonel Keyserling. (If Frederick's Colonel was connected to Bach's champion, Count Keyserling, then it is likely that they would have also been privy to these developments around Frederick.)[10] They would have discovered that, along with his fellow mice, Maupertuis and Emilie, Voltaire was buried in Newton's writings, preparing the assault on Paris and Berlin.

Meanwhile, Bach had been teaching since 1723 at the famous Thomas-schüle in Leipzig, part of Saxony.[11] In November 1736, the Saxon court in Dresden, which was at that moment involved in the "Leibniz promotion" around Frederick, made Bach the Court Composer to the Royal Majesty in Poland and Elector of Saxony, Frederick Augustus. This promotion of Bach was largely the work of Baron von Keyserling, who was then the ambassador for Russia to the Saxon court. Keyserling had arrived in Dresden in 1733, having held the president's chair of the Imperial Academy of Sciences at St. Petersburg. (This would have been during the first decade of the establishment of the St. Petersburg Leibniz-designed Academy.) Bach's eldest son, Wilhelm Friedemann, had secured his first position, also in Dresden, that same year. And, it was only earlier that year, that Frederick Augus-

tus had become the new ruler over Saxony. Bach himself was quite active before the Dresden court that year, but he suffered several years of harassment at Leipzig, before Keyserling, and the Prime Minister von Brühl, in 1736 succeeded in conquering three years of opposition to his promotion.

There exists today a beautiful crystal goblet in the Bach House in Bach's home town of Eisenach, thought to have been made in Dresden, c. 1735. It was a gift to Bach, undoubtedly from Keyserling's circles, and it speaks volumes about their deliberations over his conceptions and, consequently, his strategic importance. The musical inscription is composed of four lines of four notes apiece, with accompanying text: "Dearest Bach! Clamors ah! Hopes for life That you alone can give them. Therefore, hear their longing ah! Dearest Bach!"[12] Whether from Keyserling, or from a Dresden associate of his, the calling forth to Bach to lead, at the time that this group was fighting for Bach's promotion at the Saxon court, is clear. However, the enigmatic musical notes indicate much more, with each of four lines having a "pairs-of-pairs" of half-steps. Accompanying "Dearest Bach!" at the beginning and end, are two "pairs-of-pairs": Bach's name is spelled out in musical notes, B♭-A C-B ("BACH" as it appears in German); then the other two pairs in the two middle lines, G-G♯ F-F♯, and E-D♯ D-C♯. Included amongst these are both the "pair-of-pairs" from Bach's last work, *The Art of the Fugue*, along with material suspiciously close to the answer material in *A Musical Offering*. It indicates that these ideas were central to discussions in Bach's Dresden group not later than 1736, the year he received this, his highest official appointment. Further, it strongly suggests that Frederick did not invent the *Musical Offering* theme he posed to Bach in 1747,

Celebratory goblet shows material from "A Musical Offering" and "The Art of the Fugue."

but that he was likely briefed on the subject by someone in, or connected to, Keyserling's group. Keyserling and/or Emanuel Bach, both being in the Prussian court, and arranging for Bach's 1747 meeting with Frederick, are the obvious candidates.[13]

In 1737, Bach was publicly accused by one Johann Adolph Scheibe of the crime of introducing big, complicated ideas in his music. Scheibe claimed that the simple Bach was not aware of the proper rules of culture that had been laid down by his teacher, J.C. Gottsched. Controversy reigned for the next two years, as Bach was obviously thought to be dangerous. Regardless, Keyserling's intervention had allowed Bach to consolidate his position, and as of April 1738, he was selected to present a cantata on the occasion of the betrothal of the Saxon Princess Amalia. Scheibe would retire from the brawl, only to be brought out at another opportune moment.[14]

In 1738, Bach's son Emanuel was attached to the court of Prince Frederick, where he would serve for the next thirty years. He was a close friend of Keyserling's eldest son, Heinrich Christian, a student in Leipzig at the time.[15] Emanuel later recounted that Keyserling had arranged for him to accompany Keyserling's eldest on an extended tour of the continent for the completion of their education. The trip was interrupted, however, by Emanuel's being offered the appointment to Prince Frederick's court just at the moment of a crucial, strategic brawl was breaking out around Frederick. It is likely that Keyserling, who obviously trusted Emanuel, either arranged the appointment, or suggested it to another in Frederick's confidence (e.g., Count Schaumburg-Lippe, or the Colonel Keyserling). If so, then it also suggests that Keyserling judged it timely to interrupt his plans for his son, in order to deal with the situation around the prince.

Leibniz *vs.* Newton Replayed

In July and August of 1738, some version of the historic fight between Gottfried Leibniz and Isaac Newton from earlier in the century broke out during the completion of the education of Frederick. The principals pitted against each other were Count Schaumburg-Lippe,[16] versus the Venetian Party of Great Britain. It was a replay of the brawl the Venetian Party around Newton had launched a generation earlier (1711-1716), against first Leibniz, and then his student Caroline, the new Princess of Wales. It was a brawl that Bach would have been quite familiar with.

Leibniz had created the possibility, by his 1701 negoti-

ations resulting in England's Act of Succession, that his main supporter and student, the Prussian Queen Sophie Charlotte, would succeed to the throne of England. Thus, by 1713, Leibniz was in position to end two centuries of Venetian operations against Europe. Holding high positions of government in the Russian and the Austro-Hungarian Empires, and significant influence and respect in important circles of Prussia and France, he was on the threshold of adding England to his Grand Design. But Sophie died in 1714, before claiming the English throne. When, weeks later, England's Queen Anne died, and Sophie's son, George, became the King of England, Leibniz's student Caroline, who was George's daughter-in-law and the Crown Princess, became the target of the Venetian Party's mopping-up operations against Leibniz in the London court. Although Leibniz held high positions and intellectual authority in the Russian court of Peter the Great, and in the court of the Austrian Empire, George refused to allow him, despite his title of Court Councilor, to hold any position in the very government in England he had negotiated into existence. George even told the Austrian Emperor not to employ or trust such as Leibniz. The terror of Leibniz was so profound that, after having served the court of Hanover for four decades, he was not even allowed to appear in London.

Caroline complained to Leibniz by letter, of the low-level, materialist thinking amongst the so-called intellectuals she found around the English court. But, over the course of Leibniz's last year, Caroline was alone against the likes of Newton, his stand-in Samuel Clarke, and the "mediator," the Venetian operator Antonio Conti, who would work her over for hours on end. Today, the six Leibniz-Clarke letters document the policy fight that would shape the English world for the next three centuries, between the two opposed, strategic views of mankind, science, creativity, morality, and God. When Leibniz died in November 1716, although the whole court was invited to his funeral, and he was their senior Court Councilor (and the King was nearby, at his hunting lodge), no one attended. The silence was deafening. Nevertheless, the issues articulated by Leibniz in the Leibniz-Clarke letters, would be the basis for creating the "temple of liberty and beacon of hope," called the Ameri-

Prints and Photographs Division, Library of Congress

Sir Isaac Newton

The philosophical conflict between Leibniz and Newton was mirrored in a strategic battle against Venetian control of England's throne. When Leibniz's protégé Queen Sophie Charlotte of Prussia predeceased her relative Queen Anne of England, and Anne died without issue, the House of Hanover assumed the English crown under Sophie's brother, who became George I. Leibniz maintained influence through George's daughter-in-law Princess Caroline, who found herself under direct attack by the Venice-run "Newtonians."

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G.W. Leibniz

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George I of England

Betmann/CORBIS

Princess, later Queen Caroline

can republic, sixty years later.

In 1738, Queen Sophie Charlotte's grandson, Frederick, was being prepared to be King of Prussia. That summer, in Holland, he had entered into a series of discussions with his cousin Princess Anne, the eldest daughter of Caroline and her husband King George II.[17] They revisited the specifics of the Leibniz-Clarke letters of the fight over her mother, Caroline, twenty-two years earlier. Frederick reported the discussion to Voltaire on August 6, 1738: "I have talked a great deal about Newton with the Princess . . . from Newton we passed to Liebnitz, and from Liebnitz to the late Queen of England [Leibniz's student Caroline] . . . who, the Prince told me, was of Clarke's sentiment." Here, the Prince of Orange, Anne's husband, was boasting to Frederick that his recently-deceased mother-in-law, Caroline, had been won over to the Newtonians' ideology.

