

Beethoven's Broadwood, Stein's Hearing Machine, and a Trilogy of Sonatas

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*Jetzt ist er freilich Jedem als ein unerschöpflicher
Genius bekannt; man wird es gewohnt, sich in ihn
hinein zu studieren und das blinkende Metall aus
seinen Schachten sich zu eigen zu machen.*

To be sure, now he is known to anyone as an
inexhaustible genius; one becomes accustomed to
studying one's way into him and to making one's own
the glittering metal from his shafts.

Adolf Bernhard Marx, on Beethoven
Berliner allgemeine musikalische Zeitung 1 (February 4, 1824), 37

When I initially approached Chris Maene, a custom piano maker in
Ruselede, Belgium, with the request to make me an English piano,
I was thinking of the copy of the 1798 Longman, Clementi, & Co.
piano that he had already made, or if he'd feel up to it, a John
Broadwood & Sons from the 1810s or 1820s. But Chris had a coun-
terproposal: why not make Beethoven's Broadwood?

Once offered, the suggestion was difficult to ignore. It would be hard not to copy an instrument that had been handpicked in a prestigious London showroom on Great Pulteney Street by a committee of five highly ranked London musicians—Frederick Kalkbrenner, Ferdinand Ries, John Baptist Cramer, Jacques-Godefroi Ferrari, and Charles Knyvett. Each had carved his signature on the wrest plank of the piano, embossing his name on an instrument that was poised to make history.

26. Leaving London in December 1817, the six-octave grand piano with the serial number 7362 made it to Vienna sometime toward the end of May 1818, following a long and arduous journey over sea and by land. After some fine-tuning was done at the Streicher workshop, Beethoven put it to use immediately in the fourth movement of his “Hammerklavier” Sonata, Opus 106. There’s fascinating evidence to this effect: the three first movements of Opus 106 are written for a six-octave Viennese piano range from FF to f⁴. The fourth movement not only adjusts to the highest note c⁴ of the new Broadwood, but also has the bass drop to the lowest note, CC; together these span the typical English six-octave range, one fourth lower than its Viennese counterpart.

Beethoven’s Broadwood, on display now at the Hungarian National Museum in Budapest, is one of three extant Beethoven pianos, as they are often called. (Franz Liszt owned the piano last and bequeathed it to his home country.) The second Beethoven piano is the Graf that Beethoven received on loan in 1825; it is currently in the Beethoven-Haus in Bonn. The third is

the Erard that Beethoven acquired in 1803; it is presently in the Oberösterreichisches Landesmuseum in Linz, where it ended up through Beethoven's brother Johann, who owned a pharmacy there.

But here's the catch. Once we adopt the label *Beethoven piano*, the emphasis unavoidably shifts from object to owner, from thing to idea, from artisanship to Art. Beethoven himself seems to have participated in this process of abstraction in his thank-you note to Thomas Broadwood, promising that he would keep the piano as an "altar where I'll place the most beautiful offerings of my spirit to the divine Apollo" (*Je [le] garderai Comme un Autel, ou je deposerai les plus belles offrandes de mon Esprit au divine Apollon*; letter of February 3, 1818). (One easily forgets, though, that Beethoven sent this note before he received the instrument and that this kind of lofty language would have been rhetorically entirely appropriate for expressions of gratitude.) More neutral, and preserving equal focus on donor and beneficiary, is the following inscription on the instrument's wrest plank: *Hoc Instrumentum donum Thomae Broadwood (Londini) propter ingenium illustrissimi Beethoven* ("This Instrument is a gift from Thomas Broadwood [from London] to honor the genius of the most illustrious Beethoven").

Beethoven is known to have proudly demonstrated the beauties of his English-made piano to continental visitors, but these would have been keen, first and foremost, to hear the notoriously reclusive Beethoven *play* (that is, improvise) on any piano. Liszt kept the instrument in his library long after Beethoven's passing; how

much of Broadwood—whether father John or son Thomas—was still part of the memory, or to what extent had the piano become a (mere) reliquary of Beethoven’s spirit? Conversely, the question deserves to be asked whether, back in 1818, during several months of awaiting the announced English piano, Beethoven really expected to *use* it—that is, not just to play on it or to keep it on display as some honorary award, but to actively seek inspiration from this new artistic tool, different from the ones he had known before. So who was worthy of whom: piano maker, pianist-composer, well-crafted instrument, or Beethoven’s genius?

Pandora’s box

28. With these questions, we open a Pandora’s box of conceptions and assumptions that have long shaped Beethoven scholarship and popular wisdom—hopefully not beyond repair. We’re familiar enough with the objections. Could Beethoven even hear his Broadwood? It is true: Beethoven was largely deaf when he received the instrument. By embracing his Broadwood, was Beethoven dreaming of the modern Steinway? It is true: English pianos may be seen as precursors of the modern piano, certainly more so than their Viennese counterparts. Did he even care what kind of piano he had at this point in his life, when he had all but perfected the art of sketching compositional ideas away from the piano? It is true: Beethoven was a champion of a new method of sketching and made a point of teaching it to his privileged student and patron, the Archduke Rudolph of Austria. Are not Beethoven’s three last sonatas special testimony of the power

of the work concept, by definition transferable onto any piano? It is true: the compositional idea of transformation or even transcendence is strongly present in each of the three sonatas, and arguably most in his last sonata, Opus 111. In light of these powerfully seductive teleological lines of reasoning, why even bother replicating Beethoven's Broadwood?

