Toward a Musicology of Interfaces

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> "And yet, even with my focus so intently on the message, the experience of my fingers on keyboards feels like more than simply a means to a desired end. In the creation of both music and text, if I could bypass the keyboard and directly transmit mental signals to an instrument or to the computer, I would not want to do so."[1]
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> Howard Gardner

> "The keyboards were always there… for some reason or other it looks good if you're playing a keyboard. People understand then you're making music."[2]
>
> Robert Moog

ERNST BLOCH OPENED HIS CLASSIC essay "Magic Rattle, Human Harp" by laying out the pre-historical relationship between sound and the objects that produce it. In the deep past, he wrote, "[the musical tone] was linked quite specifically with the instrument producing it… Thus the original rattle rattled as the thing it was; the rattling sound is merely its verb."[3] With the development of humanity, however, "[the musical tone] surmounted its instrument." Bloch continued: "the ringing and tinkling broke loose from the ringing brass and tinkling bell; musicians no longer just 'attended on' their instruments but availed themselves of them."[4] This led to the modern condition whereby tones became free to travel around and wander through the air—unlike color, which remained fixed to the object emitting it.

Ultimately his description of the current relationship between note and object served to make a larger point about the human voice, which for him retained some of the primal, ancient power that occurred when sound and

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[1] Howard Gardner, "Keyboards," in *Evocative Objects: Things We Think With*, ed. Sherry Turkle (Cambridge: MIT Press, 2007), 49.

[2] Trevor Pinch, "Why You Go to a Piano Store to Buy a Synthesizer: Path Dependence and the Social Construction of Technology," in *Path Dependence and Creation*, ed. Raghu Garud and Peter Karnøe (New Brunswick, NJ: Rutgers University Press, 2001), 386. Comments in an interview with Trevor Pinch, describing the presence of keyboards in promotional material for the Moog Synthesizer.

[3] Ernst Bloch, "Magic Rattle, Human Harp," ["Zauberrassel und Menschenharfe"] in *Essays on the Philosophy of Music*, trans. Peter Palmer (Cambridge: Cambridge University Press, 1985), 140.

[4] Ibid.

material were inseparable.[5] Bloch wrote this essay in the 1930s, when the first wave of electronic musical instruments had already crested; in the wake of this period of fevered technological invention, the chasm between sound and source—what R. Murray Schafer would later call *schizophonia*—must have seemed to be growing ever wider.[6]

I am less interested here in what Bloch thought about the magic of music, the power of the singing voice, or about how the disengagement of sound and source might have served his utopian vision.[7] With the burgeoning interest in the history of musical technology in contemporary musicological scholarship, I want to reconsider Bloch's proposed relationship between note and instrument and ponder what his imagined evolution reveals about music's technologies more generally.

Two things are worth considering. The first has to do with the historicity of Bloch's argument. Bloch placed the disenchantment of the musical instrument in man's prehistory: the sound broke free from its instrument long ago, and this emancipation is implicitly a pre-condition for music. Looking at music history from the perspective of technology, however, it would be better to say that the separation of sound and object did not occur in a singular, inaugural moment, but rather has been a trope that could be used to define different technological periods within musical history. After all, Bloch could have equally been describing, say, the rise of modern orchestration, the advent of synthesizers, or the proliferation of software such as Pro Tools. Phenomena such as these mark a disciplining of instrumental technology—often through another form of technology—whereby instruments are reduced to their sonic effects. History is littered with moments in which new techniques of manipulation render certain kinds of musical technology invisible.

Second, Bloch's articulation of the separation of sound and source also reveals a commonly held assumption: music, we generally say, is an art whose

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[5] Carolyn Abbate also discusses Bloch's view of technology with respect to the voice in "Magic Flute, Nocturnal Sun," in her *The Search for Opera* (Princeton: Princeton University Press, 2001), 57–58.

[6] R. Murray Schafer, *The New Soundscape: a handbook for the modern music teacher* (BMI Canada, 1969); on the development of musical instruments in the 1920s, see Thomas Patteson, "Instruments for New Music: Sound Technologies and Modernism in the Weimar Republic" (PhD diss., University of Pennsylvania, 2013).