Frederick's letter was in response to a suggestion from Voltaire, that Maupertuis be appointed to head, i.e., refashion, the Berlin Academy of Sciences. Voltaire was immersed with his mistress, Emilie du Chatelet, at her estate in Cirey, France, in their project to extend the London operation against Leibniz to the continent. Emilie would produce the first French translation of Newton's *Principia*.[18] In sum, while the Venetian Party of London was running the Newton operation on Frederick in the summer of 1738, Voltaire was pushing Frederick to appoint the Newtonian Maupertuis to head Leibniz's Berlin Academy.

That very same evening, August 6, 1738, Frederick dined with Count Schaumburg-Lippe. They had been in discussions for at least several weeks. The Count's circle included a Graf von Kielmannsegge and the Baron de Bielfeld, who would write (in 1763) that Schaumburg-Lippe had won Frederick over to his way of thinking, and even inaugurated him into his specific Freemasonic lodge in August 1738. Without evaluating the claim about the lodge, it is enough to indicate that this circle certainly knew intimate details about the operation against Leibniz a generation earlier.

First, the Kielmannsegges had been one of the few defenders of Leibniz and of Caroline in London at that time. In January 1716, Baron von Kielmansegge had led the group of ambassadors who examined the documents which, according to Newton, proved the plagiarism of Leibniz, finding them insufficient. And, second, Schaumburg-Lippe's mother, Countess Bückeburg, had been close to the Crown Princess Caroline during the previous decade, when Caroline had been a student of Leibniz.[19] Besides Leibniz, the Countess and Caroline were the closest to Sophie, even to the point of being the last two with her when she died in 1714. And with

The Leibniz-Newton Conflict

Leibniz summarized the core of the misguided philosophy that gripped England, and that was being forced upon his student, the future Queen Caroline of England: "Natural religion itself seems to decay [there] very much . . . Sir Isaac Newton and his followers also have a very odd opinion concerning the work of God. According to them, God Almighty needs to wind up his watch from time to time, otherwise it would cease to move. He had not, it seems, sufficient foresight to make it a perpetual motion. . . . I hold that when God works miracles, he does not do it in order to supply the wants of nature, but those of grace. Whoever thinks otherwise must needs have a very mean notion of the wisdom and power of God."

Leibniz taught that God had created beautifully, and that the harmony of His mind and His creation reflects this beauty. This, indeed, is miraculous, and an act of grace. God did not create a material world with an innate, fixed quantity of energy which periodically ran down. Such a view of matter and energy would leave man as a passive consumer, dependent upon miracles to avoid destruction. Rather, Leibniz (and Genesis, and, in fact, the Declaration of Independence's "more perfect union") presented man as struggling to act in the image of his Maker, and thereby creating revolutions in science and culture which both solved earthly problems, and brought us closer to God.

Newton's method masked questions about the physical universe—for example, how gravity works—behind numerological magic, which Leibniz properly compared to a medieval, occult power. By relegating man to a mere measurer of material effects, lacking the power to act on the universe for the good, he left man as a steward of some universal estate, awaiting the Lord to avert disaster, or perhaps not.

Leibniz' investigation of the multiply-connected geometries of light moving through the physical world, and Bach's investigation of multiply-connected heard ideas moving through the mind, would not allow for answers that left man out of God's ongoing project. At the core of the fight between Newton's "British Empire/feudalist" view and Leibniz's "American/republican" view, was an argument over God, the human race, work, physical space-time, and happiness. *—DS*

Sophie gone, Caroline's two strongest supporters were Leibniz, by correspondence, and the Countess Bückeburg. Her son, the Count Schaumburg-Lippe, was raised by her in the midst of the 1701-16 battle for control of the English throne. Hence, in 1738, both Schaumburg-Lippe and Graf von Kielmannsegge were well-positioned to understand the nature of the operations against the Crown Prince Frederick.

Voltaire's group evidenced a need to escalate. In 1739, Voltaire, Emilie, and Maupertuis brought to the Cirey retreat a Professor Samuel König, who was familiar with the papers of Leibniz which still existed in Switzerland, centered around Leibniz's Bernoulli-family collaborators. The Cirey Newton-promoters evidently thought that they needed to cast a wider net, perhaps borrowing some Leibnizian terminology for their operations on the continent. König, who had been retained to instruct Emilie on methods involving maxima and minima, found her ideologically wedded to a notion of the infinitely small (where little, hard balls could be made as little as the imagination needed, to accomodate virtual reality). While he did not last there long, quickly resigning, König would not have much trouble recognizing the attacks by Maupertuis on Leibniz's concepts of monads (1746) and of least action (1750).

Further, in September 1739, the British Lord Baltimore visited Frederick to discuss Newton and Locke, plus Frederick's plans for Prussia. Frederick composed a rhymed letter to Baltimore after the visit, reprising these subjects. He sent along a copy of this report to Voltaire at Cirey. Lord Baltimore had brought the younger, and prettier, Signor Francesco Algarotti.[20] The 27-year-old Venetian, Algarotti, had written *Neutonianismo per le Donne* (*Newton for Ladies*), published in 1735. This early work promoting Newton on the continent, established Algarotti as an agent for Antonio Conti, the Venetian trouble-maker who manipulated the court in London against Caroline and Leibniz in 1715/16. Since Algarotti had also been a regular visitor to Voltaire and Emilie at Cirey, it is likely that Algarotti's promoter was also the promoter of the Cirey operation. Between 1739 and 1742, Frederick became quite taken with Algarotti.

By the time that Frederick became king in May 1740,

Venetian networks on the Continent deployed to manipulate Frederick II, and gain control over the Leibniz-inspired Berlin Academy. **Clockwise from left:** *Voltaire, Voltaire's mistress Emilie du Chatelet, mathematicians Pierre-Louis de Maupertuis and Leonhard Euler, and the Venetian Francesco Algarotti.*

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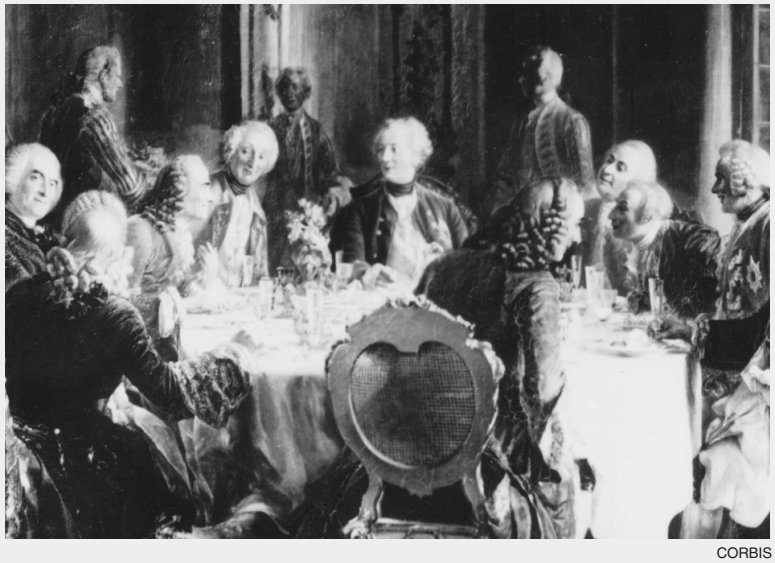
Frederick II (center) entertains Voltaire (to left) and friends at the Sanssouci Palace.



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Count Schaumburg-Lippe's access to him, evidently, was closed off. That British intelligence took Schaumburg-Lippe's presence most seriously, is reflected in Thomas Carlyle's comments over a century later. Writing with access to the spy files of the British cabinet, his biography of Frederick first rather snidely disparages Frederick's 1738 discussion with Caroline's daughter. Regarding Leibniz's warning to Caroline of the sickness of soul behind the British adoration of Newtonian philosophy, Carlyle writes: "[Enough of] that important theological controversy now dead to mankind. . . . Pity that we can not give these two Letters [between Voltaire and Frederick] in full. . . . [It is material] now fallen drearily extinct, studiable by Editors only!" Then, he continues on about Schaumburg-Lippe: ". . . within a two years of this [1738] Brunswick scene, we find Lippe used proverbially for a type-specimen of Fools . . . a windy fantastic individual, overwhelmed in financial difficulties too!" Cut off from Frederick, he still wrote to the King in Berlin, but "only Secretaries now answered him . . . ." It were likely that Carlyle's files on Schaumburg-Lippe's finances would provide clues as to who kept him away from Frederick.[21] In the last two years before Frederick became king, Schaumburg-Lippe got battered, and Conti's Newtonians had Voltaire and Algarotti influencing Frederick. Although the Leibnizians around Keyserling seem to have had only Bach's son, Emanuel, inserted into Frederick's court, they created other options, centered around Bach's pedagogy.