To make matters worse, there has been skepticism within the field of historically informed performance. In 1988, William Newman, in his influential book on Beethoven's piano music, dismissively referred to the Broadwood as "an unsolicited gift" and proclaimed that it was "clear that Beethoven was never happy with it, and maintained a firm allegiance to the Viennese instruments he knew."¹ And in a landmark 1996 recording of Beethoven's piano sonatas on period instruments (under the leadership of Malcolm Bilson, including myself as one of the seven players),² English instruments remained notably absent. Instead, we performed anything from Opus 90 onward on six-and-a-half-octave Viennese pianos.

It is true—here we go again—that in his late years Beethoven's pianistic-composing instincts remained largely Viennese, and it is also true that at the time Newman wrote his book, the iconic status of the Beethoven Broadwood had unjustly eclipsed the many Viennese-style pianos in Beethoven's life. Historically informed performance was only starting to discover the latter type of instruments.

1. William Newman, *Beethoven on Beethoven: Playing His Piano Music His Way* (New York: W.W. Norton & Company, 1988), 50–54.

2. Malcolm Bilson, Tom Beghin, David Breitman, Ursula Dütschler, Zvi Meniker, Bart van Oort, and Andrew Willis, *Ludwig van Beethoven: The Complete Piano Sonatas on Period Instruments*, Claves Records (1997), CD 9707-10, 10 compact discs.

30. Longtime ignorance of any historical pianos had led to the peculiar association of the big “Hammerklavier” Sonata, Opus 106, with “the Beethoven Broadwood” as somehow representative of a more modern, forward-looking piano—but the irony is that only its last movement can be played on it because the first three movements include high notes that do not exist on the Broadwood’s keyboard. That assumption, intriguingly, lasted until only a few years ago. As I have established elsewhere, Opus 106 is not some grand six-and-half-octave piece, but one that actually combines two ranges—first Viennese, then English.³ From the perspective of range, then, the Broadwood constituted a *step back* for Beethoven, and we can infer from various accounts that he regretted this aspect of the new instrument. (According to Anton Schindler, when Ignaz Moscheles asked Beethoven to use his Broadwood for a concert in 1823, Beethoven “suspected Moscheles of some kind of financial speculation, since the piano had too short a keyboard to be of use to him.” Almost certainly, Beethoven projected his own frustration onto his younger colleague.)⁴

In spite of all possible objections, here is a premier recording of the first-ever modern replica of Beethoven’s Broadwood. I ended up commissioning the instrument from Maene not *propter ingenium illustrissimi Beethoven* (“because of” or “in honor of Beethoven’s genius”) but *ad intelligendum ingenium illustrissimi Beethoven* (“to study and understand the genius of the most illustrious

3. Tom Beghin, “Beethoven’s Hammerklavier Sonata, Opus 106: Legend, Difficulty, and the Gift of a Broadwood Piano,” *Keyboard Perspectives* 7 (2014), 81–121.

4. Anton Schindler, *Beethoven As I Knew Him*, ed. Donald W. MacArdle, trans. Constance S. Jolly (Mineola, NY: Dover, 1996), 372.

Beethoven”). In his excellent revisionist work on Beethoven as pianist, Tilman Skowroneck has reminded us that starting with the fugue from Opus 106, Beethoven stayed within the six-octave range CC to c4 for all his remaining piano works, including the Bagatelles written after the receipt of the Broadwood, Opus 119 (starting with No. 6) and Opus 126; the Diabelli Variations, Opus 120; and the three late Piano Sonatas, Opus 109, 110, and 111.⁵ There are only two exceptions, two instances of notes that lie outside the range of the six-octave Broadwood: three high C-sharps on the last page of Opus 109 and one high E-flat in the first movement of Opus 111. For the latter note, however, already in the autograph—that is, the original manuscript—Beethoven specifies an alternative version, or *ossia*; it is a remarkable reflex betraying his own private reality. The high C-sharp in Opus 109 requires more explanation, but just acknowledging this note and finding the solution to play it spectacularly increases the relevance of the Broadwood for this sonata. I discuss the note below. So if having the Broadwood was good enough for Beethoven while he was composing his late piano works, ought we not try to play them on it as well? And—dare I take the next step—listen to them in this way too?