[7] The ways in which Bloch understood music's role in articulating the ideals of a future utopia have been a major focus for scholarship. See for example Benjamin M. Korstvedt, *Listening for Utopia in Ernst Bloch's Philosophy* (Cambridge: Cambridge University Press, 2010).

medium is sound.[8] Pointing this out is as mundane as pointing out that fish swim in water. It is ubiquitous: Eduard Hanslick treated sound as a medium when he wrote that "the crude material which the composer has to fashion, the vast profusion of which it is impossible to estimate fully, is the entire scale of musical notes and their inherent adaptability to an endless variety of melodies, harmonies, and rhythms."[9] Likewise, Pierre Schaeffer's vision of *musique concrète* worked under the assumption that sound is a medium, albeit one that requires expensive, multi-ton equipment to control fully.[10] It is discursively useful to treat sound as a medium, but it is easy to forget that this does not represent an absolute truth. To treat sound as the medium of music is a shorthand: in that idea lies a host of additional assumptions, practices, and conventions. We do not, for example, consider light the medium of painting (or of cinema), even though to do so would be physiologically analogous. To treat sound as a musical medium skirts musical technologies; better put, it stands in for the technologies that have been bypassed. Yet it would make just as much sense to talk about the media of music as consisting of the wood, metal, wires, reeds, pipes, valves, speakers, magnetic tape, vinyl, and circuits that we use to produce and record sounds. After all, sound is the effect produced by the battery of physical media. Much of the scholarship today that takes technology as its subject seeks to replace sound with the instruments and bodies that produce it: I am thinking here of Bonnie Gordon's recovery of the body of the castrato, David Yearsley's recent book *Bach's Feet*, Deirdre Loughridge's work on eighteenth-century visual technologies, Gundula Kreuzer's explorations of Wagnerian technologies, Eliot Bates's consideration of instruments and sociality, and Joseph Auner's work on questions of historical performance and electro-acoustic music.[11]

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[8] Bloch discusses this more explicitly in his essay, "The Philosophy of Music," ["Philosophie der Musik"] in *Essays on the Philosophy of Music*, 1–139; see especially the section "Means Formulae, forms and phenomenal aspect of the transcending theory of music," pp. 93ff.

[9] Eduard Hanslick, *On the Beautiful in Music*, trans. Gustav Cohen (London and New York: Novello, Ewer and Co., 1891), 66–67.

[10] See Schaeffer's description in *À la recherche d'une musique concrète* (Paris: Éditions du Seuil, 1952); translated as *In Search of Concrete Music*, trans. John Dack and Christine North (Berkeley: University of California Press, 2012).

[11] See for example: Bonnie Gordon, "The Castrato meets the Cyborg," *Opera Quarterly* 27, no. 1 (2011): 94–122; David Yearsley, *Bach's Feet* (Cambridge: Cambridge University Press, 2012); Deirdre Loughridge, "Haydn's *Creation* as an Optical Entertainment," *The Journal of Musicology* 27, no. 1 (2010): 9–54; Gundula Kreuzer, "*Wagner-Dampf*: Steam in *Der Ring des Nibelungen* and Operatic Production," *The Opera Quarterly* 27, nos. 2–3 (2012): 179–218; Eliot Bates, "The Social Lives of Instruments," *Ethnomusicology* 56, no. 3 (2012): 363–95; Joseph Auner, "Wanted

So far, we have not ventured too far from Bloch's own thoughts: after all, the evolution he describes could be easily reworded not as the decoupling of instrument and tone but the establishment of sound as the understood medium of music. I would like to suggest, though, that it is worthwhile to consider the conditions under which we can easily treat sound—rather than technologies of recording and production—as the principle medium of the art form. I want to argue that the invisibility of instruments reflects not the detachment of note from material but rather the ways in which instruments and particular modes of instrumentality have profoundly shaped what we think of as music.