Voltaire's Problem: Bach, Itzig, König, and Franklin

The period between Frederick's accession to power in 1740, and the *Musical Offering* intervention in 1747, reveals several attempts to promote culture and science around the Berlin Academy—up until 1745, when Voltaire finally got his way. Frederick's appointment of Maupertuis as President of the Academy, signaled the beginning of the end. These two periods will be covered, to re-situate Bach's offensive, beginning with the years 1740-1745.

In the first year of King Frederick II's rule, several projects were launched by Leibniz's successors. J.P. Süssmilch was elected to the Academy, based upon his work on the necessity of population growth as the source of wealth in a cameralist program. Samuel König had returned to Switzerland, where Emmerich de Vattel launched his 1741 *Defense of Leibniz,* specifically dedicated to Frederick II.[22] Vattel then proceeded to the Saxon court, Keyserling's base, where he was employed by the Saxon premier, Count von Brühl.

Meanwhile, Bach was preparing his "Well-Tempered Clavier," Part II, and then his "Aria with Divers Variations" (the "Goldberg Variations"), importantly, with the set of fourteen pedagogic canons. (One of his students during this time (1739-41), Johann Phillip Kirnberger, would later be key in promoting Bach's methods.) Bach's first visit to Berlin, in 1741, his discussions there with Emanuel, and his strategy sessions with Count Keyserling, all previously mentioned, would have included an appraisal of the problems with Frederick's cultural development. Bach's decision to circulate the pedagogic canons to the "Goldberg Variations" is coherent with an appraisal on his part that Leibnizian science needed to be reasserted. Keyserling's keyboard player, Goldberg, who had been trained by Bach's oldest son, W.F. Bach, would later be the keyboard player in Dresden for Keyserling's political associate (and Vattel's employer), Count von Brühl.

Meanwhile, in Berlin, a love for astronomy seems to have inspired a circle of Jewish scholars, although officially outside of the Berlin Academy. From no later than 1742, the Jewish philosopher Israel Samoscz, working out of the Daniel Itzig household, wrote about, and instructed youth in, mathematics and astronomy. Two of his students were Aaron Gumpertz and the teenager, Moses Mendelssohn, who arrived from nearby Dessau in late 1743, barely fourteen. Mendelssohn's relatives in Dessau, which included the family of Itzig's wife, Marianne Wulff, had led the fight against the peasant backwardness of Jewish ghetto life. They had just published the first edition in almost two hundred years of Moses Maimonides' works, along with an astronomical work by David Gans, a Jewish associate of Kepler. It is even said that the famous Gaon of Vilna, passing through Berlin at this time, amazed the Berlin professors (i.e., Euler) by solving an astronomical problem which had stumped one and all. (This same rabbi would later order one Baruch of Shklov to translate into Hebrew as many of the works of science as possible, reasoning that the lack of scientific knowledge made one "a hundredfold more ignorant of the Torah."[23])

The actions of Maupertuis and Euler between 1745 and 1747 to shut down the influence of Leibniz in Berlin, may have been in part provoked by these developments; but one other major factor may also have been in play here. As late as 1744, Samuel König attempted to organize the Academy's Leonhard Euler, who had originally been trained by Leibniz's collaborators, the Bernoullis, to take interest in the work of van Musschenbroek on elec-

tricity. Simultaneously, the Leibnizian Academy in St. Petersburg in 1744 was pursuing experiments on atmospheric electricity (led by M.V. Lomonosov and G.W. Richman).[24] Further, in 1745, König was directing Euler toward Leibniz's works, suggesting that Euler's use of maximum-minimum methods in his work on the theory of comets, was praiseworthy.

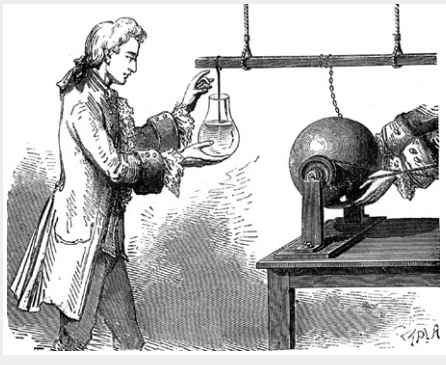
That year, 1745, the Academy publicized experiments on electricity, giving their prize to an experimentalist in Cassel, Professor Jacob Waitz. It is most likely that this award was the specific catalyst for Benjamin Franklin's initial accomplishments with electricity. Franklin would later recall, after his trip to Göttingen (near Cassel), that Peter Collinson, back in 1745, had "sent over an account of the new German Experiments in Electricity, together with a Glass Tube, and some Directions for using it, so as to repeat those Experiments. This was the first Notice I had of that curious Subject . . . ." Between Jewish astronomers in Berlin, and scientific experiments electrifying Germany, Russia, and America, hopeful developments could be expected.

It was at this point, that Maupertuis was brought to Berlin to head the Academy, fulfilling Voltaire's 1738 suggestion to Frederick. The new focus for the Academy was announced in 1746: the new prize essay was oriented around refuting Leibniz's concept of the monad. Maupertuis meant to undercut the Leibnizian framework of physical dynamics, which was proving sufficient to address such phenomena as that of energy moving through the atmosphere. If one wished to deny a rich enough conceptual framework to investigate electrical phenomena, e.g., attacking monads would be a coherent approach for such evil.[25]

König wrote to Euler, July 2, 1746, requesting clarification on the announced prize competition, as it was evidently an unexpected development, and also a suspiciously short time period for such a serious topic. Also, König apparently had other problems with Euler, requesting him to explain his method of mathematical integration. The correspondence between the two ceased with this letter, suggesting that König had ended his testing of Euler's good faith in scientific pursuits.

Meanwhile, in Bach's Leipzig, a student of the methods of Kepler and Leibniz, Abraham Kästner, was lecturing on philosophy, astronomy, and mathematics. He had attended the University of Leipzig in 1738, at the same time as Keyserling's eldest son, and may well have been in Bach's circles also. In 1746, one of Kästner's students, the seventeen-year old Gotthold Ephraim Lessing, began composing a play, which included a character who makes an academic fool of himself, by writing an essay on monads, without having any actual sense of real

Leibnizian scientific developments welled up around the Berlin Academy during the 1740's, centered in investigation of recently discovered electrical phenomena. **Right**: *Pieter van Musschenbroek, inventor of the Leyden jar, c. 1747.* **Far right:** *Benjamin Franklin conducts electrical experiments.*



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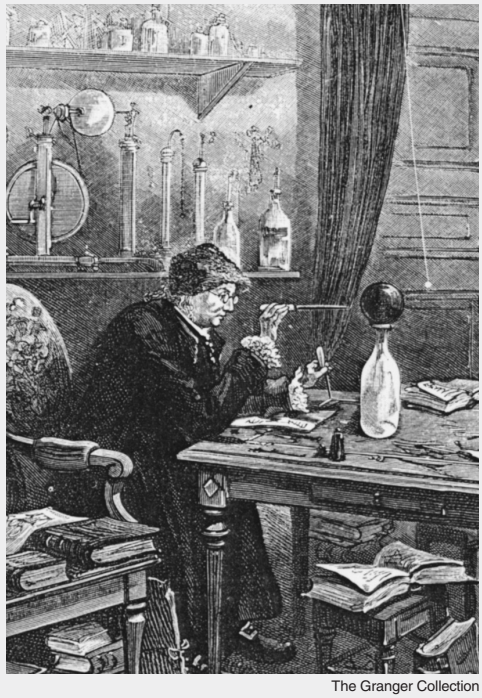