This new recording, then, sets out to refute all of the assumptions offered above. Let us spell them out again, along with the refutations. Beethoven did not hear well—but he went to great lengths having a *Gehörmaschine* (hearing machine) built to go

5. Tilman Skowroneck, “A Brit in Vienna: Beethoven’s Broadwood Piano,” *Keyboard Perspectives* 5 (2012): 41–82.

on top of the Broadwood. Beethoven was a man with a disability—but something in the Broadwood (its touch, its power, its energy) must have compensated for it. Beethoven went on long walks with a notepad in his pocket—yet he made sure to arrange for the best possible piano at whichever summer residence he moved to, so he clearly needed tangible input from the instrument too. Beethoven had little time for dreaming of some future piano: he was too busy keeping his beloved Broadwood in reasonable shape, and he called on Viennese builders such as Wilhelm Leschen, André Stein, and Conrad Graf to help him do so. The idea of transcendence in the last three piano sonatas becomes all the stronger when anchored in Beethoven’s concrete interactions with his instrument. These interactions, finally, are by no means limited to just hearing, but reflect a multisensorial experience that includes feeling and seeing—not at all untypical for a “deafly hearing” person, as my collaborator Robin Wallace argues so eloquently.

32.

Beethoven at his Broadwood

In Johann Nepomuk Hoechle’s drawing of Beethoven’s living room, made shortly after the composer’s death, we see the Broadwood in use—with music stand still open and candles half-burnt (see figure 1). Beethoven’s other piano, the Graf, had just been returned to its manufacturer and owner. Gerhard von Breuning, who lived just around the corner and as a young teenager visited Beethoven often, remembered that the two pianos had been “set curve to curve,” with the Broadwood the other way



FIGURE 1. Johann Nepomuk Hoechle, wash drawing of *Beethoven's Study in the Schwarzschanerhaus*, 1827; Wien Museum Karlsplatz, Vienna.

around: Beethoven would have had its keyboard at the window, the perfect well-lit spot for improvising, while the Graf may at this time (1825–1827) have served as Beethoven’s composition instrument, its keyboard closer to the adjacent “composition room,” or study, outside the frame to the right. (The title of the drawing is misleading: the room depicted was in fact Beethoven’s combined living and bedroom.) Of the two instruments, the Graf was outfitted with a hearing machine. Breuning remembers, “Above its keyboard and action was a sort of trumpet, like a prompter’s box [*Souffleurkasten*], made in the shape of a bent sound board of thin wood; the idea was to concentrate the sound waves of the instrument in the ears of the player.”⁶

34. Hoechle’s drawing would bring us the closest to restoring a reality of Beethoven at his Broadwood, were it not for one detail—one “addition of the artist’s,” as Breuning clarifies.⁷ As if making up for the empty chair, Hoechle positions a fictitious Beethoven bust behind the closed curtain on the right-hand windowsill. It faces away from inkpot and pen, which Hoechle himself may have carefully placed onto the left-hand windowsill, to fit the composition he had in mind. The right-hand window, furthermore, is drawn incomplete: there is no hint of the skyline of Vienna, which the left-hand window vividly opens up to; while the room is clearly demarcated on the left by a door and wall, the right-hand side suggests no end. Beethoven’s spirit, Hoechle’s composition

6. Gerhard von Breuning, *Memories of Beethoven from the House of the Black-Robed Spaniards*, ed. Maynard Solomon (Cambridge: Cambridge University Press, 1992), 63, translation of *Aus dem Schwarzspanierhause: Erinnerungen an L. van Beethoven aus meiner Jugendzeit* (Vienna: L. Kosner, 1874).

7. *Ibid.*, 66.

suggests, leaves behind all earthly things and confidently looks toward a future when also those manuscript rolls still chaotically scattered on the piano lid will be revered as true masterworks.

With this recording, we turn around Beethoven's bust to face his piano again—but it is “I,” a well-hearing pianist, who takes the seat (or “Beethoven stuhl”). Like Beethoven, I also adopt my newly built replica as a tool for artistic (re-)creation. Beethoven had no choice, but I, instead of either ignoring or sublimating the issue, acknowledge his hearing disability as a component of his art—as something that influenced his craft of composing, not just conceptually but also empirically. Finally, even Beethoven's evocation of Apollo as the god of music may be deflated: gracing the top of the bookcase that Hoechle drew between the two windows stands an elegant, full-figure statuette of Apollo Belvedere. Beethoven's promise to Thomas Broadwood to treat his piano as an “altar to Apollo,” then, may have sprung from a practical consideration: Beethoven anticipated making room for the new instrument in front of the bookcase and its overlooking statuette.

But the piano alone does not tell the full story. In 1827, Beethoven may have benefited from Graf's hearing contraption, but back in 1820–1822, when he wrote his three last sonatas, the talk was all about the construction of a similar hearing aid—the first of its kind—for his Broadwood. We turn to it now as a crucial piece of the puzzle.

The hearing machine

The story of Beethoven's "hearing machine" (*Gehörmaschine*), built to go on top of his piano, is usually told backward, from the perspective of selected witness accounts in the last few years of Beethoven's life. These typically focus on the old master's playing (mostly whether or not he could be convinced to do so, and if yes, on finding glimpses of genius) or on his utter inability to hear (always assessed from the perspective of a pitying, well-hearing visitor). No wonder the fifty-plus-year-old Beethoven would have felt self-conscious.⁸ It is telling, in this respect, that Friedrich Wieck, father of Clara Schumann, relates gaining access to Beethoven through André Stein, who introduced Wieck as someone especially experienced "in hearing aids and hearing machines"—that is, not just as a colleague-musician, but as someone capable of relating to Beethoven's physical condition. "Otherwise, in Stein's experience, [Beethoven] would not have received me," Wieck explains. And he got his reward: "For more than an hour long [Beethoven] fantasized, after he had connected his hearing machine [*seine Gehörmaschine*] and placed it on the soundboard of his piano; this piano had been given to him by the city of London; it was rather beaten up and had a strong, puffy tone."