There are many questions we might ask: what would it mean to tell a history of music from the perspective of instruments used to produce it? Can we speak of canons of instruments just as we speak of canons of musical works? In what ways does musical style follow (or not follow) technological innovation? What does it mean to call an instrument experimental? What criteria have people used to distinguish between a newly invented instrument and an improvement to an already existing one? The answers to these questions lie far outside the scope of this little essay. What I want to do here is simply contemplate a few places that might serve as jumping off points for a deeper investigation,[12] and to contemplate the paths of inquiry that open up when we think about various moments in the history of music from the perspective of interfaces. In particular, I am interested in the keyboard interface, which has endured and proliferated for centuries: what follows are some first steps towards exploring the ways in which the keyboard is imbricated with the very idea of Western Art Music.

Invention and Innovation

I would like to begin in the early nineteenth century, in one of the semi-fictional worlds of E. T. A. Hoffmann. Hoffmann's short story "Automata" (1814) is a miniature manifesto on early nineteenth-century musical technologies. The plot is ostensibly about a fortune-telling automaton, the Talking Turk, whose prophetic pronouncement disturbs Ferdinand, one of the protagonists. With the help of his friend Ludwig, Ferdinand goes in search of the Turk's creator. The heart of the tale is a spirited discussion between Ferdinand and Ludwig

Dead and Alive: Historical Performance Practice and Electro-Acoustic Music from Abbey Road to IRCAM," in *Communicating About Music: A Festschrift for Jane Bernstein*, ed. Roberta Marvin and Craig Monson (Rochester, NY: Rochester University Press, forthcoming).

[12] John Tresch and I explored a series of related questions in our essay, "Towards a New Organology," *Osiris* 28 (Music, Sound and the Laboratory, 1750–1980; 2013): 278–98.

about the horrors of automatic music and the current state of musical mechanics. In my previous work on this story, I focused on Hoffmann's articulation of the notion of the ideal sound—what he calls "nature music"—and the ways in which this story engages with the actual instrument-building practices of the period.[13] Here, though, I want to focus on the role of the keyboard. During Ludwig and Ferdinand's conversation about mechanical music and how instrument builders might better direct their creative energies, Ludwig proclaims:

> Now in the case of instruments of the keyboard class a great deal might be done. There is a wide field open in that direction to clever mechanical people, much as has been accomplished already; particularly in instruments of the piano-forte genus. But it would be the task of a really advanced system of the "mechanics of music" to observe closer, study minutely, and discover carefully that class of sounds which belong, most purely and strictly, to Nature herself, to obtain a knowledge of the tones which dwell in substances of every description, and then to take this mysterious music and enclose it in some sort of instrument, where it should be subject to man's will, and give itself forth at his touch.[14]

When Hoffmann wrote this story, instrument builders were producing new instruments. These were, by and large, keyboard instruments: Ernst Chladni's clavicylinder, Johann Gottfried and Johann Friedrich Kauffmann's harmonichord, Johann David Buschmann's terpodion, and Franz Leppich's panmelodicon, to name just a few. Many of these were attempts at creating an instrument with a tone similar to that of the glass harmonica but which was more easily and precisely controlled—and indeed some were explicitly keyboard-activated harmonicas. It is no surprise that Hoffmann believed that the "keyboard class" of instruments held the richest possibilities for musical invention. But the invention of new keyboard instruments that Hoffmann dramatizes in his story was hardly novel for the early nineteenth century; indeed, one might say that these instruments represented the tail end of a vibrant period of invention, one that peaked in the later eighteenth century and included the creation of the piano-forte.

It might be useful, in fact, to think of the Enlightenment and early Romantic periods as marked by profound musico-technological experimentation. In her 2012 dissertation, musicologist and organ builder Robin Blanton addresses eighteenth-century keyboard innovation, in particular exploring Johann An-

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[13] The story is a piece of music criticism in light disguise, with the character of Ludwig standing in for Hoffmann himself. See Emily I. Dolan, "E. T. A. Hoffmann and the Ethereal Technologies of 'Nature Music,'" *Eighteenth-Century Music* 5, no. 1 (2008): 7–25.