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Moses Mendelssohn

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Gotthold Lessing

Interest in astronomy may have drawn Gotthold Lessing to the Berlin Jewish ghetto. He collaborated with Moses Mendelssohn to defend Leibniz against the Berlin Academy onslaught.

human beings. Obviously, Kästner and Lessing thought Maupertuis' prize contest to be arrant nonsense, worthy of being mocked. They were soon joined by a third, Lessing's older cousin, Christlob Mylius. Mylius, who was also studying at the University, had just published a scientific work on the atmosphere.[26] Mylius was clearly also in Kästner's orbit, if not his direct student. Actually, it were likely that Lessing became a student of Kästner via his older cousin, given that Mylius was working in Kästner's area of Keplerian astronomy for several years before Lessing arrived. Seven years later, upon sending Mylius a copy of Kepler's *World Harmony* for his trip to America, Kästner enclosed a poem. Besides the suggestions that Newton had pulled his material from Kepler, and that Germany had allowed Kepler to be overshadowed by Newton, Kästner's poem also stressed that Mylius' ear for musical harmonies, and his mind for astronomical harmonies, were fundamentally the same.[27] In Bach's Leipzig, from 1746-48, all three—Kästner, Lessing, and Mylius—would evidence their passionate concern over the dumbing-down of the Berlin Academy.

Also in 1746 Leipzig, Bach had made his decision to escalate. While not officially joining Mizler's society until the weeks after the 1747 Berlin trip, he seems to have communicated to Mizler his intention to join them. He sat for the portrait required to be submitted to the society in 1746, and had the painter Hausmann prominently display the six-part puzzle canon from the "Goldberg" pedagogic canons. Also, manuscript evidence indicates that Bach had already begun work on what would be his final masterpiece, *The Art of the Fugue*. Bach would easily have had knowledge of the troubles in Berlin, from either Keyserling or from Kästner—if, indeed, they were not the same operation.

Further, in 1746, his eldest son, Wilhelm Friedemann, had just taken up a position in Halle, after thirteen years with Keyserling in Dresden. It is reported that Wilhelm Friedemann became quite familiar with Wolff's work while in Halle. Hence, when he came to nearby Leipzig in 1747, to accompany his father to Berlin, he would, minimally, have been aware of both Keyserling's and Wolff's objections to the assault by Euler and Maupertuis upon Leibniz.[28] Regardless, it is thought that Keyserling—who also left Dresden in 1746 to be the ambassador to Berlin—played the key role in arranging Bach's encounter with Frederick.[29] Given the extensive possibilities for the father and son to be aware of the controversies in Berlin, and, in particular, given the nature of Bach's powerful, "analysis situs" method displayed before Frederick, it would take an hysterically ideological view—namely, that Bach's music existed in some private world of "entertainment" and circus tricks—to deny Bach's concern over the epistemological warfare against Leibniz, and its effect on Frederick.

Euler: May Stupidity Rule

Euler had the prize-winning essay in his possession by January 1747, a polemical assault on Leibniz's monads by one J.H.G. von Justi. This von Justi would later be rewarded with major positions in Frederick's court, where he would re-write the pro-population arguments of Süssmilch, eliminating his moral underpinnings of science, and casting his argument in more utilitarian garb. It would also fall to von Justi's lot, later in his career, to visit Moses Mendelssohn, threatening him over his published criticisms of the King.[30] However, at the beginning of 1747, von Justi was being promoted by Euler and by a Count Dohna, a high official in Frederick's court.[31] Shortly after Bach's May 1747 intervention on Frederick, an exchange of letters between Euler and von Justi, from June to August, both clinched the victory for von Justi over Leibniz, and co-ordinated an ongoing mopping-up action by von Justi against the expected protestations from Wolff.

Wolff was Euler's preferred opponent in the contest over Leibniz's monads, as he presented at best a watered-down version of Leibniz's concepts, and, consequently, he proved very useful for running operations against Leibniz's actual ideas.[32] (Leibniz's actual writings in this period were largely unpublished, while Wolff's were. Significant efforts to address this were intiated in 1765 by Kästner and R.E. Raspe, scientific colleagues in Göttingen, and in 1770 by Lessing.) Euler could neither defeat, nor even address, the much sharper, "analysis situs" methods displayed by Bach's *A Musical Offering*.

However, later, Euler would brag about the silencing of Wolff, and snidely allude to his knowledge as to how the operation was run: "[Wolff's] followers, who were then [1747] much more numerous and more formidable than at present [1761], exclaimed in high terms against the partiality and injustice of the Academy; and their chief had well-nigh proceeded to launch the thunder of a philosophical anathema against it. I do not now recollect to whom we are indebted for the care of averting this disaster . . . ."[33] Euler could easily have named Count Dohna, Maupertuis, himself, or others.

However, behind his knowing wink, what Euler meant to convey, was that back in 1747, Wolff did submit to cowardly silence, and, in 1761, so ought Mendelssohn and Lessing. Euler would also imply, in the same 1761

letter, that the proper method for dealing with Leibniz's concepts, was one of thuggery, writing that the current defenders of Leibniz (i.e., Mendelssohn and Lessing) were "right in saying that it is a proof of dullness to be incapable of relishing their sublime doctrine; it may however be remarked, that here the greatest stupidity is the most successful." Euler didn't explain his theory of "successful stupidity," but shortly after this 1761 letter, his 1747 prize winner, von Justi, was sent to Mendelssohn to attempt to silence him.

By the summer of 1747, however, Benjamin Franklin had significant success in furthering the electrical experimentation from which the Berlin Academy had strayed following Maupertuis' attacks. In July 1747, less than a week separated the presentation of Bach's *A Musical Offering* to Frederick, and the presentation by Governor Thomas Penn to Franklin and his collaborators, of "a compleat Electrical Apparatus."[34] Before the summer was over, Franklin was happily involved in augmenting the prospects of Penn's colony. He wrote joyfully of a planned, celebratory picnic: ". . . a turkey is to be killed . . . by the electrical shock, and roasted by the electrical jack, before a fire kindled by the electrified bottle: when the healths of all the famous electricians in England, Holland, France, and Germany are to be drank in electrified bumpers, under the discharge of guns from the electrical battery . . . ."

Although Bach's plan to augment Frederick's Prussia did not win the battle that summer, the anti-Leibniz plan of Maupertuis, Voltaire, and Euler was massively disrupted. And, further, the seeds of Bach's longer-term victory were planted and did take root. In the fall of 1747, one of many repercussions ensued. One of the original copies of *A Musical Offering* was sent to Padre Martini in Italy, who, a generation later, would be one of the two most significant teachers of Mozart in his youth. (The other was yet another of Bach's sons, Johann Christian Bach.) Martini's comment on *A Musical Offering* broke from the snobbish Venetian attitude prevalent in some parts of Italy: "It is unnecessary for me to describe the singular merits of Herr Bach, for he is well known and admired, not only in Germany, but also throughout our Italy."

While the von Justi operation was being promoted, with publication over the next year in Frankfurt, Leipzig, and Halle of his more extended arguments against Leibniz's monads, Bach continued his work on *The Art of the Fugue*. The solar system was also heard from, when the solar eclipse of July 25, 1748 proved to be enough of an assertion of outside reality, to inject some health into the deliberations of the Berlin Academy. An astronomy competition regarding the eclipse was won by Lessing's cousin, Christlob Mylius. He and Lessing relocated from Leipzig to Berlin by no later than 1749. Significantly, their residence was in, of all places, the Jewish ghetto, and they were likely working with the astronomer Israel Samoscz and the Daniel Itzig household.[35] What is known, is that in 1749, Lessing collaborated with Aaron Gumpertz, the student of Samoscz, and friend of Moses Mendelssohn. Lessing's play of that year, *Die Juden,* featured a noble Jew, modeled upon Gumpertz, and provoked much controversy. Lessing and Mylius next wrote a work on German theater, published in 1750. The very house in which the two lived and worked, likely owned by Veitel Heine Ephraim, would later become famous as the house where Moses Mendelssohn spent his married life.[36]

Emanuel Bach met with the new Count Schaumburg-Lippe, Wilhelm, upon his father's death in 1748. Regardless of the difficulties that his father had experienced in fighting the Venetian Party for Frederick's mind in 1738-40, his son Wilhelm proceeded to map out with Emanuel their next offensive in Berlin—the upcoming publication of *The Art of the Fugue*.[37] However, another of the likely fruits of their meeting was that Schaumburg-Lippe would employ the 17-year-old J.C.F. Bach at his court, where this Bach son would serve for the rest of his life. J.S. Bach's letter to the Count, October 27, 1749, refers to the conclusion of these arrangements: "I feel deeply obliged to convey my humble thanks for the precious memento Your Imperial Highness has sent me." That the next year, J.C.F. was working on the proof sheets of *The Art of the Fugue,* while in the employ of the Count, indicates some involvement and interest in the project by Schaumburg-Lippe.