It is not clear what exactly Beethoven placed on the piano: the machine that Stein had made in 1820, some unknown connector between the piano's soundboard and Beethoven's ears (whether or not in conjunction with the larger machine and whether or

8. For a compelling analysis of these visitors' stories, see K. M. Knittel, "Pilgrimages to Beethoven: Reminiscences by His Contemporaries," *Music & Letters* 84 (2003), 19–54.

not involving ear trumpets), or some new contraption altogether. Another uncertainty concerns the date of Wieck's visit: the newest scholarship dates it in 1823, three years earlier than Wieck remembered at an advanced age.⁹

Unambiguously referring to Stein's original machine, however, is a witness account by the portrait painter August von Klöber, who visited Beethoven at his summer residence in Mödling most probably in late September 1820.¹⁰ The machine, barely two weeks old at the time of Klöber's visit, would have been shiny and impressive. In this scene, Beethoven's nephew Carl was practicing "on the piano, which had been a present from England and which was outfitted with a big metal cupola (*Blechcuppel*)."¹¹ Posing for his portrait, Beethoven sat with his back to the piano. "The instrument stood approximately four to five steps behind him and in spite of his deafness Beethoven corrected each of the boy's mistakes, made him repeat the one or the other passage etc."¹¹ Granted, this is an anecdote—a witness account with no bearing whatsoever on the formal performance of a Beethoven sonata—but still, two observations seem relevant: the Broadwood-*cum*-cupola had become a fixed entity so that fifteen-year-old Carl had no choice but to practice in what must have been rather aggressive acoustic circumstances; second, the machine seems to have been effective: even without visual clues, Beethoven was capable of distinguishing between correct and incorrect sounds.

37.

9. Klaus Martin Kopitz and Rainer Cadenbach, eds., *Beethoven aus der Sicht seiner Zeitgenossen in Tagebüchern, Briefen, Gedichten und Erinnerungen*, 2 vols. (Munich: Henle, 2009), 2:1094.

10. Robin Wallace has corrected this date from earlier scholarship; see his forthcoming book on Beethoven's deafness (Chicago: University of Chicago Press).

11. "Miscellen," *Allgemeine musikalische Zeitung, Neue Folge* 2 (May 4, 1864), 325.

Building the machine

The building process (what, who, when, how, and at what cost) may be most vividly reconstructed from Beethoven's 1820 conversation books. In these notebooks, visitors communicated with Beethoven through writing, and Beethoven responded orally. A complete compilation of 1820 communications to Beethoven in the conversation books about the hearing machine (which makes for a surprisingly good read) may be found as the final pages of this booklet.

Countless discussions take place, having to do mainly with the choice of material (wood or metal) and shape (early on, Stein launches the winning idea of an "arch"). Beethoven clearly has a preference for wood. (What about metal causes him to be skeptical?) But when Stein finds a tinsmith "who's skilled and inexpensive," the opinion becomes unanimous: "The gentlemen all agree that metal is better than wood," as Beethoven's personal assistant Franz Oliva summarizes for the ever-doubting Beethoven. From the outset, Stein has proactively volunteered his services, but Beethoven appears doubtful about that too, at some point even contemplating switching to Graf. The ever-diplomatic Oliva again talks Beethoven out of his indecision, arguing, "Stein knows you better and seems more technically skilled," and reminding Beethoven of the current momentum: "One shouldn't allow this fire to go out."

Measurements are made at Beethoven's house. Once the final production has started, Beethoven must temporarily part with the Broadwood—something he's been dreading all along. The piano is transported to Stein's workshop, while Beethoven moves to Mödling for the summer, possibly with a rental piano from Stein.

Oliva meanwhile keeps moving the project toward the finish line, navigating between Beethoven's impatience and unavoidable delays at Stein's. But all looks good: "Stein doesn't doubt that [with additional ear trumpets, to be customized onto the new machine] you will hear [even] the softest [of sounds]." Also Joseph Czerny (friend and piano teacher of Beethoven's nephew Carl) has tried out Stein's hearing machine and assures its efficiency—from a well-hearing person's perspective, that is. On September 7, 1820, the Broadwood and the completed machine make it back to Beethoven's, five and a half months after Stein initially broached the idea. New ear trumpets, to be modeled after the ones Beethoven already has from Johann Nepomuk Mälzel, will follow. (There is no evidence that these new ear trumpets ever arrived.)¹²

During the months before our recording in July 2016, I shared this wealth of material with a growing team of collaborators (a piano builder, an acoustician, a master artisan, a record producer) and received additional advice from friends and colleagues. As we experimented—with cardboard, with wood, with zinc foil—parallels with the activities back in 1820 quickly became palpable. We also made a prototype in wire, and like those of our historical counterparts, our attempts had varying degrees of success. Through trial and error, we ended up making three versions of a hearing machine. The ultimate goal, however, was to create what we started calling a flexible backward-projecting lid.