[14] E. T. A. Hoffmann, "Automata," in *The Best Tales of Hoffmann*, ed. E. F. Bleiler (New York: Dover, 1967), 96.

dreas Stein's combination organ and piano—the claviorganum—built in 1781.[15] Her project began as a straightforward organological investigation of the instrument, which is currently held in the Gothenburg City Museum in Sweden, but developed into a much more radical exploration of ideas of improvement and the definition of art in the late eighteenth century. In Blanton's study, Stein emerges as a highly experimental instrument builder. In addition to the fine organs, clavichords, and fortepianos for which he is well known today, Stein created a number of more unusual instruments including the Poly-Tono-Clavichordium (a combination organ and harpsichord) the Melodica (a small, pressure sensitive organ), a Vis-à-vis (a double keyboard instrument that allowed two players to perform facing each other), and the Saitenharmonika (which combined both hammer and plucking action). What Blanton demonstrates is that Stein was constantly striving to improve his instruments and that continued search for improvement allowed his craft to become a fine art. In particular, he sought to create a mechanism whereby the performer could control sound with greater dynamic and tonal nuance in order that his instruments be able to be truly expressive. The keyboard was an imperfect mechanism: it was difficult to combine the ability to sustain a tone with the ability to imbue individual tones with subtle dynamic nuance. In his *Versuch über die wahre Art das Clavier zu spielen* (1753), C. P. E. Bach famously complained, "All other instruments have learned how to sing. The keyboard alone has been left behind."[16] Of course, Bach was complaining as much about performance technique as about the mechanism of the keyboard—though he saw newly invented instruments as holding great potential for improving the artistry of keyboard performance.

What this suggests is that, in the eighteenth century, keyboard instruments presented a technological "problem." The search for improvements, however, did more than provide possible solutions to this problem: it helped establish the keyboard as a default interface creating a culture of invention. The "problem" became a universal solution: novel ways of producing sound could be efficiently instrumentalized using the keyboard. For example, Benjamin Franklin discovered that static electricity could be used to ring bells. "Franklin Bells" functioned by hanging a clapper between two bells. By charging one bell with a leyden jar and grounding the other, the clapper would be first attracted to

[15] Robin Blanton, "Johann Andreas Stein's 1781 Claviorganum and the Construction of Art in Eighteenth-Century Augsburg" (PhD thesis, University of Gothenburg, 2012).

[16] C. P. E. Bach, *Essay on the True Art of Playing Keyboard Instruments*, trans. W. J. Mitchell (New York: W. W. Norton, 1949), 31.

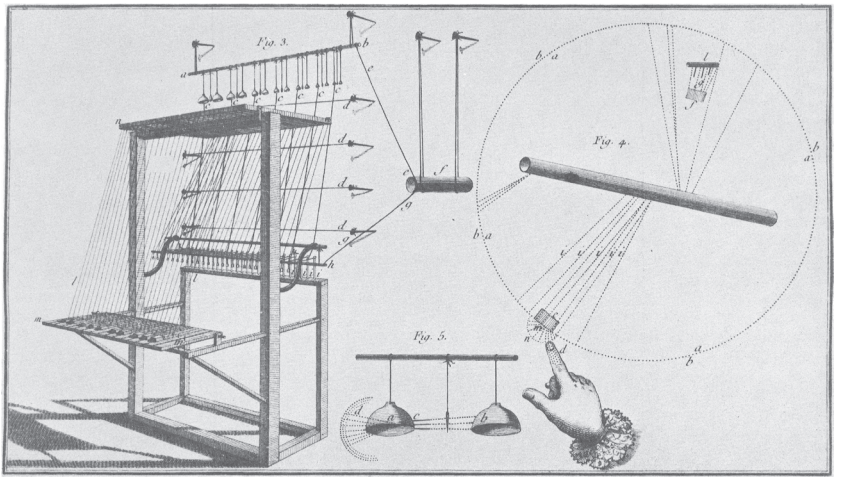

Figure 1 *Delaborde's* Clavessin électrique

the charged bell; after striking it, it would then take on the charge of the bell and be repelled, hitting the other bell, where the same thing would happen, and the ringing would last until the charge completely dissipated.[17] In 1759, Jean-Baptiste Delaborde took Franklin's principle and produced his *Clavessin électrique*, one of the first "electric" instruments (Figure 1). His invention comprised a series of tuned bells played with a keyboard: pressing a key closed the circuit and each bell would ring as long as the key was held down.[18]

This is not to say that all newly-invented instruments employed a keyboard nor that the keyboard ensured any form of widespread adoption of the new musical technologies to which they were attached. Nevertheless, the keyboard served to regulate the very idea of invention and innovation.