Postlude: The Heirs of J.S. Bach

Johann Sebastian Bach died a few months later, on July 28, 1750, following two operations by the eye surgeon Dr. John Taylor, which were deemed questionable in his day. The *Spenersche Zeitung* reported that Bach died "from the unhappy consequences of the very unsuccessful eye operation by a well-known English oculist." Emanuel Bach would publish that Taylor "had recently arrived in Leipzig. But the operation, although it had to be repeated, turned out very badly . . . his whole system, which was otherwise thoroughly healthy, was completely overthrown by the operation and by the addition of harmful medicaments and other things, so

that, thereafter, he was almost continuously ill for full half a year." Taylor must have performed many successful operations, for he was much sought after. However, he would have another famous failure two years later, leaving Bach's colleague Handel blind, but not dead.

Bach's troubles with Dr. Taylor began no later than February 1750, about the time that Voltaire himself was making arrangements for his move to Berlin, to take personal charge of Frederick II. Voltaire arrived a couple of weeks before Bach's death, and was joined by the Venetian nobleman, Alessandro Collini, soon to be Voltaire's secretary. Simultaneously, Maupertuis published *Cosmology,* his most extensive assault upon Leibniz.

Maupertuis' attack on monads formally awarded the victory to von Justi and the anti-Leibnizians, but from 1747 to 1749, Maupertuis had been frustrated by Bach, Kästner, Mylius, Lessing, a solar eclipse, and possibly even Benjamin Franklin and some Jewish astronomers in Berlin. His magnum opus *Cosmology*—largely conceived back at Cirey with his collaborators, Voltaire and Emilie—would now attempt to hijack Leibniz's conception of least-action principles, and turn the physics of a Creator composing the universe, into the mathematical equivalent of a God imposing cost-accounting methods upon the physical world. Samuel König, who had ceased corresponding with Euler after his 1744-46 attempts to steer him toward Leibniz and electrical experimentation, came to Berlin in September 1750, to discuss Maupertuis' wrongheadedness. In March, 1751, König published in the Leipzig *Acta,* the main journal for Leibniz himself, an exposé of Maupertuis' work. Also in Leipzig that year, Benjamin Franklin's electrical experiments were published for the first time in Germany. Finally, *The Art of the Fugue* was finally published by Bach's sons, possibly with Schaumburg-Lippe's backing.

The next assault of Maupertuis and Euler got ugly. In a letter of September 21, 1751, in preparation of a new crime, Euler recalled for Maupertuis their previous actions in arranging von Justi's victory (or what Euler would later brag, "the most complete refutation of the monadists.") Within a month, Maupertuis announced a trial by the Berlin Academy against König for forgery. The phony trial against König, with sentence pronounced by Euler, created an intellectual terror over Berlin for several years, which was broken only by the combined and courageous efforts of Lessing and his new partner, Moses Mendelssohn, in 1755.[38]

In the midst of this terror, early in 1754, Lessing's cousin and collaborator Christlob Mylius, died at the age of 31 in London, reportedly of pneumonia, while on his way to America on a mission for supporters in the Leipzig scientific community.[39] Given Kästner's shipment of Kepler's work to Mylius in London, it is quite likely that Kästner was in the middle of this project. Months earlier, Maupertuis' Berlin Academy had announced its next travesty: a prize contest to reduce Leibniz's conception of the Creator's method of action according to "the best of all possible worlds," to the banalities of Alexander Pope's didactic couplets of "let it be." Mylius' cousin, Lessing, in the face of these disasters, joined up with Moses Mendelssohn, to orchestrate, by 1755, an end to the Academy's assaults on Leibniz, in the form of their anonymous pamphlet, "Pope, A Metaphysician!"[40] So began a lifelong collaboration that would change German and European culture.

From 1751 to 1756, Bach's *The Art of the Fugue* sold fewer than thirty copies. However, after the combined humor and truth-telling of Lessing and Mendelssohn punctured Maupertuis, making his operations look ridiculous, Emanuel attempted another offensive. He sought to sell the sixty-odd copper plates, to have the work published elsewhere, arguing, ". . . since the respect of connoisseurs of this kind of work for my late father, especially in the fugue, of whatsoever nature and form, is still not extinct."[41] He would never give up fighting for his father's project.

The Culture Mafia: Algarotti and Krause

The musical establishment in Berlin at the time of Bach's *A Musical Offering,* reflected the same epistemological warfare carried out by Voltaire and Maupertuis against Leibniz at the Academy. In 1746, Venice's Algarotti, a favorite of Frederick's from 1738 to 1741, was back in Berlin, and was back in his favor. Then, he had been an expert on Newton; now, he was an expert on aesthetics. His approach to handling Frederick was classically Venetian: He crafted a report to Frederick on reforming the opera in Berlin, reasoning that, since opera combined all elements "to charm our senses, to enchant our heart, and to produce a pleasing illusion," it required centralized, military discipline to make the artistic effect march on time. It was a report constructed primarily to appeal to both Frederick's weakness for sensual effects in his private life, and his disciplined approach to being a ruler and a military leader. Emanuel's anecdote about Frederick's love of his flute, cited earlier, spoke to the unfinished aesthetic education of the Prince, now King.

Algarotti reigned as Frederick's culture czar until he left for Venice in 1753 with some illness. During his regime, the influence of Voltaire and the encyclopaedists upon music, was centered around a wealthy lawyer, C.G. Krause. Although Krause had learned some keyboard and violin as a youth, he developed a passion for the kettle drums! Lessing's friend, Ramler, described Krause as "a virtuoso on this thundering instrument." He had established a music salon in 1747, dedicated to studying the works of the encyclopaedists. His own *Von der musikalischen Poesie,* completed that year, and probably reflecting the thinking of the salon, gives a picture as to the arguments used with Frederick against Bach's *A Musical Offering.* According to Krause, professionals have their own "intellectual music," which gives them pleasure, but "without much appeal to the heart." However, "amateurs, who judge only by what their ears and hearts tell them," should judge "what is truly expressive. . . . Formerly, we loved those paintings that require us to sit in front of them for a half-hour before we detect a certain beauty in them. . . . Today, we love all the more that which is pleasant and lively."

Bach had waged systematic warfare precisely against this position, according to which a painter (or poet, or musician) was to have no profound thoughts, nor artistic capacity to transmit those profound thoughts, nor the passion to fight for that humanity. It is notable that Bach chose to follow up his Berlin trip in 1747, by submitting to Mizler's Society, a group that erred on the side of dry, mathematical formalisms, his canonic variations upon "Von Himmel hoch"—a learned treatment upon a happy and popular Christmas song. The heart and the mind were in the same human body, made as such by our Creator. For Bach, both Krause and Mizler suffered from opposite sides of the same malady.

After Bach's death, Emanuel's attempt to continue his father's mission in Berlin ran directly into Krause, Voltaire, and Algarotti. His announcement of "The Art of the Fugue" in May 1751, stated, " [we have] resolved to save from oblivion a work he left in manuscript. . . . [T]he mystery of fugue has for some time been rather scantily maintained. Great masters have often guarded it jealously." The public can learn the fugal science from the work. Neither thinkers, nor singers are ignored: "Those who have a concept of what is possible in art and who desire original thought and its special, unusual elaboration, will receive from it full satisfaction. . . . [A]ll the parts involved are singable throughout, and one is as strongly worked out as the other."