In my wish to make our efforts also artistically rewarding for a well-hearing person, I kept insisting on my expectation of a grand

12. Robin Wallace, personal communication, June 22, 2017.

piano that would behave acoustically like some giant clavichord, with a lid that projects sounds backward toward the player. In my mind this was to be an improved version of a clavichord, on which the soundboard is located to the right-hand side of the player with strings running sideways—both constructional features heavily favoring one's right ear. A backward-projecting Broadwood, again in my thinking, would yield a stereo image between bass and treble, the piano's collected strings now neatly perpendicular to the player, nicely divided over the whole soundboard. I hypothesized that the resulting clarity in sound, to be experienced binaurally, would be akin to Beethoven's focused listening through his respective ear trumpets. I also wanted us to construct something that would include the listener in this acoustic experience. The backward projection would have to focalize the sound (which was the priority for Beethoven), but also diffuse it (softening the blow on the player's ears and opening up a soundscape that becomes attractive for the listeners seated behind the player).

One side effect of using the hearing machine—and a potentially important component in the story—is that with any keyboard-oriented amplification device, the Broadwood would sound more like one of its Viennese counterparts. Outfitted with harsher hammerheads, Viennese pianos were designed to articulate better, while the priority for English instruments, which used a softer kind of leather for their hammer coverings, was to sing, at the expense of a clear attack. The conventional lid helps restore definition in those long and full English piano sounds, but these are projected sideways, away from the player: it is no coincidence

that the modern concert setup of the piano, with the lid opened toward the audience, originated exactly in late eighteenth-century English concert practice. By contrast, when one opens a Viennese piano, either by lifting one side of the lid or by taking the lid off completely, it loses some of its direct, articulatory power in favor of more resonance and spaciousness. Outfitting Beethoven's Broadwood with a hearing device, then, would have Viennicized his English instrument to some degree, lending it more directness and articulatory power.

We find support for our vision of Beethoven's Broadwood as a giant clavichord in a remarkably accurate report published in a Viennese cultural journal of 1819. The journalist, who may well have interviewed Beethoven in preparation of his piece, compares the touch of Beethoven's Broadwood "to that of a good clavichord: all modifications of a single tone may be produced without the need of a special register."¹³ The comment is unusual, but it makes sense if it did indeed come from Beethoven, whose earliest pianistic memories had been formed when he practiced the clavichord extensively during his childhood in Bonn. Anyone used to Viennese *prell*-action (as Beethoven was) would be impressed by the larger key-dip of the English instrument, which in combination with the English *stoss*-action generates what I like to describe as a spongy feel—similar to the sensation of pressing a clavichord key. (In a clavichord, however, the sponginess is created by direct contact with the struck string, and not by what is called after-touch in an English piano action). The illu-

41.

13. "Ehrende Auszeichnung," *Wiener Zeitschrift für Kunst, Literatur, Theater, und Mode* 4 (January 23, 1819), 78.





43.



sion, then, of direct tactile contact with his piano strings, raising for Beethoven associations with the instrument of his youth, may have helped Beethoven compensate for his hearing loss—however not through sound, but through touch, the latter being the dominant sensation on a soft-sounding clavichord also for a well-hearing player.

The three last sonatas

How relevant was the existence of a hearing machine for Beethoven's composition of his three last sonatas? To be sure, Beethoven tried the machine for the first time only after his sonata Opus 109 had been largely thought out and sketched. It is possible that he made revisions before sending the completed sonata to publisher Schlesinger in Berlin by January or February 1821. The first sonata to have been fully conceived under the amplification device was his Opus 110; its finished autograph is dated December 1821, more than a year after the arrival of the machine.¹⁴ The final sonata, Opus 111, was finished by February 1822; on April 9 of that year, Beethoven announced that he had sent a new fair copy of the second movement.¹⁵

But Beethoven's first response to his amplified piano may well be encapsulated elsewhere: his Bagatelle in C Major, Opus 119, No. 7, written exactly around the time of the hearing machine's

14. For most of the year, Beethoven had suffered from jaundice, causing delay in delivering on the three-sonata commission from Berlin.

15. Kurt Dofmüller, Norbert Gertsch, and Julia Ronge, eds., *Ludwig van Beethoven: Thematisch-bibliographisches Werkverzeichnis*, vol. 1 (Munich: G. Henle Verlag, 2014), 697–99, 703–6, 710–12.

arrival, is a quirky fifty-seven-second piece with an ear-deafening climax—perfect for testing the dynamic extremes of the arched, metal contraption. (For a 360-degree video performance of it, visit InsideTheHearingMachine.com.)