This "keyboardification" trend continued beyond the early romantic period:

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[17] These bells could also—though imperfectly—serve as a kind of storm warning, if one bell was attached to a lightning rod. On Franklin's electrical inventions, see James Delbourgo, "Chapter Two: Lightning Rods and the Direction of Nature," in *A Most Amazing Scene of Wonders: Electricity and Enlightenment in Early America* (Cambridge: Harvard University Press, 2006), 50–86.

[18] Delaborde described his instrument in his *Le clavessin électrique: avec une nouvelle théorie du méchanisme et des phénomènes de l'électricité* (Paris: H. L. Guérin & L. F. Delatour, 1761; repr. Geneva: Minkoff Editions, 1997). The first instrument to employ electricity appears to have been the mysterious *Denis d'or* built by the Bohemian priest Prokop Diviš. According to Hugh Davies, the instrument "had 790 strings and was capable of 130 gradations of timbre," and although electricity was "probably not an essential part of its action" the performer could be given an electric shock "as often as the inventor wished." Hugh Davies, "Denis d'or," in *Grove Music Online*, accessed March 12, 2013, http://www.oxfordmusiconline.com/subscriber/article/grove/music/47638

Figure 2 *The Buchla Thunder Interface Photograph by Richard Smith (www electricmusicbox com), used with kind permission*

the development of the typewriter, for example, drew heavily on the mid-nineteenth-century piano; Friedrich Kittler has argued that the similarities allowed women with piano skills to enter the workplace as typists.[19] Turning to the twentieth century, Trevor Pinch and Frank Trocco have explored the ways in which the success of Robert Moog's eponymous synthesizer was tied to his (reluctant) inclusion of a keyboard: it made the instrument mass marketable. Furthermore, as is well known, it was Wendy Carlos's 1968 album, *Switched-On Bach* that popularized the synthesizer.[20] Carlos effectively helped establish the Moog synthesizer as a keyboard instrument. Don Buchla created his own synthesizers at the same time as Moog, but, by contrast, largely resisted adding traditional keyboards to his instruments. "A keyboard is dictatorial," Buchla had argued, "When you've got a black and white keyboard there it's hard to play anything but keyboard music."[21] Today, his instruments are far less well known than Moog's. In the 1980s, much of Buchla's focus turned from synthesizers to the creation of new MIDI interfaces, including the Marimba Lumina, Thunder, and Lightning (Figure 2). Still today, the advertising for these controllers stresses that they are unconventional interfaces that make possible new forms of music: "THUNDER is an alternative controller," the website proclaims,

[19] See Friedrich A. Kittler, *Gramophone, Film, Typewriter,* trans. Geoffrey Winthrop-Young and Michael Wutz (Stanford: Stanford University Press, 1999), 194–96.

[20] Wendy Carlos, *Switched-On Bach* (Columbia Masterworks Records, 1968); Trevor Pinch analyzes the solidification of the synthesizer as a keyboard instrument in his essay "Why You Go to a Piano Store to Buy a Synthesizer," 381–402.

[21] See Trevor Pinch and Frank Trocco, *Analog Days: the Invention and Impact of the Moog Synthesizer* (Cambridge: Harvard University Press, 2002), 44.

"making no attempt to emulate the appearance or playing techniques of existing acoustic instruments, THUNDER introduces new concepts for defining musically interesting relationships between performance gesture and modern electronic vocabularies."[22]

The preference for the keyboard interface for newly invented instruments is hardly surprising: the keyboard has offered familiarity. Those with keyboard skills who encounter such an instrument for the first time can already immediately comprehend something about the instrument, no matter how unusual or unexpected the sounds it produces and regardless of the specifics of the internal mechanism. (Though mastery of an instrument—whether it has a keyboard or not—is another matter.)