Krause responded by publishing his *Von der musikalischen Poesie* (written in 1747, but only published in 1752). His model, Rousseau, captured the French court by the fall of 1752, with his simple-to-understand play, "Le devin du village," a celebration of puerile pastoralism. This was offered as a welcome relief to the dry, formal harmonies of Rameau. Louis XV's Madame Pompadour made famous the shepherdess role. Meanwhile, in Berlin, Krause organized German composers to write simple songs, "without thinking about a bass to be added." Such songs should be "not so highly poetic that a beautiful songstress cannot understand them"—assumedly, such as Pompadour. Hence, Algarotti's "Newton for Ladies" became Krause's "Singing for Ladies"—although Bach's wife, his future patron Princess Anna Amalia, and his future proponent Sara Itzig Levy, preferred instead to poetically engage their minds.

Emanuel published, in 1753, his *Essay on the True Art of Playing Keyboard Instruments,* where he argued that one must "think through singing." In 1755, Emanuel's assistant, one Christoph Nichelmann, wrote an essay on melody in opposition to this, and dedicated it to Frederick. (Nichelmann had always been favored over Emanuel by Frederick, who had always insisted on paying a higher salary to the younger, lower-ranked second harpsichordist.) Emanuel wrote a devastating rejoinder, signing it "Kaspar Dünkelfeind," or "Caspar, Enemy of darkness (obscurity)." His polemics may well have been inspired by discussions with his friend Lessing, who was then in the process, with Mendelssohn, of successfully puncturing the Academy's ridiculous comparison of Alexander Pope to Leibniz.[42] In forcing the resignation of Nichelmann, Emanuel arranged for his replacement, Karl Friedrich Fasch, who would continue the Bachs' work. Decades later, after the 1788 deaths of Emanuel and of Princess Anna Amalia, he brought together the musical collections that each had maintained, and founded the famous Berlin Singakademie. Fasch's successor at the Singakadamie, Carl Friedrich Zelter, would quote Fasch on Emanuel's differences with Frederick: "Emanuel, spirited and full of originality as a composer, was fond of the King as a person of keen intellect and a great ruler, but would not accept his autocratic claims to genius and expertise in art. The king, Emanuel contended, was the ruler of his kingdom, but not of the kingdom of the arts, where only gods ruled. All talent came from them and would return to them. . . . Such views were hardly within the limits of the great Frederick's tolerance, nor did Bach's compositions meet with approval."[43]

In 1774, on the occasion of an organ concert by Bach's son Wilhelm Friedemann, Frederick the Great was inspired to sing the theme of *A Musical Offering* to the Austrian Ambassador Baron von Swieten, fully twenty-seven years after J.S. Bach had come to Berlin. Wilhelm

Friedemann had moved to Berlin, having had troubles for many years, and had found support from one of Daniel Itzig's daughters, Sara Itzig Levy, and from Princess Anna Amalia. The concert they arranged for him revived old memories, as van Swieten described Frederick's conversation: "He spoke to me among other things of music, and of a great organist named Bach, who has been for a while [a few months] in Berlin. This artist is endowed with a talent superior, in depth of harmonic knowledge and power of execution, to any I have heard or can imagine, while those who knew his father claim that he, in turn, was even greater. The King is of this opinion, and to prove it to me he sang aloud a chromatic fugue subject that he had given this old Bach, who on the spot had made of it a fugue in four parts, then in five parts, and finally in eight parts." In fact, Bach had extemporized in three parts, then created four- and six-part versions. The King, apparently, had been bowled over, but never did benefit from the details. While in his recounting, Frederick was wrong in every particular, the larger point was made: The power of Bach's mind was imbedded in part of Frederick's mind, and twenty-seven years later, it still elicited the strongly sung theme. This larger point evidently won over the ambassador to "old Bach's" cause, as van Swieten made sure to take some of J.S. Bach's music back to Vienna, particularly *A Musical Offering*. This triggered the intense studies at van Swieten's 1782 Sunday seminars, where Bach's rigorous, scientific practice produced a revolution within W.A. Mozart.[44] He realized that such a method could enable him to address his own genius, deliberately examining the power of his own mind.

At the same time that Mozart was mastering Bach in Vienna, the twelve-year old Ludwig van Beethoven was mastering the same "Well-Tempered Clavier" studies that had been originally written for twelve-year old Wilhelm Friedemann. Beethoven's teacher, Neefe, announced: "This young genius . . . would certainly become a second Wolfgang Amadeus Mozart, if he were to continue as he had begun." As an adult, when Beethoven heard that the Leipzig publishers, Hoffmeister and Kühnel, planned shortly to issue "The Well-Tempered Clavier," and, then, a complete edition of

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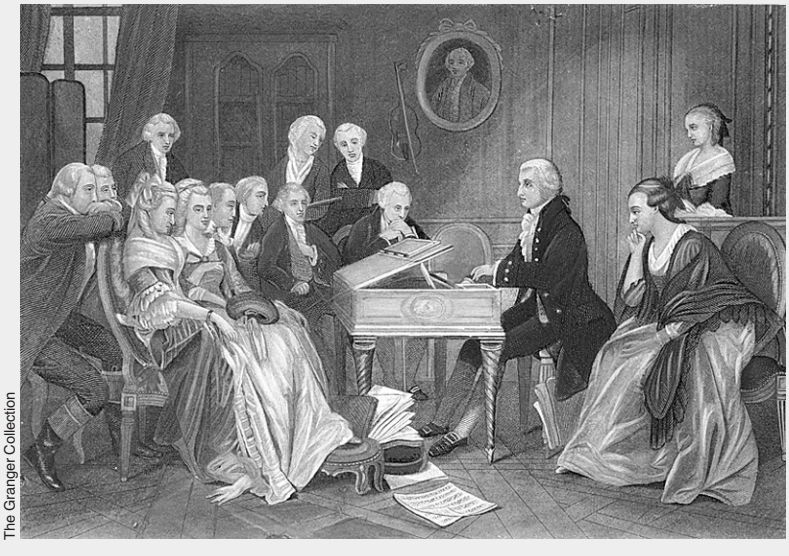
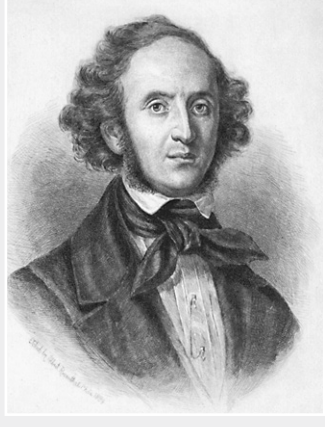
The occasion of a 1774 concert by Bach's eldest son Wilhelm Friedemann (far left), caused Frederick II to bring the works of Johann Sebastian to the attention of Austrian Ambassador Baron Gerard van Swieten (left). Van Swieten brought these works to his Vienna music seminars, where they caused a revolution in the thinking of W.A. Mozart. **Below left:** *Mozart plays to an audience of Viennese noblemen and artists.*



The Granger Collection



The Granger Collection

Moses Mendelssohn's grandson, composer Felix Mendelssohn, worked to revive Bach's music in the 1830's.

Bach's clavier works, he wrote (Jan. 15, 1801): "That you want to publish Sebastian Bach's works delights my heart, which beats wholly for the great and lofty art of this father of harmony, and I wish soon to see the enterprise in full swing." The publication later that year also impelled the Göttingen music professor, Johann Nikolaus Forkel, to pull together the first biography of "old Bach." He had been collecting materials on Bach directly from Emanuel and Wilhelm Friedemann since at least 1774. Forkel's performances of Bach likely pleased Kästner, the old warrior from the 1747 period, now in Göttingen, as well as Kästner's new pupil, Carl Friedrich Gauss.

In his 1802 biography of Bach, Forkel argued that art, and the nation, stood then at risk: "The spirit of the times, which is directed rather to trifles capable of affording immediate though fleeting enjoyment, than to what is great and cannot be attained without some pains and even efforts, has, in some places, really led to a proposal, at least, to banish the Greeks and Romans from our schools, and there can be no doubt but it would be glad to get rid of our musical classics."

However, continued Forkel, Bach "thought, like Schiller: 'If you cannot please all by your art or your work, satisfy the few: to please many is bad.' . . . [Bach's works] do not merely surprise us for a moment, but produce effects that become stronger the oftener we hear the works, and the better we become acquainted with them; that the boundless treasure of ideas heaped up in them, even when we have a thousand times considered them, still leaves us something new, which excites our admiration, and often our astonishment. . . . [H]e thought the whole could not be perfect if anything were wanting to the perfect precision of the single parts." Forkel concluded, "Let his country be proud of him; let it be proud, but, at the same time, worthy of him!"