The C-natural that wants to be a C-sharp

There is one note in Opus 109 that exceeds the six-octave range of Beethoven's Broadwood:¹⁶ a high C-sharp that recurs three times as part of the last variation, at the end of the third movement, just before the final return of the unadorned *cantabile* theme (track 3, 10:25–10:41). After having been avoided for so long, this highest note of the whole sonata (played by my right hand's pinkie) soars triumphantly over a long sustained trill (played by the lower fingers of my right hand) and wild scalar flourishes that crisscross the middle part of the keyboard (played by my full left hand). The C-sharp is itself part of a note-by-note reminder of the theme that has been transposed up by two octaves. It functions as a major-second appoggiatura, gorgeously stretching the reach of the melodic line. But there is no key for it on the Broadwood. What to do? Leave out the note? Replace it?

Here's the clincher: *Nowhere else in the sonata does Beethoven write a high C-natural*, leaving open at least the *option* of retuning the high C as a C-sharp. I stress option over obligation, because Beethoven was known to have retorted to a well-meaning

16. See also my essay, "The C-natural that Wants to Be a C-sharp: Visions and Realities of Beethoven's Broadwood," in *Artistic Research in Music: Discipline and Resistance*, ed. Jonathan Impett (Leuven, Belgium: Leuven University Press, 2017), 43–87.

colleague, “They all like to tune it, but they shall not touch it” (“it” in reference to his new Broadwood and “they” to his Viennese piano-builder friends),¹⁷ and visitors had heard him playing on the instrument despite its wretched tuning, so it seems fair to assume that the issue of an accurate single pitch would not have been important at all. The note in question, furthermore, is part of the highest of registers, which would have been all but impossible for him to hear.

46. For Beethoven, then, the discrepancy between imagined and actual, realized sound could easily be lived with. But also for a well-hearing person, there is something intensely powerful about playing a sharp on a key that is supposed to be a natural. It is as if at that very moment one succeeds, by sheer force of will, in embodying those highest piano strings (all three of them, for one key) and making them behave like one’s vocal cords, stretching what physically still feels like a minor second (one’s fifth finger gliding to the next key below) to a major-second appoggiatura (creating a full tone or the equivalent of an additional key in between). The pianist, finding this sublime voice, self-identifies with the piano in such a way as to transcend technological reality. (An association with the human voice is entirely warranted: in the autograph of the sonata Beethoven had called the theme *Gesang* or “song”—but changed this indication to *gesangvoll*, “singly,” by the first publication.)

17. Elliott Forbes, ed., *Thayer’s Life of Beethoven* (Princeton: Princeton University Press, 1967), 2:695.

At the same time, Beethoven would have found comfort in the option of scordatura: to take the tuning hammer and raise the pitch of a single note on the keyboard without making another pitch unavailable in its stead. The sonata, in other words, remains executable in its entirety on the kind of keyboard that Beethoven had. Beethoven may have been the only pianist-composer with a magnificent Broadwood in Vienna—a unique circumstance that must have flattered his ego—but the context is still one of a composer at his keyboard, the latter serving as a tool or interface for his ideas. Writing the C-sharp is not a story of vision or sheer imagination: Beethoven’s “C-natural that wants to be a C-sharp” may tweak materiality, but it does so in an utterly clever and concrete way.

C-natural or C-sharp: the question had been planted long before (or had been on Beethoven’s mind), particularly in the coda of the first movement. Listen to track 1, 03:11–03:30, where the pianist cannot make up his mind: will he go for a major or minor tonality, for C-sharp or C-natural? But ultimately we do not have to choose. By the end of the sonata, sound yields to touch and imagination—a deeply positive message for the hard-of-hearing composer.

47.

Feeling and seeing vibrations

Variation 4 of the third movement of Opus 109 (track 3, 05:19–07:53) explores the sensation of vibration to an extreme: the feeling of vibrating parts—of the instrument’s case, its keys, and its pedal lyre through the pianist’s fingers, feet, and entire body. I became especially aware of this as I practiced the sonata alternately on the Broadwood and on an 1808 Viennese Nannette Streicher on

the hardwood-floored stage at the Orpheus Institute in Ghent, and felt a noticeably more constant vibration in the Broadwood. From an organological perspective, this makes sense, since the outer frame of an English instrument is structurally anchored to its soundboard, whereas the outer case of a Viennese piano encloses yet another inner frame, making the transfer of vibration from inside to outside indirect only.

Because of their precise action and articulatory focus, Viennese pianos call for a clear differentiation between dissonance and consonance—the former to be played louder, the latter softer (as a resolution of the former). But at the outset of the fourth variation, gorgeous pairs of *appoggiatura* and resolution elide with one another, almost to the point of the one negating the harmonic function of the other. This is a rather drastic shift in harmonic thinking, and Beethoven's explorations must have been based on touch rather than sound: every tone or key on an English-action piano requires an individual finger stroke, while a Viennese-action piano allows for the second of a slurred two-note pair to be hung onto the previous one, requiring only a gentle, caressing stroke of the resolving finger. Without physical clarity of good (or strong) versus bad (or weak), the duality easily reverses to bad versus good. What starts mattering more, then, is the sine wave of the oscillation itself: the up and down of it (or, as the case may be, the down and up). In this variation, Beethoven taps into the accumulating energy of a relentless play of back-and-forth vibration, first cautiously and softly, then with ever-increased vigor and obsession.