Total Control

Allow me to make a leap into a science fiction future. One of the most famous scenes in the cult classic film *Barbarella* (1968) occurs when the eponymous heroine—a space warrior of sorts, played by Jane Fonda—is captured by the evil Doctor Durand Durand (the character was played by Milo O'Shea and was the inspiration for the band Duran Duran). Barbarella wakes up inside the doctor's contraption: the Excessive Machine, a musical instrument operated by a futuristic see-through keyboard that activates a series of levers. Instead of pipes or strings, the sounding material is Barbarella. As the doctor prepares his score—an assortment of different colored shapes on a three-line staff—an electric organ on the soundtrack invokes the opening mordent of Bach's Toccata and Fugue in D minor: a quote which simultaneously marks Durand Durand as demonic and signals the musicality of his contraption. He announces to the bewildered prisoner that he is performing *Sonata for Executioner and Various Young Women*. Though it begins pleasantly enough, he warns her "When we reach the crescendo, you will die… of pleasure!" What follows are several minutes of bombastic proto-prog rock (written by Bob Crewe and performed by The Glitterhouse) as Durand Durand attempts a virtuosic and deadly performance on the machine; it is, however, no match for Barbarella's capacity for pleasure and after a surprising number of orgasmic screams for a PG-rated film, the Excessive Machine breaks down, spewing smoke and flames.

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[22] http://www.buchla.com/historical/thunder/index.html, accessed March 11, 2013. Buchla was not entirely opposed to keyboards in this period: in 1971, he invented a polyphonic keyboard that was both pressure and velocity sensitive. According to Buchla restoration expert Richard Smith, these were the first commercially available keyboards with these features, and remained unmatched for some time.

This marvelously ridiculous scene draws on a long history of the many nefarious and demonic associations with virtuosic instrumental performance; Durand Durand is here a kind of futuristic Paganini.[23] But what does this scene reveal about the association between the keyboard and notions of control? Barbarella is trapped within the keyboard, rendering her "subject to man's will," to use Hoffmann's phrase. This leads us to a second, larger idea about the keyboard: in the quest to create a keyboard instrument with ever greater nuance and control, the keyboard becomes itself a model of control and organization.

One could argue that any instrument is a model of control and organization; indeed the basic idea behind an instrument is that it is a technology that is both manipulable and behaves predictably. Yet this was often more a goal to which both instrument builders and composers strove than a result that could be taken for granted. In his *Grand traité d'instrumentation et d'orchestration modernes* (1844), Hector Berlioz imaged all of the marvelous effects—of both color and harmony—that he could achieve were he able to create his ideal orchestra of 467 instrumentalists. One could "[divide] the 120 violins and forty violas in a high register into eight or ten parts (for an angelic, airy *pianissimo*)" or "[group] thirty harps with the full body of strings playing pizzicato (which would make a gigantic harp of 934 strings) as a large orchestra (for graceful, brilliant, sensuous sounds at any dynamic level)" or even "combine the two tamtams, the two bells and the three large cymbals with certain trombone chords (for a lugubrious, sinister, *mezzo-forte*)."[24] Berlioz's vision is opulent and would require more than a little conductorly despotism to put into action. When it came to imagining how the orchestra should be controlled, Berlioz turned to the keyboard. The orchestra, he wrote,

> may be regarded as a large instrument capable of making a great number of different sounds simultaneously or successively. Its power is limited or enormous depending on whether it involves all or only a part of the means of execution at the disposal of modern music and on whether these means are well or badly chosen and well or badly located in acoustical conditions of greater or lesser advantage. The assortment of players whose coming together constitutes an orchestra could be regarded as its strings, tubes, chests, and surfaces made of wood or metal—machines bearing intelligence but subordinate to the action of an immense keyboard played on by the conductor following the directions of the composer.[25]

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[23] See for example, Maiko Kawabata, "Virtuosity, the Violin, the Devil…: What *Really* Made Paganini 'Demonic'?" *Current Musicology* 83 (Spring 2007): 85–108.

[24] Hugh Macdonald, *Berlioz's Orchestration Treatise: A Translation and Commentary* (Cambridge: Cambridge University Press, 2002), 330–31.

[25] Ibid., 319.