The great German patriot sought by Forkel turned out to be the great-grandson of Daniel Itzig, and the grandson of Moses Mendelssohn—Felix Mendelssohn. From the revival of Bach's great B-minor Mass in 1829 (on the occasion of the centenary of the births of both Lessing and Moses Mendelssohn), to the founding of the Leipzig Conservatory, Felix Mendelssohn upheld Bach's standard against the Romantic assault against European culture. When, in 1837, he performed Bach's D-minor Clavier Concerto, found in the archives of the Berlin Singakademie, Robert Schumann exclaimed: "Will it be believed that in the music cabinets of the Berlin Singakademie . . . at least seven such Concertos and countless additional compositions, in manuscript, are carefully preserved? Few persons know about it, but there they are for sure. Altogether, would it not be a timely and useful undertaking, if the German Nation decided to publish a complete collection and edition of all the works of Bach? One might think so, and one could use the words of an expert, who speaks about this plan . . . as a motto." Schumann then quoted the 1801 letter of Beethoven, cited above.

* * *

The details of the story of the heroic efforts of the faction of Bach and Leibniz to preserve their scientific method after the early 1750's, go far beyond our present treatment. However, all the efforts of the personages introduced here—including Keyserling, the Bach sons, the Itzigs, Lessing, Kästner, Fasch, Zelter, Princess Anna Amalia, and Benjamin Franklin, plus three generations of Schaumburg-Lippes and Mendelssohns—would not only preserve the works and the memory of Bach and Leibniz, but engender the scientific and cultural geniuses upon which today, not only our souls, but even our bodies are nourished. These include Mozart, Beethoven, Schiller, Heine, Schubert, Mendelssohn, Schumann, and Brahms; but also Gauss, the Humboldt brothers, Herschel, Dirichlet, and Riemann.

Today, should what is left of the still-functioning parts of the world, physically collapse into a savage, disease-ridden hell, the judgment must be made, that its leaders chose to act childishly—and that the population by and large preferred such behavior. At such a crossroads in the world's real-life tragedy, our capacity to act can be revived by a loving act of memory.

Lyndon LaRouche has proposed,[45] in the re-examination of the qualities that created the American republic, and defined a modern standard of statecraft and public deliberation, that the specific classical methods of Leibniz and Bach best exemplify the capacity of humanity to overcome its obsessive, destructive behavior. He argues, further, that the proponents of Leibniz and Bach—including Abraham Kästner, Gotthold Lessing, and Moses Mendelssohn—were central to the true republican movement, whose prime success was the founding of the United States and creation of the American Constitution. In working to recall their methods, we may provide the critically necessary push to avoid otherwise tragic results.

Johann Sebastian Bach was perhaps the leading scientific proponent of Leibniz's "analysis situs" method in the generation after Leibniz. Both of them passionately embraced that most fundamental of scientific problems, which makes each of us a scientist: an honest man, discovering his own mortality, must determine why his existence makes sense and is necessary. This is the "site" where each of us is situated, to which no escape into fantasy will avail. This scientific problem lies at the core of

"analysis situs," whether it be of man's scientific and moral choices, of Leibniz's treatment of a physics coherent with the non-linear actions of his own mind, or of Bach's use of provocative thematic ideas to map out and display those non-linear actions. Leibniz's treatment of the physical world, his development of monads, and his non-egotistical partnership with God, was the same "analysis situs" method found in Bach's scientific investigation of the songful nature of man's highest thoughts and passions.

Bach blossomed, from a talented keyboardist at age 15, on a voice scholarship at school in Lüneburg, to a musical scientist with a mission at age 18, under the image and presence of the leading genius of the world, active in the same Lüneburg court. Leibniz was publicly identified as both an intellectual genius, and as the key political statesman of the related courts of Lüneburg, Wolfenbüttel, Hannover, Celle, and Berlin. An honest and talented 15-year old who, simply from his own keyboard playing, had personal evidence of what his mind was capable of, would have naturally gravitated to the more general investigation of the subject, represented and developed by Leibniz. The prodigious efforts of the next fifty years were the by-product of such a mind, focussed on so happy a mission.

May a loving act of memory prompted by this, the 250th anniversary of Bach's death, aid the reader in summoning up the solid optimism and courage, to take today's tragic developments into his heart, and to resolve on the happier pathway.

1. For a multiply-connected presentation of the method of Leibniz and Bach, as applied to the arts, sciences, and statecraft, the reader is referred to the many contributions of the recently published "Proceedings of the Schiller Institute International Conference: On the Subject of Strategic Method, Bad Schwalbach, Germany, May 26-28, 2000," *Fidelio,* Summer-Fall 2000 (Double Issue) (Vol. IX, Nos. 2-3)–Ed.
2. *The New Bach Reader: A Life of Johann Sebastian Bach in Letters and Documents,* ed. by Hans T. David and Arthur Mendel; revised and expanded by Christoph Wolff (New York: W.W. Norton, 1998).
3. Discussion of vocal registration takes us beyond the immediate scope of this article. For a full discussion, see *A Manual on the Rudiments of Tuning and Registration. Book I: Introduction and Human Singing Voice,* ed. by John Sigerson and Kathy Wolfe (Washington, D.C.: Schiller Institute, 1992), recently summarized in Kathy Wolfe, "The Singing Voice Demands a Scientific Middle C," *21st Century Science & Technology,* Winter 1999-2000 (Vol. 12, No. 4).
4. This "simultaneity of eternity" is, happily, developed by Lyndon LaRouche in his discussion of Raphael's "School of Athens" fresco. See Lyndon H. LaRouche, Jr., "The Truth About Temporal Eternity," *Fidelio,* Summer 1994 (Vol. III, No. 2).
5. Another special such species of double pairs of half-steps spanning the minor third, A-C, was adopted by Bach, as it spelled out his name: B♭-A-C-B♮, or in German notation, B-A-C-H (where the B commonly stood for B♭ and the H stood for B♮). It was the final element composed into his last work, *The Art of the Fugue.* It was also at this time, that Bach exploited yet another pair-of-pairs of half-steps, this species spanning the diminished fifth, E-B♭. On March 1, 1749, he inscribed a seven-voice canon into Benjamin Faber's album. (In writing F-A-B♭-E Repetatur, he constructed the theme, using his friend's name to create the four notes and the indication to repeat.) Faber was another Leipzig University student close to the Bachs.
6. Even if Mizler's attempt to initiate such scientific inquiry were made honestly, his work still suffered from a reductionist tendency. His proclivity for an analysis of vibrating strings might well be shown, upon further research, to have come under the disinformation of Euler's 1739 work *Tentamen novae theoriae musicae.* And, perhaps this was Euler's intention in publishing at that point.
7. The manuscript copy of *A Musical Offering* was purchased from Emanuel's estate by Georg Pölchau. Abraham Mendelssohn, son of Moses and father of Felix, purchased Pölchau's materials and donated them to the Berlin Singakademie's collection. Pölchau would become the librarian for the Singakademie.
8. This was perhaps most famously treated in Schiller's novella "The Ghost-Seer" [in *Friedrich Schiller: Poet of Freedom,* Vol. I, ed. by William F. Wertz, Jr. (New York: New Benjamin Franklin House, 1985), trans. by George Gregory]. Schiller drew upon the case of his ruler, Duke Karl Eugen, who went to Venice to gamble his way out of debts, and got ensnared further. Fittingly, Karl Eugen was raised in Frederick II's court, and his controller, Voltaire, was also the usurer to whom he was most heavily indebted, and hence, the direct cause of his desperate trip to Venice. Earlier, in a different case, Venice established its grip over England, by the manipulations of Henry VIII's private life, orchestrated by its agent Francesco Zorzi.
9. Frederick might also have had a more direct exposure to Leibniz. In 1736, he brought the pastor Charles Etienne Jordan from Berlin to his court in Ruppin, to be his librarian and consultant. (Jordan's parents were part of the French emigré community in Berlin.) While this author has not seen his works, he was, evidently, known to be a follower of Leibniz. For example, upon Jordan's demise, König knew to make inquiry of Euler about the works of Leibniz in Jordan's library.
10. Both Keyserlings seem to be connected to the Königsberg area. Frederick's Colonel Keyserling, a Courlander, had been educated at the University at Königsberg, taking several academic prizes there. How he may be related to Count Carl Hermann von Keyserling, is not presently known by this author. However, Bach's Keyserling, after stints in St. Petersburg, Dresden, and Berlin, would reside in Königsberg, at least when Moses Mendelssohn visited with him in 1777.
11. Leibniz's half-brother had taught at the Thomas-schüle, and his brother-in-law had been arch-deacon at the church there.
12. *The New Bach Reader, ibid.*
13. Emanuel also made his own artistic offering on the occasion of his father and Keyserling meeting with him. His son, born the following year, was named after Johann Sebastian Bach, with Keyserling acting as his godfather. This J.S. Bach, a painter, would die in Rome in 1778.