Acoustical measurements carried out by Thomas Wulfrank (see his essay in this booklet) established that Beethoven's Broadwood is indeed consistently "vibrationally louder" than a Viennese piano (an 1823 Graf) for a significant three to five decibels. This result reflects what the pianist feels through fingers or hands at the keyboard. Measurements taken on the floor, reflective of the sensations felt through the pianist's feet and legs, are even more significant: the wooden floor vibrated up to ten decibels more under the Broadwood than under the Graf—the equivalent of ten times more vibrational energy. No wonder the Broadwood appealed to Beethoven.

A hearing exercise

While in Opus 109, Beethoven searches for his pianist's singing voice—its vibrations excited either by piano strings or the pianist's inner vocal cords—at the beginning of Opus 110 (track 4), Beethoven does exactly what visitors reported him doing when demonstrating the beautiful tone of the Broadwood: he plays a single four-voice chord, with the third on top. He lingers on it: he listens! It is a celebration: hearing or listening becomes an essential topos of this sonata. When in the fourth bar, I pause on a dominant-seventh chord, the trill under the fermata allows me the freedom and time to lean forward into the machine and analyze its inner workings, the clashing sounds of my trill reflecting erratically against all possible surfaces and finding their way toward my probing ears.



Figure 2. Looking into the hearing machine.

But my explorations do not remain aural. Equally powerful is what I see before me (see figure 2): a large cave that I explore with my eyes both for its depth and its width. After the fermata, I find myself scanning the machine's outside rim—the same that may have inspired Beethoven to compose slurred melody lines and feather-light arpeggios, drawing half-circles all the way up and down the keyboard (track 4, 00:38–01:00), looping within the largest half-circle of all: the gigantic arc that looms over my keyboard. Acoustics and optics combine in the third movement (track 6) to provide the appropriately gothic setting for a dramatic recitativo-like voice that seems to emerge from deep within the cave.

Robin has made me aware of the significance of a peculiar series of single G-major chords in that same third movement—ten of them, ever louder. They reflect, perhaps, the kind of hearing exercise Beethoven may have submitted himself to every time he sat down at his piano. The third of the triad initially on top, just like in the opening of the sonata, the chords grow louder—an effect that in his earlier years Beethoven would have underlined by *poco a poco due e allora tre corde* (gradually two and then three strings), but here to be played with one string only (*una corda*) throughout. With every new blow of the chord we concentrate more on the sound of single vibrating strings, without interference from any other possibly out-of-tune unisons. This hearing exercise, I propose, evokes Beethoven's renewed hope of hearing sound *quality*: in a well-tempered tuning (like the Vallotti/Young that we used), a G-major chord is noticeably calmer than the A-flat tonality of the overall sonata. We know that Beethoven, again in his earlier years, was a big defender of key characteristics and loved a good debate on the subject with his good

friend Friedrich August Kanne. He may have delighted in hearing different affects again. Even with this biographical association of nostalgia for earlier, more fortunate times, the suggested scenario is that of an actual experience—the composer-pianist in front of his new hearing machine, intensely listening.

Transcendence

Of the three sonatas, Opus 111 encapsulates best our vision of a flexible backward-projecting lid. The dark and hollow hearing machine is still a fitting décor for the first movement's Sturm und Drang in C minor, but once C major takes over (at the end of the first movement and then throughout the second), we break out from any claustrophobia we might have felt inside the hearing machine. (Heinrich Schenker, at this point in his analysis, speaks of “a world in which light no longer meets any resistance.”)¹⁸ We still sit in front of the piano, but we straighten our back and allow sound or vibration to engulf us—oblivious of exactly how these have reflected against the lid or wall. From a multisensory perspective, Opus 111 in many ways acts as a synthesis of the two previous sonatas. Beethoven no longer compensates: all senses—visual, tactile, and aural—come together in a single holistic experience that takes up its own space.

From Opus 109, as William Kinderman has observed, Opus 111 borrows the principle of rhythmic diminution: systematically shifting from larger to smaller note values within the same speed.¹⁹ But

18. Heinrich Schenker, *Beethoven: Die letzten Sonaten – Sonate C moll Op. 111*, ed. Oswald Jonas (Vienna: Universal Edition, 1971), 46.

19. William Kinderman, *Beethoven* (Oxford: Oxford University Press, 2009), 245, 253.

while in Opus 109 this technique is restricted to the third movement's last variation (transforming only the theme of the *Gesang*), it is omnipresent in the second movement of Opus 111 (turning transformation into a reigning principle, systematically increasing the number of notes per beat from the one variation to the next). Diminution means ever faster vibration, and the ultimate step would have to be the trill, as the fastest oscillation possible between two notes. In Opus 111, the trill makes its appearance at first disruptively and without preparation or context (track 8, 11:19), but at its second entry (track 8, 15:10) oscillation becomes the essence of the musical message. Diminution has stopped being a process; time yields to timelessness.

With the third movement of Opus 110, the Arietta theme shares a remarkable series of G-major chords. There are seven of them, firmly placed between the two hands, their succession interrupted only by a root-position tonic and subdominant chord (track 8, 01:30-01:44), which, if anything, end up emphasizing G major even more. As in Opus 110 these identical chords are grouped under one large crescendo. In Opus 110 the tonality of G major had been attractive, but foreign. Upgraded to the status of dominant harmony, G major now keeps a luring presence throughout a long C-major movement.