The idea of complete control is essential to Berlioz's conception of music: throughout his treatise, he stresses the difference between noise—which arises when instruments are badly managed—and power, which is the result of complete composerly control.[26] Ultimately, this points to a specific conception of musical instrumentality. By "instrumentality" I mean the relationship between music and those technologies that enable its production, and put more specifically, the modes of mediation at work in those technologies. I would like to suggest that the keyboard has represented a particular mode of instrumentality, namely one based on the idea of complete control. This mode undergirds our idea of the modern work: the concepts of *werktreue* and repeatability rest on the premise of a composer in technological control; the work concept requires obedient instruments, performers, and ultimately audience members and musicologists.[27]

The Bananaphone, or the Attempted De-Keyboardification of Keyboards

I want to suggest that the basic idea of what we think of as music is bound up with the interface of the keyboard. Contemporary practice provides us with a whimsical but powerful example. Currently one can purchase, for under $50, a kit known as the MaKey MaKey. This technology allows a user to convert any object capable of conducting a small amount of electricity into the equivalent of a key on a computer keyboard. The system involves attaching the MaKey MaKey unit via USB to a computer, grounding oneself with an alligator clip, and attaching additional clips to whatever objects one wishes to use. The attached objects become sound devices: a beach ball could transform into a high hat; a lump of clay could morph into an organ pipe. One need not use the attached objects to control sound—they could also be configured into gaming controls or anything else one might use a keyboard for—but currently the most popular use is to construct a musical instrument.

In February 2013, NPR ran a short online feature on MaKey MaKey technology. It included a video of the Brooklyn-based musician and artist Jonathan

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[26] I discuss these themes at length in my chapter "Abuses of the Orchestra," in *The Orchestral Revolution: Haydn and the Technologies of Timbre* (Cambridge: Cambridge University Press, 2013), 211–57.

[27] Philip Alperson has written on this subject in "The Instrumentality of Music," *The Journal of Aesthetics and Art Criticism* 66, no. 1 (2008): 37–51. In this piece, he set out, quite productively, to recover the ubiquity of instruments at every stage of musical production. By and large, his study does not take a historical perspective and so he does not consider the possibility of different forms of instrumentality flourishing in different contexts.

Dagan (alias j. viewz) first shopping for produce and then hooking his carefully chosen eggplants, carrots, strawberries, and mushrooms to the MaKey MaKey system. Every tap on each fruit or vegetable produced a sound, which he then modified and looped through his synthesizer, eventually creating a cover of Massive Attack's 1999 hit "Teardrop."[28] Watching Dagan pat strawberries that emit the sound of an electric harpsichord is magical and charming—if simultaneously a little absurd.

The charm lies in the recovery of the tactile: as the touch screens of tablets and smart phones flatten and smooth our experiences, reducing our engagement with interfaces to a tap or a swipe of a single finger, the MaKey MaKey allows us to rediscover texture in all of its three-dimensional sensuousness. One might argue that the creative power of MaKey MaKey lies in its power to liberate the user from the keyboard—both the piano and the qwerty kind. But it isn't truly a liberation, since the technology amounts to an interface for an interface, a façade. The objects attached to MaKey MaKey do not affect the nature of the sound produced—they are merely extensions of the computer. Unlike Hoffmann's imagined ideal instruments that would give forth the essence of their sounding material, the strawberries and eggplants do not reveal anything about their insides. Even so, one might argue that they do recapture some of the ancient magic Bloch missed in contemporary musical technology.

And yet a few searches on YouTube reveal something poignant: the immediate tendency for MaKey MaKey users is to recreate new kinds of keyboards out of the attached objects. Currently the bananapiano is a favorite. It makes some sense to do this: the keyboard renders music possible. Just as the keyboard helped make the Moog synthesizer accessible, ordering one's fruits into a rudimentary keyboard—and actively conceiving of them that way—helps transform random sound objects into something controllable. We might say that their ability to be musical is intimately tied with their "keyboard-ness."

But this leads us to what I think is a suggestive place: instead of thinking about music as a genus in which keyboard music exists as a species, perhaps it could be productive to think of the keyboard—here standing in for all immaculately controllable instruments—as the genus, while this thing we have come to know as music *as a species of keyboard*. This would be to say that instruments were never disenchanted along the lines that Bloch suggested. Rather, we have been completely enchanted by them; we have submitted to them in order to gain control, and that control makes possible this strange thing we call music.

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[28] http://www.youtube.com/watch?v=xvmTav3SYsc