14. In 1745, at the time that Maupertuis took over the Berlin Academy, Scheibe re-launched the attack against Bach, republishing the entirety of the 1737-1739 arguments in one large volume.
15. One of Heinrich Christian's fellow students was the mathematician Abraham Kästner, who is said to have had some instruction from Bach at the time. More of Kästner later.
16. Not to be confused with his son, Wilhelm, who was the Count Schaumburg-Lippe who collaborated with Moses Mendelssohn.
17. Multiply-connected cousins: Her father and his mother were brother and sister; her grandfather and his grandmother were brother and sister; and, a few years before, Frederick was almost married to Anne's sister.
18. Evidently, she took Newton's mysterious action-at-a-distance conception quite seriously, conceiving a child while her husband was far away. Voltaire probably deserved the credit for elucidating the concept.
19. Private communication from A. Hartman, October 1999.
20. Visiting Frederick, having just completed a trip to St. Petersburg, they are likely candidates for the arrangements that brought Euler to Berlin in 1740.
21. Interestingly, Carlyle ends by foreshadowing: "A son of his, son and successor, something of a Quixote, too, but notable in Artillery practice and otherwise, will turn up at a future stage."
22. In 1775, at the time of the Continental Congress debates leading to the Declaration of Independence, Benjamin Franklin would cite Vattel's later work, *The Law of Nations,* sent to him by C.W.F. Dumas: "It came to us in good season, when the circumstance of a rising state made it necessary frequently to consult the Law of Nations. Accordingly, that copy which I kept, has been continually in the hands of the members of our congress, now sitting." Cited in Robert Trout, "Life, Liberty, and the Pursuit of Happiness: How the Natural Law Concept of G.W. Leibniz Inspired America's Founding Fathers," *Fidelio,* Spring 1997 (Vol. VI, No. 1).
23. Quote from the preface to Baruch's 1780 Hebrew translation of Euclid's *Elements;* found in Alexander Altmann, *Moses Mendelssohn: A Biographical Study* (Philadelphia: Jewish Publication Society, 1973.
24. The results of the experiments conducted between 1744 and 1747 were published in "A Work on Atmospheric Phenomena Proceeding from Electrical Force" (Luba George, unpublished, 1982).
25. See G.W. Leibniz, *Monadology.* Perhaps one of the happiest references for Leibniz's monad, pointed out to this author by Paul Gallagher while the latter was in prison, comes from Christiaan Huyghens' discussion of the propagation of light. Briefly, that there seems to be, in the simplest cases of transmission of light, a continuously regenerating source of spherical radiation of light, makes the microscopic world not fundamentally different from such continuously regenerating substances of the macroscopic world as life forms, galaxies, and the mind's thoughts—including Bach's thematic ideas. See Huyghens' *Treatise on Light.*
26. This author has not seen Mylius' work, but it is likely to be part of the same school of thought as the 1744-47 experiments of the St. Petersburg Academy. Comparisons of Mylius' work with the 1744 *Gedanken von den Figenwschaften, Würkunngen und Ursachen der Electricität,* by Bach's acquaintance at the University of Leipzig, J.H. Winckler, remains to be done. (Winckler had, in 1732, written the libretto for a Bach cantata, "Froher Tag, verlangte Stunden.") Further, comparisons of all these with Franklin's experiments, may make clear what Maupertuis and Voltaire had to fear.
27. Kästner's note to Mylius reads: "To Mr. Christlob Mylius, Along with sending over Kepler's Harmonice Mundi: Friend, your tender ear perceives the graceful art of tones, / The world-form's harmonies, your deeper thoughts explore, / Herewithin, Newton's teacher writes of both them, / Deutschland let him starve, and remains unworthy of him." Located and translated by Bruce Director, from *Abraham Gotthelf Kästners gesammelte Poetische und Prosaische Schönwissenschaftliche Werke,* Vol. I (Berlin: Theod. Christ. Friedr. Enslin, 1841).
28. In König's last letter to Euler, July 2, 1746, he refers to Wolff having favorably judged a book that attacked both Newton and Euler. König notes that the book had been burned.
29. *Zeitschrift für Musik,* Regensburg, 1936, pps. 931 and 1368-72; Fritz Müller and Rudolf Steglich's discussion.
30. On Moses Mendelssohn in general, see the *Fidelio* symposium: Helga Zepp LaRouche, "What It Takes To Be A World-Historical Leader Today"; David Shavin, "Philosophical Vignettes from the Political Life of Moses Mendelssohn"; and Steven P. Meyer, "Moses Mendelssohn and the Bach Tradition"; *Fidelio,* Summer 1999 (Vol. VIII, No. 2). The von Justi operation is reviewed by Shavin.
31. Graf zu Dohna, Albrecht Christoph, was the Oberhofmeister for Frederick.
32. Lyndon LaRouche pointedly characterized Wolff's works as "Leibniz for Ladies"!
33. Euler's *Letters to a German Princess,* Vol. 2, No. 10, May 5, 1761.
34. Interestingly, Penn's father, William Penn, had met with Leibniz, reportedly in 1677, in the period when Leibniz had digested Huyghens' work on the propagation of light, and formulated his conception of monads.
35. Why Lessing and Mylius moved to this particular neighborhood provokes a host of questions. Possible answers include, generally, the work on astronomy, but also the common fight against Maupertuis. More specific leads are suggested by the following sequence. Their teacher, Kästner, was in touch with the Schaumburg-Lippes. And, according to A. Hartmann (private communication, October 1999), Wilhelm's father had employed Heinrich Heine's great-grandfather as a financial administrator. Further, the Heine relative, Veitel Heine Ephraim, set up the school, Lehranstalt, at which Samoscz taught in Berlin. Hence, one possibility is that Kästner was aware of the Jewish astronomers in Berlin *via* Count Schaumburg-Lippe.
36. Spandauer Strasse 66, later re-numbered 33, came to be owned by Rose Ephraim, daughter of Veitel Heine Ephraim, who rented the house to Moses Mendelssohn.
37. On *The Art of the Fugue,* see "Proceedings of the Schiller Institute International Conference," *ibid.,* especially the contribution by Prof. Yelena Vyazkova.
38. The story of the trial against König is reported in David Shavin, "Philosophical Vignettes," *ibid.,* footnote 2.
39. Private communication from Caroline Hartmann, October 1999.
40. See Paul Gallagher's translation of the Mendelssohn/Lessing work, "Pope, A Metaphysician!," *Fidelio,* Winter 1999 (Vol. VIII, No. 4).
41. Curiously, Emanuel's announcement has been treated by modern historians as an indication that he knew not what his father's project was worth, and, even that he meant for the copper plates to be melted down for profit.
42. Among the fruits of the victories of 1755, might well be included the intellectual and moral capacities displayed in 1756-57, with the artillery methods of Count Schaumburg-Lippe, and the strategic boldness of Frederick, notably his double-flanking victory at Leuthen.
43. Zelter's lecture in Königsberg, Jan. 17, 1808; see *The New Bach Reader, ibid.*
44. See David Shavin, "Mozart and the American Revolutionary Upsurge," *Fidelio,* Winter 1992 (Vol. I, No. 4).
45. One recent location is Lyndon H. LaRouche, Jr., "Call Them 'The Baby Doomers,'" *Executive Intelligence Review,* July 21, 2000 (Vol. 27, No. 28).