When I perform the Arietta movement with the flexible backward-projecting lid, there is always one point where I imagine Beethoven putting away his ear trumpets once and for all (if indeed he had been using them in conjunction with the hearing machine), and becoming one with the soundscape in front

of him. This point occurs when the Arietta returns in its original form as the movement's fifth and final variation (track 8, 13:06). The whole preceding passage (which sank one step lower, from C major to B-flat major) was a fantasy-like cadenza, in which I threw snippets of sound—trills and syncopated fragments of the theme—against the reflective lids above my strings. For one last time, each of my hands explored the extremes of the keyboard (track 8, 11:57-12:22), their distance from one another causing a stereophonic divide in my brain that felt unbearably self-conscious: imagining the painful pressure of the ear trumpets' metal edges in my ears, like Beethoven, I just wanted to put them aside for good. No longer restrained by a stiff body negotiating machine-like extensions, both hands find one another just below the center of the keyboard on a striking precadential harmony (track 8, 13:00). The ensuing cadence metamorphoses into the opening theme, which makes its glorious reentry. A single wave of sound has now been set in motion—unstoppable and growing in momentum.

Undergoing these events, we are in complete control. As we adjust the movement of our fingers to that of our keys, hoppers, and hammers, we settle into that ideal rhythmic pulse, all note values together, large and small, saturating every subdivision of the bar in perfect triple meter. As we keep increasing our sound (it is still not clear who or what is in charge: the pianist or the piano), our strings radiate overtones that together sculpt a perfect tonal balance of outer calmness and internal energy, the triple divisions within the beat taking over the role of beats, now in a harmonic-acoustical sense, in a C-major well-tempered tuning. Fingers,

hands, arms—the entire body finds perfect synchronicity with the English piano; all together create a state of transcendent bliss or perfect balance between sound, touch, body, and instrument.

Opus 111, then, shows a before and after. The first movement initially reconnects with the rambunctiousness of Beethoven's fugue from Opus 106 (when he first received the piano); now the Arietta goes far beyond what Opus 109 and 110 have achieved in terms of poetic sensitivity. At the very end of the sonata (track 8, 16:29), we revisit a little remnant of the Arietta theme: a three-note call on a tonic harmony that blends with its echoes across dominant harmonies—freely vibrating, almost evaporating in the upper echelons of the piano. Casually tagged on at the end of a long movement, these echoing calls act as its large-scale structural resolution. They're a farewell of some sort, but to whom or what? To time and space? Having effectively achieved closure, we are jolted back into having to accept them. A farewell to sound? But as the sound ebbs away, one would swear there is still some left, the English instrument's after-ring prolonging the after. A farewell to the piano? But Beethoven was still to write the most magnificent of his Opus 120 Diabelli Variations (the last of which mirrors this Arietta in many ways) and all of his Opus 126 Bagatelles. A farewell to life? But Beethoven wrote Opus 111 exactly in a period of physical and mental recovery.

Conclusion

And so we have come full circle. The simplified assumptions about late Beethoven with which we took issue at the outset of this essay have morphed into complex paradoxes steeped in Beethoven's life and work. We can embrace them, or like the bust in Hoechle's drawing, we can turn the other way.

When Beethoven died, his childhood friend and lawyer Stephan von Breuning insisted on supervising the sale of Beethoven's estate. As related by his son Gerhard, he bought several items himself, such as "the little black box and the yellow one, which we had so often handed to Beethoven in his bed," "the writing desk that stood in the ante-chamber," and "a stand from the bedroom."²⁰ But when it came to the piano, the sixty-nine-year-old Gerhard sounds almost apologetic: "The Broadwood piano, which was put up for sale, was not purchased by my father because it went up only to C and did not meet the demands of the modern, that is Beethoven, era." Not only is it telling that Gerhard felt compelled to mention the piano at all, but his rationalization for his father's not purchasing it—which he presumably heard directly from his father—sounds unconvincing exactly in that so-called Beethoven era, when anything that had once belonged to Beethoven (especially his piano!) would have been fetishized. But Gerhard conflates *modern* with *Beethoven*. Like Beethoven, Gerhard's father had belonged to an older generation—one that had grown up in a different century, with a different outlook on life and art: Why purchase a ten-year-old piano that his late friend had so often complained about?

56.

20. Breuning, *Memories*, 113.

We live in different times yet again. Limited range and all, a new replica of Beethoven's Broadwood gives us the tools to reconnect with Beethoven's concrete ambitions and tangible frustrations. And a reconstruction of his hearing machine creates a new context in which to enjoy his three last sonatas as masterful examples of embodied artistic expression. It is this reality, and not some ideology shaped in the "modern Beethoven era," that is truly Beethovenian. The statuette of Apollo, I like to think, would have nodded its head in approval.



57.

*I can hear more of what I do
and do more of what I hear.*

TOM BEGHIN, REACTING TO THE FLEXIBLE
BACKWARD-PROJECTING LID, JULY 13, 2016